1979

1979-1981 Catalog

University of Alabama in Huntsville

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Inquiries or complaints concerning the application to these federal requirements and this policy should be directed to one of the following persons:

Dr. Elmer E. Anderson
Academic Affirmative Action Officer
123 Madison Hall
The University of Alabama in Huntsville
Huntsville AL 35807 (205-895-6337)

Dr. Joseph C. Dowdle
Equal Employment Compliance Officer
131 Madison Hall
The University of Alabama in Huntsville
Huntsville AL 35807 (205-895-6350)

This catalog presents current information about the facilities, programs, requirements, and regulations of The University of Alabama in Huntsville. Students enrolling in the university are subject to all the provisions stated herein. Changes may be made, however, with respect to such information and provisions by the university at any time and without advanced notice.
## Class Periods

### Monday, Wednesday, Friday

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### Tuesday, Thursday

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## The UAH Term System

UAH operates on a system in which four identical terms, each spanning twelve weeks, constitute a calendar year. Credit for course work is granted in standard semester hour units.

## General Information Center

A General Information Center located in the lobby of Morton Hall is available to all students, prospective students, and the general public to obtain information about The University of Alabama in Huntsville.
# THE UNIVERSITY OF ALABAMA IN HUNTSVILLE
## CALENDAR 1979-1980

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- A — Application Deadline
- C — Commencement
- D — Drop Deadline
- N — No Classes
- S — Study Day
- B — Beginning of Classes
- E — Examinations
- R — Registration
- P — Period Classes are dismissed
- H — Holiday
- T — Three Days

**Staff Holidays:** Sept. 3, Nov. 22, 23, Dec. 21-23, Jan. 1, May 26, July 3, 4
# Academic Calendar 1979-1980

## Fall Term

<table>
<thead>
<tr>
<th>Event</th>
<th>Dates</th>
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<tbody>
<tr>
<td>Early Registration</td>
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<tr>
<td>Placement Tests</td>
<td>July 6 &amp; August 9</td>
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<tr>
<td>Orientation</td>
<td>July 11 &amp; August 16</td>
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<tr>
<td>Application Deadline</td>
<td>August 14</td>
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<tr>
<td>Registration</td>
<td>September 4</td>
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<tr>
<td>Classes Begin—8:00 a.m.</td>
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<tr>
<td>Late Registration</td>
<td>September 6 &amp; 7</td>
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<tr>
<td>Deferred Examinations (Summer Term)</td>
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## Winter Term

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<td>Placement Tests</td>
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<td>Application Deadline</td>
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<td>Thanksgiving Holidays</td>
<td>November 22-23</td>
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<td>Registration</td>
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<td>Deferred Examinations (Fall Term)</td>
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<td>Student Christmas Holidays</td>
<td>December 21-January 1</td>
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<td>Classes Resume—8:00 a.m.</td>
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## Spring Term

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## Summer Term

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**Notes:**
- A—Application Deadline
- C—Commencement
- N—No Classes
- B—Beginning of Classes
- E—Examinations
- R—Registration
- S—Study Day
- F—Staff Holidays
- "—R, S, & T Period Classes are dismissed

Staff Holidays: Sept. 1, Nov. 27, 28, Dec. 22-31, Jan. 1, 2, April 17

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE
CALENDAR 1980-1981
Academic Calendar 1980-1981

Fall Term

Early Registration .................................................... July 10-July 23
Placement Tests .......................................................... July 2 & August 7
Orientation ............................................................... July 9 & August 14
Application Deadline .................................................... August 12
Registration ............................................................. September 2
Classes Begin—8:00 a.m. .................................................. September 4
Late Registration ........................................................ September 4 & 5
Deferred Examinations (Summertime) ............................................. September 6
Examinations ............................................................. November 14, 17, 18, & 19

Winter Term

Early Registration .................................................... October 9-October 22
Placement Tests .......................................................... November 6
Orientation ............................................................... November 13
Application Deadline .................................................... November 10
Thanksgiving Holidays ..................................................... November 27-28
Registration ............................................................. December 1
Classes Begin—8:00 a.m. .................................................. December 3
Late Registration ........................................................ December 3 & 4
Deferred Examinations (Fall Term) ............................................. December 6
Student Christmas Holidays ................................................. December 22-January 2
Classes Resume—8:00 a.m. .................................................. January 5
Examinations ............................................................. February 26, 27, 28, & March 2

Spring Term

Early Registration .................................................... January 15-January 28
Placement Tests .......................................................... February 19
Orientation ............................................................... February 25
Application Deadline .................................................... February 16
Registration ............................................................. March 9
Classes Begin—8:00 a.m. .................................................. March 11
Late Registration ........................................................ March 11 & 12
Deferred Examinations (Winter Term) ............................................. March 14
Student Spring Holidays ...................................................... April 17
Examinations ............................................................. May 22, 25, 26, & 27
Commencement .......................................................... May 30

Summer Term

Early Registration .................................................... April 16-April 29
Placement Tests .......................................................... May 14
Orientation ............................................................... May 21
Application Deadline .................................................... May 15
Registration ............................................................. June 5
Classes Begin—8:00 a.m. .................................................. June 8
Late Registration ........................................................ June 8 & 9
Deferred Examinations (Spring Term) ............................................. June 13
Examinations ............................................................. August 17, 18, 19, & 20
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Statement of Purpose

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

Such membership requires constant attention to teaching, research, and interaction with the local, state, and regional communities. It demands a steady allegiance to the academic values; an atmosphere conducive to the unhindered pursuit of knowledge and the education of students primarily as thinking individuals. Basic to the establishment and maintenance of its identity as a true university is a strong program in the liberal arts and sciences, which continues to form the core of education. 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 1960, 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 student taking electives toward their M.D. degree from the University of Alabama School of Medicine. UAH's first full-time medical students began their core clinical experience at the Huntsville component of the University of Alabama School of Medicine in the fall of 1974. UAH is accredited by the Southern Association of Colleges and Schools.

This brief chronology indicates that the programs at UAH are still in the developing stages, a characteristic of viable programs in any university. UAH was brought into being 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 major in art, criminal justice, economics, education, 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 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 campuses offer components of the core Clinical Experience and the Individualized Experience.
The Division of Continuous Education offers credit and noncredit 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.

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.
The 337-acre campus of The University of Alabama in Huntsville is located in Northwest Huntsville adjacent to Research Park. The thirteen campus university buildings, all of which have been constructed since 1960, contain modern equipment and exemplify modern functional design. 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, the textbook store, and the General Information Center.

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 Kenneth E. Johnson Environmental & Energy Center and the environmentally related parts of the Departments of Biology, Chemistry, and Physics. The wing also houses the Alabama Solar Energy Center and the offices of the Alabama state climatologist.

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

Madison Hall (formerly the Graduate Studies Building) contains executive administrative offices, graduate classrooms, the Office of Graduate Studies, and the Departments of Mathematics and 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 Continuous Education Center, adjacent to Madison Hall, contains the administrative offices and classrooms of the Division of Continuous Education. The building also houses office space for the Director of Community & Governmental Relations and for the University Press.

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.

The Clinical Science Center in the Huntsville Medical District downtown contains the School of Primary Medical Care administrative offices and academic support services, including the Health Sciences Library and Office of Educational Resources. The building also houses the headquarters for the school's medical student and continuing medical education programs, classrooms, faculty offices, and research laboratories. Adjacent to the Clinical Science Center is the Ambulatory Care Center, which houses the university's patient care services, including the UAH Family Practice Center, faculty offices, and clinical support services. The building is the headquarters for the UAH-Huntsville Hospital Family Practice Residency Program.

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 only and are assigned on a date of application basis.

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 their junior year. Work completed in the senior year and confirmation of graduation will be reviewed before a student’s admission is final.

Application forms, detailed instruction as to how to apply, catalogs, and information brochures are available at the Office of Admissions and Records located in Morton Hall.

Admission to the Freshman Class

Plan A

High school graduates may be admitted as freshman 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 sixteen high school units in the following categories:

- Four units English
- One unit history or social studies
- One unit algebra
- One unit geometry
- Nine units of electives (at least five 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 Freshman

Applicant must submit:
1. Completed application forms.
2. Nonrefundable application fee of $15.00
3. Completed student medical form.

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

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

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

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

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 eighteen 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 eighteen 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 eighteen 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);
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 sixty-four 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 sixty-four hours to be applied toward a degree. Exceptions to the sixty-four 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 thirty 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 thirty semester hours at UAH.

Credit for engineering courses taken at schools accredited by the Engineers' Council for Professional Development (ECPD) is transferrable to UAH. Engineering courses taken in non-ECPD accredited institutions may also be applied toward a BSE degree based upon an appropriate examination (written or oral) at the discretion of the respective department. This will apply to courses taken after September 1, 1979. All inquiries concerning applicability of credit should be made to the UAH engineering department chairman where the course, or its equivalent, is being taught.

Application Procedure for Transfers

Applicant must submit:
1. Completed application forms.
2. Nonrefundable application fee of $15.00.
3. Completed student medical form.

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

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

An individual who has applied and who does not qualify as a regular transfer student may be admitted on probation as a special nondegree student. A transfer student enrolled in this category is subject to the same periodic review of his academic record as a regularly admitted student who is on scholastic probation. (See section on Academic Information.) If at such a
Admission of Irregular Postgraduate (IPG) Students

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

A student admitted in this category may take any course at the 500 level or below if he has met the prerequisites. In some instances, a student may, with the approval of the department chairman, take courses numbered 600 or above; however, credits earned in these courses while a student is classified as an IPG will not carry graduate credit.

A person whose application to the Graduate School has not been approved on the basis of quality point average and/or GRE score may apply for admission as an irregular postgraduate. Upon completion of twelve hours or more of advanced level courses with an average grade of B or better, a student may re-apply for admission to the Graduate School. Evaluation of the application will include the demonstrated performance in the advanced level courses. In this case, an applicant may be admitted provisionally if acceptance is recommended by the appropriate academic department.

Admission of Transient Students

See "Admission of Special Nondegree Students."

Admission of Audit Students

See "Admission of Special Nondegree Students."

Admission of Special Nondegree Students

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

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

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

Application Procedure for Special Nondegree Students

Applicant must submit:
1. Completed application forms.
2. Nonrefundable application fee of $15.00.
3. Completed student medical form.
No transcripts or other credentials are required. A special nondegree student must certify that he is:
1. A high school graduate or has a satisfactory score (50 or higher) on the GED.
2. Is not under current suspension from another collegiate institution.

Admission of Foreign Students

Foreign students are expected to meet all established requirements for admission from secondary 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:
1. Completed application forms.
2. Nonrefundable application fee of $15.00.
3. Completed student medical form.

In addition, he must request that:
4. Two official copies, in English, of secondary school and college/university transcripts be forwarded to The University of Alabama in Huntsville directly from the institution(s) attended. (DO NOT SEND PERSONAL COPIES.)
5. American College Test (ACT) scores be sent directly to UAH from ACT Headquarters. (ACT is not required of applicant who has earned more than eighteen semester hours of college work or was graduated from high school more than five years ago.)
6. Scores from the Test of English as a Foreign Language (TOEFL) be sent directly to UAH from Educational Testing Service.
7. A certified financial statement be submitted as evidence of sufficient finances to cover their university and personal expenses while attending The University of Alabama in Huntsville. In addition, a deposit of $1500.00 is required before an applicant will be considered for admission. The procedure for making this deposit is as follows:

Have a bank cashiers check drawn in U.S. dollars in the amount of $1500 made payable to The University of Alabama in Huntsville. Mail this check to the Office of Admissions and Records, The University of Alabama in Huntsville, 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.

8. Evidence be presented of a university approved health 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 academic term at those institutions before admission will be granted at UAH.

Graduate applicant must submit:
1. Completed application forms.
2. Nonrefundable application fee of $15.00.
3. Completed student medical form.

In addition, he must request that:
4. Two official copies, in English, of secondary school and college/university transcripts be forwarded to The University of Alabama in Huntsville directly from the institution(s) attended. (DO NOT SEND PERSONAL COPIES.)
5. Graduate Record Examination (GRE) scores be sent directly to UAH from Educational Testing Service.
6. Scores from the Test of English as a Foreign Language (TOEFL) be sent directly to UAH from Educational Testing Service.
7. A certified financial statement be submitted as evidence of sufficient finances to cover their university and personal expenses while attending The University of Alabama in Huntsville. In addition, a deposit of $1500.00 is required before an applicant will be considered for admission. The procedure for making this deposit is as follows:
   Have a bank cashiers check drawn in U.S. dollars in the amount of $1500 made payable to The University of Alabama in Huntsville. Mail this check to the Office of Admissions and Records, The University of Alabama in Huntsville, 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.
8. Evidence be presented of a university approved health 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.
Expenses per Term

ON CAMPUS*

Full-time students taking 8 to 12 semester hours (undergraduate) .................................................. $256.00
plus $26.00 per semester hour for each hour in excess of 12
Full-time students taking 5 to 9 semester hours (graduate) ................................................................. $259.00
plus $41.00 per semester hour for each hour in excess of 9

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

Part-time students taking less than 8 semester hours (undergraduate)
- Registration Fee (per term) .................................................. $ 3.00
- Course, Buildings, and Student Union Fees per semester hour .................................................. $ 32.00
- Student Activity Fee (per term) .................................................. $ 6.00
- Registration Fee for courses on semester basis .................................................. $ 4.50

Part-time students taking less than 5 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

*These fees do not apply to any short-term, off-campus, or noncredit offerings.

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.

In 1978 the university adopted a single payment system for fees. 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 nonpayment.

Students who are withdrawn for nonpayment will not be allowed to attend classes. They will have seven 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 .......................................................... $ 10.00
Addition of Course Fee ................................................... $ 10.00
Change of Course Fee ...................................................... $ 10.00

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.

Laboratory and Studio Instruction Fees

<table>
<thead>
<tr>
<th>Level</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$3.00</td>
</tr>
<tr>
<td>2</td>
<td>$10.00</td>
</tr>
<tr>
<td>3</td>
<td>$15.00</td>
</tr>
<tr>
<td>4</td>
<td>$20.00</td>
</tr>
<tr>
<td>5</td>
<td>$30.00</td>
</tr>
</tbody>
</table>

Late Payment Fee $10.00

Late Registration Fee (in addition to regular registration fee) $10.00

Returned Check Handling Fee (per check) $5.00

Any person who has as many as three non-negotiable checks returned to the university will not be allowed to cash a personal check or to pay obligations with a personal check. All transactions must be by cash or certified funds.

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 charged according to the withdrawal schedule below. All other applicable fees must be paid in full.

<table>
<thead>
<tr>
<th>Withdrawal</th>
<th>Charges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration fee $3.00</td>
<td>Withdrawal after registration is completed but before first class meeting of the course</td>
</tr>
<tr>
<td>Withdrawal fee $15.00</td>
<td>Withdrawal after late registration and before end of second week of classes</td>
</tr>
<tr>
<td>100% of basic fees</td>
<td>Withdrawal after second week of classes</td>
</tr>
</tbody>
</table>

Separate withdrawal schedules will be identified for other than full-term courses.

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

**School of Primary Medical Care**

General Fee (per term) $400.00

Out-of-State Residents (per term) $800.00
UAH Student Health Service Fee (per term) ........................................... $ 25.00
Hospitalization Insurance (per year) .................................................. Variable
Personal Liability Insurance (per year) .............................................. $ 25.00
Student Activity Fee (per term) .......................................................... $ 12.00
General Building Fee (per term) ....................................................... $ 30.00
Medical Building Fee (per term) ....................................................... $ 34.00
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 (exclusive of utility charges) are as follows:

<table>
<thead>
<tr>
<th>Type of Apartment</th>
<th>Furn.</th>
<th>Unfurn.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Bedroom Apartment</td>
<td>$188.00</td>
<td>$169.00</td>
</tr>
<tr>
<td>Private Apartment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Students per Apartment (private room)</td>
<td>$ 94.00 per person</td>
<td></td>
</tr>
<tr>
<td>Three Bedroom Apartment</td>
<td>$204.00</td>
<td>$186.00</td>
</tr>
<tr>
<td>Private Apartment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Students per Apartment (private room)</td>
<td>$ 68.00 per person</td>
<td></td>
</tr>
</tbody>
</table>

In addition to rental charges, residents are also responsible for paying part of their utility usage for each month.

Pre-School Learning Center

<table>
<thead>
<tr>
<th>Attendance Plan</th>
<th>Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan A—All day (full week)</td>
<td>$22.50 per week</td>
</tr>
<tr>
<td>Plan B—Half day (full week)</td>
<td>$15.00 per week</td>
</tr>
<tr>
<td>Plan C—All day (M-W-F)</td>
<td>$18.00 per week</td>
</tr>
<tr>
<td>Plan D—Half day (M-W-F)</td>
<td>$ 9.00 per week</td>
</tr>
<tr>
<td>Plan E—All day (T-Th)</td>
<td>$12.00 per week</td>
</tr>
<tr>
<td>Plan F—Half day (T-Th)</td>
<td>$ 6.00 per week</td>
</tr>
<tr>
<td>Plan G—Afternoon by the Hour</td>
<td>$.75 per hour (two-hour minimum)</td>
</tr>
</tbody>
</table>
The Division of Student Affairs provides services to individual students which facilitate the student's attainment of academic, cultural, social and personal goals; in addition, it coordinates and supports group activities and campus events which enhance the quality of student life at the university. The Division of Student Affairs also supports Student Government Association activities and programs, as well as interprets and administers the Student Judicial Code, which protects student rights and assists students in their awareness of student responsibilities. These student needs and interest 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.

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 interest, 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, 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 EOC office. Students desiring to tutor or be tutored may make application with the EOC counselor-coordinator at the EOC office, Room 216 Morton Hall or telephone 895-6450/6451.

**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 this office. Students are invited to browse at their leisure 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 Aids and Job Placement 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 Aids 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.

Students should make financial plans well in advance of entering the university, and are advised to write the Office of Financial Aids and Job Placement requesting a copy of the financial aids booklet at the same time application is made to the university. Applications for student aid should be filed at the Office of Financial Aids and Job Placement 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 Col-
lege 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 Office of Financial Aids and Job Placement 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 to $1000. Scholarship applications are available in the Office of Financial Aids and Job Placement. The deadline for receipt of applications is March 1.

The following scholarships are awarded annually:

Kelly Zettle Memorial Scholarship—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—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 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 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, but not to exceed $1,000.

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

Carl T. Jones Engineering Scholarships—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—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 tuition scholarships each year 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 of $600 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—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—created in honor of Dr. von Braun by his numerous friends and 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 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 of $375 awarded each year by the Huntsville Community Chorus Association. To be eligible, the student must be a full-time music student in voice, maintain a 1.8 quality point average on a 3.0 scale, be a regular participant in the Huntsville Community Chorus during the period of the award, and audition before a committee of the 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 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 Scholarship—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 fifty-nine credit hours but no more than ninety-one credit hours by the end of the term in which he is considered a candidate; have an overall quality 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—scholarship awarded each year by the Huntsville chapter of the Alabama Society of Professional Engineers to
a full-time freshman engineering student who has a minimum 2.0 grade point average. This fund provides a $200 grant that is awarded during the fall term following the award.

University of Alabama Huntsville Foundation Scholarships—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—an annual scholarship fund of $4000 provided by the Chesebrough-Ponds Corporation for the purpose of assisting deserving students.

Omicron Delta Epsilon Scholarship—awarded annually to a student majoring in economics. The recipient must have and maintain an overall average of 2.0 and have completed twelve hours in economics.

George W. Ditto Scholarship—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, nonrenewable 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—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 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 hand at the time of the granting, but not less than $300.

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

University Merit Scholarships—several full-tuition scholarships are awarded to students of sophomore through graduate status who demonstrate exceptional scholastic ability. Application is through the Office of Financial Aids and Job Placement. 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 who have demonstrated scholastic achievement, but who must pursue their educational objectives on a part-time basis due to the financial necessity of working full-time.

Economics Scholarship—established for a junior or senior student majoring in economics with a grade point average of 2.0. Recipient will be selected jointly by the faculty of the Department of Economics and the Dean of the School of Humanities and Behavioral Sciences.
State Nursing Scholarships

An act was passed by the Alabama Legislature in 1957 to provide scholarships for basic nursing education. These scholarships are 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.

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

Loans

Although it is sometimes necessary to borrow money 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—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—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.

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, Clinical Science 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 ninety days or until the end of the term whichever comes first. Applications are available from the Office of Financial Aids and Job Placement.

Grants

_Supplemental Educational Opportunity Grant_—provides aid to undergraduate students who would not, except for the grant, be financially able to attend college. A student must be accepted for enrollment, show evidence of academic promise, and be capable of maintaining good standing in his course of study. Grants may be renewed for the four years of undergraduate work, subject to the availability of funds 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_—assists in making available the benefits of postsecondary 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 postsecondary education. Grants are awarded for one year. The grants are renewable, but new applications must be made each year. All awards are determined by student eligibility requirements, available funds and student need. Students should contact the Office of Financial Aids and Job Placement for information regarding eligibility, application, selection and awards procedures.

Federal Financial Aids Repayment
Federally funded student financial aid (BEOG, SEOG, NDSL, FNSL) to a student who withdraws after registration but prior to the tenth (10th) day of an academic term will be repaid to the respective program source. When withdrawal or reduction of class load occurs after the tenth (10th) day of the term full tuition charges will be paid from the aid source and the unused proportion of the indirect aid will be repaid to the respective aid source. Specific regulations governing this policy may be found in the Student Financial Aids brochure which is available in the Office of Financial Aids and Job Placement.

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 Office of Financial Aids and Job Placement arranges student-employer interviews on the campus throughout the year. This office also maintains a career library of occupational information and company literature.

A complete and permanent personnel file, including a summary of college activities and confidential evaluations from faculty members, is established for each student who registers with this 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 ac-
tivities by providing the student practical experience in his 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 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 sixteen semester hours credit, including at least eight 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 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 Office of Financial Aids and Job Placement. 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 35801 or to the Director of Vocational Rehabilitation, Room 416, State Office Building, Montgomery, Alabama 36104.

**Miscellaneous**

Some business 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 Office of Financial Aids and Job Placement.

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 eight 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

Community Housing is available to full-time students, single and married. The two- and three-bedroom apartments, fully air-conditioned and carpeted, are located within walking distance of the campus. Furnished apartments include basic living room, dining area, and bedroom furniture. Monthly rates are shown in the Financial Information section.

Assignments are made on the basis of application date; the 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 Community Housing brochure and in the rental agreement which residents sign. Students interested are responsible for obtaining this sup-
plemental information and should apply at least one academic term in advance of enrolling. Application forms and additional information may be obtained from the Office of University Housing, The University of Alabama in Huntsville, P.O. Box 1247, Huntsville, Alabama 35807, 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 aids, 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 admissions 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. As an element in the Division of Student Affairs, the staff members are involved in advising several student groups. 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. 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**

A game room is 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 500 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.

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

Textbooks 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.

American Society of Mechanical Engineers (ASME)

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.

Campus Ministry Association

Chemistry Club

College Bowl Team
The College Bowl Team competes yearly in several intercollegiate contests of knowledge and quick recall and also sponsor 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 community. Past interests of the club have included disadvantaged youth, ecology, minority concerns, and drug education. Circle K holds weekly meetings and occasional social events.

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

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

The society meets twice a month to discuss current engineering developments and to participate in special programs of science and engineering enrichment. The meetings provide a common ground for communication between faculty and students leading to a more complete understanding of engineering practice. The Engineering Society also works with the Dean of the School of Science and Engineering in solving problems related to curriculum, class scheduling, professional licensing, and the like.
Episcopal Student Fellowship
The primary objective of the Episcopal Student Fellowship is to provide a ministry to any member of the university community who may have need of or desire Christian fellowship or counsel. Membership in ESF is open to any university student.

FOCAL (Art)

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.

Institute of Electrical and Electronic Engineers (IEEE)

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.

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

**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.

**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 mathematics.

**Medical Careers Association**

The Medical Careers Association is for students who intend pursuing a career in the health field, which includes premedical and predental students as well as those in nursing and allied health sciences. The purpose of the association is to help its members fulfill the entrance requirements of the various professional schools across the nation and to acquaint them with opportunities in the health fields. Interviews with and lectures by admission officers of professional schools, programs about the latest advances and opportunities in the health fields, and guidance in the selection of courses of study are some of the services provided by the association.

**Nursing Students’ Association**

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

**Political Science Club**

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

**Presbyterian Faith and Life Fellowship**

The Presbyterian Faith and Life Fellowship provides a ministry to any
member of the university community. Membership is open to any student interested in study, worship, or counseling in community life.

**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.

**The Society of Women Engineers**

**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.

**Academic Honors Societies**

**Alpha Epsilon Delta**

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

**Alpha Kappa Delta**

The Epsilon of Alabama Chapter of Alpha Kappa Delta was chartered by the National Sociology Honorary Society in the spring of 1976. It thus became the fifth chapter of this society in this state. Membership in Alpha Kappa Delta is limited to students who have maintained a high standard of excellence in their courses of study in sociology and who show serious interest in this academic field. The candidate for membership in the chapter must have completed at least 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.

Beta Beta Beta

The Mu Omega Chapter of the national honor society for biology was installed in May, 1978. The purpose of the society is to provide recognition for students of the biological sciences who achieve scholastic distinction. The society promotes an interest in and furthers the objectives of science. Active members are undergraduate majors who have completed three courses in biology with a B average.

Eta Kappa Nu (Electrical Engineering)

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 sixty-four semester hours (at least thirty-two 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 fifteen 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 twelve 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.

Phi Sigma Iota (Foreign Language)

Pi Tau Sigma (Mechanical Engineering)

Psi Chi

Psi Chi is a national recognition society for students in the field of psychology. The purposes of Psi Chi are to encourage, 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 twelve hours of psychology for a minor or fifteen 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 fifteen 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 and educational activities for the students and the alumni of the chapter as well as the entire university and civic community. Membership is open, by chapter invitation only, to English majors and minors of junior standing who have a 2.0 quality point average.

Sigma Theta Tau

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

**Tau Beta**
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 twenty-four credit hours at UAH and have either junior or senior standing. If the student is a junior, he 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 and complement the cultural interests of the students and the university community. Events are selected and managed by the UAS committee of students and faculty. Students are admitted free to events by picking up a ticket at the UAH Book Nook in advance of each event. An additional reduced price date ticket for each event may be purchased by all students at UAH. Also, 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 production 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 bandsmen who perform the best available music literature for wind ensemble and concert band. Rehearses Wednesday from 7:00 to 9:30 p.m. Attendance at all rehearsals and concerts required. By audition with conductor.

**Summer Band**

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

**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. Noncredit.

**Intercollegiate Athletics**

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

**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 at West Georgia, Livingston University and Kentucky State. The Chargers were 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 Women (AIAW). The team plays a regional schedule. At the end of the 1978-79 season the program moves from the small college division to the large college division of the AIAW.

**Rowing (Men and Women)**

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 University, Purdue University and Florida Tech. The crew participates in several major regattas each year during both fall and spring quarters. The 1972-73 lightweight four-oared crew won the Doc Bradley Trophy, symbol of the national small college lightweight championship.

**Soccer**

In its six 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, Quincy College, and Alabama A&M. 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, and was ranked seventh in the nation. In 1977 the Chargers finished second in Area 5 and was the host team for the NAIA National Soccer Tournament which was held at Charger Field in Huntsville. The 1978 Chargers were the Area 5 champions and advanced to the finals of the NAIA Soccer Championships before bowing to Quincy College in the championship game. The second place finish by the Chargers was the first time a southern team had advanced to the championship game.

**Tennis (Women)**

UAH initiated a women’s intercollegiate tennis team during the 1977-78 season. This team is affiliated with the AAIAW and AIAW and plays matches against teams throughout the Southeast.

**Club Sports**

**Rugby**

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

**Track**

A Track Club was established in the fall of 1977 to provide competitive run-
ning events open to all members of the university community. Noncompetitive 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, tennis, volleyball and racquetball.

**Fraternities and Sororities**

At present, there are six national fraternities and sororities on campus. The three fraternities are Alph 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 sixteen members 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. Squad membership is determined by a panel of judges during clinic and tryout sessions conducted each spring. All cheerleaders must be students who are currently enrolled as 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.
Commencement

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

Academic Advisement and Information Center

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

Freshman (students who have completed less than thirty semester hours of course work) are given first priority in requesting services of advisers. They are also required to visit the center at least once 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 freshman nursing students at the Nursing Building. All other undergraduates enrolled as special students must also have their schedules validated each term at the Academic Advisement and Information Center as long as they remain under this classification.

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.

A Campus General Information Center is located in the lobby of Morton Hall. It is available to all students, prospective students, and the general public to obtain information about The University of Alabama in Huntsville.

A bulletin board of all university activities on and off campus is maintained to keep interested persons aware of cultural and other activities connected with the academic community.

With proper identification, students may obtain a limited number of free
tickets to various cultural events on and off campus at this location.

The center may be reached by calling 895-6295.

Course Information

The courses to be offered each term will be announced in printed 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</th>
<th>Normally Takes Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>001-099</td>
<td>Refresher (noncredit)</td>
<td></td>
</tr>
<tr>
<td>100-199</td>
<td>Freshman</td>
<td></td>
</tr>
<tr>
<td>200-299</td>
<td>Sophomore</td>
<td></td>
</tr>
<tr>
<td>300-399</td>
<td>Junior (upper level)</td>
<td></td>
</tr>
<tr>
<td>400-499</td>
<td>Senior (upper level)</td>
<td></td>
</tr>
<tr>
<td>500-599</td>
<td>Advanced undergraduate credit; graduate credit awarded by permission.</td>
<td></td>
</tr>
<tr>
<td>600-799</td>
<td>Graduate (IPG and advanced undergraduate students only by special permission.)</td>
<td></td>
</tr>
</tbody>
</table>

Student Classification

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

<table>
<thead>
<tr>
<th>Semester Hours Earned</th>
<th>Freshman</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-29</td>
<td>Freshman</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-59</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-91</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>92 up</td>
<td></td>
<td></td>
<td></td>
<td></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. 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. Suspected violations of the Student Judicial Code should be reported to the Office of the Dean of Students.

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

Confidentiality of Records

The Family Educational Rights and Privacy Act of 1974 is a federal law which protects the confidentiality of student education records. 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 educational records or any personally identifiable information contained in them to other individuals or agencies. Disclosure to the following parties, however, is specifically excepted by the Privacy Act from this rule: (a) Administrative and academic personnel within the institution who have a legitimate educational interest; (b) officials of institutions in which the student seeks to enroll; (c) persons or organizations to whom the student is applying for financial aid; (d) accrediting agencies; (e) organizations conducting studies relating to tests, student aid programs, instruction, 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 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 nondisclosure 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 and Information Center.
3. Chairman, Nursing, Lower Division.
4. Director, Continuous Education.
5. Dean of Students.
6. Director, Medical Student Affairs.
7. Coordinator, Financial Aid and Job Placement.

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 Privacy Act have been
violated by the university may notify and request assistance from the Vice President for Academic Affairs and may file a complaint with The Family Educational Rights and Privacy Act Office, Department of Health, Education, and Welfare, Washington, D.C., 20201.

Marital, Parental, or Temporary Disability Status

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

Academic Loads

A full-time undergraduate student is one who is enrolled in courses totaling at least eight semester hours per term. The maximum number of semester hours in which a student will be permitted to enroll in one term is thirteen, including simultaneous correspondence courses. Under exceptional circumstances, permission may be granted by the dean of the school on which the student is enrolled to take additional hours. (Equivalents will be used for non-credit and audit courses.) A part-time undergraduate student is one who is enrolled in courses totaling one to seven 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 twenty 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 totaling six to ten 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. Students desiring to register for Chemistry 121 must (1) be placed in CH 121 from results of the Chemistry Placement exam, or (2) have taken CH 101 or its equivalent. A student who has had formal training in French, German, or Spanish is placed on the level of that language according to the number of units and grades earned in high school or is recommended to take a CLEP subject examination. Because they have a chance to earn from
three to nine hours of academic credit, some students who had two or more years in a language are urged to take a CLEP examination. Credit earned in this manner will satisfy in-class instruction hours as required by the Modern Language Department (see Modern Language section). If a student elects not to take the CLEP examination, he must begin on the level he has been placed. A student who takes a language other than the one in which he has had formal training will begin on level 101.

A student is required to pursue placement procedures only with regard to the aforementioned academic area and conditions. If a student has not received placement recommendations before enrollment, he should contact the Office of Counseling and Testing.

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.

The charge for the residual ACT examination is $9 and the Chemistry Placement examination is $3.

Credit By Examination

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

Advanced Placement Program

Several UAH departments will award credit to students who have earned a score of three or higher on Advanced Placement (AP) Program examinations of the College Entrance Examination Board. The areas in which credit is presently awarded are biology, English, French, mathematics, and Spanish. Credit, if awarded, will be recorded without grades or quality points.

College Level Examination Program

General Examinations

The General Examinations are objective tests that measure achievement in five basic areas of the liberal arts: English Composition, humanities, mathematics, natural sciences, and social sciences-history. 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. The student may be awarded six hours elective credit per examination. To achieve credit for any of the general tests, the student must score a minimum of 549. No credit is awarded for scores below 549. Credit is recorded without grades or quality points and is counted as elective credit only.
Subject Examinations

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

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minimum Score</th>
<th>For</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Government (with essay)</td>
<td>54</td>
<td>PSC 101</td>
</tr>
<tr>
<td>American History (with essay)</td>
<td>53</td>
<td>HY 221, 222</td>
</tr>
<tr>
<td>*Analysis and Interpretation of Literature (with essay) and College Composition (composite score)</td>
<td>60</td>
<td>EH 101, 102</td>
</tr>
<tr>
<td>College French, Levels 1 &amp; 2</td>
<td>37</td>
<td>FH 101</td>
</tr>
<tr>
<td>College French, Levels 1 &amp; 2</td>
<td>42</td>
<td>FH 101, 102</td>
</tr>
<tr>
<td>College French, Levels 1 &amp; 2</td>
<td>48</td>
<td>FH 101, 102, 201</td>
</tr>
<tr>
<td>College German, Levels 1 &amp; 2</td>
<td>36</td>
<td>GN 101</td>
</tr>
<tr>
<td>College German, Levels 1 &amp; 2</td>
<td>38</td>
<td>GN 101, 102, 201</td>
</tr>
<tr>
<td>College Spanish, Levels 1 &amp; 2</td>
<td>44</td>
<td>SH 101</td>
</tr>
<tr>
<td>College Spanish, Levels 1 &amp; 2</td>
<td>35</td>
<td>SH 101, 102</td>
</tr>
<tr>
<td>College Spanish, Levels 1 &amp; 2</td>
<td>39</td>
<td>SH 101, 102, 201</td>
</tr>
<tr>
<td>Elementary Computer Programming-Fortran IV</td>
<td>54</td>
<td>EG 196</td>
</tr>
<tr>
<td>General Chemistry (must first take placement exam)</td>
<td>48</td>
<td>CH 121, 123, 125, 126</td>
</tr>
<tr>
<td>Introductory Accounting</td>
<td>48</td>
<td>AC 211, 212</td>
</tr>
<tr>
<td>Introductory Business Law</td>
<td></td>
<td>BUS 321</td>
</tr>
<tr>
<td>Introductory Macroeconomics</td>
<td>55</td>
<td>EC 142</td>
</tr>
<tr>
<td>Introductory Microeconomics</td>
<td>55</td>
<td>EC 143</td>
</tr>
<tr>
<td>Introductory Sociology</td>
<td>54</td>
<td>SOC 100</td>
</tr>
<tr>
<td>Statistics</td>
<td>57</td>
<td>HBS 231</td>
</tr>
<tr>
<td>Western Civilization (with essay)</td>
<td>56</td>
<td>HY 101, 102</td>
</tr>
</tbody>
</table>

51
*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 six hours credit for English 101 and 102. Note that no credit is allowed unless both examinations are taken.

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

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

**UAH Credit By Department Examination**

Computer Science .................................................. All Courses
Mathematics .......................................................... MA 104, 105, 119, 121, 143, 151, 153, 154, 233
Modern Languages .................................................. Contact Department Chairman
Music ................................................................. MU 101, 102, 103, 110, 201, 202, 311, 312
Nursing ............................................................... Contact Nursing Advisement Office
Philosophy ............................................................ PHL 102, 220
Sociology ............................................................... All courses except 100, 231, 390, and 401
(Contract Department Chairman)

For further information concerning CLEP or the AP program 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 begins, 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 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 credit courses and receives a grade other than W or S.
Class Attendance

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

A student’s final grade in each course is determined on the basis of identified course requirements; therefore, regular class attendance 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 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 at the beginning 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 eight 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 eight 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 eight semester hours are completed, be designated as an Honor Scholar.

For this purpose, a part-time student’s work will be considered in blocks that do not overlap.

Scholar

An undergraduate student earning eight 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 eight 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 eight semester hours are completed, have his named placed on the list of Scholars.

For this purpose, a part-time student’s work will be considered in blocks that do not overlap.
Honors at Graduation

A student graduating at the bachelor's level with a quality point average of 2.20 up to 2.50 will be graduated With Honor; a student with a quality point average of 2.50 up to 2.80 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 eight 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 eight 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 eight 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>Quality Point Average</th>
<th>If Overall* Quality Point Average Is</th>
<th>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>Probation Removed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1.0 and</td>
<td>1.0 or higher or 7 or less</td>
<td>Probation Continued</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1.0 and</td>
<td>Less than 1.0 and More than 7</td>
<td>Suspension</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**Including transferred deficiencies.

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

When a student within the University of Alabama system is suspended the second time for scholastic reasons, he is disqualified for readmission. After a
period of one year he may petition 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 Point.) 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 twelve 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. Conditions governing the granting of permission include the following:
1. The student must be a full-time student or a full-time university employee who is a part-time student.
2. The course desired must be unavailable at the student’s home institution.
3. Visiting students are limited to one undergraduate course per term at the host institution except where the second course is a laboratory required to accompany the first course or the second course is a one hour course in basic military science.
4. The student must have an overall C average.
5. The student’s request must be approved by his advisor and other appropriate personnel.
6. Permission of the host institution is dependent upon availability of space for the visitor after its own students are accommodated.

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

**Reserve Officers Training Corps (ROTC)**

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

**Application for Graduation**

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

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

**Second Bachelor’s Degree**

A student who holds a bachelor’s (or higher) degree from another institution and who wishes to earn a second bachelor’s degree at UAH, must request a detailed evaluation of his previous record before he may officially declare a major. The program for the second bachelor’s degree must meet all requirements imposed on transfer students (e.g., hours in residence, upper level hours, appropriate major and minor or cognate studies, 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 twenty-five percent
of the total degree requirements for the second degree. The second degree must include a new major. The student must meet all other applicable requirements for the degree. Excess credits earned while pursuing the first degree are not applicable to the second degree.

**Time Limits**

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

**Transcripts**

Official transcripts are issued and sent by the Office of Admissions and Records to recognized institutions and agencies which require such documents. Transcripts are issued only upon the 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 2967, University, Alabama 35486.

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

**Undergraduate Schools’ Majors and Degrees**

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

The undergraduate academic programs of The University of Alabama in Huntsville are administered by 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
- Education
- English
- French
- German
- History
- Music
- Music Education
- Political Science
- Psychology
- Slavic Studies
- Sociology

Other areas with course offerings are: American Studies, Communications, Linguistics, Philosophy, Russian, Spanish, 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, Education, Mathematics, Mathematics Education, Physics.

Bachelor of Science in Business Administration—Accounting, Finance, Management, Marketing.

Bachelor of Science in Engineering—Unified Programs with professional specializations.

Bachelor of Science in Nursing—Unified Professional 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 twenty-five percent of the total requirements and twelve of the last eighteen hours must be completed at UAH. Also, unless otherwise specified by the department involved, a minimum of twelve semester hours of upper level courses (numbered 300 or above) must be completed at UAH in a student’s AOC (six hours in his major and six hours in his minor or cognate studies). (AOC is defined on pages 59-60.) A minimum of thirty percent of the total degree requirements must be taken in courses numbered 300 or above.

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

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

Outline of Requirements for Programs Leading to BA and BS Degrees

1. General Education Phase
   The general education phase provides the foundation for liberal learning and includes writing, literature, history, social science, natural sciences, mathematics, and foreign 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 sixty-four 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></td>
<td></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>
</tbody>
</table>

(See section entitled Modern Foreign Languages.)
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 education section for certification requirements.)

a. Six hours mathematics; eight hours one laboratory science.
b. Eight hours in each of two laboratory sciences.
c. Three hours mathematics; eight hours one laboratory; four hours another laboratory science.
d. Three hours mathematics; twelve 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>
<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, Psychology, Philosophy, or Sociology (one discipline)</td>
<td>6</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>6-12</td>
</tr>
</tbody>
</table>

(See section entitled Modern Foreign Languages.)

**Science-Mathematics**

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

II. The Area of Concentration (AOC)

The Area of Concentration (AOC) is that part of the student’s undergraduate degree program comprised of the major and minor or major and cognate studies. The upper limit which the university may require in the AOC is sixty-four 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 sixty-four 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: thirty-six (including fifteen upper level, with a minimum of six 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 twenty-one semester hours (six upper level, with a minimum of six upper level at UAH) in a single department or program in which the minor is taken. A minimum of six hours (usually two courses) must remain to be taken at the time the minor is approved. Its development can be visualized as vertical similar to that of the major, but at less depth. Individual departments or programs 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 twenty-one (including nine upper level, with a minimum of six 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 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 twelve hours of electives must be chosen from disciplines not included in the AOC.
Requirements for Programs Leading to BSBA, BSE, and BSN Degrees

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

Professional Preparatory Programs

Prelaw Program

To be admitted to an accredited law school, the student must have a bachelor's degree, an acceptable score on the Law School Admissions Test (LSAT), and, in most cases, an accumulative grade-point average of B or better. The LSAT should be taken in 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 prelaw program at The University of Alabama in Huntsville, the student will find that the best preparation during the first two years is through the completion of the general education requirements. The Statement on Prelegal Education of the Association of American Law Schools notes that "What law schools seek in their entering students is not accomplishment in mere memorization but accomplishment in understanding, the capacity to think for themselves, and the ability to express their thoughts with clarity and force." The prelaw student therefore must develop perception and skill in the English language, insight into the institutions and values with which people are concerned, and the power to think clearly, carefully, and independently. Since these skills are fostered by the general education requirements, completion of them should be the primary concern of the beginning prelaw student.

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

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

Premedical and Predental Programs

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

Competition for admission to medical and dental schools is 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 nonscience courses to include six (preferably twelve semester hours in English. It is recommended that students complete twelve 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 ninety 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 preprofessional health programs (predentistry, premedicine, preoptometry, preveterinarian medicine) are encouraged to contact the Preprofessional 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 BS degree. (See Biology Curriculum VII or Chemistry Curriculum VI.) Upon the completion of all other university requirements, a maximum of twenty-nine semester hours of elective credit, earned through the medical technology internship, may be applied toward the BS 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. 208). The program includes basic science courses, most of which would normally be included in the curriculum; a core of four courses in ecology, climatology and meteorology, geology and hydrology, and pollution problems; and any two of several advanced environmental science and engineering courses. In completing the program the student also satisfies the requirements for an undergraduate minor in environmental science.
The 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 the 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, education, English, finance, French, German, history, management, marketing, music, political science, psychology, Slavic studies, or sociology. In addition to these majors, courses are offered in Russian, Spanish, philosophy, communications, physical education, American Studies, and linguistics. Students majoring in the behavioral sciences may also choose a supporting minor in law enforcement 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 twenty-one 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 twenty-one 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 twenty-one 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 of 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 description are listed in this section.

Administrative Science Program
A Master’s Degree Program
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 twenty-one semester hours in a core curriculum and twelve hours in a specialized option, except in the Education Administration option which requires eighteen credit hours in a core curriculum and eighteen 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 244 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**  
Principles of organizational structure, planning and forecasting, directing, controlling, staffing, decision-making, communication, and how these relate to each other in a comprehensive sense. Prepares the student for higher level administrative science courses.

**622 Human Behavior in Organization**  
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. Deals with the problem of the selection, training, promotion and severance of organizational members.

**623 Complex Organizations**  
Survey. Basic theories of organizations and organizational structures. Considers organizations from the perspectives of management, psychology, sociology, political science and economics. Explores organizations as groups of people and as systems existing in multiple environments. Analyzes goals, resources, effectiveness, equilibrium and change as they relate to organizations. Studies the administration's relationships with the organization, emphasizes organizational research and assessment.

**624 Organizational Planning, Direction, Coordination and Control**  
Major administrative functions of planning, directing, coordinating and controlling in an organizational setting. Investigates forecasting and planning objectives and techniques. Evaluates different styles of directing and their effectiveness. Studies coordination and control methods and their purpose. Identifies and discusses the relationship between planning, direction, coordination and control.

**625 Labor Relations and the External Environment**  
Survey relationships between management and organized labor and between organizations and the world outside their confines. Reviews the development of organized labor in the U.S. and major legislation affecting relations between management and labor. Covers the collective bargaining process and administration of the resulting contract, as viewed from the standpoint of management and labor. Evaluates the effects of the social, economic, political and technological environments on labor relations and upon the organization's relations with the external environment. Considers the impact of the public and the news media upon management actions.

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

**627 Quantitative and Research Methods in Administrative Science**  
Basic assumptions and techniques used in social science research. Enables 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 nonparametric tests of hypothesis, estimation techniques and analysis of associations (regression and correlation).
Elective Courses

629 Leadership and Motivation 3 hrs.
Analyse various authority and leadership styles and their effectiveness in different types and levels of organization. Evaluate theories of personnel motivation and their practicability and effectiveness. Consider 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.
Examine traditional as well as contemporary theories of the purposes, functions, and processes of personnel administration. Study the personnel administration needs of large, complex organizations in both the private and public sector. Consider elements of a comprehensive personnel program in relation to the total management of an organization.

632 Civil Systems Planning 3 hrs.
Illustrate the values and dangers inherent in currently used planning methods and predictive models. Apply specific techniques and planning situations for solving social problems through integration of purely technical information with that of economics, sociology, psychology and political science. There will be a mixture of classroom work and laboratory visits to community agencies.

633 Socio-Economic Consequences of Government Procurement 3 hrs.
Analyse 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 twenty-four 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 twenty-one semester hours in a core curriculum and twelve hours in an option, except in the Education Administration option, which requires eighteen credit hours in a core curriculum and eighteen hours in the option. Normally, a student will acquire twelve hours of credit in one of the following designated options. 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 (or departmental waivers), 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 601, ED 602, ED 606, ED 647, ED 648, Ed 649
Electives: ED 600, (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, PSC/PA 500

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

American Studies Program

The minor in American Studies is an interdisciplinary program designed to acquaint students with important features of American culture and civilization. Stressing a multi-faceted approach, American Studies provides an opportunity for the student to develop analytical skills applicable to a wide range of situations, both past and contemporary. American Studies also offers the student a chance to utilize imaginative resources, as well as scholarly ones, by combining objectivity and personal interests in a coherently organized group of courses developed by the student and an advisor. In American Studies, by explicitly drawing upon materials and theory from economics, sociology, and political science to elucidate various aspects of American culture, and by using appropriate literary materials to capture sense and feeling as well as facts, students can learn the habit of seeing human problems and events in a cultural context and come to appreciate the interrelatedness of human and scholarly endeavor.

All American Studies minors must be drawn up in consultation with a member of the American Studies Committee; they will be countersigned by the program director as well as the advisor in the major field. It is recommended that plans be made as early as possible in the student’s career, so that the problems generally encountered with prerequisites in interdisciplinary work can be anticipated and avoided.

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

Each minor program developed by a student and faculty advisor will reflect a core theme or interest area of the student. Programs can be planned by drawing from the wide variety of courses concerning aspects of American civilization in the UAH catalog. Advisors can provide students with a summary list of such courses and can discuss model programs which illustrate some of the ways in which appropriate minors can be designed.

American Studies (AMS)

201 Introduction to American Studies 3 hrs.
Concepts and methods involved in the interdisciplinary study of American culture through analysis of a central theme in the American experience. Offered every spring; required for all minors. Prerequisite: Sophomore standing.

301 Special Topics in American Studies 3 hrs.
Elective offering developed by members of constituent departments in American Studies and approved by the American Studies Committee. Each course focuses upon a specific period or topic and explores its meaning and significance in an interdisciplinary framework. Prerequisite: AMS 201 or permission of instructor.

401 Seminar in American Studies 3 hrs.
Seminar. Discuss themes studied in the minor; subject matter to vary depending upon interests and program of students in each year's class. Prerequisite: Open only to students who have a minor in American Studies and senior standing.

Art Department

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.

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

All of the studio courses require supplies to be secured by the student 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 twelve semester hours of art courses numbered 300 or above at UAH. A student having a cluster in art must take at least eight semester hours of this work at UAH.

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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.

While work is progressing on an art curriculum expressly for nonmajors, students are encouraged to consider various level art courses as electives. The development of one's human faculties and understanding through art is universally recognized.

Area of Concentration (AOC) with Art Major

Two basic patterns have been established for the degree candidate in art: 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 sixteen courses (forty-eight 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 (twenty-four 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 (twenty-four semester hours)—A specialty should be chosen and an AOC Declaration completed by the beginning of the junior year. In the junior year all three of the courses at the 300 level in the specialty should be completed.
  Communication Graphics 330, 331 and either 332 or 333
  Sculpture (choose three of the following 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 twenty-one hour minor or group of cognate studies outside art is required.

Lower Division Program (twenty-seven 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 Program (eighteen 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 BA 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 two major programs are as follows:

Program I—Class B Secondary Certificate to teach art.

General Education Requirements .................................. 51 or 57 hours

English (EH 101, 102, 205, 206) .......................... 12 hours
Speech ......................................................... 3 hours
History (HY 101, 102) ..................................... 6 hours
Foreign Language ........................................... 6 to 12 hours
Social Sciences (one discipline) ............................ 6 hours
Psychology ................................................. 3 hours
Science .......................................................... 12 hours
Mathematics .................................................. 3 hours
Major Requirements (Art)

Lower Division ........................................... 21 hours
six hrs. of art history, ARH 100 and 101, fifteen hrs. of studio
(five 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
three hrs. of art history at the 300 level, ARS 370 and fifteen
hrs. (five courses) in studio, including at least two areas in addition to
painting. Printmaking ARS 382 or ARS 383 is recommended.

Education Major Requirements 30 hours
(See Education Department Section)

Electives 12 hours

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 twelve hours upper division courses)
Art history ................................................... 15 hours
(including six hours upper division courses)
ARS 215 ..................................................... 3 hours

Education Major Requirements 30 hours
(See Education Department Section)

Total requirements for this program: 141-147 hours

Program 3—Major in Elementary Education with Art as Secondary Area.

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

To meet university requirements a minimum of eighteen hours, fifteen of
which must be upper level, are to be selected from courses listed below with the
help of the art education faculty advisor and approved by the chairman of the
Department of Art. This curriculum may require more than the minimum total
of 128 hours for the degree.

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 excep­
tional 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 six additional hours above the requirements for graduation. Plan II may be followed in two ways: (a) Independent study six 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) six additional semester hours of work in art history may be scheduled by the studio major, or six 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 twenty-one semester hours, six 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, nineteenth century photographs, Victorian leaded glass windows, sculpture in a variety of media, prints and paintings, the state juried exhibition, fiber arts, and laser works.

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

Some of the recent guests have been sculptors: Lyman Kipp, Jason Seley, Kenneth Snelson, Frank Gallo, Duane Hanson, and Kosso Eloul. The laser artist Rockne Krebs and neon sculptor Stephen Antonakos were also 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.
Consider architecture, painting, sculpture and decorative arts of the ancient and medieval worlds in relation to the environment and the social conditions of the times.

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

109 Art Appreciation for Nonmajors 3 hrs.
Acquaints the nonart major with the problems of how to review a work of art. Emphasis 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.
Encompasses the primary fundamentals of analytical and intuitive work in dot, line, and plane on the pictorial surface.

121 Color in Design 3 hrs.
Investigate 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 3 hrs.
Three-dimensional form and space in clay; practice mold-making and casting techniques and the use of hydrocal materials as a constructive material.

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

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

161 Drawing with Fluid Media 3 hrs.
Use inks, washes, oils, gouache, airbrush, batik and related media.

162 Drawing with Light-On-Dark Media 3 hrs.
Use light drawing materials, (charcoal, pastels, oil paint) with strong emphasis on representation and nonlinear perspective. Especially useful in preparation for oil painting.

163 Drawing with Collage 3 hrs.
Assemble preformed visual materials. Develop skills in handling color, form, texture, fantasy, realism, and theory without the necessity of developing manual skills.

165 Photography for Drawing and Design 3 hrs.
Understand and practice 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 3 hrs.
Investigate 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 3 hrs.
Intaglio, planographic and relief printmaking techniques with emphasis on drawing and design as applicable to these processes.
215 Art for Elementary Teachers
Art methods and media for elementary school teachers by lecture, demonstration, discussion, reading and studio experience.

Upper Division

300 Colonial and Nineteenth Century American Art
Visual arts in America prior to World War II. Look at such figures and movements as Thomas Jefferson, Whistler, Frank Lloyd Wright and the Hudson River School. 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.

304 Twentieth Century Art
Investigate the origins and development of art since 1890. Special attention is given to such figures and movements as Picasso, Matisse, Dada, Jackson Pollock, the Bauhaus and contemporary trends. Prerequisite: ARH 100 and 101 or approval of instructor.

306 Baroque Art
The development of Baroque and Rococo Art in Europe, with special attention given to such artists as Rubens, Bernini, Rembrandt, Velasquez and Poussin. Prerequisite: ARH 100 and 101 or approval of instructor.

309 Period Styles in Interior Design
Survey 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.

310 Nineteenth Century Art in Europe
The development in European Art from 1760 to 1890. Investigate the roles of such artists as van Gogh, Cezanne, Caspar David Friedrich and Goya, in addition to such movements as Impressionism and Realism. Prerequisite: ARH 100 and 101 or approval of instructor.

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

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

332 Illustration in Black and White
The design and production of one color art for the print media using ink, ink wash, pencil and commercial drawing materials and techniques. Gain publication experience in offset and letterpress. Prerequisite: ARS 120, 160 and 167 or approval of instructor.
Illustration with Color 3 hrs.
Design and prepare full color imagery for the mass media. Experience gouache, colored ink, and acrylic mediums. Examine graphic arts production techniques needed for color reproduction. Prerequisite: ARS 120, 121, 161 or approval of instructor.

Sculptural Use of the Thermoset Plastics 3 hrs.
Sculptural manipulation of thermoset resins and foams. Prerequisite: ARS 140, or approval of instructor.

Sculptural Use of the Thermoplastics 3 hrs.
Manipulation of thermoplastics by bonding, dying, forming, and welding. Prerequisite: ARS 140, 141, or approval of instructor.

Sculpture: Investment Casting 3 hrs.
The lost-wax method of producing cast metal sculpture. Create sculpture in wax; the investment of these waxes in refractory molds and casting in bronze and aluminum constitutes the major emphasis of this course. Prerequisite: ARS 140, 141 or approval of instructor.

Sculpture Workshop 3 hrs.
Explore 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.

Sculpture: Carving 3 hrs.
Manipulation of three dimensional forms via the subtractive technique. Work in both stone and wood. Prerequisite: ARS 140 or 141 or approval of instructor.

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

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

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

Painting 3 hrs.
Paint 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.

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

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

Graphics: Planographic Printmaking 3 hrs.
Beginning studio practice in lithography. Prerequisite: One of ARS 160, 161, 162, 163, or approval of instructor.
382 Graphics: Relief Printmaking 3 hrs.
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.

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 3 hrs.
Photo gravure techniques. Prerequisite: ARS 121 and one of ARS 160 or 162 or approval of instructor.

385 Graphics: Color Intaglio Printmaking 3 hrs.
Various color intaglio methods. Includes a presentation of stencil, multi-plate, reduction and viscosity techniques. Emphasizes the development of the unique aspects of the color image. Prerequisite: ARS 120 and one of ARS 160 or 162 or approval of instructor.

386 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.
Discuss and research 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, 300 or 306 or approval of instructor.

401 Art History Seminar: Modern Art 3 hrs.
Discuss and research 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 310 or approval of instructor.

402 Art History Seminar: American Art 3 hrs.
Discuss and research 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 300 or approval of instructor.

403 Trends in Post-1945 Art 3 hrs.
Investigate in-depth contemporary developments in the visual arts. Prerequisite: ARH 100, 101, and 304 or approval of instructor.

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
Individual content by consultation. Prerequisite: Senior standing.
3 hrs.

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

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

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

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

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

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

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

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

490 Independent Study
Independent study in art history leading to a presentation of a research paper at 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.
3 hrs.

491 Independent Study
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.
3 hrs.

495 Technical Problems
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.
1-3 hrs.

500 Special Problems in Art History
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.
1-3 hrs.

Business Administration Department

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.

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 forty-five to forty-seven semester hours of
General Education Requirements, complete an approved Area of Concentration (AOC) and take a minimum of twelve 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.

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

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

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

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

Course descriptions for the above are located under the respected departments.

General Education Requirements

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English Composition (EH 101-102 or EH 103-104) .......</td>
<td>6</td>
</tr>
<tr>
<td>Basic Speech Communication (CM 113) ..................</td>
<td>3</td>
</tr>
<tr>
<td>College Algebra (MA 105 or Level II Placement) .......</td>
<td>3</td>
</tr>
<tr>
<td>Humanities (Maximum of six hours in one discipline)</td>
<td>15</td>
</tr>
<tr>
<td>Art, Communications (other than CM 113), Foreign Language, Literature, Music, Philosophy, or History</td>
<td>9</td>
</tr>
<tr>
<td>History or Literature (two courses in one discipline required)</td>
<td>6</td>
</tr>
<tr>
<td>Social Sciences (Maximum of six hours in one discipline)</td>
<td>12</td>
</tr>
<tr>
<td>Political Science, Psychology, or Sociology</td>
<td></td>
</tr>
<tr>
<td>Science and Quantitative Studies ........................</td>
<td>6-8</td>
</tr>
<tr>
<td>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)</td>
<td>3</td>
</tr>
<tr>
<td>Total 45-47</td>
<td></td>
</tr>
</tbody>
</table>

Electives 29-24
Area of Concentration—Major Options. The following courses are required in all major options:

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 100 or CS 113 Introduction to Computing</td>
<td>3</td>
</tr>
<tr>
<td>EC 142 Principles of Economics I</td>
<td>3</td>
</tr>
<tr>
<td>EC 143 Principles of Economics II</td>
<td>3</td>
</tr>
<tr>
<td>AC 211 Principles of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 212 Principles of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301 Principles of Finance</td>
<td>3</td>
</tr>
<tr>
<td>MGT 385 Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>MGT 301 Principles of Management</td>
<td>3</td>
</tr>
<tr>
<td>MKT 301 Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>HBS 231 Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUS 321 Business Law</td>
<td>3</td>
</tr>
<tr>
<td>BUS 420 Business Policy</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional Requirements for each major option are as follows:</td>
<td></td>
</tr>
</tbody>
</table>

**Accounting (AC)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC 313 Income Tax I</td>
<td>3</td>
</tr>
<tr>
<td>AC 314 Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 310 Intermediate Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 311 Intermediate Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>AC 312 Intermediate Accounting III</td>
<td>3</td>
</tr>
<tr>
<td>AC 415 Advanced Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 431 Auditing I</td>
<td>3</td>
</tr>
<tr>
<td>AC 432 Auditing II</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>24</td>
</tr>
</tbody>
</table>

**Finance (FIN)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 352 Money and Banking</td>
<td>3</td>
</tr>
<tr>
<td>FIN 375 Financial Institutions</td>
<td>3</td>
</tr>
<tr>
<td>FIN 362 Security Analysis and Portfolio Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN 431 Managerial Finance and Policy Determination</td>
<td>3</td>
</tr>
<tr>
<td>FIN 550 Seminar in Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 554 International Finance</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

**Management (MGT)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGT 361 Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MGT 363 Personnel: Human Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>MGT 430 Business and Society</td>
<td>3</td>
</tr>
<tr>
<td>MGT 362 Management and Labor Relations</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Six Hours From the Following:</td>
<td></td>
</tr>
<tr>
<td>MGT 520 International Management</td>
<td></td>
</tr>
<tr>
<td>MGT 570 Seminar in Management</td>
<td></td>
</tr>
</tbody>
</table>

83
MGT 405 Small Business Management ........................................ 6

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 twenty-one semester hours. It is recommended that the following courses be included in the twenty-one 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>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 113</td>
<td>Introduction to Computing</td>
<td>3</td>
</tr>
<tr>
<td>BUS 321</td>
<td>Business Law</td>
<td>3</td>
</tr>
<tr>
<td>AC 211</td>
<td>Principles of Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 212</td>
<td>Principles of Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>AC 310</td>
<td>Intermediate Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>AC 311</td>
<td>Intermediate Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>AC 312</td>
<td>Intermediate Accounting III</td>
<td>3</td>
</tr>
<tr>
<td>AC 313</td>
<td>Income Tax I</td>
<td>3</td>
</tr>
<tr>
<td>AC 314</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 415</td>
<td>Advanced Accounting</td>
<td>3</td>
</tr>
<tr>
<td>AC 431</td>
<td>Auditing I</td>
<td>3</td>
</tr>
</tbody>
</table>
One of the following:
AC 432 Auditing II
AC 417 Government Accounting
AC 323 Income Tax II .................................................. 3

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

### Business (BUS)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>231</td>
<td>Statistical Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Collection, classification, and presentation of data, measures of central tendency, and dispersion, introduction to probability distribution and sampling theory, confidence limits and tests of significance, chi-square and “t” distribution. Prerequisite: MA 105, or its equivalent, or the approval of the instructor. (Same as HBS 231.)</td>
<td></td>
</tr>
<tr>
<td>311</td>
<td>Computer Applications in Economics and Business I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Same as CS 311.</td>
<td></td>
</tr>
<tr>
<td>321</td>
<td>Business Law I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>322</td>
<td>Public Policy Toward Business</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Same as EC 322.</td>
<td></td>
</tr>
<tr>
<td>325</td>
<td>Intermediate Economic and Business Statistics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Same as EC 325.</td>
<td></td>
</tr>
<tr>
<td>331</td>
<td>Business Law II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Partnerships, corporations, legal problems of business organization, insurance, security devices, personal property, real property, leases, trusts and estate administration. This course acquaints the student with business organization and various problems affecting the enterprise. Recommended for Accounting Majors.</td>
<td></td>
</tr>
<tr>
<td>411</td>
<td>Computer Applications in Economics and Business II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Same as CS 411.</td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>Business Policy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Integrates the principles and methods acquired in the core curriculum of business strategy, policy, and management action. Analyses comprehensive business cases; provides opportunity to acquire and develop skills in diagnosing and solving complex business problems. Prerequisite: Senior standing and completion of all core courses.</td>
<td></td>
</tr>
<tr>
<td>490</td>
<td>Special Projects</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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 problems. Prerequisites: Senior standing and approval of the department chairman.</td>
<td></td>
</tr>
</tbody>
</table>

### Accounting (AC)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>211</td>
<td>Principles of Accounting I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A basic conceptual and practical approach to the art of accounting; emphasizes recording, measuring, and communicating the accounting data of business entities. Develops data creation and accumulation on the basis of the double-entry theory. Covers the develop-</td>
<td></td>
</tr>
</tbody>
</table>
Principles of Accounting II 3 hrs.
Basic external financial statements, with particular attention to the special accounting problems of partnerships and corporations; an introduction to management accounting, with emphasis on the development and interpretation of cost and revenue data for purposes of management decision-making. Prerequisite: AC 211.

Intermediate Accounting I 3 hrs.
Detailed theoretical and practical treatment of financial accounting. Topics include introduction to accounting theory; professional accounting and other organizations and their contributions to accounting theory and practice; review of the accounting model and information processing; an in-depth analysis of the income and retained earnings statements; review of the balance sheet; concepts of future and present value; and, fair value and price-level accounting. Prerequisite: AC 212.

Intermediate Accounting II 3 hrs.
Continued in-depth theoretical and practical treatment of selected accounting topics covering the balance sheet classifications of assets and liabilities. Current assets; investments; property, plant and equipment; intangible assets; other assets; current liabilities; long-term debt; contingent liabilities; and, interperiod tax allocation. Prerequisite: AC 310.

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

Income Tax I 3 hrs.
Determination of taxable income, business and nonbusiness deductions, and selected aspects of tax accounting for individuals and businesses. Prerequisite: AC 311.

Cost Accounting 3 hrs.
Development of the role and importance of cost and revenue data; includes study of the various cost systems applicable to the process of management decision-making. Prerequisite: AC 212.

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

Advanced Accounting 3 hrs.
Study specialized accounting topics including partnerships, business combinations, international operations, corporate liquidation and reorganization, estates and trusts, and governmental accounting. Prerequisite: AC 312.

Governmental (Fund) Accounting 3 hrs.
Study the broad field of fund accounting at the state and local government level; special accounting principles, budgeting, accounting for the various funds and account groups, reporting requirements and auditing. Prerequisite: AC 311.

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

Auditing I 3 hrs.
Study the conceptual foundations of auditing practice. Basic auditing concepts, including professional ethics, independence, and due audit care. Auditing of electronic data process-
ing systems, statistical sampling, legal liability, and standards of reporting. Prerequisite: AC 311, HBS 231.

432 Auditing II  
Practical application of auditing concepts and standards. Students are carried through a hypothetical audit of a selected business centered around a practice case. Covers in depth actual audit steps required in each phase of the annual examination; includes initial client contact, the engagement letter, review of internal controls, the audit program, compliance testing, substantive testing of the various accounts, working paper form and technique, proper documentation, closing the audit, assembling the financial statements, adequate disclosure, opinion, exit client conference, and other related topics. Prerequisite: AC 431.

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

460 Controllership  
Develop an appreciation of the interrelationship of managerial accounting and analytical, behavioral and technological considerations in the analysis and design of planning and control systems. Investigate the goals of firms and organizational structures for specifying system requirements. Discuss and evaluate the component elements of these systems against the system requirements and the present, and consider future roles of management accounting within the scope of management information and control systems. Case studies are used for illustration. Prerequisite: AC 314.

470 Seminar in Contemporary Issues of Accounting  

540 Managerial and Financial Accounting  
Survey. Accounting principles from the viewpoint of management; income measurement; analysis and interpretation of accounting data; internal reports. Not available to anyone who has taken more than three credit hours of accounting. Prerequisite: Senior or graduate standing.

Finance (FIN)

260 Personal Finance  
Review 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  
Study finance in the operation and organization of business enterprise; 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 economics 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. Examine and study the principles underlying security selections, timing and diversification to achieve optimum balance for various investment goals. Prerequisite: FIN 301.
375  Financial Institutions  3 hrs.
Study the role and activities of financial intermediaries in the capital formation process. Examine the capital markets in which these institutions operate. Prerequisite: FIN 301.

431  Managerial Finance and Policy Determination  3 hrs.
Analyze the function of the financial executive through advanced cases in financial management. 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  3 hrs.
Study administration, fiscal importance and economic effects of state and local finances. Emphasis on the recent trends in state and local revenue and expenditure and their significance. Prerequisite: EC 142. Same as EC 452.

Graduate and Undergraduate Credit

550  Seminar in Finance  3 hrs.
Seminar. Extensive readings and reports reflecting current developments and trends in the area of financial theory and their application to the decision-making process. 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  3 hrs.
Study 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, senior or graduate standing, or approval of department.

590  Monetary and Credit Policy  3 hrs.
Analyse 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. Prerequisite: Junior standing or approval of the department.

361  Organizational Behavior  3 hrs.
A behavioral science and social systems approach to the behavior of people at work in organizations. Behavioral decision-making, organizational 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.

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

385  Operations Management  3 hrs.
An introduction to the management of the production/operations function in business organizations; covers production systems design considerations, production planning, production control, inventory control, quality control, and maintenance and includes applicable quantitative methods. Prerequisite: MGT 301 and HBS 231.
405  Small Business Management  
Study the principles and practices of modern management as applied to the start-up operation and control of small business firms. Also, examine the role of small businesses in the economy. Identify and analyse opportunities and operational problems of small firms. Prerequisite: MGT 301.

430  Business and Society  
Identify and discuss power influence in the American business system. Look at some of the problems which have developed historically as well as some of the difficulties present in today's business environment; evaluate these in light of how they could have been avoided with proper recognition of responsibilities. Same as MKT 430. Prerequisite: MGT 301, MKT 301.

440  Honors: Small Business Counseling  
A practical exposure to the problems and opportunities of small business firms. Student teams are assigned as a counseling unit to assist local business managers with the identification of problems and the formulation of alternative solutions, as well as the identification of areas of opportunity within the organization. Students selected for this honors course must have demonstrated ability to understand and apply the knowledge gained from several disciplines to the day-to-day operations of the business enterprise. Prerequisite: Approval of SBI Director.

Graduate and Undergraduate Credit

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

570  Seminar in Management  
Treatment of selected topics in management. Prerequisite: Senior or graduate standing or approval of instructor.

Marketing (MKT)

301  Principles of Marketing  
Functional, commodity and institutional approaches are integrated and studied from the viewpoint of the consumer and the marketing manager. Prerequisite: Junior standing or approval of the department.

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

342  Promotional Strategy  
Examine the promotional techniques available to marketing management. Become acquainted with consumer behavior and with the communication process providing the means by which products can be effectively promoted. Examine the specific tools of personal selling, advertising, sales promotion, and publicity as components of overall promotional strategy. Prerequisite: MKT 301.

343  Market Research  
Understand 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; to the concept of marketing information systems; and to the role of marketing research in such systems. Prerequisite: MKT 301, HBS 231.

345  Market Channel Structure and Strategy  
Study marketing channels as a functional area and the alternative choices available to marketing management in developing over-all marketing strategy. Attention given to institutional structures and the dynamic interrelationships in distribution logistics. Prerequisite: MKT 301.
410 Marketing Management  3 hrs.
Management of the marketing function of the firm: determination of objectives, organization and controls for the effective utilization of marketing resources in a coordinated effort with other major functional areas. Identify and select market opportunities, formulate competitive strategies and develop marketing policies and programs. Prerequisites: Senior standing and fifteen hours in marketing.

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

415 Sales Management and Professional Salesmanship  3 hrs.
Combines and integrates the techniques and concepts of professional selling with the problems of sales management. Establishes and evaluates objectives and policies for sales managers concerning managing the sales force and methods of marketing analysis in terms of sales forecasts and sales budgeting. In-depth study of the problems faced by sales management in the area of competition, pricing, and promotion. Prerequisite: MKT 301.

416 Retailing Policy and Management  3 hrs.
The policies, practices and problem solutions in the efficient operation of both chain and independent retail stores. Includes the study of such problem areas as store location, organizational layout, merchandise planning and control, buying, pricing and promotion. Prerequisite: MKT 301.

430 Business and Society  3 hrs.
Identify and discuss 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.
Examine 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 effect of national differences in business practices and regulation. Prerequisite: Fifteen 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 & Linguistics Program (see English Dept.)
Criminal Justice Program (see Political Science Dept.)

Economics Department

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 twenty-one semester hours of core courses (in addition to EC 142-143) which include the following: EC 310, 340, 341, 345, 352, 448. In addition to these courses, the student can take an additional fifteen 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:
An example of an AOC for a degree in economics for students interested in entering the labor force may be:

HBS 231 Statistical Analysis .......................................................... 3
EC 310 Introduction to the Use of Mathematics in Economics .............. 3
EC 322 Public Policy Toward Business ............................................. 3
EC 325 Intermediate Statistics ......................................................... 3
EC 340 Macro Economic Analysis .................................................... 3
EC 431 History of American Economic Growth .................................. 3
EC 345 Micro Economic Analysis .................................................... 3
EC 352 Money and Banking ........................................................... 3
EC 430 Advanced Economic and Business Statistics ........................... 3
EC 460 Problems in Economics ....................................................... 3
EC 448 Development of Economic Theory ......................................... 3
EC 585 Comparative Economic Systems .......................................... 3

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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

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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) twenty-one semester hours of appropriate
courses offered in the Economics Department including six 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 twelve semester hours, six of which must be in courses numbered 300 or above.

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

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>With Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EC 142 Principles of Economics ................. 3</td>
</tr>
<tr>
<td></td>
<td>EC 143 Principles of Economics .................. 3</td>
</tr>
<tr>
<td></td>
<td>HBS 231 Statistical Analysis ..................... 3</td>
</tr>
<tr>
<td></td>
<td>EC 352 Money and Banking .......................... 3</td>
</tr>
</tbody>
</table>

**And any three of the following five courses**

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

21

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>With History or Political Science</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EC 142 Principles of Economics .... 3</td>
</tr>
<tr>
<td></td>
<td>EC 143 Principles of Economics .... 3</td>
</tr>
<tr>
<td></td>
<td>EC 322 Public Policy Toward Business .. 3</td>
</tr>
<tr>
<td></td>
<td>EC 341 History of American Economic Growth .. 3</td>
</tr>
<tr>
<td></td>
<td>EC 344 European Economic History ....... 3</td>
</tr>
<tr>
<td></td>
<td>EC 353 Public Finance ................. 3</td>
</tr>
<tr>
<td></td>
<td>EC 585 Comparative Economic Systems ........ 3</td>
</tr>
</tbody>
</table>

21

<table>
<thead>
<tr>
<th>Semester Hours</th>
<th>With Psychology or Sociology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EC 142 Principles of Economics .... 3</td>
</tr>
<tr>
<td></td>
<td>EC 143 Principles of Economics .... 3</td>
</tr>
<tr>
<td></td>
<td>EC 322 Public Policy Toward Business .. 3</td>
</tr>
<tr>
<td></td>
<td>EC 325 Intermediate Statistics ........ 3</td>
</tr>
<tr>
<td></td>
<td>EC 341 History of American Economic Growth .. 3</td>
</tr>
<tr>
<td></td>
<td>EC 430 Advanced Economic and Business Statistics .... 3</td>
</tr>
<tr>
<td></td>
<td>EC 585 Comparative Economic Systems ........ 3</td>
</tr>
</tbody>
</table>

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**Economics for Second Area of Study**

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

To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the
help of the economics education faculty advisor and approved by the Chairman of the Department of Economics. This curriculum may require more than the minimum total of 128 hours for the degree.

**Economics (EC)**

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

142 **Principles of Economics I** 3 hrs.
Economic analysis and its application in investigating the economic functional relation between business, consumers, and government. 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.
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.

231 **Statistical Analysis** 3 hrs.
Collection, classification, and presentation of data, measures of central tendency and dispersion, introduction to probability distribution and sampling theory, confidence limits and tests of significance, chi-square and "t" distribution. Prerequisite: MA 105, or its equivalent, or the approval of the instructor. Same as HBS 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. 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.
Survey 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 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 select 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: HBS 231 or its equivalent. Same as BUS 325.

340 **Macro Economic Analysis**

3 hrs.

Comprehensive study of the national economy 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.

Survey the origins of basic economic institutions in Europe; study in detail 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.

Examine the economic principles underlying value and distribution with additional training in the application of these principles to problems of analysis. Prerequisite: EC 143, EC 310 or its equivalent.

352 **Money and Banking**

3 hrs.

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

353 **Public Finance**

3 hrs.

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

400 **The Soviet Economy**

3 hrs.

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.

411 **Computer Applications in Economics and Business II**

3 hrs.

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

430 **Advanced Economic and Business Statistics**

3 hrs.

Review 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.

448 **Development of Economic Theory**

3 hrs.

Study the historical development of economic thought from ancient times to the nineteenth century and from early modern times to present. Prerequisite: EC 345, 340.
452  State and Local Finance  3 hrs.  
Study administration, fiscal importance and economic effects of state and local finances with emphasis on the recent trends in state and local revenue and expenditure and their significance. Prerequisite: EC 142. Same as FIN 452.

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

Graduate and Undergraduate Credit

510  Survey of Economic Theory  3 hrs.  
Rigorous treatment of basic principles underlying economic theory. Topics: Theory of national income determination, theory of market structures, principles of value and distribution theory. Prerequisite: Approval of instructor.

546  International Economics and Trade  3 hrs.  
Theoretical principles underlying international trade with 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 noneconomic majors.

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

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

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

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

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

630  Evolution of Economic Thought  3 hrs.  
Methodology and social philosophy of outstanding economists, and their part in shaping economic development. 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 noneconomic majors.

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

Education Department

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 as early as the freshman year. The student will also be required to counsel with an advisor from another approved academic department in order to coordinate planning of the program of study.

The Elementary-Secondary Certification Programs (Grades 1-12) are available only in art and music. The specific requirements in these two areas are set forth elsewhere in the appropriate sections of this catalog.

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; 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 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 an advisor in the department of the student’s second area of study.

A student’s second area of study determines whether he is working toward a BA or a BS 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 (ARS 215)</td>
<td>3</td>
</tr>
<tr>
<td>Music for the Young Child (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 (six hours from one discipline)</td>
<td>6</td>
</tr>
<tr>
<td>Economics, History, Political Science or Sociology (a minimum of three 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 BA degree a student should select one of the following options:

1. Eight hours in biology or a physical science and four hours in the second area | 12 |
   Three hours in mathematics | 3 |

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

For a BS degree:

   Eight hours in biology and eight hours in chemistry or physics | 16 |
   Nine hours in mathematics | 9 |

66-72

**Area of Concentration (AOC)**

**Major Area of Study: Elementary Education**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED 230</td>
<td>Human Development</td>
<td>3</td>
</tr>
<tr>
<td>ED 261</td>
<td>Foundations of Education in the United States</td>
<td>3</td>
</tr>
<tr>
<td>ED 263</td>
<td>Educational Psychology</td>
<td>3</td>
</tr>
<tr>
<td>ED 300</td>
<td>Group Processes</td>
<td>1-3</td>
</tr>
</tbody>
</table>
ED 360  Diagnostic and Prescriptive Teaching  ......................... 3  
ED 372  Teaching the Social Studies  (3)  
ED 373  Teaching the Natural Sciences (3)  Choose two  .......... 6  
ED 374  Teaching of Arithmetic  (3)  
ED 375  Teaching of Reading  ........................................ 6  
ED 371  Language Arts  (3) or  
ED 400  Literature for Children & Adolescents (3)  Choose one  .... 3  
ED 491  Student Teaching in the Elementary School  ............. 9  

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

A student planning to teach in an elementary field must select an 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.

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.

128-131*

*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. Upon successful completion of the program the student is eligible for the Alabama Class B Secondary Professional Teachers Certificate.

General Education Requirements

<table>
<thead>
<tr>
<th>Humanities &amp; Behavioral Sciences</th>
<th>Semester Hours</th>
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<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>
</tbody>
</table>
Economics, Political Science, or Sociology (six hours from one discipline) .................................................. 6
Psychology (PY 103) .................................................. 3

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

For a BS degree:*
   Eight hours in biology and eight hours in chemistry or physics .......... 16
   Nine hours in mathematics ..................................... 9

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 major in the School of Science and Engineering are biology, chemistry, mathematics, mathematics education, 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 fields will not exceed thirty-six hours.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Area II: Professional Education Program</td>
</tr>
<tr>
<td>ED 261 Foundations of Education in the United States .......... 3</td>
</tr>
<tr>
<td>ED 263 Educational Psychology .................................. 3</td>
</tr>
<tr>
<td>ED 388 Teaching Secondary School Subjects ..................... 3</td>
</tr>
<tr>
<td>ED 408 Teaching Reading in the Secondary School ............... 3</td>
</tr>
<tr>
<td>ED 490 Principles of High School Teaching (Seminar) ........... 3</td>
</tr>
<tr>
<td>ED 497 Secondary Student Teaching ............................... 9</td>
</tr>
<tr>
<td>Advised Electives (choose any two)</td>
</tr>
<tr>
<td>ED 325 Sociology of Education .................................. 3</td>
</tr>
<tr>
<td>ED 360 Diagnostic and Prescriptive Teaching .................... 3</td>
</tr>
<tr>
<td>ED 375 Teaching of Reading ..................................... 3</td>
</tr>
<tr>
<td>ED 410 Foundations of Educational Evaluation .................. 3</td>
</tr>
<tr>
<td>ED 500 Special Problems in Education ............................ 3</td>
</tr>
<tr>
<td>ED 549 Educational Media ....................................... 3</td>
</tr>
</tbody>
</table>

........................................ 30
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)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>Career Exploration</td>
<td>1 hr.</td>
<td>Educational and vocational planning. Prerequisite: Nine hours college credit and placement tests.</td>
</tr>
<tr>
<td>263</td>
<td>Educational Psychology</td>
<td>3 hrs.</td>
<td>Psychological principles basic to an understanding of the learner, the learning process, and the learning situation. Prerequisite: PY 103 and sophomore standing.</td>
</tr>
<tr>
<td>325</td>
<td>The Sociology of Education</td>
<td>3 hrs.</td>
<td>A sociological approach to the study of education as a social institution, its structure, function and role in contemporary life. Prerequisite: SOC 100 or approval of instructor. Same as SOC 325.</td>
</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 MU 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. Prerequisite: MU 103, 110 or permission of instructor. (Students in teacher certification program should utilize ED prefix.) Same as MU 327.</td>
</tr>
<tr>
<td>410</td>
<td>Foundations of Educational Evaluation</td>
<td>3 hrs.</td>
<td>Provides the prospective teacher with an in-depth look at the measurement process with a special emphasis on its relation to the problems of educational evaluation. Evaluation will be presented as an integral part of overall educational planning in addition to its use in the measurement and evaluation of academic achievements.</td>
</tr>
<tr>
<td>411</td>
<td>Guidance for Teachers</td>
<td>3 hrs.</td>
<td>The sociological, psychological, and philosophical bases for guidance in schools.</td>
</tr>
<tr>
<td>456</td>
<td>Mental Health in the School</td>
<td>3 hrs.</td>
<td>Dynamics of behavior, the recognition of minor maladjustments, the criteria for referral and classroom practices supporting good mental health. Prerequisite: ED 263 or equivalent and junior standing.</td>
</tr>
<tr>
<td>467</td>
<td>Tests and Measurements</td>
<td>3 hrs.</td>
<td>Survey of standardized and teacher-made evaluation instruments.</td>
</tr>
</tbody>
</table>
500 Special Problems in Education
1-3 hrs.
Independent study, special projects, and special in-service programs. Prerequisite: Senior standing.

502 Environmental Education
3 hrs.
The general nature of ecological life systems; relationships of humankind and environment; major conservation problems facing the world today; exploration of alternate solutions; the tasks for educators.

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

Elementary Education

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

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.
Consider 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.
Examines the major principles of group dynamics and their effective use in education. Informal group counseling experiences to help gain a better understanding of self and others are an integral part of the course methodology. (Enrollment for less than three hours credit only with permission of instructor.)

360 Diagnostic and Prescriptive Teaching
3 hrs.
Analyzes and determines the strengths and deficiencies of a student in an academic area and subsequently devises a program which will enhance strengths and remediate weakness. Both group and individual processes are explored. Prerequisite: ED 263, junior standing, and admission to teacher education program.

Note: ED 371 thru 375 includes a minimum of sixteen 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 art 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.
Stresses 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.
Examination, design, and evaluation of experiences for teaching mathematics in elementary school. Modern trends in mathematics education. Prerequisite: ED 360.
Teaching of Reading 3 hrs.
Materials and methods in teaching reading with emphasis on skill and development, both developmental and remedial techniques, and planning of reading programs.

Literature for Children and Adolescents 3 hrs.
Illustrates the relationship between developmental stages and the literature that young people find relevant at various stages of growth, and develops 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. Prerequisite: None.

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.

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.

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.

Teaching Reading in the Secondary School 3 hrs.
Provides knowledge of certain basic developmental and remedial reading skills, practices, and concepts. Extends those learned in previous, more fundamental reading courses and shows 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.) Survey special reading programs such as Remedial Reading and reading instruction as practiced in Special Education. Prerequisite: Junior standing.

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

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

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

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

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.

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

A Master of Arts degree in developmental learning is described on pp. 104-05. 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.

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

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

602 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.

603 Sources of American Educational Thought 3 hrs.
The foundations of education as seen in their philosophical, historical, social, and/or comparative aspects. Describes major relationships of schools and educative processes with society at large, pointing to the development of particular crucial issues.

604 Contributions of Psychology to Education 3 hrs.
Principles, theory, and practice of psychology for teaching and administrative service in educational institutions. Focuses on the factors that determine learning, the conditions of effective teaching, the administrator and supervisor as the organizer of the milieu wherein teaching, learning and growth occur.

606 Principles of Curriculum Development 3 hrs.
Principles of curriculum construction which underlie the reorganization of the program of studies for elementary and secondary schools; origin and background of the curriculum; methods of organization; curriculum planning and development; and pertinent applications.

608 The Educational Leader as Evaluator 3 hrs.
Procedures and techniques of empirical evaluation including a sampling of available instruments; and research approaches complementary to the course AS 627 (Quantitative Methods of Management). 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.
Instruction in development 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 Program

A Master's Degree Program

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 six credit-hour core curriculum, DL 610 and DL 630 (plus DL 593 if certification is desired) as well as at least fifteen credit hours in a specialization and three 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. Twenty-one hours are required for certification in learning disabilities. DL 593, DL 602, DL 604, DL 606, DL 630, DL 650, and DL 627. A prerequisite to the Class A certificate is eligibility for a Class B Professional Certificate.

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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</th>
<th>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>
</tr>
<tr>
<td>601</td>
<td>Early Childhood Development</td>
<td>3 hrs.</td>
</tr>
<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>
</tr>
<tr>
<td></td>
<td>Comprehensive study of symptoms and learning theory as related to children with learning problems. Includes observation and participation practicum.</td>
<td></td>
</tr>
<tr>
<td>603</td>
<td>Sensory-Motor Readiness in Children</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Provides an understanding of the necessary early learning process in children from birth to six years of age; techniques and sequential approaches to sensory-motor training on a developmental basis presented. Includes participation practicum.</td>
<td></td>
</tr>
<tr>
<td>604</td>
<td>Adaptive Academics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Provides a sequential and veridical approach to making adaptations in academic areas so that programs can be developed to serve individuals who can best learn through adaptive and concrete procedures. 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>Structuring environments for optimum developmental learning. Curriculum models will be surveyed. Includes observation practicum.</td>
<td></td>
</tr>
<tr>
<td>606</td>
<td>Language Development</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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; diagnosis and remediation of related deficiencies; and other related topics for the regular and special education teacher. Same as ED 609.</td>
<td></td>
</tr>
<tr>
<td>610</td>
<td>Interdisciplinary Aspects of Intervention</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
<tr>
<td>625</td>
<td>Diagnostic Procedures: Advanced Psychometrics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Psychometric theory and psychological tests. In the first phase of the course, psychometric issues such as standardization, validity, reliability and theory of testing will be covered. The second phase will survey standardized tests in the areas of intelligence, psychomotor assessment, personality, etc. Includes observation practicum. Prerequisite: HBS 231.</td>
<td></td>
</tr>
<tr>
<td>626</td>
<td>Diagnostic Procedures: Selected Tests For Preschoolers</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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. Prerequisite: DL-603.</td>
<td></td>
</tr>
</tbody>
</table>
627 Diagnostic Procedures: Selected Tests For School-Age Children 3 hrs.
Advanced practicum in administration, interpretation and use of selected tests for elementary school children. A minimal level of competency will be defined which all students will be required to master. Prerequisite: DL 604.

628 Human Learning Theory 3 hrs.
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 principle of the learning problems of children and adults will be studied.

629 Behavior Modification 3 hrs.
Basic psychological principles concerning the control of human behavior and current theoretical experimental research in the field of behavior modification.

630 Statistics and Methodology 3 hrs.
Research Methodology includes an overview of experimentation, simple data presentation normal probability vs. non-normal distributions, correlation, and reliability and validity. Examines both the concept and actual work-type situations. Prerequisite: HBS 231.

631 Diagnostic Procedures: Stanford-Binet, Wechsler 3 hrs.
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; HBS 231 or DL 630, DL 625, DL 626 or DL 627, and permission of instructor.

632 Diagnostic Procedures: Wechsler 3 hrs.
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: HBS 231 or DL 630, DL 625, DL 626 or DL 627, and permission of instructor.

640 The Family in a Changing Society 3 hrs.
Study 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.

644 Advanced Studies in Socialization 3 hrs.
In-depth survey and critical analysis of comparative theories of socialization. Particular emphasis on how theoretical constructs may be transformed into effective child training practices.

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

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

699 Master's Thesis 3 hrs.
Required each term a student is working and receiving direction on his master's thesis. A minimum of two terms required. A maximum of nine hours of credit is awarded upon successful completion of the master's thesis.

Program Alternatives
Learning Disabilities for a Teacher (Leads to Class A Certification)
Core: DL 593, 610, 630.
Professional Specialization: DL 602, 604, 606, 625 or 626, 627, 650.
Early Childhood Learning
Core: DL 610, 630.

Early Childhood for Handicapped
Core: DL 610, 630.

Psychometrics for School or Clinical Diagnostician (Leads to Licensing)
Core: DL 610, 630.

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
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 Department
English Major
The requirements for a major are twenty-four to thirty-three semester hours of upper-division courses in addition to the twelve 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>3</td>
</tr>
<tr>
<td>American literature (EH 330, 331, 430, 431, 432/532, 433/533)</td>
<td>3</td>
</tr>
<tr>
<td>Literature before 1800</td>
<td>6</td>
</tr>
<tr>
<td>Literature after 1800</td>
<td>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 twelve semester hours of upper division English courses (numbered 300 or above) at UAH. No more than three 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 Eighteenth Century (for example EH 380, 381, 470, 492)
   III. Nineteenth 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 twenty-one semester hours, six 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 twenty-one semester hours, of which nine 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 twenty-one semester hours of which at least three must be taken in courses numbered 400 or above, identified as follows:

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Courses (general education requirements in composition and literature)</td>
</tr>
<tr>
<td>Shakespeare (EH 360)</td>
</tr>
<tr>
<td>One course chosen from Groups I, II, or III as listed in requirements for English major</td>
</tr>
<tr>
<td>Electives in English</td>
</tr>
</tbody>
</table>

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

**English for Second Area of Study**

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

To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the help of the English education faculty advisor and approved by the Chairman of the Department of English. This curriculum may require more than the minimum total of 128 hours for the degree.
Graduate Program

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

1. Eighteen semester hours of graduate work in English, six hours of which may be transferred credit approved by the department Graduate Committee.
2. Six additional semester hours of elective graduate courses in English or a related subject approved by the Graduate Committee.
3. At least 50% of the hours offered for the degree (exclusive of thesis credit hours) in courses numbered 600 or above, and at least nine hours in English courses at UAH numbered 600 or above (exclusive of thesis credit hours).
4. Master's thesis, required for a minimum of two terms. Upon petition to and approval by the departmental Graduate Committee, a student may substitute nine hours of graduate English courses for the thesis.
5. A minimum of thirty hours for a student attending full-time for three or more terms; otherwise, thirty-three hours. A maximum of nine 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 thirty-three hours is required: twenty-four hours in English, nine 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 sixty 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 probationally. See section on School of Graduate Studies in this catalog.

English (EH)

003 Remedial Writing

Required of students whose placement test score or class performance indicates the need of remedial work.

No credit
101 Freshman Composition 3 hrs.
Emphasis on theme writing, including at least one documental 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.
Reading literature, especially prose fiction; writing about it and the way it treats central humanistic concerns of western civilization. Required of and open only to students whose placement test score indicates superior ability. Prerequisite: Placement.

104 Advanced Freshman Composition 3 hrs.
Reading literature, especially drama and poetry; writing about it and the way it treats central humanistic concerns of western civilization. Required of and open only to students whose placement test score indicates superior ability. 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 twentieth 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 1-3 hrs.
Study 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.
Restoration and Early Eighteenth Century
Dryden, Swift, Pope, and others.

Later Eighteenth Century
Johnson, Boswell, and others.

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

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

English Linguistics
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.

History of the English Language
Diachronic study of the English language from the pre-Anglo-Saxon period to the modern English period. Analysis of the phonological, morphological, syntactic, and semantic changes 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.

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

Modern Poetry
Major movements in American and British poetry of the twentieth century. Prerequisite: Junior-senior standing.

Modern Drama
Major ideas and forces which originated new movements in drama from Ibsen to the present.

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

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

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

William Faulkner
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 Seventeenth Century
Milton's minor poems, selected prose, and Paradise Lost, studied with reference to the seventeenth-century context.
471 English Drama 3 hrs.
From the beginnings to 1642, exclusive of Shakespeare. Prerequisite: Junior-senior standing.

492 The English Novel 3 hrs.
Defoe to Jane Austen: Critical reading of representative novels, accompanied by historical study of the emergence of the genre.

493 The English Novel 3 hrs.
Dickens through Hardy: Critical reading of representative novels, accompanied by historical survey of major trends.

Major novelists 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.

500 Literary Criticism 3 hrs.
Major theories and methods, with application by student. Prerequisite: Senior standing.

530 Special Studies in American Literature 3 hrs.
Intensive study of one or more writers, groups, or movements, announced in advance. Prerequisite: Junior-senior standing.

540 Special Studies in English Literature 3 hrs.
Intensive study of one or more writers, groups, 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.

500 Literary Criticism 3 hrs.
507 English Linguistics 3 hrs.
508 History of the English Language 3 hrs.
511 Library Research 1 hr.
520 Modern Poetry 3 hrs.
Major movements in British and American poetry of the twentieth century. Selected readings in the more important criticism.

530 Special Studies in American Literature 3 hrs.
532 Southern Renaissance 3 hrs.
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.
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
Current debate against the background of earlier theory and practice. 3 hrs.

630 Studies in American Literature to 1865
Consideration of major movements from Colonial times to 1865; selected major figures or special problems will be considered in depth (topics may vary). 3 hrs.

631 American Literature from 1865 to the Present
Consideration of change and development in terms of genre, theme, and major figures. Emphasis may vary. 3 hrs.

651 Studies in Medieval Literature
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. 3 hrs.

652 Selected Studies in Anglo-Saxon Literature
Offered upon demand. 3 hrs.

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

670 Milton
Study *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes* in 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. 3 hrs.

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

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

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

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, and no more than six hours' credit is allowed for the thesis. 3 hrs.

**Communication and Linguistics Program**

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 twenty-one semester hours of which at least nine must be taken in courses numbered 300
or above. The minor incorporates a core of three course (one each from the 100, 200, and 300 level courses), three additional courses from the desired option (journalism, broadcasting, or speech-theater), 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. Nine hours of core courses (CM 130, 310, 311, or 330)
   b. Nine hours of CM courses (three courses from CM 430, and the following courses offered at A&M: TEL 201, TEL 202, TEL 212, TEL 304)
   c. Three hours of elective (one elective)

Journalism Option
a. Nine hours of core courses (CM 130, 201, 310 or 330)
   b. Nine hours of CM courses (three courses from CM 131, 202, 301, and 311 or 430)
   c. Three hours of elective (one elective)

Speech-Theatre Option
a. Nine hours of core courses (CM 130, 214, 310, or 330)
   b. Nine hours of CM courses (three courses from CM 110, 113, 121, 122, and 311)
   c. Three hours of elective (one 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)

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

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

121  Acting  3 hrs.
     Emphasis on role-playing and fundamentals.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>122</td>
<td>Play Production</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study and practice the methods of producing a play.</td>
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<tr>
<td></td>
<td>Survey. 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>
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<tr>
<td>201</td>
<td>Journalism I</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study the fundamentals of news value and elements of a news story. Emphasis on composition.</td>
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<tr>
<td>202</td>
<td>Journalism II</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>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>
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</tr>
<tr>
<td>214</td>
<td>Oral Interpretation</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study and practice in the intellectual, artistic and communicative skills required to read prose, poetry and drama aloud effectively for oneself, for small groups, or for public performances. Prerequisite: CM 110.</td>
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<tr>
<td>301</td>
<td>News Editing, Headlining and Layout</td>
<td>3 hrs.</td>
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<td></td>
<td>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.</td>
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</tr>
<tr>
<td>310</td>
<td>Persuasion: Theory, Research and Analysis</td>
<td>3 hrs.</td>
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<td></td>
<td>Study of premises, theories and methods used in a variety of persuasion forms, including commercial advertisement, religious evangelism and nonprofit solicitation. Relates speculative and experimental works to analysis of persuasive messages. Prerequisite: CM 113 or CM 130 is recommended or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>311</td>
<td>Interviewing: Theory and Technique</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study and practice the theory and technique of several two-party communication forms, including employment interviewing, basic counseling and information-getting. Prerequisite: CM 113.</td>
<td></td>
</tr>
<tr>
<td>330</td>
<td>Communication Theory and Research</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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<tr>
<td>430</td>
<td>Law of Mass Communication</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study 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 &quot;fairness doctrine.&quot; Prerequisite: CM 130 or approval of instructor.</td>
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</tbody>
</table>

The following courses under Broadcast Option are available through UAH-A&M Visiting Student Program.

**TEL 201 Broadcasting: The Industry and Function**  
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.

**TEL 202 TV Production and Direction**  
Fundamentals of TV production including the electronic equipment, TV cameras, optics, sound, lighting, staging and directoral techniques; basic experience in TV studio operations and program production. Prerequisite: TEL 201.
TEL 212 Writing For Broadcasting

Fundamentals of writing and adapting literature for television and radio.

TEL 304 Advanced Television Production

Laboratory in the development of various types of TV production. Write, produce, budget and direct a TV program of considerable length in a category other than drama. Program idea and design will be emphasized.

Linguistics (LI)

100 Language, Mind and Society

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

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.

Health, Physical Education and Recreation Program

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

Health, Physical Education and Recreation (HPE)

100 Sliminastics

1 hr.

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 & Square Dance

1 hr.

108 Soccer & Speed Ball. Lab fee: Level 1

1 hr.

109 Bowling. Lab fee: $ .50 per class

1 hr.

110 Ice Skating. Lab fee: Level 4

1 hr.

111 Intermediate Ice Skating. Lab fee: Level 4

1 hr.

Prerequisite: HPE 110 or permission of instructor.

112 Beginning Swimming. Lab fee: Level 3

1 hr.

113 Intermediate Swimming. Lab fee: Level 3

1 hr.

Prerequisite: HPE 112 or permission of instructor.

114 Advanced Lifesaving. Lab fee: Level 3

1 hr.

115 Water Safety It counts, and techniques of cover layout and page design. Prerequisite: CM 201 and/or approval of instructor.

116 Swimnastics. Lab fee: Level 3

1 hr.

118 Beginning Self-Defense

1 hr.

119 Intermediate Self-Defense

1 hr.

Prerequisite: HPE 118 or permission of instructor.
120 Handball. Lab fee: Level 1 1 hr.
121 Racquetball. Lab fee: Level 1 1 hr.
122 Badminton. Lab fee: Level 1 1 hr.
123 Intermediate Tennis. Lab fee: Level 1 1 hr.
Prerequisite: HPE 102 or permission of instructor.
124 Advanced Tennis. Lab fee: Level 1 1 hr.
Prerequisite: HPE 123 or permission of instructor.

*125 Archery 1 hr.

127 Intermediate Racquetball. Lab fee: Level 1 1 hr.
Prerequisite: HPE 121 or permission of instructor.

128 Basic Bridge 1 hr.
129 Intermediate Bridge 1 hr.
130 Jogging for Fitness & Weight Control 1 hr.
131 Weight & Circuit Training 1 hr.
133 Advanced Ice Skating. Lab fee: Level 4 1 hr.
Prerequisite: HPE 111 or permission of instructor.

134 Backpacking 1 hr.
135 Frisbee 1 hr.

*136 Introduction to Riding & Horse Care. Lab fee: $80.00 1 hr.
137 Beginning Stunts & Tumbling 1 hr.
139 Intermediate Golf. 1 hr.
140 Varsity Sports-Basketball 1 hr.
141 Varsity Sports-Soccer 1 hr.
142 Varsity Sports-Crew 1 hr.
143 Varsity Sports-Tennis 1 hr.

150 Contemporary Medicine & The Young Adult 3 hrs.
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.
Broad look at the history, principles, and philosophy of the profession. Emphasis on concepts of learning and education, recreation and health education, athletics, professional organization, and physical education as a career.

* Courses marked with an asterisk (*) are taught off campus.

History Department

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 thirty-six semester hours in history, including HY 101-102 (a part of the General Education Requirements), HY 221-222, and a minimum of fifteen 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 six 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 six semester hours in American history above HY 221-222.
A European history major who has substituted HY 391-392 for HY 101-102 is also is 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 twenty-one semester hours, six 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 twenty-one semester hours six 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 twenty-one semester hours, nine 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, Preprofessional and Prelaw Preparation, International Studies, Secondary School Teaching, and the Fine Arts. A student who wishes to plan his own AOC can do so through his history 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 twenty-one semester hours and including six semester hours in courses numbered 300 or above. The minor program must have the approval of the History Department Chairman. Appropriate history courses may also form a part of an area of cognate studies with other disciplines to support another major program. Such a program must be approved by the student's major department and must meet the requirements established in (3) above.

History for Second Area of Study
Students majoring in elementary education may select history as their second area of study. Major requirements can be found in the Education section of the catalog.

To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the help of the history education faculty advisor and approved by the Chairman of the Department of History. This curriculum may require more than the minimum total of 128 hours for the degree.

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

1. Eighteen semester hours of graduate work in history, six of which may be transfer credit approved by the Graduate Committee. Twelve hours in American History is required; HY 605 is required.
2. Six additional hours of elective graduate courses in history or a related subject approved by the Graduate Committee.
3. At least 50% of the hours required for a graduate degree (exclusive of thesis credit hours) must be in courses numbered 600 or above, and at least nine 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 thirty hours is required; otherwise, thirty-three hours is required and the additional hours must be in history courses. A maximum of nine 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 must be taken and 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 sixty 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>
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</thead>
<tbody>
<tr>
<td>101</td>
<td>Origins and Development of the Contemporary World, Part I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major western civilizations to 1500. Not open to seniors.</td>
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</tr>
<tr>
<td>101T</td>
<td>Origins and Development of the Contemporary World, Part I (Tutorial)</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Similar to HY 101. Students are held responsible for the full work of the course, but emphasis is given to developing the basic skills of historical study. Permission of history faculty required.</td>
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</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>Major western civilizations since 1500. Not open to seniors.</td>
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</tr>
</tbody>
</table>
102 Origins and Development of the Contemporary World, Part II
(Tutorial) 3 hrs.
Similar to HY 102. Students are held responsible for the full work of the course, but emphasis is given to developing the basic skills of historical study. Permission of history faculty required.

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

201 Current American Issues in Historical Perspective 1 hr.
The historical background and present significance of selected topics in twentieth century American experience (e.g., racial problems, the urban crisis, the impact of technology).

202 Current World Issues in Historical Perspective 1 hr.
Study selected topics in world history during the twentieth century designed to foster an historical awareness of present day problems (e.g., World Communism, the Meaning of Anti-Semitism, the Emergence of Africa).

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

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

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

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

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

247 English Constitutional History to 1603 3 hrs.
The condition of society and the impact of ideas and social forces on historical developments; the origins and evolution of English governmental and legal institutions such as common law, parliament, the judiciary and national administration. Appropriate for students of history, government or literature. Same as PSC 247.

248 English Constitutional History Since 1603 3 hrs.
The impact of revolutions and industrialization upon English society, expansion of English liberties and development of the cabinet political parties and the welfare state. Same as PSC 248.

249 Current World History 3 hrs.
Study the post World War II period involving all continents.

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

337 Contemporary Latin American 3 hrs.
Analyse politico-socio-economic developments since World War II including the forms of organization; the functions and operations of government; the interrelationship between demographic and other social phenomena; the writings of leading Latin American political figures; and industrial development. Prerequisite: HY 238 or approval of instructor.

341 Modern France 3 hrs.
Study 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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>343</td>
<td>Modern Germany</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Examines 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.</td>
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<tr>
<td>345</td>
<td>History of Italy Since the Renaissance</td>
<td>3 hrs.</td>
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<td></td>
<td>Study 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.</td>
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<tr>
<td>364</td>
<td>The Western Movement in American History Since 1803</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A study of pioneering society, Indian relations, land policies, expansion, and politics of the westward-moving frontier.</td>
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<tr>
<td>366</td>
<td>The Negro in Twentieth Century American</td>
<td>3 hrs.</td>
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<td></td>
<td>Study the interrelationship of the negro and the industrial-urban environment of the United States.</td>
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<tr>
<td>369</td>
<td>Social and Cultural History of the United States to 1865</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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</tr>
<tr>
<td>370</td>
<td>Social and Cultural History of the United States Since 1865</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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<tr>
<td>373</td>
<td>Foreign Relations of the United States to 1900</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Analyse American foreign relations from the Revolutionary era to the emergence of the United States as a world power. Topics include American territorial and commercial expansion and relations with the European powers.</td>
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</tr>
<tr>
<td>374</td>
<td>Foreign Relations of the United States Since 1900</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Examine the United States as a world power. Topics include American involvement in both world wars, the development of the Cold War, and the growth of American presence in Asia and Latin America.</td>
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<tr>
<td>375</td>
<td>Imperial Russia</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>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.</td>
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<tr>
<td>376</td>
<td>Twentieth-Century Russia</td>
<td>3 hrs.</td>
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<td></td>
<td>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.</td>
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<tr>
<td>391</td>
<td>Europe, 1500-1815</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Examine the economic, commercial, scientific, social, political, and cultural developments in Europe from the Renaissance to the close of the Napoleonic Wars.</td>
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<tr>
<td>392</td>
<td>Europe, Since 1815</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study 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.</td>
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</tr>
</tbody>
</table>
Courses listed below are open to students who have completed fifteen semester hours in history or twelve semester hours in history with senior standing.

411 Problems in American Culture 3 hrs.
Study 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.

413 The Nineteenth Century South 3 hrs.
Analyse continuity and change in the nineteenth century South, stressing development, disruption, and reconstruction of the economic, social and political order. Prerequisite: HY 221, 222, or approval of instructor.

414 The South in the Twentieth Century 3 hrs.
Study the economic, social, and political readjustments of the late nineteenth century, and the vast changes in the South during the twentieth century. Prerequisite: HY 221, 222, or approval of instructor.

418 Constitutional History of the United States 3 hrs.
Study the growth and development of the American constitutional system with emphasis on those aspects of constitutional growth which relate closely to the fundamental structure of American government and social order. Prerequisite: HY 221, 222, or approval of instructor.

424 Colonial American to 1763 3 hrs.
Study 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.

425 The Revolutionary and Constitutional Epochs 3 hrs.
Study the Revolutionary Era, the period of the Confederation and the development of the Young Republic.

439 Problems in American Foreign Relations Since 1939 3 hrs.
Study selected problems in the light of ideological conflicts, domestic factors and the national interest. Same as PSC 439.

446 The Relations of the United States and the Far East 3 hrs.
Study 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.

473 The High Middle Ages, C. 1000-1300 3 hrs.
Study 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.

475 Europe in the Seventeenth Century 3 hrs.
Study Europe from the Edict of Nantes to the Peace of Utrecht with major emphasis on 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.
Study the major political, social, economic, and intellectual developments in Europe from the Congress of Vienna to World War I.
Courses at the 500 level are open to students who have completed fifteen semester hours in history or twelve 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.
Study 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.
Study 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.
Study the expansion, industrialization and urbanization of the United States, the emerging political, economic and social problems, and the Progressive response. Prerequisite: HY 221, 222, or approval of instructor.

538 The United States in the Twentieth Century 3 hrs.
Study 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.
Study 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.
Analyse 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.
Study 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.
Examine 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.
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.
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.
Courses at the 600 level are open only to graduate students or to senior history majors with permission of the instructor.

605 Recent Interpretations of Modern History 3 hrs.
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.

614 Studies in Southern History 3 hrs.
Study selected topics with emphasis on guided research and examination of leading interpretations in Southern history. Prerequisite: Graduate standing or permission of instructor.

628 Studies in Nineteenth Century American History 3 hrs.
Study selected topics with emphasis on guided research and examination of leading interpretations in nineteenth century American history. Prerequisite: Graduate standing or permission of instructor.

638 Studies in Twentieth Century American History 3 hrs.
Study selected topics with emphasis on guided research and examination of leading interpretations in twentieth century American history. Prerequisite: Graduate standing or permission of instructor.

639 Studies in American Foreign Relations 3 hrs.
Study 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.

673 Studies in the Renaissance and Reformation 3 hrs.
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.

675 Studies in Modern Russian History 3 hrs.
Analyse 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.

698 Directed Readings in History 3 hrs.
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.

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 six hours' credit is allowed for the thesis.

Philosophy Program
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 twenty-one semester hours in philosophy including at least six 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 nine semester hours in courses numbered 300 or above and must be approved by the philosophy faculty.

Philosophy (PHL)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>102</td>
<td>Introduction to Logic</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>103</td>
<td>Introduction to the Philosophy of Art</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey. The major theories of art from Plato to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the present day, with special emphasis on the</td>
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<tr>
<td></td>
<td>analysis of the concepts of art in common</td>
<td></td>
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<tr>
<td></td>
<td>among such theories.</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Introduction to Social and Political Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey. The major attempts to justify the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>exercise of political power at the expense of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>individual liberty from Plato to Mill.</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>Introduction to Ethics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study both major theories of ethics, from</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aristotle to Utilitarianism, and major theories</td>
<td></td>
</tr>
<tr>
<td></td>
<td>about theories of ethics, from naturalism to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>prescriptivism.</td>
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</tr>
<tr>
<td>106</td>
<td>Introduction to the Philosophy of Religion</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Examine the major proofs of God's existence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>that have been offered in the Judeo-Christian</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tradition and study the role which the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>possibility of proving God's existence has</td>
<td></td>
</tr>
<tr>
<td></td>
<td>played in religion (in the western world).</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>From the earliest Greek philosophers to Plato:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>An introduction to the presocratic philosophers,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Socrates and Plato, with emphasis on Plato.</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>From Aristotle to the Renaissance: An</td>
<td></td>
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<tr>
<td></td>
<td>introduction to such philosophers as</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aristotle, the Stoics, the Epicureans, Saint</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Augustine and Thomas Aquinas, with emphasis on</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aristotle. Prerequisite: PHL 101, or one course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in the history of philosophy, or approval of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>instructor.</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>History of Western Philosophy</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>The seventeenth century: An introduction to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>such philosophers as Descartes and Spinoza.</td>
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</tr>
<tr>
<td></td>
<td>Prerequisite: PHL 101, or one course in the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>history of philosophy, or approval of instructor.</td>
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</tr>
</tbody>
</table>

The following courses are open to students who have at least junior standing or have completed at least six hours of philosophy or are approved by the instructor.
304 History of Western Philosophy
The eighteenth century: An introduction to such philosophers as Leibniz, Locke, Berkeley and Hume. Prerequisite: PHL 101 and one course in the history of philosophy, or approval of instructor.

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

306 Contemporary European Philosophy
Introduction to some twentieth century European philosophers such as Bergson, Husserl, Heidegger and Sartre, with emphasis on phenomenology and existentialism. Prerequisite: PHL 101 and one course in the history of philosophy, or approval of instructor.

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

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

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

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

342 Metaphysics
Critical investigation of the fundamental problems of reality such as appearance and reality, substance and universals, matter and life, mind and body, space and time, causality, necessity and freedom. Prerequisite: Nine hours of philosophy including PHL 101 or approval of instructor.

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

362 Political Philosophy
Fundamental issues of politics as treated by some representative thinkers of the Western world. Same as PSC 362.

385 Selected Topics in the History of Philosophy
More intensive examination of particular problems, periods or movements in the history of philosophy. Prerequisite: To be determined in accordance with the content of the course.

Law Enforcement Program (see Political Science Dept.)
Modern Foreign Languages Department
French, German, Russian, Spanish
Acquisition of a second language, and through it an understanding of another culture, is not only a personally enriching experience, it is also, today,
a valuable and salable commodity.

The language programs are designed to enable effective use of a modern foreign language, both oral and written, in 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 BA or BS degrees, unless the student can demonstrate by CLEP examination a competence at a level more advanced than the beginning 101 course. For example:

<table>
<thead>
<tr>
<th>Placement Level</th>
<th>Hours Required</th>
<th>Students Must Take in One Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>101 course (1st level)</td>
<td>12 hours</td>
<td>101, 102, 201, 202</td>
</tr>
<tr>
<td>102 course (2nd level)</td>
<td>9 hours</td>
<td>102, 201, 202</td>
</tr>
<tr>
<td>201 course (3rd level)</td>
<td>6 hours</td>
<td>201, 202</td>
</tr>
<tr>
<td>202 course (4th level)</td>
<td>3 hours</td>
<td>202</td>
</tr>
</tbody>
</table>

Students with Previous Language Training

A student who has had formal training in a foreign language will be placed on the level of that language according to the number of units and grades earned in high school, or will take the CLEP examination in the language, the score of which will determine the placement. By taking the CLEP, a student may receive credit hours with no quality points, depending on placement level and score.* Native or quasi-native speakers must take departmental examinations and may earn up to fifteen hours credit.

The Department of Modern Foreign Languages reserve the right to limit the amount of credit obtained by means other than enrollment in a class which may be credited towards a major or supporting minor.

*See Advanced Placement Section.

Program of Studies

A foreign language major shall consist of twenty-four 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 thirty-six semester hours.

A foreign language minor shall consist of twelve 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 twenty-four semester hours. Advanced conversation, advanced grammar and composition, and the introduction to literature course are required. An additional course on the 300 level will complete the requirement for the minor.

Modern Language (ML) Courses

Courses coded under ML are language-related courses taught in English. Therefore, such courses cannot count towards either major or minor requirements in a language, nor for language requirements for degree purposes.
Area of Concentration (AOC) with French Major
Required courses: FH 300, 303, 304, 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 300, 311, 312, plus three courses on the 400 level and two electives from either 300 or 400 level.

Area of Concentration (AOC) with Slavic Area Studies Major
The Slavic Area Studies Program is 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, 300, 331, 332, 335
and two 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 in minor.

**French for Second Area of Study**

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

To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the help of the French faculty advisor and approved by the Chairman of the Department of Modern Foreign Language. This curriculum may require more than the minimum total of 128 hours for the degree.

**German for Second Area of Study**

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

To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the help of the German faculty advisor and approved by the Chairman of the Department of Modern Foreign Language. This curriculum may require more than the minimum total of 128 hours for the degree.

**Modern Languages (ML)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>333</td>
<td>Russian Masterpieces in English Translation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: EH 206 or approval of instructor.</td>
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</tr>
</tbody>
</table>

**French (FH)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Elementary French</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>102</td>
<td>Elementary French</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: FH 101 or placement.</td>
<td></td>
</tr>
<tr>
<td>103</td>
<td>Introductory French I</td>
<td>4 hrs.</td>
</tr>
<tr>
<td></td>
<td>Total immersion in French course, using the Dartmouth Intensive Language Model. All language and cultural elements stressed. Individualized instruction.</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Introductory French II</td>
<td>4 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of French 103. Prerequisite: FH 103 or approval of the director.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Intermediate French</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: FH 102 or placement.</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Intermediate French</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: FH 201 or placement.</td>
<td></td>
</tr>
<tr>
<td>203</td>
<td>Introductory French III</td>
<td>4 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of Level II with increased emphasis on culture. Prerequisite: FH 104 or approval of the director.</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>Introduction to French Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major movements and works from the beginning to the present. Prerequisite: FH 202 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
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</tr>
<tr>
<td>304</td>
<td>Advanced French Composition</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>310</td>
<td>French for Business and Professions</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>403</td>
<td>Sixteenth Century French Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>404</td>
<td>Seventeenth Century French Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>405</td>
<td>Eighteenth Century French Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>406</td>
<td>Nineteenth Century French Novel</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>407</td>
<td>French Drama</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>408</td>
<td>Twentieth Century French Novel</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>410</td>
<td>Practicum</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>499</td>
<td>Independent Studies</td>
<td>3 hrs.</td>
</tr>
</tbody>
</table>

**German (GN)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Elementary German I</td>
<td>3 hrs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Elementary German II</td>
<td>3 hrs.</td>
<td></td>
<td>GN 101 or placement.</td>
</tr>
<tr>
<td>201</td>
<td>Intermediate German I</td>
<td>3 hrs.</td>
<td></td>
<td>GN 102 or placement.</td>
</tr>
<tr>
<td>202</td>
<td>Intermediate German II</td>
<td>3 hrs.</td>
<td></td>
<td>GN 201 or placement.</td>
</tr>
</tbody>
</table>
300 Introduction to German Literature 3 hrs.
Major movements and works from the beginning to the present. Prerequisite: GN 202 or approval of instructor.

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

312 Advanced German Composition and Usage 3 hrs.
Primarily a composition course with emphasis on grammar review and idiomatic expression. 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.
Read and translate (two-way) 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 Eighteenth Century 3 hrs.
Focus on contributions of Goethe and Schiller to German literature, compared with significant works by contemporary writers of the eighteenth century: Lessing, Gellert, Klopstock, Herder, Wieland, Lenz, et al. Prerequisite: GN 300 or approval of instructor.

413 German Romanticism 3 hrs.
Study German literature of the romantic period, its philosophy and theory. Prerequisite: GN 300 or approval of instructor.

414 The German “Novelle” from Goethe to Kafka 3 hrs.
Study this important literary genre using representative novellas of the nineteenth century. Prerequisite: GN 300 or approval of instructor.

416 Twentieth Century German Literature 3 hrs.
Writers and works of the early twentieth century, with emphasis on post-war German literature, short stories and novels. Prerequisite: GN 300 or approval of instructor.

418 Modern German Drama 3 hrs.
Analyze and compare German drama from the nineteenth century to present, showing development and diversity of modern German drama. Prerequisite: GN 300 or approval of instructor.

419 German Lyric Poetry 3 hrs.
Study and interpret selected masterpieces of major German poets from the eighteenth to the twentieth century. Prerequisite: GN 300 or approval of instructor.

420 Goethe’s Faust 3 hrs.
Goethe’s drama in the context of German and European literary tradition. Prerequisite: GN 300 or approval of instructor.

424 History of the German Language 3 hrs.
Study the linguistic development of German from the first written records through Middle High German to Early New High German. Prerequisite: Two German courses on the 300 level or approval of instructor.

425 Practicum 3 hrs.
Interpret (simultaneous translation) and make 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
Prerequisite: Approval of Department Chairman. 1-3 hrs.

Russian (RN)

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

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

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

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.

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

339 Russian Poetry 3 hrs.
Study 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.

340 Russian for Business and Professions 3 hrs.
Read and translate (two-way) materials, documents, and forms pertinent to commerce and the various professions. Individualized instruction. Prerequisite: RN 202 or approval of instructor.

433 Major Writers of the Nineteenth Century 3 hrs.
Study representative works from Pushkin through Chekhov. Prerequisite: RN 300 or approval of instructor.

439 Gogol 3 hrs.
Study Gogol’s major works especially Dead Souls. Style, ideology and literary technique of the author shall be the main points considered. Prerequisite: RN 300 or approval of instructor.

440 Dostoevsky 3 hrs.
Study and analyse the major works by Dostoevsky, as regards style, ideology, philosophies and technique. Prerequisite: RN 300 or approval of instructor.

441 Practicum 3 hrs.
Interpret (simultaneous translation) and make 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.

499 Independent Studies 1-3 hrs.
Prerequisite: Approval of department chairman.
## Spanish (SH)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Elementary Spanish</td>
<td>3 hrs.</td>
</tr>
<tr>
<td>102</td>
<td>Elementary Spanish</td>
<td>3 hrs.</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 hrs.</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 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: SH 201 or placement.</td>
<td></td>
</tr>
<tr>
<td>300</td>
<td>Introduction to Spanish Literature</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Major movements and works from the beginning to the present. Prerequisite: SH 202 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>320</td>
<td>Hispanic Culture</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Contrastive Hispanic and American cultural patterns; their cause and effect. Prerequisite: SH 202 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>323</td>
<td>Spanish Conversation and Pronunciation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Prerequisite: SH 202 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>324</td>
<td>Advanced Spanish Grammar and Composition</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Recommended for teachers. Prerequisite: SH 202 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>327</td>
<td>Spanish for Business and Professions</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Read and translate (two-way) materials, documents, and forms pertinent to commerce and the various professions. Individualized instruction. Prerequisite: SH 202 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>420</td>
<td>Practicum</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Interpret (simultaneous translation) and make 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.</td>
<td></td>
</tr>
<tr>
<td>423</td>
<td>Cervantes: Don Quixote</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study and analyse this famous novel, the diverse interpretations of it and its transcendency as a work. Prerequisite: SH 300 or approval of instructor.</td>
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</tr>
<tr>
<td>424</td>
<td>Golden Age Drama</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey the drama of the sixteenth and seventeenth centuries, with emphasis on the major dramatists: Lope de Vega, Tirso, and Calderon. Representative works. Prerequisite: SH 300 or approval of instructor.</td>
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</tr>
<tr>
<td>427</td>
<td>Spanish American Novel</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Representative novels of the modern period which reflect the cultural, economic, political and social concerns of the Spanish American republics, nationally and internationally. Prerequisite: SH 300 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>429</td>
<td>The Generation of '98</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study the literary and philosophical works of this important group of Spanish writers using representative works. Emphasis on Miguel de Unamuno. Prerequisite: SH 300 or approval of instructor.</td>
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</tr>
<tr>
<td>499</td>
<td>Independent Studies</td>
<td>1-3 hrs.</td>
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<td></td>
<td>Prerequisite: Approval of department chairman.</td>
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</tr>
</tbody>
</table>
Music Department

Courses for the General Student

In addition to providing degree programs in music and music education, the Department of Music faculty has developed a variety of opportunities for instruction in music making and study for students majoring in other disciplines at the university. All students are encouraged to include at least one music experience in their elective or humanities requirements. The following courses and ensembles are open to all university students with little or no musical experience required. Upper level credit is available for some courses. Also, when instructor time permits, students may receive studio instruction (private lessons) in voice and in nearly every musical instrument.

MU 100 Fundamentals of Music
MU 105 Music Skills for Aspiring Songwriters and Broadway Singers
MU 109 Creative Dance
MU 110 Introduction to Music
MU 111 American Folk Music and Jazz
MU 112 Trends in Popular and Commercial Music
MU 210 Music with the Maestro
MU 215 Music for the Young Child
MU 310 American Music

MU 190/390 UAH Choir
MU 191/391 Premier Singers
MU 192/392 Huntsville Village Singers
MU 198/398 Huntsville Symphony Orchestra
MU 199/399 UAH Wind Ensemble
MU 297 Jazz Workshop

BA 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.

BA 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 Teachers 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**

General Education Requirements for the BA 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*

**A. Music Performance or Literature Emphasis**

**Major**

MU 1-1/4-3 Principal Instrument* ........................................ 16  
(twelve terms; eight hours upper level)

MU 1-0/2-0 Secondary Instrument (six 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, Twentieth Century Materials and Techniques .................. 3

MU 325 Conducting ............................................................. 2

Upper level music elective .................................................... 2

Ensembles** ................................................................. 3-6

Junior Recital ................................................................. 0

Senior Recital ................................................................. 0

*Students electing the Music Literature emphasis will be limited to twelve hours (rather than twenty hours) 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  
(twelve terms; four hours upper level)
Junior Recital (solo and ensemble works) ........................................... 0
Secondary Instrument(s): (six 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 Twentieth 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
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 twelve terms of small and large ensemble experiences; however, a maximum of six 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, twelve hours; Music Education six hours.)

Music majors are required to attend at least six approved concerts per term; music minor must attend three. Thirty percent of the degree requirements must be upper level courses.

Music for Second Area of Study
Students majoring in elementary education may select music as their second area of study. Major requirements can be found in the Education section of the catalog.
To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the help of the music education faculty advisor and approved by the Chairman of the Department of Music. This curriculum may require more than the minimum total of 128 hours for the degree.

**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, twenty-five hours of music is necessary (three hours upper level), including the following courses:

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

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**Music (MU)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td><strong>Fundamentals of Music</strong></td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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 or minor in music; such students will not receive degree credit for this course.</td>
<td></td>
</tr>
<tr>
<td>101</td>
<td><strong>Theory of Music I</strong></td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
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</tr>
<tr>
<td>102</td>
<td><strong>Theory of Music II</strong></td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of MU 101. Prerequisite: MU 101.</td>
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<tr>
<td>103</td>
<td><strong>Theory of Music III</strong></td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of MU 102. Prerequisite: MU 102.</td>
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<tr>
<td>105</td>
<td><strong>Music Skills for Aspiring Songwriters and Broadway Singers</strong></td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Practical, basic-level course in the understanding and usage of musical notation, leading toward independence in selecting, learning, and/or composing music for the stage, studio, or just for personal pleasure and satisfaction.</td>
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<tr>
<td>109</td>
<td><strong>Creative Dance (Basic Modern Technique)</strong></td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>Explore time and space through movement. Developing proper body placement, control and agility while stimulating creative thinking. No dance experience necessary.</td>
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<tr>
<td>110</td>
<td><strong>Introduction to Music</strong></td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Explore ideas and issues in various types of Western music through reading, listening and discussion.</td>
<td></td>
</tr>
<tr>
<td>111</td>
<td><strong>American Folk Music and Jazz</strong></td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study the history and development of American folk music and jazz. Special attention is given to current developments.</td>
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<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
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<tr>
<td>112</td>
<td>Trends in Popular and Commercial Music</td>
<td>3 hrs.</td>
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<td></td>
<td>Survey popular music stemming from folk songs, blues and dance hall music with emphasis on rock music from the beginning, include Bill Haley, Elvis Presley, the Beatles, etc. and the growth of the recording industry. The course includes a field trip to a recording studio and discussion of local performances. Explore social-economic aspects of the music industry.</td>
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<tr>
<td>201</td>
<td>Advanced Theory of Music IV</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Continuation of studies in MU 101-103 on a more advanced basis. Prerequisite: MU 103.</td>
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<tr>
<td>202</td>
<td>Advanced Theory of Music V</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Continuation of MU 201. Prerequisite: MU 201.</td>
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<tr>
<td>208</td>
<td>Contemporary Dance Techniques</td>
<td>1 hr.</td>
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<td></td>
<td>Achieve the kind of flexibility, physical grace, and coordination required of a dance. Prerequisite: Audition or approval of instructor.</td>
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<tr>
<td>209</td>
<td>Environmental Dance (offered summer only)</td>
<td>1 hr.</td>
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<tr>
<td></td>
<td>Interact, physically and psychologically 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.</td>
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<tr>
<td>210</td>
<td>Music with the Maestro</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A listening survey of music masterpieces for those who desire more exposure to great music. Focus is on listening and how to listen. Classes include live performances, records, films, and informal discussion with musicians.</td>
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<tr>
<td>215</td>
<td>Music for the Young Child</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>A course for elementary and special education teachers, church school or prospective teachers not trained in music. Prepares one to teach children ages 3-12 in classroom situations through experience in singing, reading, planning and presentation. Elementary Education majors using music as their Second Area of Study must select MU 326 rather than MU 215 for their GER.</td>
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<tr>
<td>304</td>
<td>Analysis of Music Form</td>
<td>2 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study 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.</td>
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<tr>
<td>310</td>
<td>American Music</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Survey important aspects of American musical art, including the Colonial period, folksong and European influences, jazz and popular influences and the contemporary period beginning with Charles Ives. For the nonmusic student.</td>
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<tr>
<td>311</td>
<td>History of Music I</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey 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.</td>
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</tr>
<tr>
<td>312</td>
<td>History of Music II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Survey 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.</td>
<td></td>
</tr>
<tr>
<td>313</td>
<td>Survey of a Musical Form</td>
<td>2 hrs.</td>
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<tr>
<td></td>
<td>Study a musical form from its origins to the present time. Topic varies. Prerequisite: MU 202, and 311 or 312.</td>
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</tr>
<tr>
<td>314</td>
<td>Biographical Survey</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study the life and works of great composers of music. Topic varies. Prerequisite: MU 202 and 311 or 312.</td>
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</tbody>
</table>
320 Piano Pedagogy 2 hrs.
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.

321 Piano Technology 1 hr.
Understand the development of keyboard instruments, equal temperament tuning, and piano action regulation and repair.

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

326 Teaching General Music in Elementary Schools 3 hrs.
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.

327 Teaching General Music in Secondary Schools 3 hrs.
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.

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

410 Piano Literature 2 hrs.
Survey of music for string keyboard instrument from the prepianoforte period to the present including representative works from all periods. Prerequisite: MU 202, 312 or permission of instructor.

411 Musicum Practicum 1 hr.
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.

425 Advanced Conducting and Instrumentation 3 hrs.
Further development of conducting techniques and communication with emphasis on score reading of instrumental and choral-instrumental compositions. Includes a study of basic instrumentation. Prerequisite: MU 325. Offered upon demand.

428 Organizing and Directing Vocal Groups in Secondary Schools 3 hrs.
Repertoire, procedures for administering and teaching school glee clubs, choirs, and vocal ensembles. Prerequisites: MU-ED 326, 327 and MU 425 or permission of instructor.

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.

510 Concert Band Literature and Conducting Critique 3 hrs.
Investigate and study 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. Prerequisite: MU 325; junior standing in music; permission of instructor.

520 Arts in the Elementary School Curriculum 3 hrs.
An interdisciplinary approach to teaching the arts in the elementary school, including music, movement, theater arts and the visual arts. Practical experiences in playing in-
strums (percussion), moving, drawing, creating, singing, working in clay, play-acting and pantomine will be emphasized. Methodology for integrating the arts will be included through active participation.

521 Philosophical Principles of Music Education
3 hrs.
Examine the philosophical bases of music education, its justification in the public schools, and criteria for determining what its objectives should be. Also includes the application of aesthetic theory to the analysis and evaluation of music.

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 forty to sixty minutes weekly.

To advance to the next one hundred level of studio instruction (i.e., from 133 to 231 or 130 to 230), each student must perform before a faculty jury. The jury may retain students at any level until proper achievement is reached for advancement, 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 performances, 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 nonmusic 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, 233, 331, 332, 333, 431, 432, 433
Studio Instruction in Keyboard 11/3 hrs.
For principal instrument music credit. Studio Instruction Fee: Level 5. Prerequisite: Approval of instructor.

140 Studio Instruction in Voice 2/3 hr.
For music education emphasis, secondary instrument or nonmusic credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: Approval of instructor.

240 Studio Instruction in Voice 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 140 and approval of instructor.

340 Studio Instruction in Voice 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 240 and approval of instructor.
440 **Studio Instruction in Voice** 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 340 and approval of instructor.

150 **Studio Instruction in Strings (orchestral strings and guitar)** 2/3 hr.
For music education emphasis, secondary instrument or nonmusic credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: Approval of instructor.

250 **Studio Instruction in Strings** 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 150 and approval of instructor.

350 **Studio Instruction in Strings** 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 250 and approval of instructor.

450 **Studio Instruction in Strings** 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 350 and approval of instructor.

151, 152, 153, 251, 252, 253, 351, 352, 353, 451, 452, 453 **Studio Instruction in Strings** 1 1/3 hrs.
For principal instrument music credit. Studio Instruction Fee: Level 5. Prerequisite: Approval of instructor.

154, 254 **Class Instruction in Strings** 2/3 hr.
For secondary instrument, music education emphasis students. Studio Instruction Fee: Level 4.

160 **Studio Instruction in Woodwinds** 2/3 hr.
For music education emphasis, secondary instrument or nonmusic credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: Approval of instructor.

260 **Studio Instruction in Woodwinds** 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 160 and approval of instructor.

360 **Studio Instruction in Woodwinds** 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 260 and approval of instructor.

460 **Studio Instruction in Woodwinds** 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 360 and approval of instructor.

161, 162, 163, 261, 262, 263, 361, 362, 363, 461, 462, 463 **Studio Instruction in Woodwinds** 1 1/3 hrs.
For principal instrument music credit. Studio Instruction Fee: Level 5.

164, 264 **Class Instruction in Woodwinds** 2/3 hr.
For secondary instrument, music education emphasis students. Studio Instruction Fee: Level 4.

170 **Studio Instruction in Brass** 2/3 hr.
For music education emphasis, secondary instrument or nonmusic credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: Approval of instructor.

270 **Studio Instruction in Brass** 2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 170 and approval of instructor.
370  Studio Instruction in Brass  2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 270 and approval of instructor.

470  Studio Instruction in Brass  2/3 hr.
For music education emphasis or secondary instrument credit. May be repeated. Studio Instruction Fee: Level 4. Prerequisite: MU 370 and approval of instructor.

For principal instrument music credit. Studio Instruction Fee: Level 5. Prerequisite: Approval of instructor.

174, 274  Class Instruction in Brass  2/3 hr.
For secondary instrument, music education emphasis students. Studio Instruction Fee: Level 4.

184  Class Instruction in Percussion  2/3 hr.
For secondary instrument, music education emphasis student. Studio Instruction Fee: Level 4.

Ensembles

The several UAH music ensembles are open to all students of the university, some requiring an audition. Ensemble participation is essential for all music majors and minors, and an appropriate ensemble should be selected each term one is enrolled in the university. A maximum of six semester hours in ensemble courses (MU 190-199) may be applied as credit toward total degree requirements in any discipline program; however, students may continue to enroll and repeatedly participate in ensembles throughout their university tenure. Students who have held membership in an ensembles for six terms should enroll in the 300 level instruction. Through audition students may be granted upper-level credit after three terms of membership.

190, 390  UAH Choir  1 hr.
Mixed voices singing the serious choral repertoire.

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

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

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

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

196  Chamber Ensembles  1 hr.
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  1 hr.
Rehearsal and performance of a variety of music for the concert band. By audition with conductor.
198, 398 Huntsville Symphony Orchestra 1 hr.
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 1 hr.
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 1 hr.
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 1 hr.
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 Program (see History Dept.)
Political Science Department

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 thirty-six semester hours in political science, including PSC 101, 231 (statistics), and a minimum of fifteen 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 twenty-one semester hours of courses drawn from a discipline other than political science. At least six hours in the minor must be in courses numbered 300 or above. In lieu of a minor, the student has the option of choosing twenty-one hours in cognate studies, a group of courses drawn from two or more disciplines of which nine 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. 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 declaration 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 prelaw training, international studies, public service, journalism, graduate-school preparation, criminal justice, and integrated studies with the social sciences, humanities or environmental sciences.

Political Science for Second Area of Study
Students majoring in elementary education may select political science as their second area of study. Major requirements can be found in the Education section of the catalog.
To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the
help of the political science education faculty advisor and approved by the Chairman of the Department of Political Science. This curriculum may require more than the minimum total of 128 hours for the degree.

### Political Science (PSC)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>American Government</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Survey. The principles, institutions, and practices of American national government.</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Problems in Politics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Study outstanding problems now confronting government in areas of foreign and domestic policy. Prerequisite: PSC 101 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td>Southern Politics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Examine the nation’s most distinctive political region with consideration given to both state and national politics. Prerequisite: PSC 101 or approval of the instructor.</td>
<td></td>
</tr>
<tr>
<td>202</td>
<td>Urban Politics</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Introduction to urban politics in America with attention given to urban environment, governmental forms, power structures, and policy outputs. Prerequisite: PSC 101 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>205</td>
<td>European Governments</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Examine the political systems of Great Britain, France, and West Germany. Prerequisite: PSC 101 or approval of instructor.</td>
<td></td>
</tr>
<tr>
<td>231</td>
<td>Statistical Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Collection, classification, and presentation of data, measures of central tendency and dispersion, introduction to probability distribution and sampling theory, confidence limits and tests of significance, chi-square and &quot;t&quot; distribution. Prerequisite: MA 105 or approval of instructor. Same as HBS 231.</td>
<td></td>
</tr>
<tr>
<td>247</td>
<td>English Constitutional History to 1603</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Emphasis on the condition of society and the impact of ideas and social forces on historical developments and on 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>
<td></td>
</tr>
<tr>
<td>248</td>
<td>English Constitutional History Since 1603</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Continuation of PSC 247. 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>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>Political Analysis</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Examine 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: Nine hours in political science. Required of all students majoring in political science.</td>
<td></td>
</tr>
<tr>
<td>305</td>
<td>Totalitarian Governments</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Examine the nature of totalitarianism and a study of political practices, ideologies, and behavior in selected communist and noncommunist countries.</td>
<td></td>
</tr>
<tr>
<td>310</td>
<td>Public Administration</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Examine administrative principles and practices in public organizations and agencies.</td>
<td></td>
</tr>
<tr>
<td>313</td>
<td>American Federalism</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Analyse the function and importance of federalism as an aspect of the American political</td>
<td></td>
</tr>
</tbody>
</table>
Consideration is given to the role of the states as partners in the federal arrangement and to their capacity to act as effective units of government.

315 International Politics
Examine 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, subsystems, and diplomacy.

325 Political Modernization
Study of 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.

327 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.

333 International Law and Organization
Examine the contribution of international law and organization to world order since World War II. Emphasis is given to the role of the United Nations in the third world and to the political and sociological origins of international law and its application to selected contemporary problems.

339 Mass Political Behavior
Examine 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.

340 Political Socialization
Study the development of attitudes and behavior patterns relevant to politics. Topics include developmental models, belief systems and consequences for political institutions.

357 The American Congress
Examine the American legislative process with attention given to the institutional setting and process of decision-making, recruitment and socialization of legislators, and relationships between Congress and the remainder of the political system.

358 The American Presidency
Examine 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
Examine the role of revolution, violence, and extremist politics in the social and political process. Same as SOC 359.

362 Political Philosophy
Study the fundamental issues of politics as treated by some representative thinkers of the western world. Same as PHL 362.

363 Modern Political Ideologies
Examine political ideologies in the twentieth century such as nationalism, liberalism, democratic socialism, fascism, Marxism and its variants.

364 American Political Thought
Examine the main currents in American political thought from its European antecedents to contemporary times.

371 American Constitutional Law
Examine the policy-making role of the supreme court in the American political system through analysis of leading cases interpreting the constitution.
372 Civil Liberties 3 hrs.
Examine judicial interpretations of contemporary questions involving the rights of individuals and the limits of freedom of action in American society.

399 Directed Study in Political Science 1-3 hrs.
Independent studies in an area of political science selected in consultation with a faculty advisor. Approval of the chairman required.

Courses listed below are open to students who have completed fifteen hours of political science or who have senior standing.

410 Local Government and Metropolitan Problems 3 hrs.
Examine the structure and difficulties of local government in metropolitan areas, with emphasis on 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.
Study social and political change in contemporary Latin America, with emphasis on Mexico, Cuba, Colombia, Peru, Chile, Argentina, and Brazil. Prerequisite: Fifteen hours of political science or permission of the instructor.

472 The American Judiciary 3 hrs.
Study the American judiciary with attention given to the institutional setting and the process of litigation, recruitment and 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.
Examine the theoretical approaches to the study of international politics with a focus on systems theory, defense planning, and economic interaction. Prerequisite: PSC 315.

499 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 area of political science. Approval of the chairman required.

Criminal Justice Program

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 as 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 thirty-six hours of course work in the social and behavioral sciences chosen with the approval of the student’s advisor. Also, at least fifteen semester hours in the major must be in courses numbered 300 or above. Requirements for the minor must be met with twenty-one semester hours in law enforcement (LE) courses of which six semester hours must be in courses numbered 300 or above. Of the 128 semester hours required for graduation, at least thirty-nine 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 Differences
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 .................................. The American Judiciary

Students interested in a degree in criminal justice should seek academic counseling from faculty advisors in the Department of Political Science. AOC’s will also be prepared in this department. 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.

**Law Enforcement Program (LE)**

101 Introduction to Criminal Justice 3 hrs.
Survey the panorama of the criminal justice system. Philosophical and historical background; constitutional limitations; criminal justice agencies; pretrial, trial, and posttrial processes; evaluation of criminal justice today.

102 Law Enforcement Operations 3 hrs.
Study the functions and relationships in line elements of law enforcement agencies. Independent study only.

201 Investigation and Evidence 3 hrs.
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 approval of the coordinator.
Introduction to Criminalistics 3 hrs.
Survey the scientific approach to criminal investigation. Definition and scope of criminalistics; physical evidence and probability; equipment for investigation; collecting physical evidence; nature of physical evidence; laboratory operations and techniques; the expert witness. Prerequisite: LE 101; introductory science desirable.

The following courses are open to students who have completed LE 101 (or the equivalent) or who have upper-division standing.

Crime and Delinquency 3 hrs.
Study crime and delinquency in the United States; quantity, measurement, trends, economic impact, and victimization. Examine the nature and impact of organized crime. Prerequisite: LE 101 or approval of instructor.

Criminal Law 3 hrs.
Study 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.

Criminal Procedure 3 hrs.
Study the procedure that controls the judicial process in criminal cases. Nature of the criminal process; arrest, search, and seizure; interrogation and confessions; pretrial proceedings; order and conduct of trials; review of convictions; juvenile proceedings; military criminal proceedings; constitutional rights. Prerequisite: LE 303 or equivalent.

Probation and Parole 3 hrs.
Examine procedures for the release of convicted law violators. Presentence investigations; the selection, supervision, and releasing of probationers and parolees; rules and regulations; trends in treatment; effectiveness of release procedures.

Criminal Behavior 3 hrs.
Analyse 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.

Studies in Criminal Justice 1-3 hrs.
Special studies, readings, projects, or field work in an area of criminal justice.

Critical Issues in Law Enforcement 3 hrs.
Examine current issues that are of critical importance to law enforcement in a free society. Reading and discussion of articles and commission reports.

The Sociology of Corrections and Rehabilitation 3 hrs.
Analyse 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.

Public Administration Program (PA)
Courses listed below are open to advanced undergraduates and to graduate students in the administrative sciences program.

Studies in Political Science 1-3 hrs.
Special studies and projects in an area of political science. Same as PSC 500.

Administration of Major Federal Programs 3 hrs.
Compare 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.
Psychology Department

Area of Concentration (AOC) with Psychology Major

A student who majors in psychology must include in his academic program a minimum of thirty-six semester hours in psychology, with at least fifteen 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 twenty-one semester hours, six 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 twenty-one semester hours, six 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 twenty-one semester hours, of which nine 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. 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 for Second Area of Study

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

To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the help of the psychology education faculty advisor and approved by the Chairman of the Department of Psychology. This curriculum may require more than the minimum total of 128 hours for the degree.

Psychology Minors

A student using psychology as a minor (variation No. 1 above) must include twenty-one 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 No. 3 above.

The six hour General Education Social Sciences requirement may be satisfied by taking both PY 103 and PY 113. Both are required for all students taking more than fifteen hours in psychology. Either PY 103 or PY 113 may be taken first, but they may not be taken at the same time.

**Psychology (PY)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>103</td>
<td>General Psychology</td>
<td>3 hrs.</td>
<td>Survey. The empirical findings of the major areas of psychology, with primary focus on general methodology, development, personality, abnormal and social psychology. (See note above.)</td>
</tr>
<tr>
<td>113</td>
<td>Principles of Behavioral Analysis</td>
<td>3 hrs.</td>
<td>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.)</td>
</tr>
<tr>
<td>204</td>
<td>Laboratory Procedures</td>
<td>3 hrs.</td>
<td>Behavioral research techniques and descriptive statistics. Includes laboratory. Fee: Level 3. Prerequisite: PY 103, 113. HBS 231 is strongly recommended before PY 204.</td>
</tr>
<tr>
<td>207</td>
<td>Principles of Personal Reconciliation</td>
<td>3 hrs.</td>
<td>Examine the application of basic principles in psychology to the origin and resolution of personal conflicts. Prerequisite: PY 103, 113.</td>
</tr>
<tr>
<td>231</td>
<td>Statistical Analysis</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 &quot;t&quot; distribution. Prerequisite: MA 105 or equivalent or approval of instructor. (Listed in the schedule as HBS 231).</td>
</tr>
<tr>
<td>300</td>
<td>Experimental Psychology: Learning</td>
<td>4 hrs.</td>
<td>Study 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.</td>
</tr>
<tr>
<td>304</td>
<td>Experimental Psychology: Perception and Judgement</td>
<td>4 hrs.</td>
<td>Analyse the process and interpretation of sensory information and of decision processes. Includes laboratory. Fee: Level 3. Prerequisite: PY 204.</td>
</tr>
<tr>
<td>311</td>
<td>Individual Differences</td>
<td>3 hrs.</td>
<td>Study the factors, both learned and innate, that lead to individually unique patterns of behavior. Prerequisite: PY 103, 113.</td>
</tr>
<tr>
<td>313</td>
<td>Psychometrics</td>
<td>3 hrs.</td>
<td>Theory and practice within psychological testing. Prerequisite: PY 103, 113, HBS 231.</td>
</tr>
<tr>
<td>315</td>
<td>Development Psychology</td>
<td>3 hrs.</td>
<td>Study theory and issues pertinent to development processes in human organisms. Implications of both theory and empirical data will be emphasized. Prerequisite: PY 103, 113.</td>
</tr>
<tr>
<td>330</td>
<td>Communication Theory and Research</td>
<td>3 hrs.</td>
<td>Study 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 on empirical findings of the modes, media and the effects of various communication forms. Prerequisite: PY 103. Same as CM 330.</td>
</tr>
</tbody>
</table>
375 Social Psychology
3 hrs.
Analyse the fundamental principles of group structure. Emphasis on such topics as
development of group solidarity, cohesion, intergroup conflict and cooperation, and the ef­
facts of different patterns of leadership. Prerequisite: SOC 100 or PY 103 or 113. Same as
SOC 375.

390 Readings in Psychology
3 hrs.
Supervised in-depth readings in an area of particular interest to the student. Prerequisite:
Fifteen hours PY and approval of instructor. May be taken twice for credit.

391 Special Topic in Psychology
1 hr.
Preannounced special areas are studied via seminar discussion, laboratory work, or pract­
icum. Prerequisite: Fifteen hours PY. May be taken twice for credit.

392 Special Topic in Psychology
2 hrs.
Preannounced special areas are studied via seminar discussion, laboratory work, or pract­
icum. Prerequisite: Fifteen hours PY. May be taken twice for credit.

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

410 Human Research: Developmental
4 hrs.
Study the effects of the environment upon cognitive and social development in both
humans and animals. Includes laboratory. Fee: Level 3. Prerequisite: 231, HBS 315.

411 Human Research: Motivation and Emotion
4 hrs.
Study 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.
Study 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.
Investigate topics in social psychology, with consideration of various techniques for ex­
amining 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.
Reports on psychological problems within a particular area are presented and discussed.
Prerequisite: Fifteen hours PY and approval of instructor. May be taken twice for credit.

422 Individual Research
3 hrs.
With the advice of an instructor, 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.
Study the history of psychology as it has led to the development of systematic study within
the field. Prerequisite: Fifteen hours PY.

433 Abnormal Psychology
3 hrs.
Examine major behavioral exceptionalities, with an emphasis on empirical findings. Pre­
requisite: PY 401 or approval of instructor.

436 Physiological Psychology
3 hrs.
Analyse the neural and endocrinological systems underlying behavior. Prerequisite (either a
or b): (a) Fifteen hours PY or approval of instructor; (b) BY 114 or BY 213 and six hours of
PY or approval of instructor. Same as BY 436.
437 Symbolic Process 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 in-
dustrial problems. Prerequisite: Approval of instructor.

503 Advanced General Psychology 3 hrs.
Survey. The various major areas of psychology. Open only to senior psychology majors.
Prerequisite: Twenty-four hours PY and senior standing.

506 Language Development 3 hrs.
Study stages of language development and techniques for stimulating language develop-
ment 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.
Basic psychological principles concerning the control of human behavior and current
theoretical and experimental research in the field of behavior modification.

530 Statistics and Methodology 3 hrs.
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; particular emphasis is given to the Stanford-Binet.
Both theory and practice are utilized. Includes laboratory. Fee: Level 3. Prerequisite: Ap-
proval 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 Department

Area of Concentration (AOC) with Sociology Major
Requirements for a major are thirty-six hours of sociology including SOC 100, 102, 300, 465, and HBS 231. A minimum of fifteen hours should be taken
in courses numbered 300 or above.
Up to six hours, of the thirty-six hours required for 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 twenty-one hours
of sociology courses including SOC 100 and 102. A minimum of nine 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 majoring in elementary education may select sociology as their se-
cond area of study. Major requirements can be found in the Education section
of the catalog.
To meet university requirements a minimum of eighteen hours, fifteen of
which must be upper level, are to be selected from courses listed below with the help of the education faculty advisor and approved by the Chairman of the Department of Sociology. (Especially useful for teachers are: SOC 100, 102, 106, 305, 306, 310, 325, 330, 375, 452, and 490.) This curriculum may require more than the minimum total of 128 hours for the degree.

**Sociology (SOC)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Introduction to Sociology</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Perspective methods, concepts, and general findings of the sociologist; discussion of historical and conceptual development of sociology.</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>102</td>
<td>Analysis of Social Problems</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A sociological interpretation of contemporary social problems as they relate to significant trends in complex societies.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>106</td>
<td>Marriage and Family</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Analyse the family as a social institution, its structure and function in contemporary societies, dating, marital interaction, the life cycle, and the socialization process.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Survey 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.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>Cultural Anthropology</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Study the origin and development of man’s ways of life. Special emphasis on the analysis of preliterate societies.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>231</td>
<td>Statistical Analysis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Collection, classification and presentation of data, measures of central tendency and dispersion, introduction to probability distribution and sampling theory, confidence limits and tests of significance, chi-square and “t” distribution. Prerequisite: MA 105 or its equivalent or approval of instructor. Same as HBS 231.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>Introduction to Social Work</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>Research Methods</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Techniques and tools utilized in sociological research. Emphasis on logic of proof, theory of measurement, and allied topics. SOC 231 will be helpful but not required.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>305</td>
<td>Urban Sociology</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Analyse 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.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>306</td>
<td>Sex Roles</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Examine social and sexual roles, their interrelationships, and articulation with societal institutions and agencies. Emphasis on the social upheaval which is both cause and effect of sex-role changes in societies in transition.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>310</td>
<td>Socialization</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Analyse personality development in the social environment focusing primarily on childhood and adolescent socialization. Includes basic introduction to learning theory,</td>
<td></td>
</tr>
</tbody>
</table>
comparative family child-rearing practices, and factors accounting for the development of achievement, aggression and self control in children.

315 Population and Ecology 3 hrs.
Survey the growth and distribution of world population and the environmental problems created in relation to population growth.

319 Deviance and Social Control 3 hrs.
Study the social construction of deviant behavior and societal reactions to it.

320 Criminal Behavior 3 hrs.
Analyse theories of criminal behavior and criminal control procedures. Emphasis on causation, criminal and chancery laws, and crime control by police and criminal or juvenile courts.

325 The Sociology of Education 3 hrs.
Study 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 Sociology of the South 3 hrs.
Analyse 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.
Nontraditional 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.
Analyse 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.
Examine the role of the revolution, violence, and extremist politics in the social and political process. 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 on 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 Organization 3 hrs.
Basic introduction to the theory and structure of past and present complex organization on the larger social structure. Analyse military, industrial and political bureaucracies.

390 Readings and Individual Research 3 hrs.
Supervised readings and/or in-depth research in an area of specialized interest to the student or the instructor. With instructor's permission only. May be taken twice for credit with advisor's approval.

400 Applied Research Methods 3 hrs.
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.
Analyse 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.
Apply sociological principles to religious institutions; emphasis on the interaction of 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.
Survey the relationship of sociology and social psychology to the field of medicine. Study the role and status of medical and paramedical personnel in the United States; analyse health care delivery systems and problems encountered.

452 Sociology of Mental Health 3 hrs.
Study the social construction of mental health and mental illness. Analyse mental hospitals, community mental health center, and the mental health movement.

455 Sociology of Work and Occupations 3 hrs.
Analyse contemporary work situations and experiences. Emphasis on 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 3 hrs.
Study the development of 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 3 hrs.
Designed to cover the major theories of social change. Emphasis on the impact of technology on social institutions with a brief introduction to technology forecasting an assessment. Focus on future development of social institutions.

490 Sociology of Poverty and Deprivation 3 hrs.
Analyse poverty and deprivation as variables in social life. Emphasis 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

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

Programs are administered by eight academic departments, the Office of Science and Engineering and the Office of the School of Graduate Studies. Specific departmental degree requirements along with course descriptions are available in the catalog.
listed in the sections that follow. Because its unified nature, the entire engineering program (both undergraduate and graduate) is presented in a single, separate section. Additional information concerning environmental science and natural science programs are given in their respective sections in alphabetical order.

**Biology**

**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. 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 thirty 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. A minimum of one seminar credit hour must be taken during the junior or senior year. This requirement can be met at the Marine Environmental Sciences Consortium.

For premedical technology students, the Biology Department has adopted Curriculum VIII in which the student obtains the baccalaureate degree before entering clinical training. Students already enrolled in the curriculum which allows them to complete degree requirements while enrolled in clinical training will have the option of completing that program or moving into Curriculum VIII.

For those students who elect premedical, predental, preveterinary, preoptometry, medicine, and premedical technology programs, it is recommended that they consult the curriculum designed for these areas of vocational and academic pursuits.

A minor in biology consists of twenty-one hours to include BY 113, 114 (or equivalent) and at least six hours numbered 300 or above.

Curricula I-X 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 in all program for the BS Degree.

In all programs for the BS degree where the mathematics requirement includes two or more calculus courses, it is possible that only three semester hours of calculus will be required provided appropriate courses in statistics (ST) be added to the program in addition to the GER minimum of nine hours in MA courses.

**Curriculum I**

BA degree appropriate for a biology major with an associated minor in social sciences.
<table>
<thead>
<tr>
<th>Curriculum II</th>
<th>BS Degree for secondary teachers of biology and chemistry.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semester Hours</strong></td>
<td></td>
</tr>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>21</td>
</tr>
<tr>
<td>Mathematics—(depending on placement)</td>
<td>9</td>
</tr>
<tr>
<td>Physics—PH 101, 102, (PH 111, 112 may be taken)</td>
<td>8</td>
</tr>
<tr>
<td>Education core</td>
<td>30</td>
</tr>
<tr>
<td>Electives</td>
<td>0-7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curriculum III</th>
<th>BS degree, preparatory for general graduate study.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semester Hours</strong></td>
<td></td>
</tr>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>21</td>
</tr>
<tr>
<td>(341 desirable)</td>
<td></td>
</tr>
<tr>
<td>Mathematics—(depending on placement)</td>
<td>9</td>
</tr>
<tr>
<td>Physics—PH 101, 102 (PH 111, 112 may be taken)</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>27-35</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curriculum IV</th>
<th>BS degree with chemistry minor, preparatory for graduate study.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semester Hours</strong></td>
<td></td>
</tr>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
<td>21</td>
</tr>
<tr>
<td>Mathematics—(depending on placement)</td>
<td>9</td>
</tr>
<tr>
<td>Physics—PH 101, 102, 201, (PH 111, 112 may be taken)</td>
<td>8</td>
</tr>
<tr>
<td>Electives</td>
<td>12-20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curriculum V</th>
<th>BS degree with physics-chemistry cognate studies, preparatory for graduate study.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semester Hours</strong></td>
<td></td>
</tr>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
<td>30-36</td>
</tr>
<tr>
<td>Biology core courses and biology electives</td>
<td>30-32</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 331, 332, 335, 361, 362</td>
<td>17</td>
</tr>
<tr>
<td>Mathematics—(depending on placement)</td>
<td>15</td>
</tr>
<tr>
<td>Physics—PH 111, 112, 201, 241, 331, 351</td>
<td>20</td>
</tr>
<tr>
<td>Electives</td>
<td>12-20</td>
</tr>
</tbody>
</table>
Curriculum VI
BS degree, premedical, predental, preveterinary. (See chemistry section for an alternate premedical curriculum.)

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
</tr>
<tr>
<td>Biology core courses and biology electives (to include either BY 317 and 361 or BY 361, 543, 544, &amp; 545)</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 333, 335, 336 (341 desirable)</td>
</tr>
<tr>
<td>Mathematics—(depending on placement and essential prerequisites)</td>
</tr>
<tr>
<td>Physics—PH 101, 102 or PH 111, 112</td>
</tr>
<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

Curriculum VII
BS degree, microbiology emphasis; preparatory for: (a) The National Registry of Microbiologists Examination for Registered Microbiologists with the American Academy of Microbiology; (b) graduate study in microbiology.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements</td>
</tr>
<tr>
<td>Mathematics (depending on placement)</td>
</tr>
<tr>
<td>Physics—101, 102, or 111, 112</td>
</tr>
<tr>
<td>Chemistry—121, 123, 125, 126, 223, 331, 332, 335, 336, 361, 362</td>
</tr>
<tr>
<td>Electives</td>
</tr>
<tr>
<td>Biology 221 General microbiology</td>
</tr>
<tr>
<td>319, 320 Genetics</td>
</tr>
<tr>
<td>421 Medical microbiology</td>
</tr>
<tr>
<td>435 Microbial physiology</td>
</tr>
<tr>
<td>430 Immunology</td>
</tr>
<tr>
<td>525 Parasitology</td>
</tr>
<tr>
<td>496-499 Seminar</td>
</tr>
<tr>
<td>490 or 492</td>
</tr>
</tbody>
</table>

Curriculum VIII
BS degree, premedical technology emphasis.
A program satisfying the academic requirements for a BS Degree in Biology with emphasis in premedical technology is offered as an option in biology. This curriculum also satisfies prerequisites for acceptance into clinical training in medical technology. The clinical phase, which is taken after the BS degree has been awarded, consists of a twelve-month internship in an accredited Medical Technology Clinical Training Program of the student’s choice. Upon successful completion of the clinical component the candidate is eligible for certification as a medical technologist.
The following curriculum is approved for the preclinical component. Completion of this four-year degree program does not automatically assure acceptance into a clinical training program.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
</tr>
<tr>
<td>Science—BY 113, 114 (or equivalent) and PH 101, 102</td>
</tr>
<tr>
<td>Mathematics (depending upon placement)</td>
</tr>
<tr>
<td>Biology—BY 221, 313, 319, 421, 430, 521, 525, seminar</td>
</tr>
<tr>
<td>Chemistry—121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
</tr>
<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

159
**Curriculum IX**

BS degree, preparatory for graduate study in biology-mathematics (biometrics).

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</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—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
</tr>
<tr>
<td>Mathematics—MA 153, 154, 233, 244, 251, 352 or 353, 385</td>
</tr>
<tr>
<td>Physics—PH 101, 102 or 111, 112</td>
</tr>
<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

**Curriculum X**

BS degree, environmental biology emphasis, preparatory for graduate study in ecology or environmental science.

<table>
<thead>
<tr>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education Requirements (humanities and social sciences)</td>
</tr>
<tr>
<td>Biology—BY 221, 312, 319</td>
</tr>
<tr>
<td>BY 531, 532</td>
</tr>
<tr>
<td>BY Electives: Two from BY 496, 497, 498, 499</td>
</tr>
<tr>
<td>One from BY 378, 371</td>
</tr>
<tr>
<td>Two from BY 561, 564, 565, &amp; 566</td>
</tr>
<tr>
<td>One additional biology course 300 level or above</td>
</tr>
<tr>
<td>Chemistry—CH 121, 123, 125, 126, 223, 331, 332, 335, 361, 362</td>
</tr>
<tr>
<td>Physics—PH 101 &amp; 102, or 111 &amp; 112</td>
</tr>
<tr>
<td>Mathematics—(depending upon placement and essential prerequisites)</td>
</tr>
<tr>
<td>Environmental Sciences—ES 102</td>
</tr>
<tr>
<td>Computer Sciences—CS 113, 208</td>
</tr>
<tr>
<td>Electives</td>
</tr>
</tbody>
</table>

**Biology for Second Area of Study**

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

To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the help of the biology education faculty advisor and approved by the Chairman of the Department of Biology. This curriculum may require more than the minimum total of 128 hours for the degree.

**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 development 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 twenty-four semester
hours of graduate course work.

b. Completion of an acceptable thesis.

c. Pass a comprehensive final examination.

**Plan II—Master of Science, nonthesis**

a. Successful completion of an approved program of thirty-three 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 twenty-four semester hours in biology and nine 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)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>113</td>
<td>4 hrs.</td>
<td>Study 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.</td>
</tr>
<tr>
<td>114</td>
<td>4 hrs.</td>
<td>Continuation of 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.</td>
</tr>
<tr>
<td>213</td>
<td>4 hrs.</td>
<td>Study 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. Lab per week. Lab Fee: Level 4. Prerequisite: BY 113, 114, or NS 111, 112, 113 or equivalent.</td>
</tr>
<tr>
<td>214</td>
<td>4 hrs.</td>
<td>Study microbiological aspects of the internal and external environments of man—includes epidemiological and immunological aspects. Not open to biology majors. Two two-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 113, 114 or equivalent.</td>
</tr>
<tr>
<td>221</td>
<td>5 hrs.</td>
<td>Cultivation and observation of microorganisms and their relation to foods, water, industrial processes and disease. Two three-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.</td>
</tr>
<tr>
<td>230</td>
<td>2 hrs.</td>
<td>Identification and use of the most widely used shrubs in landscape design for northern and</td>
</tr>
</tbody>
</table>
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.
Laboratory course 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 4 hrs.
Basic ecological principles controlling plant and animal populations. Includes the study of the development of ecosystems, communities and habitats. One four-hour lab per week. Lab Fee: Level 3. Field trips required. Prerequisite: BY 113, 114; BY 238; CH 121.

313 Human Physiology and Anatomy 4 hrs.
Structure and function of the human body. The physiology and anatomy of the major organs, organ systems and their interactions. Students preparing for professional schools and graduate studies in physiology or development are encouraged to take the advanced physiology. One lab per week. Lab Fee: Level 3. Prerequisite: BY 114, CH 101 and 105 (CH 113 Recommended).

315 Ichthyology 4 hrs.
Classification, anatomy, physiology, and ecology of freshwater and marine fishes. Emphasis on fishes of North Alabama. Laboratory and field trips required. Lab Fee: Level 3. Prerequisite: BY 114.

317 Vertebrate Zoology 5 hrs.
Study the morphology of vertebrate animals with emphasis on the relationship of organs and systems and their phylogenetic significance. Two three-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 114.

319 General Genetics 3 hrs.
Study 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 1 hr.
Practical applications of modern genetic techniques. One three-hour lab per week. Lab Fee: Level 3. Prerequisite or concomitant: BY 319.

340 Introduction to Cellular and Developmental Biology 4 hrs.
A modern approach to embryology. Discuss 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, CH 113 and CH 131 recommended. It is strongly recommended that biology majors and preprofessional 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) 3 hrs.
Study the molecules that comprise living systems, including their nomenclature structure, properties, and functions in metabolism. Major emphasis on 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 CH 362) 1 hr.
Practical experience in the isolation, qualitative identification, and quantitative estimation of biomolecules. One four-hour lab per week. Lab Fee: Level 4. Prerequisite or parallel: CH 361.

364 Phytogeography 3 hrs.
Study the floristic provinces of North America, considering the plant species, plant com-
munities 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** 4 hrs.
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. One four-hour lab per week. Lab Fee: Level 2. Prerequisite: BY 113. Recommended: BY 238.

371 **Nonvascular Cryptogamic Botany** 5 hrs.
Introduction to the biology of ray fungi, cellular and slime molds, fungi, algae, lichens, liverworts, hornworts and mosses, emphasizing their ontogeny, structure and phylogenetic lines of development. Two three-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 113.

372 **Biology of Vascular Plants** 5 hrs.
Comparative anatomy and morphology of the vascular plants and their relationship in various phylogenetic lines of development. Vascular cryptogams as well as ferns, gymnosperms and angiosperms are studied. This is not a field course. Two three-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 113.

378 **Invertebrate Zoology** 5 hrs.
Survey the invertebrate phyla emphasizing anatomy, morphology, embryology, ecology and phylogenetic relationships. Two three-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 114.

421 **Introduction to Medical Microbiology** 5 hrs.
Survey the medically significant microorganisms and their relation to human diseases. Bacterial, fungal, and viral agents will be considered with emphasis on their distribution, properties, pathogenesis and epidemiology. Two three-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 221, BY 361 and BY 430.

429 **Animal Histology** 5 hrs.
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. Two three-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 114 or equivalent.

430 **Immunology** 5 hrs.
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. Two three-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 221 and 361.

435 **Bacterial Physiology and Metabolism** 4 hrs.
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. One four-hour lab per week. Lab Fee: Level 4. Prerequisite: BY 221 and 361.

436 **Physiological Psychology (same as PY 436)** 3 hrs.
Functional analysis of the neural and endocrine systems underlying behavior. Prerequisite (Either a or b): (a) Fifteen hrs. of PY or approval of instructor; (b) BY 114 or 213, and six hrs. of PY or approval of instructor.

455 **General Entomology** 4 hrs.
Study classification, habits and economic importance of insects including their collection,
preservation, and identification. One three-hour lab per week. Lab Fee: Level 3. Prerequisite: BY 114.

463 Plant Anatomy 4 hrs.
Study the ontogeny, differentiation and maturation of the various tissues and organs of angiosperm. Investigate problems in the growth and development of an angiosperm, using histological techniques. Two three-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 372.

464 Plant Speciation & Evolution 4 hrs.
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 four-hour laboratory will meet weekly with emphasis on family recognition and relationships utilizing biosystematic laboratory techniques. Field trips required. Lab Fee: Level 3. 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 two hours, Level 3 for three hours, and Level 4 for four hours. Prerequisite: Approval of instructor.

496, 497, 498, 499 Seminar 1 hr. each
Student discussions and presentations of biological literature from current library monographs and journals. Prerequisite: Junior standing. Grading in seminar will be on a pass/fail basis. Biology majors are required to take one seminar. No more than three seminar credits can be counted in the biology major. May be taken at the Marine Environmental Sciences Consortium.

Advanced Undergraduate — Graduate Courses

510 Radiation Biology (A&MU) 4 hrs.
Characteristics of radioisotopes; detection and counting techniques and instrumentation; tracer techniques; health and safety system. Prerequisite: Consult instructor.

511 Biological Control (A&MU) 4 hrs.
Designed to introduce components of resistance, use of parasites, predators and microorganisms, foreign exploration, shipment, release and establishment of imported parasites and predators will be discussed.

512 Histotechniques (A&MU) 3 hrs.
Microscopic study of the various tissues and organs of the animal systems.

521 Medical Mycology (UAH) 4 hrs.
Comprehensive study of fungi pathogenic to man with emphasis on their properties, pathogenesis, and laboratory diagnosis. Two two-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 421, BY 430.

522 Microbial Physiology (A&MU) 3 hrs.
The relationship between structure and biochemical functions in microorganisms. 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: BY 221.
524 Mycology (UAH and A&MU) 4 hrs.
Study the various lines of the phycomycetes using representative species; the various series of the actinomycetes; representative pathogenic (crop and vegetative pathogens) and non-pathogenic heterobasidiomycetideae 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 relations to their roles as vectors. Two three-hour labs per week. Lab Fee: Level 4. Prerequisite: BY 221.

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: BY 221.

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 three-hour lab per week. Lab Fee: Level 3. Prerequisite: BY 113, 371, or 372, CH 113 or 331.

532 Animal Physiology (UAH) 4 hrs.
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 gastrointestinal 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; sixteen hours completed in the AOC and CH 113 or 331 or graduate standing.

533 Medical Physiology I (A&MU) 4 hrs.
Study nerve and muscle cell function, fluid and electrolyte environment of body tissues, blood, heart, circulatory and nervous systems. Prerequisite: Organic Chemistry, preferably Biochemistry.

534 Medical Physiology (A&MU) 4 hrs.
Continuation of Mammalian Physiology I with consideration of kidney function, respiratory, digestive, reproductive and endocrine systems. Prerequisite: Medical Physiology I.

535 Endocrinology (A&MU) 4 hrs.
Current developments on anatomy, physiology, chemistry, and regulations of major endocrine glands. Laboratory sessions in biological and chemical assays of hormones. Prerequisite: ZOO 409.

540 Molecular Biology (A&MU) 4 hrs.
Study the structure, behavior and function of the larger biological molecules including biological oxidations, metabolism of carbohydrates, lipids, amino acids and the genetic aspects of metabolism. Prerequisite: CHE 301 Organic Chemistry.

541 Cell Physiology and Metabolism (UAH) 4 hrs.
Study 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 three-hour lab per week. Lab Fee: Level 4. Prerequisite: BY/CH 361 and 362 or approval of instructor.

542 Analytical Biochemistry Laboratory (A&MU) 2 hrs.
Advanced laboratory course dealing with modern techniques of molecular biology and biochemistry.

543 Cellular and Developmental Biology (UAH) 3 hrs.
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 113 or CH 123, 126 and 331 (may be taken concomitantly).

544 Cellular and Developmental Biology (UAH) 3 hrs.
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.

546 Cytogenetics (A&MU) 4 hrs.
Detailed analysis of composition, morphology and behavior of genes, especially as they relate to function, development and heredity. Prerequisite: BIO 406.

551 Insect Physiology (A&MU) 4 hrs.
Study metabolism and utilization of carbohydrates, lipids and nitrogen compounds; energy production, neuromuscular mechanisms, hormones and morphogenesis; role of organs and organ systems in metabolism. Prerequisite: General Entomology or equivalent, Advanced Biochemistry.

552 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.

553 Insect Taxonomy and Morphology (UAH & A&MU) 4 hrs.
Classification of insects, external and internal anatomy of insects with emphasis on the comparative and functional aspects. Prerequisite: BY 455.

560 Environmental Biology (A&MU) 3 hrs.
Principles of the interaction between living systems and their resources are considered. Particular emphasis will be given to current problems in the management of our natural resources including new approaches in the management of pest populations.

561 Physiological Ecology (UAH) 4 hrs.
Study the physiological and behavioral responses of organisms to natural changes in their chemical and physical environment. One three-hour laboratory per week. Lab Fee: Level 3. Prerequisites: BY 312 or approval of instructor. Recommended: BY 361 or 532.

562 Community Ecology (UAH) 4 hrs.
Detailed consideration of ecological principles and concepts, as well as biotic and abiotic factors, relative to the development of plant communities and ecosystems. One four-hour lab per week. Lab Fee: Level 3. Field trips required. Prerequisite: BY 312 and taxonomy.

563 Population Ecology (UAH) 4 hrs.
Study the distribution, population dynamics and behavior of animal population in relation to environmental factors. One four-hour lab per week. Lab Fee: Level 3. Field trips required. Prerequisite: BY 312, and organic chemistry.

564 Limnology (UAH) 4 hrs.
Study fresh-water environments and organisms exemplified by lakes, ponds, and streams in North Alabama. Includes laboratory and required field trips. One four-hour lab per week. Occasionally, Saturday field trips will be required in lieu of the week’s laboratory session. Lab Fee: Level 4. Prerequisites: BY 312, 315, 371 or 378, or approval of instructor.

570 Plant Pathology (A&MU) 4 hrs.
History, nonparasitic, and parasitic diseases incited by bacteria, fungi, plasmodiophorales,
nematodes and viruses, will be discussed. Disease control through exclusion, eradication, protection and post resistance will be mentioned. Prerequisite: BIO 344.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>571</td>
<td>Plant Anatomy (UAH and A&amp;MU)</td>
<td>4 hrs.</td>
<td>Study the ontogeny, differentiation and maturation of the various tissues and organs of angiosperms. Investigate problems in the growth and development of an angiosperm, using histological techniques. Two three-hour labs per week. Prerequisite: BY 372 or approval of instructor.</td>
</tr>
<tr>
<td>572</td>
<td>Plant Taxonomy (A&amp;MU)</td>
<td>4 hrs.</td>
<td>Principles of classifying, naming, and identifying vascular plants with special emphasis on flowering plants, including a consideration of ecologic factors influencing vegetational distribution.</td>
</tr>
<tr>
<td>579</td>
<td>Problems in Biological Sciences (A&amp;MU, Plan III Only)</td>
<td>4 hrs.</td>
<td>Considers the problems of elementary and secondary school teachers of science in all areas of biological sciences. Emphasis on relations of biological organisms to their environment, stressing climatic and soil factors which influence their distribution and adaptations. Provision is made for individual investigation in the biological science.</td>
</tr>
<tr>
<td>621</td>
<td>Pathogenic Bacteriology (UAH)</td>
<td>5 hrs.</td>
<td>Detailed study of bacteria that cause infections in man. Mechanisms of pathogenicity and host-parasite relationships are emphasized. Two three-hour labs per week. Lab Fee: Level 4. Prerequisites: BY 361, 421, and 430, or approval of instructor.</td>
</tr>
<tr>
<td>622</td>
<td>Applied and Industrial Microbiology (A&amp;MU)</td>
<td>4 hrs.</td>
<td>Examine by microbiological assay sewage disposal and waste water treatment plants. Study microorganisms of industrial importance in the biological production of antibiotics, vitamins, organic acids and alcohols is included. Prerequisite: Microbiology.</td>
</tr>
<tr>
<td>623</td>
<td>Advanced Virology (A&amp;MU)</td>
<td>4 hrs.</td>
<td>Outline of the field of virology stressing the molecular biology of virus replication. Topics include immunology, genetics and epidemiology. Emphasis on bacterial and vertebrate viruses although plant and insect viruses may be discussed. Prerequisite: Microbiology, Principles of Virology.</td>
</tr>
<tr>
<td>624</td>
<td>Immunology (UAH)</td>
<td>4 hrs.</td>
<td>Theoretical and practical aspects of immunology. Current areas of immunology that are controversial will be discussed in detail. One four-hour lab per week. Lab Fee: Level 4. Prerequisites: BY 361 and BY 430 or approval of instructor.</td>
</tr>
<tr>
<td>631</td>
<td>Medical Pharmacology (A&amp;MU)</td>
<td>5 hrs.</td>
<td>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.</td>
</tr>
<tr>
<td>633</td>
<td>Endocrinology (UAH)</td>
<td>4 hrs.</td>
<td>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: BY 361 and 532 or approval of instructor.</td>
</tr>
<tr>
<td>641</td>
<td>Advanced Cell Biology (UAH and A&amp;MU)</td>
<td>4 hrs.</td>
<td>Integrated approach to the fine structure and function of various cellular processes. Special attention to particular aspects of cellular processes each term; e.g., motility in cells, cellular</td>
</tr>
</tbody>
</table>
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.
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: BY 543 and 643 or approval of instructor.

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

646 Molecular Genetics (UAH and A&MU) 4 hrs.
Discusses the molecular mechanisms underlying genetic principles. Structure of genes and chromosomes; primary, secondary and tertiary structure of DNA; DNA replication; genetic recombination; RNA transcription; translation and genetic code; regulation of gene function; evolution at the molecular level. Prerequisites: BY 319 and BY-CH 361.

647 Enzymology (UAH) 4 hrs.
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 approval of instructor.

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

651 Medical Entomology (UAH) 4 hrs.
Insects and other arthropods as parasites and disseminators of disease. Mechanism of life cycles, biology, and control of insect parasites of man. Lab Fee: Level 3. Prerequisites: BY 361 and 455, or approval of instructor.

Economic thresholds, economic injury levels, population dynamics, residues in food crops, chemical control, insect transmission of plant diseases, and livestock. Prerequisite: General Entomology.

653 Taxonomy of the Immature Insect (UAH and A&MU) 4 hrs.
Studies of the literature, comparative morphology and techniques of identification of the immature stages of the insect, methods of collecting and preserving the immatures. Prerequisite: BY 455 or approval of instructor.

660 Ecosystem Dynamics (UAH) 4 hrs.
An analytical study of the functional energetics, interrelationships, and adaptive interac-
tions of living organisms in terrestrial aquatic and marine environments. Methodology includes simulations, modeling, field and laboratory experimentation and other predictive and investigational procedures. One four-hour lab per week. Lab Fee: Level 3. Field trips required. Prerequisites: BY 564 and BY 565.

661 Advanced Population Ecology (UAH) 4 hrs.
Interaction of population structure, genetic properties and ecology factors in controlling the dynamics and evolutionary character of natural population. One four-hour lab per week. Lab Fee: Level 3. Prerequisite: BY 312, BY 564 or 565, or approval of instructor.

672 Advanced Systematic Botany (A&MU) 4 hrs.
Advanced studies in classification, nomenclature, and taxonomic theory of vascular plants. Prerequisite: Plant Taxonomy.

690 Seminar (UAH and A&MU) 1 hr.
Students report on current journal articles.

691 Special Topics (UAH and 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 and 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.

699 Master's Thesis (UAH and A&MU) 1-4 hrs.
Required each term a student is working and receiving direction on his/her master's thesis. A minimum of two terms is required for MS students. A maximum of nine 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 nonbiology majors:

201 Ocean Science 4 hrs.
Introduction to the marine environment; a full perspective of the major features of the oceanic realm and the relation of oceans to man. Lecture, laboratory, and field work included. May be used as biology elective.

202 Marine Biology 4 hrs.
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. Prerequisite: General biology and consent of instructor. Accepted in biology cluster.

203 Natural History of Commercial Invertebrates 3 hrs.
Provides the nonmajor 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 4 hrs.
Basic principles of ecology, techniques of laboratory and field studies, sources and control
measures of pollution included. Open to upper level undergraduate and graduate students preparing for a teaching career.

501 Introduction to Oceanography 4 hrs.
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 4 hrs.
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 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. Prerequisite: Physical geology and consent of instructor.

503 Marine Botany 4 hrs.
General survey of marine algae, vascular and nonvascular plants associated with the marine environment. Distribution, identification, structure, ecology, and reproduction will be considered.

504 Marine Invertebrate Zoology 4 hrs.
Survey based on 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.
Study marine fishes, reptiles, and mammals, with an in-depth, comprehensive treatment of their systematics, zoogeography, and ecology. Lectures will encompass subject matter on a nonregional 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: BY 113 and consent of instructor.

506 Marine Zoogeography 4 hrs.
Study 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: Twelve semester hours of biology.

507 Physiology of Marine Animals 4 hrs.
Introduction to environmental adaptations of marine animals. Emphasis on biochemical, osmotic, respiratory and temperature responses. Both invertebrates and fish are considered. Prerequisites: BY 113, general physiology, organic chemistry (biochemistry desirable).

508 Marine Plankton 4 hrs.
Study physical, chemical and biological factors influencing the distribution of marine organisms. Emphasis on the Western North Atlantic Ocean.

509 Marine Ecology 4 hrs.
Study bioenergetics, community structure, population dynamics, predation, competition, and speciation in marine ecosystems. Lecture and laboratory work 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 studied as they relate to ecological principles which they exemplify providing both a taxonomic and ecologic background. Prerequisites: By 113, general chemistry, general physics, and consent of instructor.

170
510 Marsh Ecology 4 hrs.
Basic understanding of the ecology of a salt marsh. Emphasis on 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 faculty. 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.
Patterns of benthic macroinvertebrate 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.
In-depth study of the principles and methods of marine fishery biology and their application to conservation. Lecture and laboratory work included. Prerequisites: BY 113 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.
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.
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.

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

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 nineteen 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 twenty-seven to twenty-eight hours of science and mathematics included in Requirement No. 1 satisfy the science and mathematics General Education Requirements for the BS 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 BS degree with a chemistry major and supports the undergraduate programs of other disciplines. A minimum of nine 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)</td>
</tr>
<tr>
<td>General Education Requirements (science and mathematics)</td>
</tr>
<tr>
<td>Chemistry (Requirement No. 2 above)</td>
</tr>
<tr>
<td>Total hours 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.)

**Curriculum II**

For Class B Secondary Professional Teachers 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 six hours social sciences requirements in this curriculum.

**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.

**Curriculum IV**

General education curriculum with a chemistry major. Deficiencies may exist with respect to graduate school entrance requirements.

**Curriculum V**

Chemistry-physics program appropriate for pregraduate education.
Physics—PH 241, 331, 351, one laboratory from 310-312 and one elective ............................................. 13
Mathematics—MA 244, 251, 352, and one elective ................................................................. 12
Electives .................................................................................................................................................. 5-11

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 BS degree may apply for certification as a clinical chemical technologist. Further successful experience may lead to certification as a clinical chemist.

Semester Hours

Chemistry—CH 337, 343, 346, 361, 421, and a senior project ......................................................... 14-15
Biology—BY 113, 114, 221, and two electives ................................................................................... 21
Mathematics—MA 244 .......................................................................................................................... 3
Electives .................................................................................................................................................. 6-9

Minors: Typical chemistry minors which include six 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.

Chemistry for Second Area of Study

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

To meet university requirements a minimum of eighteen hours, fifteen of which must be upper level, are to be selected from courses listed below with the help of the chemistry education faculty advisor and approved by the Chairman of the Department of Chemistry. This curriculum may require more than the minimum total of 128 hours for the degree.

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 BS 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 MS degree is correspondingly increased. (See section on Graduate Programs.)
MS 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) twenty-four 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 PhD Degree Requirements

The PhD requirements of the School of Graduate Studies and Chemistry Department of The University of Alabama (Tuscaloosa) must be fulfilled. Please consult The University of Alabama (Tuscaloosa) Graduate Catalog. The following considerations are made for UAH cooperative students.

1. Only two 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.
The properties of solids, liquids, gases, and solutions, atomic theory and bonding, concentration concepts, and 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 BS 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 received elective credit only. Parallel: CH 101. Lab Fee: Level 3.

113 Elementary Organic Chemistry 4 hrs.
An extension of CH 101 offering the broad concepts of organic chemistry. Recommended for nursing majors, and as a sequel to CH 101 and 105 for the eight-hour laboratory science for nonscience 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, thermochernistry, 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: CH 125.

123 General Chemistry 3 hrs.
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.
Apply 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, spectrophotometric, gravimetric, and volumetric techniques are discussed. Includes laboratories. Lab Fee: Level 4. Prerequisite: CH 126.

301 Elementary Biochemistry 3 hrs.
Survey. 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, liquid 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 113 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.
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.
Discuss 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.
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.
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 four-hour lab per week. Lab Fee: Level 4. Prerequisite or parallel: CH 361.

401 Inorganic Chemistry 3 hrs.
Survey 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.

421 Instrumental Analysis 4 hrs.
Introduction to modern analytical instrumentation including e.g., IR, UV and atomic absorption spectrophotometers, nuclear magnetic spectrometer, electroanalytical equipment and gas and liquid chromatographs. Lecture and laboratory. Lab Fee: Level 4. Prerequisite: CH 346.

491, 492, 493 Introduction to Chemical Research 1-3 hrs.
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.

521 Chemical Instrumentation 4 hrs.
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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>525</td>
<td>Environmental Chemistry</td>
<td>3 hrs.</td>
<td>CH 521; or CH 122 or 123; EG 311, 342.</td>
</tr>
<tr>
<td>531</td>
<td>Physical Organic Chemistry</td>
<td>3 hrs.</td>
<td>CH 333, 343, or approval of instructor.</td>
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<tr>
<td>540</td>
<td>High Polymer Chemistry</td>
<td>3 hrs.</td>
<td>CH 337, 342.</td>
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<tr>
<td>549</td>
<td>Spectroscopy and Molecular Structure</td>
<td>3 hrs.</td>
<td>CH 343.</td>
</tr>
<tr>
<td>553</td>
<td>Introductory Quantum Mechanics I</td>
<td>3 hrs.</td>
<td>CH 343, PH 351; MA 224, 251, 352.</td>
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<tr>
<td>554</td>
<td>Introductory Quantum Mechanics II</td>
<td>3 hrs.</td>
<td>CH 553.</td>
</tr>
<tr>
<td>561</td>
<td>Biochemistry I</td>
<td>3 hrs.</td>
<td>CH 333 or CH 361.</td>
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<tr>
<td>562</td>
<td>Biochemistry II</td>
<td>3 hrs.</td>
<td>CH 561.</td>
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<tr>
<td>565</td>
<td>Molecular Biochemistry Laboratory</td>
<td>2 hrs.</td>
<td>CH 562.</td>
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<tr>
<td>600</td>
<td>Advanced Inorganic Chemistry</td>
<td>3 hrs.</td>
<td>CH 562.</td>
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<tr>
<td>601</td>
<td>Structural Methods in Inorganic Chemistry</td>
<td>3 hrs.</td>
<td>CH 401.</td>
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<tr>
<td>602</td>
<td>Chemistry of Coordination Compounds</td>
<td>3 hrs.</td>
<td>CH 600.</td>
</tr>
<tr>
<td>603</td>
<td>Chemistry of Nonmetal Compounds</td>
<td>3 hrs.</td>
<td>CH 600.</td>
</tr>
<tr>
<td>621</td>
<td>Methods of Chemical Analysis</td>
<td>3 hrs.</td>
<td>CH 521.</td>
</tr>
<tr>
<td>631</td>
<td>Advanced Organic Chemistry I</td>
<td>3 hrs.</td>
<td>CH 531.</td>
</tr>
</tbody>
</table>
632 Advanced Organic Chemistry II 3 hrs.
Complementary to previous courses and treats special classes of compounds and natural products.

633 Synthetic Organic Chemistry 3 hrs.
Study the reactions and principles involved in the synthesis of simple and complex organic compounds. Prerequisite: CH 632.

640 Advanced Chemical Thermodynamics 3 hrs.
First, second, and third laws of thermodynamics and applications. Includes a brief introduction to statistical thermodynamics. Prerequisite: CH 343, MA 251, or approval of instructor.

641 Statistical Thermodynamics 3 hrs.
Principles leading to the development of Maxwell-Boltzmann, Bose-Einstein, and Fermi-Dirac statistics is presented and thermodynamic properties are calculated from the partition function. Prerequisite: CH 640.

642 Advanced Chemical Dynamics 3 hrs.
The velocity of chemical reactions in homogeneous and heterogeneous systems. Absolute rate theory, collision theory, scattering, and the concept of reaction cross sections. Prerequisite: CH 640.

643 Quantum Chemistry 3 hrs.
Application of theory to the chemical bond in the spirit of Coulson and Murrell, Kettle, and Tedder. Prerequisite: CH 640.

661 Biological Macromolecules 3 hrs.
Detailed analysis of the structures of proteins, nucleic acids, and complex polysaccharides. Prerequisite: CH 562.

680 Chemistry Seminar 1 hr.
A minimum of two terms required of all students working toward the MS degree.

699 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 MS students.

705 Selected Topics in Inorganic Chemistry 3 hrs.
Prerequisite: CH 600.

735 Selected Topics in Organic Chemistry 3 hrs.
Prerequisite: CH 633.

745 Selected Topics in Physical Chemistry 3 hrs.
Prerequisite: CH 643.

765 Selected Topics in Biochemistry 3 hrs.
Prerequisite: CH 661.

799 Doctoral Dissertation 3, 6, or 9 hrs.
Required each term a student is working and receiving direction on his doctoral dissertation.

Natural Science
The natural science sequence (twelve semester hours) is an integrated science program designed specifically for liberal arts (nonscience) majors. Contemporary aspects of science are used as a framework for introducing basic scientific concepts in a manner more appropriate for nonscience 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, relativity, 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

Courses in computer science are offered to satisfy the requirements of a minor or cognate studies in the undergraduate program and to satisfy approved specializations in the graduate program.

The following list is typical of a cluster of courses chosen by students:

**Undergraduate**
(a) CS 113, 208, 214, 308, 311, 411 and one of the following CS 513, 517, 524 or 530
(b) CS 113, 208, 214, 308, 309, 415 and one of the following CS 517, 520, 524 or 530
(c) CS 100, 211, 310, 411

**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 MS 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, twelve hours beyond college algebra including a minimum of three 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 or 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 department.

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 all core courses and each CS 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 Department, 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 department 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 twenty-four semester hours of course work and the writing of an acceptable thesis must be completed. The course work must include: (a) Fifteen to eighteen semester hours of graduate credit in the core and major electives; (b) Six to nine hours of courses in an approved minor area. Passing a comprehensive final examination is required.
Plan II. A minimum of thirty-three semester hours (thirty for students with three or more terms of full-time work) must be completed and must include: (a) Eighteen to twenty-one semester hours of graduate credit courses in the core and major electives; (b) twelve to fifteen 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 707 Information Theory
CS 612 Compiler Construction and Writing Systems
EG 621 Statistical Methods for Engineers
EG 631 Management Information Systems
CS 680 Microprocessors
CS 681 Data Base Systems
EG 702 Theory of Automata
CS 703 Theory of Programming Languages

Approved Minor Areas
Administrative Science
Computer Engineering
Control Sciences
Economics
Ergonomics
Management Applications
Mathematics
Operations Research
Statistics with Application

Other appropriate minors may be approved by the chairman of the computer science department.

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.
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 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 re-entrant 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 2. Prerequisite: CS 100 or CS 113.

214 Introduction to Discrete Structures 3 hrs.
Review of set algebra including mappings and relations; algebraic structures including semigroups and groups; elements of 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 121 or Level III placement in mathematics.

308 Computer Organization and Software Systems II 3 hrs.
Interpreters and simulations of computers; data flow in the central processing unit; microprogramming and simulation of a microprogrammable computer; functional description of input/output and mass storage devices; software for controlling and utilizing such devices; structure and operation of assemblers; study of the architecture of the university's computer and its operating system. Lab Fee: Level 2. Prerequisite: CS 208.

309 Switching Theory 3 hrs.
Techniques for the analysis and design of combinational and sequential switching networks; Boolean algebra, elements of coding theory; minimum complexity combinational networks; threshold logic; functional decomposition; minimum complexity sequential networks; asynchronous sequential networks. Prerequisite: Junior standing and CS 113 or EG 196. Same as EG 309.

310 Introduction to Business Data Processing 3 hrs.
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 3 hrs.
Business systems and data processing procedures; impact of data processing methods on the economic structure of business; user communications, file design, report control, documentation; data bases, information collection, planning and control, systems design concepts. Includes COBOL. Lab Fee: Level 3. Prerequisite: CS 308.

411 Computer Applications in Economics and Business II 3 hrs.
Techniques in economic business modeling; case studies of business applications; 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 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: CS 309 or permission of instructor. Same as EG 415.

511 Assembly Language Programming* 3 hrs. Assembly language programming in fixed wordlength computers; techniques in addressing and machine control; data structures and data processing; use of subroutine linkages; subroutines, pushdown lists, list processing, recursions and input-output subroutines; use of a macroassembly 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's 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. Review of computer hardware functional units. Examine the architecture of selected third generation computers; organization of various computer processors; study computers with single and multiprocessor environments; parallel processing; computer families. Prerequisite: CS 308 or CS 511. Not open to students who have had CS 415, EG 502 or equivalent. Same as EG 513.

517 Data Structures 3 hrs. Basic concept of data. Linear lists, sublists, strings, arrays, trees, queues, and stacks. Storage systems and structures, and storage allocation and collection. Efficient algorithms for creating, sorting, merging, searching structured data. Formal specification of data structures, data structures in programming languages, and generalized data management systems. Prerequisite: CS 308 or CS 511 or approval of instructor. Same as EG 517.

520 Computer Related Mathematics 3 hrs. Classification of numerical errors; propagation of errors; algorithms for computing roots of polynomials with error analysis; propositional logic, graph theory, predicate calculus and their relationship to program analysis; regular expressions and their applications to various areas of computer science. Prerequisite: CS 214 or equivalent and at least one mathematics course at the 200 level or above.

524 Programming Languages 3 hrs. Define and classify 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 517 or equivalent.

530 Artificial Intelligence 3 hrs. Study 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 3 hrs. Formal definition of programming languages including specification of syntax and semantics. Definition of formal grammars finite-state, context-free and context-sensitive grammars. Definition of mathematical machines finite-state, pushdown, linear bounded automata. Relationship between formal languages and automata. Prerequisite: CS 214 or approval of instructor.
612 Compiler Construction and Writing Systems 3 hrs.
Review 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.

685 Microprocessors 3 hrs.
History of microprocessors and typical applications; architecture: Four, eight, sixteen bit processors, register and bus structures, I/O and interrupt structures; memories; RAM, ROM; instruction sets: Addressing modes, stacks, interfacing fundamentals; programming and interfacing projects. Prerequisites: CS 511 or equivalent and CS 415 or CS 513 or EG 502.

687 Data Base Systems 3 hrs.

680-684 Selected Topics in Computer Science 3 hrs.
The purpose of this course is to enable the Computer Science Department to comply with requests for courses in special topics. Prerequisite: Approval of instructor.

690 Operating Systems 3 hrs.
Techniques of constructing operating system control programs including management of system, jobs, and data; multiprogramming, multiprocessing, and timesharing systems. Prerequisite: 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 nine hours of credit is awarded upon successful completion of the master's thesis.

703 Theory of Programming Languages 3 hrs.
Syntactic analysis and semantic interpretation of programming languages based on research and results in formal languages and associated compiler techniques as utilized in current procedure oriented compilers. Identification of research directions and potential research projects in programming languages. Prerequisite: CS 603. Same as EG 703.

Engineering Department

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 nonengineering majors who wish to select a minor in engineering, must take a minimum of twenty-one 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>Middle Digit</th>
<th>Engineering Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>Electrical Engineering</td>
</tr>
<tr>
<td>2-3</td>
<td>Industrial and Systems Engineering</td>
</tr>
<tr>
<td>4-7</td>
<td>Mechanical Engineering</td>
</tr>
<tr>
<td>8-9</td>
<td>General Engineering</td>
</tr>
</tbody>
</table>

**Undergraduate Engineering Program**

**Bachelor of Science in Engineering Degree Program**

The engineering program has as its primary objective the preparation of qualified students for careers in any one of many engineering disciplines, for research, and for advanced studies. It stresses a broad education in mathematics, physical sciences, liberal arts, social sciences, engineering science, and engineering design and synthesis.

The School of 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, Prerequisite Courses, and Transfer Credit**

Students who intend to pursue the BSE Degree should carefully read the section of this catalog (p. 8) 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 103** 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 the 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.

Credit for engineering courses taken in ECPD accredited schools is transferrable to UAH. Engineering courses taken in non-ECPD accredited institutions may also be applied to a BSE degree based on an appropriate examination (written or oral) at the discretion of the respective department. This will apply to courses taken after September 1, 1979. All inquiries concerning ap-
plicability of credit should be made to the UAH engineering department chairman where the course, or its equivalent, is being taught.

Each student in the School of Science and Engineering, especially those transferring from other institutions, must assume the responsibility for registering for all required courses in their proper sequence and for fulfilling all requirements for admission and graduation. Failure to do so may extend 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 fifteen 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—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 302 ........................................ 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 Process—EG 487 ........................................ 2
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.

**Semester Hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical Circuits Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>Electronics Laboratory I</td>
<td>1</td>
</tr>
<tr>
<td>Electrical Circuits II</td>
<td>3</td>
</tr>
<tr>
<td>Electronics I</td>
<td>2</td>
</tr>
<tr>
<td>Electrical Engineering Elective</td>
<td>3</td>
</tr>
<tr>
<td>Group Elective (choose a, b, c):</td>
<td></td>
</tr>
<tr>
<td>a) Electronics Laboratory II</td>
<td>1</td>
</tr>
<tr>
<td>Electromagnetic Waves</td>
<td>3</td>
</tr>
<tr>
<td>Electronics II</td>
<td>3</td>
</tr>
<tr>
<td>b) Logic Circuits</td>
<td>3</td>
</tr>
<tr>
<td>Digital Electronics</td>
<td>3</td>
</tr>
<tr>
<td>Digital Electronics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>c) Electrical Networks Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>Electric Power Systems</td>
<td>3</td>
</tr>
<tr>
<td>Passive Electrical Networks</td>
<td>3</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.

**Semester Hours**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability and Engineering Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>Systems Analysis</td>
<td>2</td>
</tr>
<tr>
<td>Management Systems Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Introduction to Human Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Production and Operation Systems</td>
<td>3</td>
</tr>
<tr>
<td>Industrial and Systems Engineering Elective</td>
<td>3</td>
</tr>
</tbody>
</table>

**Mechanical Engineering Option.** Mechanical Engineering is a broad field which traditionally is considered to comprise three primary subfields: Energy, mechanisms and machinery, and manufacturing. The work done by mechanical engineers includes: The design, construction, and use of systems for the conversion of energy available from natural sources (water, fossil fuels, nuclear fuels, solar radiation, etc.) to other forms of useful energy (for transporation, 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 of using energy, machines, and resources.

Semester Hours

Thermodynamics II—EG 342 ............................................. 3
Heat and Mass Transfer—EG 442 ...................................... 4
Kinematics and Dynamics of Rigid Bodies—EG 364 .................. 4
Mechanics and Design of Machine Elements—EG 466 ............... 3
Elective in Mechanical Engineering Design, Chosen from
   EG 446, EG 550, or EG 552 ........................................... 3

Structural Engineering Option. The structural engineer applies the fundamentals of engineering, human factors, and economics to the analytic design and construction of a wide variety of structural and mechanical systems including bridges, high-rise and industrial buildings, machines and hoists, transmission lines and towers, dams and locks, tunnels, and pipe lines, and structural and mechanical systems for aircraft, missile, space, military and marine applications.

Semester Hours

Structural Analysis I—EG 371 ........................................... 3
Elements of Structural Design—EG 374 ................................ 3
Structural Analysis II—EG 471 ......................................... 2
Vibrations of Elastic Systems—EG 561 ................................ 3
Applied Mechanics of Solids—EG 571 ................................ 3
Elective in Structural Engineering .................................... 3

7. Approved Technical Elective:
Selection of six 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 three semester hours of free elective credit, the student may choose any course offered by UAH in which the subject matter does not duplicate the same or a lower level of courses in his or her program. Departmental approval required.

BSE 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></th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12 hrs.</td>
<td>12 hrs.</td>
<td>11 hrs.</td>
<td>35 hrs.</td>
</tr>
<tr>
<td>MA 153</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>MA 154</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>CH 121 &amp; 125</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>EG 198</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>EG 196</td>
<td></td>
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<td>EG 195</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

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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) state 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 100 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 considered for graduate admission provide they are otherwise eligible to pursue a particular engineering discipline. In order to be reconsidered they must successfully complete twelve 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 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 twelve 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 twenty-four semester hours of graduate level course work, which must include: (a) Six hours of courses (600 or above) in the primary engineering discipline; (b) six hours of courses in a second approved engineering area of specialization, physics, chemistry courses in a second approved engineering area of specialization, physics, chemistry, or biology; (c) six hours of approved electives, chosen in support of the primary area of
specialization; (d) six 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 693, EG 721 provided that such EG courses are not counted in the requirement (b) above.

With prior approval, up to twelve 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 nine 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 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 649, 653, and 671. The engineering mechanics area requires EG 561, 571, and 671. The remainder of the program and elective courses are to be chosen with the approval of the student’s advisor. MSE students must enroll in the departmental seminar, EG 683, for one term and PhD 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 nonengineering 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 School of Graduate Studies 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 twenty-four semester hours
of graduate level course work, which must include: (a) Twelve semester hours of graduate credit courses in operations research, including EG 525, 625, 629; (b) six hours of courses in an approved minor area; (c) six 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 PhD 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 PhD degree.

In addition to the minimum requirements of the School of Graduate Studies for the granting of all graduate degrees, some special minimum requirements must be met by doctoral students in engineering. These are set forth below.

Admission to the PhD Degree Program
A PhD candidate must be admitted to the School of Graduate Studies before being admitted to the PhD 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 PhD 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 twenty-four 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 PhD degree. The following conditions must be satisfied prior to taking the examination: (1) Foreign language requirements, (2) basic program of study, (3) at least eighteen 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 can-
didates for the PhD 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 sixty semester hours of graduate course work. A minimum of eighteen semester hours of course work must be within a defined major and a total of at least thirty-three semester hours for work within related departments including credits for the major. A minimum of fifteen semester hours of work is required for the first minor, and a minimum of twelve 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 PhD 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 twenty-four semester hours of graduate work in three consecutive terms during the second and/or third year of graduate study in the School of Graduate Studies at UAH. Half-time graduate assistants are required to complete a minimum of eighteen 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 School of Graduate Studies 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 eighteen 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 Introduction to Engineering 1 hr.
Introduction to the engineering profession. Includes a brief history of the profession and of the interaction of technology and civilization; an overview of the various fields of engineering; the relationship between engineering and the sciences, the arts, industry, and business; an introduction to the functions of engineers, with special emphasis on engineering design. Required of all freshman engineering students. No credit for upper level engineering students.

220 Introduction to Production and Operations 3 hrs.
An introduction to the quantitative methods used in the planning, analysis, design and control of production systems. Lab Fee: Level 1. Prerequisites: MA 154; EG 196 or CS 113.

270 Statics 2 hrs.
Study 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 251.

The structure of matter, basic concepts of phase transformations, mechanical, electrical, magnetic, and thermal properties; and corrosion. Approximately one semester hour of course work is devoted to laboratory experiments and two 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 and EG 301.
### 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 coding 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.
Study 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 and must parallel EG 305.

### 320 Production and Operation Systems
3 hrs.
Continuation of EG 220 with the introduction of additional quantitative methods for the analysis, designing and control of productive systems. Lab Fee: Level 1. Prerequisites: EG 220, EG 390.

### 321 Engineering Economy
3 hrs.
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
3 hrs.
Study 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
3 hrs.
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
2 hrs.
Properties of fluids and fundamental principles governing fluid motion, including fluid statics, conservation of mass, momentum and energy with applications to pipe and channel flows of incompressible fluids. Prerequisites: EG 363, MA 251.

### 359 Fluid-Thermal Laboratory
1 hr.
Laboratory in fluid mechanics, thermodynamics, and related areas. Typical experiments included are: flows in pipes and channels, flow control devices, verification of gas laws, com-
pressible flow and engine performance and emission control. Lab Fee: Level 3. Prerequisites: EG 341, 352.

363 **Particle Dynamics** 2 hrs.
Kinematics of a particle, Newton's laws, linear and angular momentum, work and energy, conservation laws, relative motion. Laboratory demonstrations are included. Prerequisite: EG 270, PH 111.

364 **Kinematics and Dynamics of Machines** 4 hrs.
Study 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** 3 hrs.
Theory of stress and strain; combined stresses; analysis of stresses and deformations in bodies loaded by axial, torsional, and bending loads; statically indeterminate members. Laboratory experiments and demonstrations included. Lab Fee: Level 2. Prerequisites: EG 270, MA 251; Prerequisite or Parallel: EG 294.

371 **Structural Analysis I** 3 hrs.

374 **Elements of Structural Design** 3 hrs.
Basic principles of design of metallic and nonmetallic structures. Analysis and design of structural elements including beams, columns, connection details, and footings. Prerequisite: EG 371.

378 **Materials and Manufacturing Processes** 3 hrs.
Survey manufacturing processes. Technical and economic feasibility of different processes. Control by mechanical and metallurgical means of the properties of both ferrous and nonferrous materials. Manufacturing equipment, tooling, and process design. Field trip included. Prerequisite: EG 294 and junior standing.

381 **Operational Methods in Engineering** 2 hrs.
Study 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.
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. Prerequisite: 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 microelectronics 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 System 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 approximation 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 microdevices related to multistage amplifiers, oscillators, design specifications, operational amplifiers, and microcircuits. 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 nonparametric statistics. Includes introduction to design of engineering experiments, quality control, and computer solution of large scale problems. Prerequisite: EG 390.

422 Systems Analysis 2 hrs.
Introduction to the philosophy and methods of industrial and nonindustrial systems analysis. Methods of systems definition, analysis, simplification, methods of provision of control and information feedback, and methods of systems evaluation are presented and illustrated. A group design project is required. Prerequisite: EG 390 and senior standing.

427 Management Systems Analysis 3 hrs.
Study various formal organization structures and functions. Analyze the informal organization as to its function within the formal organization. Develop analytical techniques for making decisions within formal organizations, together with ethical constraints. Prerequisite: EG 220, 390.

442 Introduction to Heat and Mass Transfer 4 hrs.
Study 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.

446 Analysis and Design of Energy Systems 3 hrs.
Apply 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. Prerequisite: EG 341, 442.

466 Mechanics and Design of Machine Elements 3 hrs.
Detailed design and selection of machine elements, such as gears, shafts and bearings. Topics include analysis of stresses and deformations under combined static and dynamic loads, stress concentrations, and fatigue. Prerequisite: EG 364, 370.
471 Structural Analysis II 2 hrs.

487 Analysis and Control of Dynamical Processes 2 hrs.
Study a variety of dynamical processes found in engineering, economics, biology, sociology, psychology, etc. Problem 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.

488 Analysis of Engineering Systems 3 hrs.
Mathematical modeling of physical systems and determining their dynamic response. Mechanical, electrical, electromechanical, heat transfer, fluid-mechanical and other engineering problems are treated. Prerequisite: EG 381 and senior standing.

493 Introduction to Engineering Design 2 hrs. Lab
Study and apply 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. Prerequisite: EG 311, 341, 370.

494 Engineering Design 2 hrs.
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.

496 Selected Topics in Engineering Credit to be arranged

502 Logic Circuits 3 hrs.
Boolean algebra, binary, reflected, star and Karnaugh arrays; function representation, reduction and realization by contacts and gates; one-to-one transformations and sub-transformations; symmetric switching functions with applications to adders, subtractors, binary order detectors and applications. 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 nonlinear 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 352.

504 Instrumentation 3 hrs.
Study measurement techniques and conventional and electronic instruments. The construction, theory of operation, and proper use of bridge circuits, oscilloscopes transducers, and digital instruments. Prerequisite: EG 311.

505 Automatic Control Theory 3 hrs.
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 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; co-
routines, pushdown lists, list processing, recursions and input-output subroutines; use of a
macroassembly 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. Pre-
requisite: 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 pre-
requisite.

513 Digital Computer Systems 3 hrs.
Review computer hardware functional units. Examine 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. Not open to students who had CS 415, EG 502, or
equivalent. Same as CS 511.

516 Digital Electronics 3 hrs.
Nonsinusoidal generating and wave-shaping circuits, timing circuits, limiters, comparators,
dampers, logic gates, multivibrators and voltage-controlled oscillators. Prerequisite: 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. Prerequisite: EG 308 or EG 511. Same as CS 517.

519 Digital Electronics Laboratory 1 hr.
Experiments and reports related to logic circuit realization of digital hardware. Emphasis
on RTL, DI, TT, ECL families for combinational and sequential switching circuits. Must
parallel EG 516. Lab Fee: Level 3.

522 Logistics Planning and Control 3 hrs.
Evaluate the basic nature of logistics systems. Since the engineering aspects of the produc-
tion function are covered elsewhere, the emphasis is on the quantitative analysis of two net-
works 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. Prerequisite: EG 390 or MN 502.

523 Statistical Quality Control 3 hrs.
Study statistical theory and techniques used to control the quality of manufactured prod-
ucts. Prerequisite: EG 390.

524 Introduction to Ergonomics: Work Development 3 hrs.
Introduction to the philosophy, methodology, and techniques related to providing the op-
timal match between job requirements and worker skills. Intensive use of actual industrial
requirements gives the student experience in practical applications. Lab Fee: Level 2. Prere-
quisites: EG 390; EG 320 or graduate standing.

526 Design and Analysis of Experiments 3 hrs.
Advanced topics in statistical experiments with emphasis on the design aspect. Topics in-
clude confounding, fractional replication, factorial and nested designs. Prerequisite: EG
421.

527 Systems Simulation 3 hrs.
Methods and procedures for simulation of complex systems. Both discrete increment and
continuous time models are considered. Lab Fee: Level 4. Prerequisite: EG 196 or CS 113;
EG 390, 621 or MA 585.

200
540 Physical Properties of Fluids
Develop and study 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.

543 Energy Conversion and Power Generation
Apply 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. Prerequisite: EG 342, 352.

544 Analysis and Design of HVAC Systems
Introduction to the analysis and design of Heating, Ventilation, and Air Conditioning (HVAC) systems. Topics include design requirements for human comfort, exterior weather conditions, and energy conservation; calculation of heating and cooling loads for residential and commercial buildings; air and liquid distribution systems; selection and specification of system components; energy recovery and system efficiency; a survey of commercially available systems. Prerequisite: EG 342, 442.

549 Introduction to Environmental Engineering
Study 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 on the transport processes in environmental problems and in their control. Prerequisite: EG 442.

550 Environmental Control
Engineering design and synthesis of environmental control systems. Particular emphasis is placed on the control of multi-phase systems with application to air pollution control and water pollution control. Prerequisite: EG 442.

554 Advanced Fluid Mechanics
Develop fundamental equation of fluid mechanics, with applications to two- and three-dimensional flows. Topics include stream functions, vorticity, potential functions, and viscous flow. Prerequisite: EG 352.

558 Dimensional Analysis and Similitude
Nature and use of dimensions; principles of dimensional analysis; systematic calculation of dimensionless products, algebraic theory of dimensional analysis, similarity and model testing; applications to problems of stress and strain, dynamics, fluid mechanics, theory of heat, and electrical phenomena; differential equations and similarity. Prerequisite: EG 352. Offered upon demand only.

559 Selected Topics in Mechanical Engineering
Credit to be arranged

561 Vibrations of Elastic Systems
Formulation of the equations of motion of discrete and continuous systems, analytical and numerical methods of solution, eigenvalue problems, and dynamic response. Prerequisite: EG 488.

563 Intermediate Dynamics
Kinematics and dynamics of particles, system of particles, and rigid-body. Variational principles and Lagrangian mechanics. Prerequisite: EG 363.

570 Mechanical Behavior of Engineering Materials
Study the structure, properties and behavior of materials. Topics are structural defects and their influence on mechanical properties, point defects, dislocation and lattice imperfection in crystals, plastic deformation of single crystal and polycrystalline alloys, strengthening mechanisms and fracture. Strain rate, time to failure and cyclic life are treated from a microscope viewpoint. Prerequisite: EG 294, 370.

201
571 Applied Mechanics of Solids 3 hrs.
Analyse stresses and strains at a point, the theories of failures, stress concentration factors, thick-walled cylinders, torsion of noncircular members, curved beams, unsymmetrical bending, and shear center. Prerequisite: EG 370.

572 Matrix Methods in Structural Mechanics 3 hrs.
Apply matrices to the formulation and solution of linear problems in structural mechanics. Analyse stresses, vibrations and stability of engineering structures. Prerequisite: EG 471.

579 Selected Topics in Structural Engineering Credit to be arranged

601 Linear Systems 3 hrs.
Formulation and solution by transform methods of the differential equations of linear electrical and electromechanical systems, the state equations, signal-flow graphs; discrete-time systems. Prerequisite: Graduate standing.

602 Digital Computer Design 3 hrs.
Digital arithmetic; logic matrices, redundant logic circuits; flip-flops, delayors, shift registers, counters; parallel and serial adders, subtractors, multipliers, dividers, comparators, accumulators, structure of a simple digital computer, digital differential analyzer and a digital filter. Prerequisite: EG 309 or 502.

605 Control System Design 3 hrs.
Study 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.
Study antennas and antenna arrays. Radiation patterns and impedance characteristics. Analyse 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.
Study the principles of the executive process in technical organizations. Emphasis on 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: EG 620.

621 Statistical Methods of Engineers 3 hrs.
Designed to introduce graduate students to the application of probability and statistics useful in research work. Includes descriptive statistics, theoretical distribution functions, point and interval estimation, test of hypotheses, linear regression, and analysis of variance. Not open to students majoring in Industrial and Systems Engineering (except Engineering Management) or the MSOR program. Prerequisite: MA 251 and graduate standing.

622 Research and Development Management 3 hrs.
Deals with problems unique to the management of organizations engaged in R&D activities. Topics include management control systems for R&D projects, motivation of technical personnel, problems of managing the creative person, means of increasing creativity, and the management of change. Prerequisite: EG 620.

623 Engineering Economic Analysis 3 hrs.
Mathematical models for expenditure analysis under uncertainty. Relationship between investment decision criteria and microeconomic theory. Capital planning and budgeting. Decisions involving expansion, acquisitions, replacement, and disinvestment. Prerequisite: EG 421 or EG 621.

624 Advanced Ergonomics: Man-Machine Interfaces 3 hrs.
Examine the psychological, physiological, and anthropometric requirements of human beings. These requirements are related to design specifications for the machine in man-machine interfaces. Lab Fee: Level 2. Prerequisite: EG 524.

626 Introduction to Operations Research 3 hrs.
Introduction to the philosophy and methodology of operations research. Lab Fee: Level 1. Prerequisites: EG 196 or CS 113.

627 Introduction to Systems Engineering 3 hrs.
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.

628 Engineering Management II 3 hrs.
Deals with the organizational and human relations aspects of technical management. Formal and informal organizations, job satisfaction, motivation of employees, manager-employee relations, social behavior in the work situation and executive management functions as they influence the design and implementation of management systems. Prerequisite: EG 620.

Study 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 626; EG 390 or EG 621.

631 Management Information Systems 3 hrs.
Introduction to the design of integrated information systems necessary for effective management. Includes the methods of systems design, the basic concepts of computer pro-
cessing 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
Analyse processes whose outputs are governed by probabilistic laws. Included are Gaussian processes, processes with correlated and uncorrelated variables and Markov processes. Prerequisite: EG 421 or EG 621.

633 Industrial Forecasting and Analysis I
Study 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
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 390 or EG 621.

635 Linear Programming
Apply linear programming to complex allocation problems. Methods for determining the maximum or minimum of objective functions whose variable 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 626.

636 Systems Modeling
Introduction to the philosophy and methodology for modeling probabilistic systems. A team project is required. Lab Fee: Level 1. Prerequisite: EG 390 or 621; EG 626 or EG 627.

638 Engineering Reliability
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
Apply classical thermodynamics; emphasis on treating problems involving nonideal gases and liquids, phase equilibrium, and chemical equilibrium. Prerequisite: EG 342.

644 Solar Energy Systems Design
Study components for solar energy systems (collectors, heat exchangers, thermal storage), the numerical simulation of solar energy systems, and solar energy system design. Applications include residential and commercial space heating, process heating, and hybrid systems. Prerequisite: EG 442, EG 544.

645 Propulsion
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.

649 Transport Phenomena
Mass, energy, and momentum transport in steady and transient motions in real and theoretical substances. Prerequisite: EG 442.

652 Introduction to Air Pollution Control
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.
653 Gasdynamics
Fluid mechanics and thermodynamics of ideal and real gases. Topics include shock waves, Prandtl-Meyer fans, acoustic waves, isentropic, isothermal, and general diabatic flows. Laval Nozzles, exact solutions for flow over wedges and cones, and approximate methods. Prerequisite: EG 554.

654 High Speed Flow Theory
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 653.

655 Hydrodynamics
Study 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.

656 Viscous Flow and Convective Heat Transfer I
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
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
Variational methods, optimization, and dynamic stability. Lagrangian and Hamiltonian formulation for dynamical systems and Hamilton-Jacobi theory. Prerequisite: EG 563.

663 Astrodynamics
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
Introduction to kinematics and kinetics, various coordinate systems, constitutive equations for continuous media; applications to boundary value and initial value problems. Prerequisite: EG 352, 370.

672 Theory of Elasticity
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
Introduction to finite element theory, variational methods, weighted residuals; applications to linear partial differential equations in continuous media; solution of boundary value and initial value problems. Prerequisite: EG 352, 370.

676 Inelastic Behavior of Materials and Structures
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
Experimental methods used to determine stress distribution in machine and structural elements subjected to static and dynamic loadings. Theory and laboratory application of
mechanical and electrical resistance strain gauges, brittle coatings, and analogies. Pre­
requisite: 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 PhD 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.
Prerequisite: 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.

693 Graduate Engineering Analysis II 3 hrs.
Fourier series, Fourier integrals, Laplace transformations, partial differential equations,
boundary value problems, and special functions. Prerequisite: MA 352.

699 Master's Thesis 3 or 6 hrs.
Required each term a student is working and receiving direction on his master's thesis. A
minimum of two terms and six hours required for MS students. A maximum of nine hours
of credit is awarded upon successful completion of the master's thesis.

700 Sampled Data Control Systems 3 hrs.
Classical and modern methods for analysis and design of sampled data control systems:
Z-transforms, transport lags, z and w plane analysis, state variables and the transition
matrix. Prerequisite: EG 701.

701 Advanced Linear Control Theory 3 hrs.
Modern techniques for the analysis and design of linear control systems. Matrix formula­
tion, multivariable control systems, state variable concepts. Linear transformation, con­
trollability, observability, discrete-time systems. Prerequisite: EG 605 or permission of in­
tstructor.

702 Theory of Automata 3 hrs.
Linear automata, efficient and inefficient coders analyzed with Z-transforms and cyclo­
tomic polynomials. State description of autonomous automata. Multilinear automata and
various machines. Prerequisite: EG 415 or 502.

703 Theory of Programming Languages 3 hrs.
Syntactic analysis and semantic interpretation of programming languages based on
research results in formal languages and associated compiler techniques as utilized in cur­
rent procedure oriented compilers. Identify research directions and potential research pro­
jects in programming languages. Prerequisite: CS 603. Same as CS 703.

704 Nonlinear Control Systems 3 hrs.
Classical and modern methods for the analysis and design of nonlinear automatic control
systems. State variables, phase plane, limit cycles, stability, describing functions, relay con­
trol, stabilization theory. Prerequisite: EG 701.

705 Theory of Optimal Control 3 hrs.
The general theory of optimal control of dynamic processes. Calculus of variations.
Hamilton-Jacobi theory. Pontryagin's maximum principle, dynamic programming.
Prerequisite: EG 701 or approval of instructor.

706 Communication Systems 3 hrs.
Analyse nonlinear communication processes using Hilbert transforms. Optimum nonlinear
and time-varying systems and nonstationary signals. Phase lock demodulation. Orthogonal
multiplexing. Modulation, detection and series approximation for nonlinear systems.
Prerequisite: EG 606.
707 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).

708 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.

710 Selected Topics in Electrical Engineering Credit to be arranged

719 Advanced Electromagnetic Field Theory 3 hrs.
Study in depth the classical theory of electricity and magnetism. Potential theory, time-varying fields, boundary-value problems, stresses, theory of relativity. Prerequisite: EG 609.

721 Advanced Statistical Applications 3 hrs.
Continuation of EG 621 with an extension to nonparametric methods, multivariate analysis and clustering techniques. Prerequisite: EG 621.

729 Advanced Nonlinear Programming 3 hrs.
Continuation of EG 629 with emphasis on the development and application of nonlinear programming algorithms. Topics include the SUMI algorithm, Zoutendyk's method of feasible directions, Rosen's gradient method, and selected algorithms from the current literature. Prerequisite: EG 629.

730 Multi-criteria Decision Analysis 3 hrs.
Study methods for the analysis of management decision problems involving multiple goals and constraints. Topics include linear and nonlinear goal programming; risk programming and decision making in fuzzy environments. Prerequisite: EG 635.

733 Industrial Forecasting and Analysis II 3 hrs.
Study industrial forecasting methods. Topics include Box-Jenkins model diagnostic checking, seasonal models, and transfer function modeling. Prerequisite: EG 633.

735 Discrete Optimization 3 hrs.
Study integer programming and network analysis. Topics include zero-one problem formulation and the Balas method, cutting plane techniques, branch and bound, out-of-kilter algorithm, and special applications of integer programming. Prerequisite: EG 635.

737 Advanced Simulation Modeling 3 hrs.
An advanced course on simulation methodology utilizing the GPSS, Q-GERI and GASPIV simulation languages. Emphasis on the design, preparation and execution of continuous, discrete and combined simulation models. Prerequisite: EG 527.

739 Selected Topics in Industrial and Systems Engineering Credit to be arranged.

741 Statistical Thermodynamics 3 hrs.

743 Direct Conversion of Energy 3 hrs.
Analyse and study systems for the direct conversion of heat to electricity including thermionic, magneto-hydrodynamic, fuel cells, and semiconductor devices. Prerequisite: EG 641.

747 Advanced Heat Transfer 3 hrs.
Mechanics of Rarefied Gases 3 hrs.
Study and apply kinetic theory to rarefied gas flow problems. Boltzmann statistical distribution; gas surface interaction, transport properties, free molecule flow; neat free molecule flow; procedures for non equilibrium flows. Prerequisite: EG 554. Offered upon demand.

Magneto-Gas Dynamics 3 hrs.
Equations of motion for ionized gases with critical analysis of transport properties in steady and varying electric and magnetic fields. MHD shock waves and radiation effects. Prerequisite: EG 653.

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 653, 656.

Turbulence 3 hrs.
Study turbulence in gases and liquids; boundary layers, atmospheric phenomena. Prerequisite: EG 656.

Selected Topics in Mechanical Engineering Credit to be arranged

Analytical Methods in Nonlinear Dynamics 3 hrs.
Develop theory and applications of nonlinear vibration phenomena, transient and steady state response of nonlinear systems. Prerequisite: EG 661.

Wave Motion of Continuous Elastic Bodies 3 hrs.
Study 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.

Dynamics of Aerospace Vehicles 3 hrs.
Advanced problems in aerospace vehicles rigid-body dynamics and stability are studied. Trajectory optimization for space navigation and related topics are included. Prerequisite: EG 661.

Theory of Structural Stability 3 hrs.

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.

Finite Element Analysis II 3 hrs.
Advanced topics in finite element analysis; application to nonlinear partial differential equations in continuum mechanics; theoretical studies of convergence and stability of solutions. Prerequisite: EG 674.

Doctoral Dissertation 3 to 6 hrs.

Environmental Sciences

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 Projects in Environmental Science
ES 521 Environmental Data Analysis

**Requirements for a Minor in Environmental Science**

Students in any area of study, 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)

101 Planetary and Atmospheric Science 4 hrs.
Spatial relationships of the earth, moon, and sun that determine the figure of the earth, earth motions, time, seasons, atmospheric and oceanic circulation, weather, and climates. Includes practical and field work. Lab Fee: Level 2.

102 Physical Geology 4 hrs.
Nature and evolution of the earth's continents and ocean basins; includes rocks and minerals; landscape formation by rock weathering, surface and ground water, volcanoes and related igneous activity, glaciers, wind, ocean currents and waves; crustal deformation and balance; continental drift; earthquakes, interior heat, gravity, and magnetism. Lunar and planetary geology. Includes laboratory and field work. Lab Fee: Level 2.

303 Environmental Climatology 3 hrs.
Classification definition of types of climate; processes of atmospheric dispersions—turbulent transfer and diffusion; environmental alterations by man; climate/ecology relationships. Prerequisite: ES 101, MA 105 or approval of instructor.

304 Environmental Meteorology 3 hrs.
Physical properties and dynamics of the atmosphere; factors that govern weather conditions; meteorological factors affecting the design and operation of aircraft; weather research. Prerequisite: ES 101 and MA 151 or MA 154 or approval of instructor.

311 Environmental Geology and Hydrology 3 hrs.
Study and evaluate the geologic and hydrologic constraints on land use. Includes considerations of influence of topography; energy, mineral, soil, and water resources; and geologic and hydrologic hazards. Fundamentals of hydrology. Prerequisite: ES 102 or permission of the instructor.

321 Pollution Problems 3 hrs.
Quantitative descriptions of environmental conditions, regulations, and abatement technology; specific pollution problems with air, water, noise, and radiation; assessment of environmental impacts of development or construction projects. Prerequisite: Sophomore standing and approval of instructor.

490 Special Topics in Environmental Science 1-4 hrs.
A literature search and summarization with regard to topics of interest, conducted under the direct supervision of an instructor. Prerequisite: Approval of instructor.

492 Special Projects in Environmental Science 1-4 hrs.
Individual investigation of environmental problems under the direct supervision of an instructor. Prerequisite: Approval of instructor. Lab Fee: Level 4.

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

Mathematics Department and Statistics

Undergraduate Programs
The mathematics faculty offers courses in mathematics (MA) and statistics (ST) to satisfy requirements for a BS or BA degree in mathematics, a BS or BA 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 in-
clude: MA 153, 154, 233, 244, 251, 442, and 502 (basic core—twenty-one 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 double major in mathematics education and elementary education (Curriculum III) must include: MA 153, 154, 233, 244, 333, 350, 385, 442, and one approved MA course at 300 level or above.

Students majoring in other academic areas may include only MA courses numbered above 150 in their AOC. A typical mathematics minor consists of MA 153, 154, 233, 244, 251 and two approved MA courses numbered above 300. All MA minors must include MA 153 and 154.

No student may enroll in his first MA course at UAH 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 three to nine hours to satisfy General Education Requirements should make their choice from the sequence MA 105 (104), 143, 151, 244, 333, 350, 385, beginning with the course indicated by their placement level.

Students who may continue in mathematics and need three or nine 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**

**BA or BS Degree with a Major in Mathematics.**

<table>
<thead>
<tr>
<th>General Education Requirements:</th>
<th>Semester Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>English and history</td>
<td>18</td>
</tr>
<tr>
<td>Language (French, German or Russian recommended)</td>
<td>6-12</td>
</tr>
<tr>
<td>Social Science</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics (courses numbered below 150)</td>
<td>0-6</td>
</tr>
<tr>
<td>Laboratory science</td>
<td>0-16</td>
</tr>
</tbody>
</table>

[NOTE: Math majors taking physics courses must choose from the sequence PH 111, PH 112, PH 113.]

For BA .................. eight hours in one science or a science cluster
For BS .................. eight hours in physics and eight 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.]
Curriculum II

BA or BS degree with major in mathematics; meets requirements for a Class B Secondary Professional Teachers Certificate.

**Semester Hours**

**General Education Requirements:**

- English, history, speech and psychology........................................... 24
- Language (French, German or Russian recommended)................................. 6-12
- Social sciences (economics, political science or sociology)....................... 6
- Mathematics (courses numbered below 150).......................................... 0-6
- Science.................................................................................................. 12-16

(Note: Math majors taking physics courses must choose from the sequence PH 111, PH 112, PH 113.)

For BA, one of the following options:

(a) Four hours in a biological science and eight hours in a physical science
(b) Four hours in a physical science and eight hours in a biological science

For BS........................................eight hours in Physics and eight hours in Biology

(Note: Teacher Certification requires at least four hours in a biological science in the student's program.)

**Professional Education Courses:**

See Department of Education Section..................................................... 30

Mathematics major (minimum requirements):

- MA basic core, MA 333, and MA 385, or 585 ........................................ 27
- MA electives (must have prior approval of student’s mathematic advisor; must be at 300 level or above; must include at least one 500 level course) .................................................. 6
- Electives (to bring total number of semester hours to 128)....................... 1-17

(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

BA or BS Degree with a double major in mathematics education and elementary education; meets requirements for Class B Elementary Professional Teachers Certificate.

**Semester Hours**

**General Education Requirements:**

- As in Curriculum II............................................................................... 48-64
- Additional humanities (ART 215, MU 215, ED 215)................................. 9
- Additional social sciences (see Department of Education Section)............ 6

**Mathematics (Acceptable for second area of study in elementary education curriculum)**

- MA 153, 154, 233, 244, 333, 350, 385, 442, and one MA elective at 300 level or above.................................................. 27

- Education (see Department of Education Section)................................. 36
Electives (to bring total number of semester hours to 128) .................0-2

[NOTES: 1. This curriculum may require more than the minimum total of 128 semester hours. 2. Students who elect this curriculum will not be adequately prepared for graduate study in mathematics.]

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 thirteen 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, 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 nine hours from one of the following options: CS 311, 411, 513, 517, 524, 530, (interest in business or economics); CS 309, 415, 513, 517, 520, 530, (interest in systems design and analysis).

(h) A minor of twenty-one hours in one discipline, including at least six hours numbered above 300 which is approved by the department concerned and the student’s mathematics faculty advisor.

[NOTE: Students who expect to work in industry or pursue graduate study in applied mathematics are urged to select a minor in science or engineering.]

Graduate Programs

The mathematics graduate faculty offers courses in mathematics (MA) and statistics (ST) to satisfy the requirements for an MA degree in mathematics and to satisfy individual needs for courses to supplement other areas of study. The PhD 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 twelve hours of electives which must be selected so that the program includes an approved six hour sequence; or

(b) Twenty-one 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 requirement 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 three hours of approved electives;

(c) An approved thesis or nine 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 twenty-four 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 six hours of non-MA courses are applicable to the MA degree in mathematics. Students choosing the thesis option must include at least fifteen hours from 600 level or higher courses. Students who choose the non-thesis option must include at least twenty-one hours from 600 level or higher 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 nine 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 sixty hours of work, and
(b) Score at least 1,000 on the aptitude portion of the GRE.

An applicant whose scholastic record does not fully meet the requirements for admission may be admitted provisionally (see section on School of Graduate Studies).

Mathematics (MA)

NOTE:

1. No student may receive more than six hours credit for MA courses numbered below 150 or more than three hours credit for MA courses numbered below 120.

2. Students placed at Level II may receive no more than three 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 must remove these deficiencies prior to enrollment in MA courses numbered 100 or above.

5. No student may enroll in his first MA courses at UAH prior to determination of his placement level.

004 High School Algebra
For students with a deficiency of high school credit in algebra.

033 High School Geometry
For students with a deficiency of high school credit in geometry. Prerequisite: MA 004 or one unit of high school algebra.

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

105 **College Algebra** 3 hrs.
No credit given to students who have received credit for another MA course or who are placed at Level II or above. Sets, set operations, the real number system, equations in one variable, polynomials, rational expressions, exponents and radicals, systems of linear equations, matrices, determinants, relations and functions, the exponential and logarithmic functions. Prerequisite: One unit of high school algebra and Level I placement.

119 **Percalculus I** 3 hrs.
Should be taken only by students who are going on to MA 121 and 153. No credit given to students who have received credit for another MA course or who 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** 3 hrs.
Should be taken only by students who are going on to MA 153. No credit given to students who have successfully completed an MA course numbered above 121 or who 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** 3 hrs.
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 III placement.

151 **An Introduction to Calculus** 3 hrs.
No credit given to students who have received credit for any other calculus course. Students planning to continue in calculus should begin with MA 153 instead of this course. Sequences, limits, continuity, derivatives, chain rule, derivative tests, logarithm and exponential functions, applications of the derivative, definite integral, techniques of intergration, Fundamental Theorem of Calculus, applications of the integral. Prerequisite: MA 143 or Level III placement.

153 **Calculus and Analytic Geometry** 3 hrs.
Functions, limits, continuity, the derivative, differentials, chain rule, implicit differentiation, applications of the derivative, topics in analytic geometry. Prerequisite: MA 121 or Level III placement.

154 **Calculus and Analytic Geometry** 3 hrs.
The definite integral, the fundamental theorem of calculus, applications of the definite integral, exponential and logarithmic functions, derivatives and integrals of trigonometric and hyperbolic functions and their inverses, integration by parts, trigonometric substitutions, partial fractions. Prerequisite: MA 153.

233 **Calculus and Analytic Geometry** 3 hrs.
Infinite series, polar coordinates, vectors and analytic geometry in three dimensions, vector valued functions. Prerequisite: MA 154.

244 **Introduction to Linear Algebra** 3 hrs.
No credit given to students who have successfully completed either MA 442 or MA 501. Such students must substitute MA 544. Systems of linear equations, matrices, matrix operations, determinants, vector spaces, bases, dimension of a vector space, inner product spaces, Gram-Schmidt process, linear transformation, change of basis, similar matrices, eigenvalues and eigenvectors, diagonalization, and symmetric matrices. Prerequisite: MA 233 or MA 151 and approval of instructor.
251 Calculus and Analytic Geometry 3 hrs.
Partial, differentiation, the chain rule, directional derivatives, tangent plane, Lagrange multipliers, multiple integration, vector fields, line integrals, Green’s Theorem, divergence and curl, surface integrals, Stokes’ Theorem. Prerequisite: MA 233.

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

350 Logic and the Real Number System 3 hrs.
Symbolic logic, set theory, the axiomatic method, abstract algebra, number systems, the real number system and the limit concept. No credit given to students who have successfully completed either MA 442 or MA 502. Prerequisite: MA 244.

352 Introduction to Differential Equations 3 hrs.
First-order differential equations, linear differential equations, linear differential equations with variable and constant coefficients, variation of parameters, Laplace transforms, series solutions, selected applications. Prerequisite: MA 251. It is recommended that the student take MA 244 prior to taking this course for a better understanding of the material in this course.

385 Introduction to Probability 3 hrs.
No credit given to students who have successfully completed MA 585. Finite probability spaces, conditional probability, random variables, expectations, variances, covariances, and introduction to binomial, Poisson, uniform exponential and normal distributions. Prerequisite: MA 151 or MA 154, and one MA course at the 200 level or above.

415 Introduction to Numerical Methods 3 hrs.
Iterative methods for the solution of nonlinear equations, error analysis, acceleration of convergence, interpolation and approximation of functions, numerical integration. Student should be able to use either a digital computer or a programmable calculator. Prerequisite: MA 244, 251, or approval of instructor.

442 Introduction to Abstract Algebra 3 hrs.
Introductory study of groups, rings, integral domains and fields. Elementary theory of numbers. Prerequisite: At least one MA course at 300 level or above.

490 Senior Seminar 1-3 hrs.
The purpose of this course is to enable the mathematics faculty to offer selected undergraduate topics in mathematics. Prerequisite: Approval of instructor.

502 Introduction to Real Analysis 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, 352, 442 or approval of instructor.

Explicit and implicit methods for numerical integration of ordinary differential equations, error bounds, convergence, extrapolation, boundary value problems, an introduction to finite difference methods in partial differential equations. Student should be able to use either a digital computer or a programmable calculator. Prerequisite: MA 244, 352.

521 Introduction to Complex Analysis 3 hrs.
Complex algebra, analytic functions, Cauchy-Riemann equations, exponential, trigonometric, and logarithmic functions, integration. Cauchy integral theorem. Morera’s theorem, Liouville’s theorem, maximum modulus theorem, residue theory, Taylor and Laurent series, and applications. Prerequisite: MA 502 or approval of instructor.

525 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.
526 Partial Differential Equations I 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, wave equation, heat equation, and potential equation. Prerequisite: MA 352.

527 Advanced Vector Calculus 3 hrs.
Brief review of vector algebra and the calculus of vector-valued functions, representation of vector operators in curvilinear coordinates, line and surface integrals, the theorems of Gauss, Green, and Stokes, the Jacobian, and changes of variables in multiple integrals. Prerequisite: MA 352 or approval of instructor.

533 Differential Geometry 3 hrs.
Theory of space curves, the concept of a surface, first and second fundamental forms, foundations of tensor calculus, Gaussian, mean and geodesic curvature. Prerequisite: MA 352.

544 Linear Algebra 3 hrs.
Vector spaces, linear transformations, matrices, determinants, eigenvalues, similarity, linear functionals, bilinear forms, quadratic forms, orthogonal and unitary transformations. Prerequisite: MA 442 or 502.

551 Functions of Several Variables 3 hrs.
Topology of En, 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.
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 and one of MA 385, EG 390, ST 281, or approval of instructor.

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.

615 Numerical Methods for Partial Differential Equations 3 hrs.
Finite difference methods for parabolic, elliptic, and hyperbolic partial differential equations; error analysis, stability, and convergence of finite difference methods. Lab Fee: Level 2. Prerequisite: MA 244, 352, and CS 113 or EG 196.

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.

626 Partial Differential Equations II 3 hrs.
The potential equation, the equations of classical mathematical physics, systems of partial
differential equations, conservation laws, Laplace transform methods, perturbations, variational methods, singular perturbation methods, and special topics. Prerequisite: MA 526.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>633</td>
<td><strong>Geometry</strong></td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Axioms of incidence and order, affine structure</td>
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<td></td>
<td>of the plane, metric properties, isometries,</td>
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<td></td>
<td>similarity transformations, the group of angles,</td>
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<td></td>
<td>orientation. Prerequisite: MA 442, 544 or</td>
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<td></td>
<td>approval of instructor.</td>
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<tr>
<td>642</td>
<td><strong>Abstract Algebra</strong></td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Isomorphism theorems for groups, rings and</td>
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<td></td>
<td>modules, group automorphism, direct products,</td>
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<td>first Sylow theorem, unique factorization domain</td>
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<td>and principal ideal domain, finite fields,</td>
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<td>field extensions, Kronecker's theorem, basic</td>
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<td></td>
<td>notions about modules. Prerequisite: MA 442 or</td>
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<td></td>
<td>approval of instructor.</td>
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<tr>
<td>644</td>
<td><strong>Matrix Theory I</strong></td>
<td>3 hrs.</td>
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<td></td>
<td>Matrix polynomials, characteristic and minimal</td>
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<td>polynomials, functions of matrices, invariant</td>
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<td>polynomials, elementary divisors, similarity of</td>
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<td>matrices, normal forms of a matrix, matrix</td>
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<td></td>
<td>equations, generalized inverses. Prerequisite:</td>
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<td></td>
<td>MA 442 or approval of instructor.</td>
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<tr>
<td>653</td>
<td><strong>Real Analysis I</strong></td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Archimedian ordered fields, the real number</td>
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<td>system, characterization of open and closed</td>
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<td>sets, Lebesgue measure of open, closed, G-delta</td>
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<td>and F-sigma sets, the sigma algebra of</td>
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<td>measurable sets, measurable functions, the</td>
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<td>theorems of Riesz, Egorov, and Luzin,</td>
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<td>sequences of measurable functions, the Riemann</td>
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<td>integral, the Lebesgue integral of bounded,</td>
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<td>nonnegative functions and of general</td>
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<td>measurable functions, Fatou's lemma, and the</td>
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<td></td>
<td>Lebesgue dominated convergence theorem. Prerequisite: MA 570.</td>
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<tr>
<td>656</td>
<td><strong>Complex Analysis I</strong></td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Topology of the complex plane, analytic</td>
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<td>functions of one complex variable, elementary</td>
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<td>functions and their mapping properties, power</td>
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<td>series, complex integration, Cauchy's theorem</td>
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<td>and its consequences, isolated singularites,</td>
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<td>Laurent series, residue theory. Prerequisite:</td>
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<td>MA 502, 551 or approval of instructor.</td>
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<tr>
<td>670</td>
<td><strong>Introduction to Functional Analysis</strong></td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Normed and inner product spaces, finite</td>
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<td>dimensional spaces, product and quotient</td>
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<td>spaces, equivalent norms, the Hahn-Banach</td>
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<td></td>
<td>theorem, the principle of uniform boundedness,</td>
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<td>the open mapping theorem, the Riesz</td>
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<td>representation theorem, complete ortho-normal</td>
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<td>sets, Bessel's inequality, Parseval's identity,</td>
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<td>and conjugate spaces. Prerequisite: MA 570.</td>
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<tr>
<td>671</td>
<td><strong>General Topology</strong></td>
<td>3 hrs.</td>
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<td></td>
<td>Topological spaces, bases, subbases, continuity</td>
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<tr>
<td></td>
<td>and homeomorphisms, topological properties</td>
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<td></td>
<td>(first and second axiom of countability,</td>
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<tr>
<td></td>
<td>separability, Lindelof property, compactness,</td>
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<tr>
<td></td>
<td>connectivity, and separation axioms), heredity</td>
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<tr>
<td></td>
<td>of topological properties, generalized products,</td>
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<tr>
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<td>the product topology, product invariance of</td>
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<tr>
<td></td>
<td>topological properties, and introduction to</td>
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<tr>
<td></td>
<td>Moore-Smith convergence. Prerequisite: MA 570.</td>
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<tr>
<td>685</td>
<td><strong>Stochastic Process</strong></td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Normal, Wiener, stationary and Poisson processes,</td>
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<td>counting and renewal processes, discrete and</td>
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<td>continuous Markov chains, and generalized</td>
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<td>recurrent events. Prerequisite: MA 585, 244 or</td>
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<td></td>
<td>approval of instructor.</td>
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<tr>
<td>690</td>
<td><strong>Special Topics in Mathematics</strong></td>
<td>3 hrs.</td>
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<td>The purpose of this course is to enable the</td>
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<td>mathematics faculty to comply with requests for</td>
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<td>courses in special topics. Prerequisite: Approval of instructor.</td>
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<tr>
<td>699</td>
<td><strong>Master's Thesis</strong></td>
<td>3 hrs.</td>
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<td>Required each term a student is working and</td>
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<td>receiving direction on his master's thesis. A</td>
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<td>minimum of two terms is required for Plan I, MA</td>
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<td>students. A maximum of nine hours of credit is</td>
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<td>awarded upon successful completion of the master's thesis.</td>
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</table>
743 Group Theory
The isomorphism theorems, permutation groups, the basis theorem and the fundamental theorem for finite abelian groups, the Remak-Krull-Schmidt theorem, the Sylow Theorems, normal series, solvable groups, extensions, selected topics in representation theory. Prerequisite: MA 642 or approval of instructor.

744 Matrix Theory II
Special types of complex matrices, nonnegative matrices, stochastic matrices, localization of eigenvalues, and selected advanced topics. Prerequisite: MA 644 or approval of instructor.

752 Theory of Differential Equations
Existence and uniqueness of solutions, initial value problems, theorems of Picard-Lindelof, Cauchy-Peano and Kamke, stability problems, two-point boundary value problems, orthogonal systems, perturbation theory, Poincare-Bendixon theory. Prerequisite: MA 525, 653 or approval of instructor.

754 Real Analysis II
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.

756 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.

785 Advanced Theory of Probability
Probability measure, stochastic independence, modes of convergence, limit theorems, and introduction to Brownian motion. Prerequisite: MA 585, 653 or approval of instructor.

790 Graduate Seminar
The purpose of this course is to enable the mathematics faculty to teach selected topics to students in the Cooperative PhD Program. Prerequisite: Approval of instructor.

799 Doctoral Dissertation
Required each term a student is working and receiving direction on his PhD thesis in the Cooperative PhD Program. Prerequisite: Approval of instructor.

Statistics (ST)

281 Elements of Statistical Inference
Descriptive statistics, fundamentals of probability theory, fundamentals of statistical inference, including estimation and hypothesis testing. Includes Laboratory. Lab Fee: Level 2. Prerequisite: MA 154 or 151. A student cannot receive credit for more than one of ST 281, 281, or HBS 231.

287 Applied Statistics
Collection and presentation of data, averages, dispersion and skewness, binomial, normal X', 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 more than one of ST 281, 287, or HBS 231.

387 Elements of Statistical Analysis
Analysis of variance and multiple comparisons, analysis of covariance, multiple regression and correlations, nonparametric methods. Prerequisite: ST 281 or approval of instructor.
687 Theory of Statistics I
3 hrs.
Distribution of statistics based on ordered samples, asymptotic sampling distributions, maximum likelihood, least squares, and other methods of point estimation, Rao-Blackwell theorem and Cramer-Rao inequality, confidence intervals, regions, and their optimal properties. Neyman-Pearson formulation and tests of simple hypothesis against simple alternatives. Prerequisite: MA 244, 585.

787 Theory of Statistics II
3 hrs.
Continuation of hypothesis testing, likelihood ratio and unbiased tests, uniformly most powerful tests, power function, nonparametric tests, statistical decision theory, distribution and linear models. Prerequisite: ST 687.

Physics Department
Undergraduate Program
The basic courses for a BS degree with a major in physics include PH 111, 112, 113, 201, 241, 310, 311, 312, 321, 331, 351. Three approved AOC' are listed. Other AOC's may be approved after consultation with the student's faculty advisor.

Curriculum I
For working professionally at the BS level or preparation for graduate school.

| 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.

| General Education Requirements (humanities and social sciences) | 30-36 |
| Physics—PH 111, 112, 113, 104, 105, 201, 241, 310, 311, 312, 331, 351 | 30 |
| Chemistry—CH 121-123, 125, 126, 331, 332, 333, 335 | 15 |
| Mathematics—MA 153, 154, 233, 244, 251 | 18 |
| Biology—BY 113-114, 319, 3 hours elective | 14 |
| Electives | 15-21 |

Curriculum III
AOC with double major in physics and secondary education.

| General Education Requirements (humanities and social sciences) | 30-36 |
| Physics—PH 111, 112, 113, 104, 201, 241, 310, 311, 321, 331, 351 | 31 |
| Mathematics—MA 153, 154, 233, 244, 251 | 15 |
| Chemistry—CH 121, 123, 125, 126 | 8 |
| Biology—BY 113 | 4 |

Minor optional with double major.
With Chemistry Minor:
Chemistry—CH 223, 331, 332, 333, 341, 342 or (335, 336) ............... 15
Education major .................................................. 30
Electives ........................................................... 0-4

With Mathematics Minor:
Mathematics—MA 333, 442, 385 or 585 ............................... 9
Education major ................................................... 30
Electives ........................................................... 0-10

With Biology Minor:
Biology—BY 114, 319, eleven hours elective ...................... 18
Education major ................................................... 30
Electives ........................................................... 0-1

Physics for Second Area of Study
Students majoring in elementary education may select physics as their
second area of study. Major requirements can be found in the Education sec­tion of the catalog.
To meet university requirements a minimum of eighteen hours, fifteen of
which must be upper level, are to be selected from courses listed below with the
help of the physics education faculty advisor and approved by the Chairman
of the Department of Physics. This curriculum may require more than the
minimum total of 128 hours for the degree.

Graduate Programs
The physics faculty offers programs of study leading to the Master of
Science degree under Plan I and Plan II and to the Doctor of Philosophy
degree.
General information about the graduate program at UAH and 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 Ap­
proval 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 re­
quired. This option is designed for those students who are oriented towards
theoretical physics and/or for those who desire to complete course re­
quirements 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 Selected Topics. Frequently offered
selected topics courses include Fourier optics, laser physics, electron spin
resonance, microwave properties of solids, physics of plasmas, superconduc-
tivity. 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 PhD program in physics may be obtained from the physics department office.

Admission to the PhD program in physics is dependent upon the performance on the Master of Science Comprehensive Examination. Students entering UAH with an MS degree or previous graduate training in physics are required to take the MS Comprehensive Examination at their earliest opportunity.

A minimum of forty-eight hours of graduate course credit is required for the PhD 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 PhD degree a student must pass the Qualifying Examination. A student must have earned forty-two of graduate credit to be eligible to take the Qualifying Examination. After two or more years of full-time graduate work or the equivalent in part-time work, the student may be required to take the Qualifying Examination. This examination may be taken no more than twice and is designed to test the student's fitness for pursuing a research project in his chosen area and to test his general knowledge of physics.

A significant portion of the dissertation must be submitted for publication in an approved journal with international circulation.

Physics (PH)

Prerequisites for physics courses are listed in the interest of the students. Prerequisites may be waived by the instructor or the department chairman for auditors or students with equivalent experience.

101 General Physics 4 hrs.
Introductory course for the nonscience student. Phenomenological in nature with emphasis on understanding basic ideas of physics and ability to apply these ideas to specific problems. Subject 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. Subjects 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.
Introductory course for science and engineering students. Phenomenological and quantitative in nature with emphasis on understanding basic ideas of physics and ability to apply these ideas to specific problems. Subjects 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, spring.

112 General Physics with Calculus II 4 hrs.
Continuation of PH 111. Subjects 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. Fall, winter, spring.

113 General Physics with Calculus III 2 hrs.
Continuation of PH 111-112. Modern physics part of the general physics sequence. Subjects include relativity, quantum effects, atomic and nuclear structure, and elementary particles. May be taken parallel to PH 112. Fall, spring.

201 Mechanics 3 hrs.
Galilean invariance; energy and momentum; nonrelativistic particle kinematics and dynamics; harmonic oscillator; Lorentz transformations; relativistic momentum, energy, and dynamics. Prerequisite: PH 101 or 111. Prerequisite or parallel: MA 233. Fall, spring.

241 Waves and Oscillations 3 hrs.
Introduction to periodic phenomena, free oscillators, forced oscillators, traveling waves, modulation and Fourier analysis. Prerequisite: PH 201. Prerequisite or parallel: MA 244. Winter, summer.

310 Intermediate Laboratory I 1 hr.

311 Intermediate Laboratory II 1 hr.
Electronic instrumentation, electric fields, motion of charged particles. Lab Fee: Level 3. Prerequisite or parallel: PH 331. Spring.

312 Intermediate Laboratory III 1 hr.
Electric circuits, acoustics and fluids, optics. Prerequisite: PH 311. Fall.

321 Thermal and Statistical Physics 3 hrs.
Microscopic systems, equilibrium, heat and temperature, irreversibility; probability and statistics; thermal interactions, approach to equilibrium, mean energy and pressure of ideal gas; 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 Nonnuclear Energy Studies 3 hrs.
Topics in nonnuclear technologies including oil recovery and coal mining techniques, hydrogen and synthetic fuel production, energy storage techniques, solar voltaic conver-
sion, 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 inertially-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.

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. Summer.

413 Nuclear Physics Laboratory 1 hr.
Statistics in counting processes, beta-ray continuum, scintillation spectroscopy. Fall.

414 Solid State Physics Laboratory 1 hr.
Fundamental solid state experiments, including electron paramagnetic resonance, nuclear magnetic resonance, Hall effect, cyclotron resonance, Mossbauer spectroscopy. Lab Fee: Level 2. Winter.

415 X-Ray Laboratory 1 hr.
Powder and single crystal x-ray photography with theory as needed. Lab Fee: Level 3. Spring.

416 Senior Laboratory 1 hr.
Selected experiments from PH 412-415. Lab Fee: Level 3. Offered upon demand.

420 Senior Thesis 3 hrs.
Semioriginal work performed under the direction of a faculty member. Lab Fee: Level 4. Offered upon demand.

431 Intermediate Electricity and Magnetism 3 hrs.
Development of Maxwell's equations for time-varying fields, basic concepts of AC circuit
<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
<th>Semester</th>
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</thead>
<tbody>
<tr>
<td>506</td>
<td>Introduction to Astrophysics of Stellar Systems</td>
<td>3 hrs.</td>
<td>PH 331, MA 352</td>
<td>Spring</td>
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<td></td>
<td>Review 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.</td>
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<td>521</td>
<td>Thermal Physics</td>
<td>3 hrs.</td>
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<td></td>
<td>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.</td>
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<tr>
<td>531</td>
<td>Introduction To Plasma Dynamics</td>
<td>3 hrs.</td>
<td>PH 431</td>
<td>Summer</td>
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<td>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. Prerequisite: PH 431 and PH 321. Winter.</td>
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<tr>
<td>536</td>
<td>Introduction to Space Physics</td>
<td>3 hrs.</td>
<td>PH 351, 431</td>
<td>Spring</td>
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<td></td>
<td>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.</td>
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<td>541</td>
<td>Optics</td>
<td>3 hrs.</td>
<td>PH 431</td>
<td>Fall</td>
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<td></td>
<td>Review geometrical optics. Physical optics including interference, diffraction, partial coherence, polarization, interaction of radiation with matter. Prerequisite: PH 431. Fall.</td>
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<tr>
<td>551</td>
<td>Introductory Quantum Mechanics</td>
<td>3 hrs.</td>
<td>PH 351, 401, 431</td>
<td>Fall</td>
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<td></td>
<td>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.</td>
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<tr>
<td>552</td>
<td>Introductory Quantum Mechanics</td>
<td>3 hrs.</td>
<td>PH 551</td>
<td>Winter</td>
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<td>Continuation of PH 551. Prerequisite: PH 551. Winter. Same as CH 554.</td>
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<td>561</td>
<td>Introduction to Solid State Physics</td>
<td>3 hrs.</td>
<td>PH 551</td>
<td>Winter</td>
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<td>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.</td>
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<tr>
<td>565</td>
<td>Introduction to Nuclear Physics</td>
<td>3 hrs.</td>
<td>PH 552</td>
<td>Spring</td>
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<td>Stable nuclei, isotopes, nuclear reactions, nuclidian masses, binding energy, scattering experiments, nuclear cross sections, spins, energy levels, nuclear models. Prerequisite or parallel: PH 552. Spring.</td>
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<tr>
<td>571</td>
<td>Introduction to Elementary Particles</td>
<td>3 hrs.</td>
<td>PH 552</td>
<td>Summer</td>
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<td></td>
<td>Invariance principles and quantum numbers, symmetry schemes, scattering and reactions, resonances, strong-interaction dynamics, and weak interactions. Prerequisite: PH 552. Summer.</td>
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<tr>
<td>601</td>
<td>Classical Dynamics</td>
<td>3 hrs.</td>
<td>PH 401</td>
<td>Spring</td>
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<tr>
<td>607</td>
<td>Mathematical Methods I</td>
<td>3 hrs.</td>
<td>MA 521</td>
<td>Fall</td>
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<td></td>
<td>Review 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. Prerequisite: MA 521. Fall.</td>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>609</td>
<td>Mathematical Methods II</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Orthogonal functions, Gamma functions, Bessel</td>
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<td>functions, Legendre functions, special</td>
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<td>functions, Fourier series, Integral transforms</td>
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<td>and equations. Prerequisite: 607. Winter.</td>
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<td>622</td>
<td>Kinetic Theory and Statistical Mechanics</td>
<td>3 hrs.</td>
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<td>Review thermodynamics, kinetic theory, classical</td>
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<td>statistical mechanics, canonical and</td>
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<td>grand canonical ensembles, quantum statistical</td>
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<td>mechanics, Bose and Fermi statistics, the</td>
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<td>partition function. Prerequisite: PH 521, 552,</td>
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<td>MA 521. Fall.</td>
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<tr>
<td>631</td>
<td>Electromagnetic Theory I</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>The electrostatic and magnetostatic fields in</td>
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<td>vacuum and material matter. Conservation</td>
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<td>laws. The homogeneous wave equations. Prerequisite:</td>
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<td>PH 431, 607, MA 521. Spring.</td>
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<tr>
<td>632</td>
<td>Electromagnetic Theory II</td>
<td>3 hrs.</td>
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<tr>
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<td>The inhomogeneous wave equation and sources.</td>
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<td></td>
<td>Introduction to special relativity. Radiation</td>
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<td>from accelerated charges. Hamiltonian formulation</td>
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<td>of electrodynamics. Prerequisite: PH 631. Summer.</td>
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<tr>
<td>641</td>
<td>Optics II</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Selected topics from advanced optics including</td>
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<td>Fresnel and Fraunhofer diffraction, theory of</td>
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<td>aberrations, theory of partial coherence</td>
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<td>including laser applications. Prerequisite: PH</td>
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<td>541. Winter.</td>
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<tr>
<td>651</td>
<td>Quantum Mechanics I</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Review basic principles, general formulation in</td>
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<td>Hilbert space, angular momentum, steady-state</td>
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<td>perturbation theory, scattering theory and</td>
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<td>applications. Prerequisite: PH 552, 601, 609.</td>
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<td></td>
<td>Winter.</td>
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</tr>
<tr>
<td>652</td>
<td>Quantum Mechanics II</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Identical particles, symmetry principles, time-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>dependent perturbation theory, variational</td>
<td></td>
</tr>
<tr>
<td></td>
<td>principles, formal scattering theory. Prerequisite:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PH 651. Spring.</td>
<td></td>
</tr>
<tr>
<td>661</td>
<td>Intermediate Solid State Physics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Topics surveyed include semiconductor crystals,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>superconductivity, dielectric polarization,</td>
<td></td>
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<tr>
<td></td>
<td>ferroelectric crystals, diamagnetism, paramagnet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ism, ferromagnetism, antiferromagnetism,</td>
<td></td>
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<tr>
<td></td>
<td>magnetic resonance, optical phenomena in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>insulators, point defects and dislocations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prerequisite: PH 561 or equivalent. Prerequisite</td>
<td></td>
</tr>
<tr>
<td></td>
<td>or parallel: PH 631. Spring.</td>
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<tr>
<td>680-689</td>
<td>Selected Topics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Offered upon demand. Previous topics include</td>
<td></td>
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<tr>
<td></td>
<td>superconductivity, optical properties of solids</td>
<td></td>
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<tr>
<td></td>
<td>in the infrared, laser propagation, collision</td>
<td></td>
</tr>
<tr>
<td></td>
<td>theory, quantum electronics and microwave</td>
<td></td>
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<tr>
<td></td>
<td>properties of solids.</td>
<td></td>
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<tr>
<td>699</td>
<td>Master's Thesis</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>A minimum of two terms required for MS students.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A maximum of nine hours of credit is awarded</td>
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<tr>
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<td>upon successful completion of the master's thesis.</td>
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</tr>
<tr>
<td>702</td>
<td>Advanced Classical Dynamics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Review Lagrangian and Hamiltonian dynamics,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>canonical transformation, Hamilton-Jacobi</td>
<td></td>
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<tr>
<td></td>
<td>theory, Lagrangian field theory, selected topics.</td>
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<tr>
<td></td>
<td>Prerequisite: PH 601. Fall.</td>
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</tr>
<tr>
<td>705</td>
<td>Relativity</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study the special and the general theory, with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>emphasis on a covariant formulation of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>electrodynamics. Prerequisite: PH 601, 631.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spring.</td>
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<tr>
<td>723</td>
<td>Kinetic Theory and Statistical Mechanics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Advanced topics in kinetic theory and</td>
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<tr>
<td></td>
<td>statistical mechanics. Prerequisite: PH 622.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Summer.</td>
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</tr>
<tr>
<td>753</td>
<td>Advanced Quantum Mechanics</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Relativistic wave equations, second quantization,</td>
<td></td>
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<tr>
<td></td>
<td>interacting fields, Feynman techniques. Prerequisite:</td>
<td></td>
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<tr>
<td></td>
<td>PH 652. Summer.</td>
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</tbody>
</table>
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.

780-789 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 microwaves properties of solids.

792  Physics Seminar  No Credit
Students report on journal articles or individual research. Prerequisite: PH 552. Two terms required for MS students. Fall, winter, spring.

799  Doctoral Dissertation  3, 6, or 9 hrs.
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 and to prepare him to practice nursing now and in the future. In addition, the curriculum prepares one to pursue graduate study. 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, 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 their 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 as well as 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 a least one-half of the major nursing courses must be earned at UAH to complete requirements for the Bachelor of Science in Nursing degree.

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 care 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 any registration. This information must be on file with the Coordinator of the Lower Division prior to registration.

2. 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.

3. 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.

Responsibility to Agencies:

Students practicing in patient-care agencies are responsible for complying with all policies and procedures required by the agency which includes coverage by malpractice insurance when enrolled in clinical courses. Failure to meet this requirement may mean that the student will be excluded from required practice which may prevent completion of the program.

Baccalaureate Program

Lower Division  

Semester Hours

<table>
<thead>
<tr>
<th>Natural Science and Mathematics:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Science (Biology, Chemistry, Physics)</td>
</tr>
<tr>
<td>Human Ecology (Physiology, Microbiology, Epidemiology, Immunology)</td>
</tr>
<tr>
<td>Statistical Concepts (A statistics course offered in any department will meet this requirement)</td>
</tr>
<tr>
<td>Mathematics, freshman level (or Level II placement)</td>
</tr>
</tbody>
</table>

26
Social and Behavioral Sciences:
Sociology and Psychology (Two courses in one of the fields and one course in the other field) ................................................................. 9
Electives ................................................................................. 9

18

Humanities:
English Composition ................................................................. 6
Literature or History (Two courses in sequence) .......................... 6
Electives ................................................................................. 6

18

Upper Division
Nursing Major
Bases of Nursing Practice ......................................................... 24
Episodic Nursing ..................................................................... 8
Distributive Nursing ................................................................. 8
Nursing Roles in Delivery of Health Services ......................... 4
Independent Study .................................................................. 4

48

Electives ................................................................................. 18

Summary
A total of 128 semester hours of credit is required for the BSN 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 eighteen semester hours of related courses which support an area of nursing practice. The secondary area of concentration must include at least six hours of upper division courses, three 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. All lower division requirements must be completed before 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>2</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>
<td>2</td>
</tr>
</tbody>
</table>

23
A minimum of thirty-six semester hours of credit is required for the MSN degree. Twenty-three semester hours as specified in the program of studies are required in nursing. Additional hours may be added through appropriate electives.

In addition to the requirements for the School of Graduate Studies, the requirements for the Master of Science in Nursing are:

1. Twenty-three semester hours of graduate course 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 fifty percent of all courses offered for the degree must be numbered 600 or above.
5. Master's 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. Present 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, when possible.
7. Successful nursing practice.

Nursing (NUR)

301 Integration of Self into Systems 1 hr.
Experimental course on enhancement of self-awareness and exploration of thoughts, feelings, and behavior which will support transition into social and professional systems. Elective.

321 Principles of Pharmacology 2 hrs.
Supplement to Nursing 382, 383 for students who desire to expand their theoretical base of knowledge about drugs currently utilized in medical modalities. Elective; may not be used as a component of the secondary area of concentration. Prerequisite: NUR 381 or approval of instructor.

331 Nursing Care of the Person with a Long-Term Illness 3 hrs.
The effects of long-term illness on the growth, development, and adjustment of a person and his family. Focus 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.
The effect of surgical intervention on the growth and development of the person and the subsequent adjustment of himself and his family. Focus on the family centered intervention prior to, during and after surgery. Emphasis on promoting the highest level of rehabilitation possible for the individual and his family. Elective. Prerequisite: NUR 381 and approval of instructor.

333 Nursing Care of the Acutely Ill Child through Adolescence 3 hrs.
Provides an opportunity to facilitate the adaptation of acutely ill children through adolescence utilizing a family-centered approach. Elective. Prerequisite: NUR 381 and approval 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.

335 Family-Centered Maternal-Infant Care 3 hrs.
The emphasis 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. Prerequisite: NUR 381, 382, and approval of instructor. Elective.

336 Origins and Development of the Contemporary Profession of Nursing 3 hrs.
Emphasis on the historical development and present significance of nursing theory, practice, and research. Elective; may not be used as a component of the secondary area of concentration.

381 Bases of Nursing Practice, I 8 hrs.
Builds on 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.
Focus on 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. Prerequisite: 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. Prerequisite: NUR 381 and approval of proposal by instructor and dean.

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 approval 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. Prerequisite: NUR 481, 482 and approval of instructor.
435 Clinical Psychiatric Nursing 3 hrs.
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. Prerequisite: NUR 481, 482 and approval of instructor.

441 Independent Study 4 hrs.
Student-initiated, faculty-guided experience or research to support selected functional role. Prerequisite: NUR 381, 382, 383, 443 (may be concurrent), 481, and 482.

443 Nursing Roles in Delivery of Health Services 4 hrs.
Nursing roles and functions in systems of delivery of health services. Study existing and emerging systems; emphasis on creating new approaches on basis of systems and organizational theories. Preceptorship included. Prerequisite: NUR 381, 382, 383, 481, and 482.

481 Episodic Nursing 8 hrs.
Nursing patients with complex medical, surgical and psychiatric conditions requiring episodes of hospitalization. Prerequisite: 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. Prerequisite: 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. Elective. Prerequisite: Approval of instructor.

Eligibility, for graduate clinical nursing courses is dependent upon acceptance into the School of Nursing graduate program.

600 Professional Practice 3 hrs.
The emergence of professional nursing practice and thought provides a base for assessing the state-of-the-art and for planning for future development. Emphasis given to family nursing practice.

601 Development of Nursing Theory 2 hrs.
Seminar. The concepts of theory and theory building explored and practiced in a clinical setting. Focus on implications of theory building for nursing practice and its application to research in nursing.

602 Seminar in Research 2 hrs.
Seminar. 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.
Application of the research or investigative process with faculty guidance. 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, increase understanding and identify anticipated and existing physiological alterations as they affect the individual and the family.

621 Family Nursing Care of Mothers and Infants 4 hrs.
Advanced nursing theory and clinical practicum; 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; assume responsibility for providing nurs-
ing 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; 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.
Assume total nursing responsibility for selected families. Discussion and guidance will be provided conjointly by the responsible medical and nursing faculty members. 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 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. Focus on professional education at the baccalaureate level.

650 Independent Study 2-4 hrs.
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.
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)

<table>
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<tr>
<th>Course</th>
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<tr>
<td>100</td>
<td>Introduction to Library Research</td>
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<tr>
<td></td>
<td>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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<tr>
<td>310</td>
<td>Bibliography of British and American Philology</td>
<td>1 hr.</td>
</tr>
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<tr>
<td>316</td>
<td>Bibliography of German Philology</td>
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<tr>
<td>318</td>
<td>Bibliography of Romantic Philology</td>
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<td>Bibliography of American History</td>
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<td>345</td>
<td>Bibliography of the Health Sciences</td>
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<tr>
<td>360</td>
<td>Bibliography of Behavioral Science</td>
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<tr>
<td>380</td>
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<tr>
<td>385</td>
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</tbody>
</table>
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.
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 (UASMEP). The UAH School of Primary Medical Care offers a complete 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 coursework 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 Premedical or Predental 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

In accord with the mission, goals, and objectives of the University of Alabama System Medical Education Program, the mission of the UAH School of Primary Medical Care is to develop and maintain:

1. A complete clinical program for junior and senior medical students that demonstrates the primary care disciplines as viable career options.
2. Residency training programs in the traditional primary care disciplines, in order to contribute practicing physicians to meet the needs of Alabama.
3. A continuing medical education program to provide physicians and other
health care professionals in North Alabama an opportunity to stay abreast of advances in patient care.

4. Research in the psychosocial and socioeconomic areas related to medicine and health care in general, as well as traditional biomedical research.

5. Continuous documentation and monitoring of quality patient care.

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

The medical student curriculum is determined by the School of Primary Medical Care faculty with the agreement of the Curriculum Committee of UASMEP. The family practice residency curriculum is determined by the SPMC faculty in family medicine with the agreement of Huntsville Hospital and the approval of the joint Residency Review Committee for Family Practice. All educational programs of the UAH School of Primary Medical Care are subject to change through the mechanisms described above without prior notice.

Student Medical Education

The two-year clinical program of the School of Primary Medical Care completes the qualifications of students for the MD 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 all disciplines. 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 assignments, 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:

1. Each student is assigned patient families to be seen in the 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. A “Dean’s hour” covering topics of clinical and professional importance which are not included in the core clerkships may be held weekly throughout the core clinical experience. Faculty from clinical programs participate as well as invited guest lecturers. The topics may include a review of clinical and laboratory skills, social sciences in medicine, medical ethics, review of clinical physiology, and professional growth seminars.

The clinical electives offered by the UAH School of Primary Medical Care are characterized by:

1. A one-to-one faculty-student relationship, in most offerings.
2. Experience with both hospital and ambulatory patient care.
3. Experience in early diagnosis of illness.
4. Experience, through private practice exposure, in the nonmedical aspects of health care and practice that are frequently not taught in the formal curriculum.

Electives
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

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.
The curriculum for family practice residents is divided into two phases. The first eighteen months constitute Phase 1. During this time the resident receives in-depth hospital experience in medicine, pediatrics, surgery, obstetrics and gynecology, cardiology, gastroenterology, and emergency service. Rotations in neurology, 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 during the first year and two half-days during the first six months of the second year. 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.

The next eighteen months is spent mainly in Family Practice. Patients are seen daily in the Family Practice Center seven half-days per week, and those needing hospitalization are admitted to the Family Practice Service in Huntsville Hospital. Rounds are made each morning with discussion of patients preceding the patient visits. Residents are rotated through specialty clinics in the Ambulatory Care Center three half-days per week. 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 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 variety of supporting services are readily available. An on-going noontime conference schedule and a Thursday afternoon nonclinical teaching experience make up the remainder of the program.

Further information on the UAH-Huntsville Hospital Family Practice Residency Program is available from: Director of the Family Practice Residency, Ambulatory Care Center, 201 Governors Drive, S.W., Huntsville, Alabama 35801.

**Resources and Facilities**

In all aspects of its work, the UAH School of Primary Medical Care depends on the active cooperation of the hospitals and medical professionals of North Alabama. The largest hospital in North Alabama, Huntsville Hospital is a nonprofit 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. Huntsville Hospital and the Clinical Science Center and Ambulatory Care Center of the UAH School of Primary Medical Care form a geographic and functional nucleus for health care education and delivery.

The UAH Ambulatory Care Center has been arranged, staffed, and equipped to facilitate demonstration of how primary physicians' office practices, consultant services, and community resources may be integrated 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.

Biomedical research is conducted in the UAH Clinical Science Center in specially designed and equipped laboratories, including the only human diagnostic virology laboratory in the area. The location of the School's Health Sciences Library in this building in the Huntsville Medical District makes the collection conveniently available to area physicians and other health professionals as well as to medical students, residents, and faculty.

Through the UAH Library, of which it is a component, the 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 in the SPMC Health Sciences Library makes available to the faculty and other members of the Huntsville medical community on-line searches through the data base of the National Library of Medicine.

The UAH Library is a member of NABIN (North Alabama Biomedical Information Network), which facilitates the rapid exchange of biomedical information among libraries and other 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 growing number of medical schools that are organically integrated into the life of their communities, drawing on existing facilities and professional personnel and, in return, expanding and diversifying the health services available.
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 School of Graduate Studies. 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.

**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 thirteen semester hours remaining to be taken.
2. An overall undergraduate average or an average on the last sixty hours of at least 2.0 (B).
3. A total course load of less than twelve semester hours.

**Application Procedure**

Applicant must submit: (1) Completed graduate application form (available
in the Office of Admissions and Records); (2) nonrefundable application fee of $15. In addition, the student must request the following items to be sent to the Office of Admissions and Records: (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 Office of Admissions and Records no later than dates specified in the UAH Calendar.

Applicants are urged to initiate action 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 School of Graduate Studies of The University of Alabama in Huntsville must submit a completed re-evaluation form to the Office of Admission and Records.

Members of the university faculty with rank above that of instructor may not pursue work toward an advanced degree at The University of Alabama in Huntsville.

Requirements For Admission

For admission to the School of Graduate Studies, an applicant 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 sixty 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 Office of Admissions and Records.

Students applying for admission to the School of Graduate Studies may be admitted on a probationary basis, based on a minimum score of fifty 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 sixty hours of at least 2.0 or (4) a score on the Miller Analogies Test of at least fifty.

Nondegree 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 nondegree graduate student and be continued on a term-by-term basis. Admission in this category may be granted to students submit-
ting evidence of at least a bachelor’s degree from an accredited institution. The student must maintain the same QPA grade requirements expected of the probationally admitted graduate student. Courses taken while in this category must have prior approval by the department offering the course and the graduate dean.

Credit earned under a nondegree graduate status may be applied toward a graduate degree program 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 twelve semester hours toward the degree. If the student is not admissible, the nondegree graduate credit may be considered in lieu of irregular postgraduate requirements.

Unclassified Admission
A person who desires to obtain graduate credits without pursuing one of the degree programs may be admitted as unclassified, provided that the applicant meets the qualifications outlined for probational admission.

Change in Major
A student previously admitted to the School of Graduate Studies 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
Refer to admission as an IPG student in the Admissions Information section of this catalog.

Registration
A student must be admitted to the School of Graduate Studies 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 ten semester hours per term. Students employed full time (forty or more clock hours per week) can schedule no more than three 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 three-hour courses per academic year [nine 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 School of Graduate Studies; 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 fifty percent of the hours required for a graduate degree must be completed in courses numbered 600 or above.

**Probationary Status:**

1. A student admitted on 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 twelve 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 twelve 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 School of Graduate Studies. In exceptional cases, a student may be readmitted upon recommendation of the faculty in the major department and approval by the graduate dean.

**The Master's Degree**

To avoid wasted effort, students are encouraged to plan a Program of Study before the completion of twelve 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 twenty-four 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 Office of Admissions and Records. If additional copies are required by the student, the current fee is $4.25 per additional copy. Theses must comply with the regulations set forth in the *Guide for Preparation of Theses and Dissertations at The University of Alabama in Huntsville* which is available at the Office of Admissions and Records.

In exceptional cases, theses may be written in absentia. To obtain permis-
sion 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 thirty-three semester hours of graduate course work. A thesis is not required. The degree requirements may be met with a minimum of thirty semester hours of graduate course work if the student enrolls full time (six to ten semester hours per term) for at least three terms.

A candidate working under Plan Two may be required to participate successfully in a 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 twelve 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.

Credit for courses transferred from other institutions cannot be validated by UAH.

Second Master's Degree

A student is permitted to apply no more than six semester hours of credit earned for one graduate degree toward an additional master's degree at UAH at the discretion of the major department.
Examinations

In addition to the regular course examinations, a final comprehensive examination is required of all candidates for the master's degree. This examination may be written, oral, or both. If a thesis is submitted and a written examination 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 three 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 Office of Admissions and Records during the term in which all remaining requirements for the degree are to be met, but at least two months before it is to be conferred.

The Doctor of Philosophy Degree

The doctor of philosophy degree is a research-oriented degree awarded upon the demonstration of scholarly competence. The degree program at UAH is based on the successful completion of a program of study, designed by the student and a faculty committee. The program includes mastery of certain tool skills (languages, computer programming, statistics, and others approved by the Graduate Council) 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 School of Graduate Studies 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 School of Graduate Studies 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 ac-
ceptable 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 twelve 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 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. The Supervisory Committee will examine the students 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.

**Time Limit**

All requirements for the doctoral degree must be completed in not more than five years after the student has passed the Qualifying Examination.

**Admission to Candidacy**

Upon successful completion of the Qualifying Examination and the requirements for ancillary skills the student may be admitted to candidacy for the degree. Admission to candidacy is based on the recommendation of the student’s supervisory committee and the appropriate department, and is approved by the graduate dean. It is the responsibility of the student to secure the appropriate forms from the Office of Admissions and Records and to initiate the procedure for admission to candidacy at least six months 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 Office of Admissions and Records. If additional copies are required by the student, the current fee is $4.25 per additional copy. A copy of the dissertation must be submitted for microfilming to University Microfilms International by the time of graduation. Dissertations must comply with the regulations set forth in the Guide for Preparation of Theses and Dissertations at The University of Alabama in Huntsville, which is available at the Office of Admissions and Records. Approval by the graduate dean is necessary before graduation.

**Application for Degree**

Each candidate for a PhD degree must apply for the degree through the Office of Admissions and Records during the term in which all remaining requirements for the degree are to be met, but at least two months before it is to be conferred.

**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 PhD Programs**

Close cooperation on PhD 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 School of Graduate Studies. Upon begin 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) eighteen 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.
General Information

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 Division offers credit and noncredit 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 attendees. Many are scheduled in the evening and on a short-term basis. 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. Services provided by the division include the following:

Community Services
Today, education is not only career oriented. Many individuals are looking for educational programs to satisfy interests, promote personal growth, keep up with societal changes that affect daily life, and fill leisure hours with meaningful activity.

The Community Services component of the division is designed to provide such educational programs. Its primary objective is to make the expertise and resources found in the university more readily accessible to the North Alabama community. In this effort, we present the UAH Speakers Bureau and Listener’s License Program; work closely with local service oriented agencies, civic groups, and professional organizations; and present a variety of noncredit programs tailored to meet educational, cultural, athletic and humanistic needs.

Administrative Studies
The Office of Administrative Studies serves as the primary liaison between the university and business and industry in this region. It has the responsibility of coordinating the administrative and logistical details for all business related credit and noncredit conferences, workshops, short courses, seminars and special training programs sponsored by the university. This office is responsive to university departments, professional businesses and industrial groups in developing instructional services in administrative areas.
Technical Studies
The Office of Technical Studies is charged with the responsibility of organizing and administering activities which provide for training in the scientific and teaching professions. Such activities fall into three categories: (1) Activities that comprise in-service training programs designed specifically for industrial and governmental organizations; (2) refresher courses for various scientific and professional areas; and (3) activities that provide for the dissemination of technology transfer. The purpose of technical studies is to offer additional educational opportunities to those individuals who have a desire to pursue particular technological and scientific studies apart from or beyond degree sequences and to those individuals with professional skills that require updating and upgrading.

Emergency Medical Technician-Paramedic Training
The Division of Continuous Education offers advanced training to those persons involved in emergency medical service who have already completed an Emergency Medical Technician-Basic course and Emergency Medical Technician-Intermediate course. This level of training integrates pathophysiology, pharmacology and emergency patient management. Upon successful completion of the course, the student is qualified to make application for licensure as an Emergency Medical Technician-Paramedic through the State Bureau of Public Health.

Admission and Credit
Applications for noncredit 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 noncredit 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 Division of Continuous Education.

Persons desiring to have credit earned through the Division of Continuous Education 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 special nondegree student. If the student later is admitted as a regular student, the credit will count if applicable in an undergraduate degree program.

The application to enroll as a special nondegree student may be completed at the time of registration. No transcripts or other credentials are required. A special nondegree student must certify that he or she is (1) a high school graduate or has a satisfactory grade on the GED, (2) has the stated prerequisites for the course desired, and (3) is not under current suspension from another institution. For further information please refer to the Admissions Information section in this catalog.

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 Division of Continuous Education. 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 noncredit 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 re-entering 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 sixty semester hours credit, including twenty-four to twenty-six hours in general education requirements, thirty 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 eighteen semester hours, including six hours in specialty courses, in classes through UAH and must complete six of the last nine 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 thirty 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 twenty-four to twenty-six semester hours credit as follows:

1. English Composition, six hours in (a) EH 101 and EH 102, or (b) CLEP English Composition Examination.

2. History-Social Sciences, six 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, six to eight 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, six 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 thirty semester hours in specialty and supporting courses as follows.

**Specialty Courses:** CD 101 and CD 203 required; minimum of nine 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 thirty semester hours in specialty and supporting courses as follows.

**Specialty Courses:** LE 101 required; minimum of twelve 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 thirty 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).
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 thirty semester hours credit, including three to six 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 twelve semester hours in classes through UAH, and must complete six of the last nine hours credit through this institution. Up to fifteen 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).

Noncredit Certificate Programs

In addition to the academic certificate programs, the Division of Continuous Education offers certificate programs based on noncredit courses. These programs are open to any adult; 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, Supervisory Management, and Hotel and Motel Management. Brochures for these programs can be obtained by writing the Division of Continuous Education or by visiting the Continuous Education Center on campus.

Licensing and Certificate Examinations

The Division of Continuous Education also offers review courses which prepare participants for professional certificate examinations. The Certificate in Management Accounting Review course, Chartered Life Underwriter study courses, and Quality Engineering Certification review courses are currently being offered. 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 educa-
tion 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.

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 discussion, 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 sixteen years of age and/or a high school senior. Students under disciplinary or academic suspension are ineligible to register as listener’s.

Declaration of Intent (DOI)

The DOI Form is a document prepared cooperatively by the 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; and Noncredit 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, in cooperation with academic units, primarily for the Academic Certificate programs described in the previous sections.

Child Development (CD)

101 Introduction to Child Development 3 hrs.
Introduction to the physical, social, emotional, and mental development of the young child; survey of the work functions, employment opportunities, and responsibilities of personnel trained in child development.

102 Child Nutrition and Health Care 3 hrs.
Basic information on human nutrition, the nutritional value of food, and the relationship of food and food habits to nutrition of the young child; fundamental descriptions of diseases and disorders of children, preventive medicine, emergency treatment, and care of handicapped children.

201 Creative Activities 3 hrs.
Introduction to art and simple science media for use with young children; principles relating to the choice, use, and value of creative media in enrichment opportunities for children.
202 Language Development 3 hrs.
Study the development of speech and language in the young child; basis for language growth; language arts in preschool and elementary school programs; introduction to written expression; identification of speech problems. Prerequisite: CD 101 or permission of coordinator.

203 Teaching the Young Child 3 hrs.
Study the total pattern of child development, curriculum, learning, methods, and guidance of the child from two to nine years of age; analysis of curricula for various types of preschool programs; introduction to basic testing and evaluating the young child. Prerequisite: CD 101 or permission of coordinator.

301 Preschool Programs and Centers 3 hrs.
Detailed study of preschool programs and centers. History and philosophy of preschool programs; legislation, standards, and program planning; practical aspects of financing, administration, supervision, management, and evaluation. Prerequisite: CD 101 or permission of coordinator.

302 Preschool Practicum 3 hrs.
A structured program of observation and participation in a preschool center. Prerequisite: Twelve semester hours in CD courses, including CD 101.

Interior Decoration (ID)

101 Fundamentals of Home Furnishings 3 hrs.
Introductory survey of furnishings for the home. Design terms; styles of furniture; basic decoration methods including furniture arrangement, elements of color, window treatment, accessories, and lighting; and customer buying of furniture, floor coverings, fabrics, and wall coverings.

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

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

201 Introductory Architectural Planning 3 hrs.
Survey of architectural planning and drawing, primarily as these topics relate to interior decoration. Basic drawing and sketching; planning processes for home and light-commercial buildings; construction materials; elements of construction methods; introduction to preparation of architectural drawings.

202 Interior Decoration Problems 3 hrs.
Detailed study of selected problems in interior decoration. Practical applications in combining furniture, accessories, materials, and finishes; development of a portfolio of materials; ethics in commercial interior decoration. Prerequisite: ID 102.

309 Period Styles 3 hrs.
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 background for related styles of furnishings. Same as ARH 309.
### Law Enforcement (LE)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Introduction to Criminal Justice</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Introductory survey of the panorama of the criminal justice system. Philosophical and historical background; constitutional limitations; criminal justice agencies; pretrial, 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>Study the functions and relationships in line elements of law enforcement agencies. 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 physical evidence; nature of physical evidence; laboratory operations and techniques; the expert witness. Prerequisite: LE 101, introductory science desirable.</td>
<td></td>
</tr>
</tbody>
</table>

The following courses are open to students who have completed LE 101 (or the equivalent) or who have upper-division standing.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>Crime and Delinquency</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study crime and delinquency in the United States: Quantity, measurement, trends, economic impact, and victimization. Examination of the nature and impact of organized crime. Prerequisite: LE 101 or permission of instructor.</td>
<td></td>
</tr>
<tr>
<td>303</td>
<td>Criminal Law</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study substantive criminal law. Principles of criminal law; theories of legal defenses; crimes against the person and property; offenses against public morality and decency; offenses against the sovereign, public peace, and maintenance of order.</td>
<td></td>
</tr>
<tr>
<td>304</td>
<td>Criminal Procedure</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Study the procedure that controls the judicial process in criminal cases. Nature of the criminal process; arrest, search, and seizure; interrogation and confessions; pretrial proceedings; order and conduct of trials; review of convictions; juvenile proceedings; military criminal proceedings; constitutional rights. Prerequisite: LE 303 or equivalent.</td>
<td></td>
</tr>
<tr>
<td>305</td>
<td>Probation and Parole</td>
<td>3 hrs.</td>
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<tr>
<td></td>
<td>Examine procedures for the release of convicted law violators. Presentence investigations; the selection, supervision, and releasing of probationers and parolees; rules and regulations; trends in treatment; 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>Analyse theories of criminal behavior and criminal control procedures. Emphasis 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.</td>
<td></td>
</tr>
<tr>
<td>400</td>
<td>Studies in Criminal Justice</td>
<td>1-3 hrs.</td>
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<tr>
<td></td>
<td>Special studies, readings, projects, or field work in an area of criminal justice.</td>
<td></td>
</tr>
<tr>
<td>401</td>
<td>Critical Issues in Law Enforcement</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Examine current issues that are of critical importance to law enforcement in a free society. Reading and discussion of articles and commission reports.</td>
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</tr>
<tr>
<td>420</td>
<td>The Sociology of Corrections and Rehabilitation</td>
<td>3 hrs.</td>
</tr>
<tr>
<td></td>
<td>Analyse the social variables involved in restructuring the behavior of the social offender.</td>
<td></td>
</tr>
</tbody>
</table>
Special attention is given to the basic problems faced by correctional institutions. Pre-requisite: 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.

101 **Cardiopulmonary Resuscitation** 1 hr.
Provides 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.
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Charles Maples, Jr., A.B., M.A., Ph.D. ......................... Dean of Students
Vacant ...................................................... Dean, School of Nursing
Jon G. Rogers, A.B., M.A., Ph.D. .......................... Dean, School of Humanities and Behavioral Sciences
Silas W. Grant, A.B., M.D. ........................................ Associate Dean, School of Primary Medical Care
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Earl C. Jacoby, A.B. .................................................. Director, Fiscal Affairs
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Marilyn McClure, B.A., M.A. ......................................... Director, Office of News & Publications
Gerry Moore, B.S. .......................................................... Director, Personnel Services
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Robert W. Rieder, Jr., B.A., J.D. ................................. University Counsel
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Larry R. Whitt .............................................................. Director, Purchasing and Communication 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.)

School of Humanities and Behavioral Sciences


BARNARD, WILLIAM D., A.B. (Birmingham-Southern College), M.A., Ph.D. (University of Virginia). Adjunct Associate Professor of History, 1977.


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CHANG, ROSANNA, B.A. (National Taiwan University), M.S. (Brigham Young University), Ph.D. (Oklahoma State University). Assistant Professor of Sociology, 1978.

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.


CONTRERAS, FRANK, B.M. (Millikin University), M.M. (East Carolina University), D.M.A. (West Virginia University), Assistant Professor of Music, 1977.


DAVIS, BERVIL D., B.S.E.E. (University of Alabama, University), M.P.A., Ph.D. (University of Oklahoma). Adjunct Associate Professor of Administrative Science, 1976, 1978.


DILLARD, NANCY F., A.B., M.A. (University of South Carolina), Ph.D. (University of Tennessee). Assistant Professor of English, 1972, 1974.


GRZYB, GERARD, B.A., M.A. (University of Wisconsin, Milwaukee), Ph.D. (Washington University, St. Louis). Assistant Professor of Sociology, 1977.


HODGES, H. EUGENE, A.B., M.A. (University of Georgia), Ph.D. (University of Minnesota). Associate Professor of Sociology, 1975, 1978.


HUGHES, CUTTER, A.B. (Davidson College), J.D. (University of Virginia), LL.M. (University of London). Adjunct Instructor of Communications, 1978.


JAMES, ROBERT E., B.S. (Carnegie Institute of Technology), M.A. (Hollins College), Ph.D. (University of Tennessee). Assistant Professor of Psychology and Adjunct Assistant Professor of Communications and Linguistics, 1971, 1978.

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


LEISTER, RICHARD, A., B.A. (St. Peter’s College), B.A. (The Johns Hopkins University), Ph.D. (Rutgers-the State University), Assistant Professor of German, 1978.

MAPLES, CHARLES, A.B. (Samford University), M.A., Ph.D. (University of Alabama, University). Adjunct Assistant Professor of History, 1977.

MACDOUGALL, JOHN J., B.A. (Boston College), B.S. (Georgetown School of Foreign Service), M.S. (Massachusetts State College), M.A., Ph.D. (University of Michigan). Associate Professor of Political Science, 1975, 1979.


MC CAULEY, PATRICK, B.A. (Tulane University), M.A. (Vanderbilt University). Adjunct Assistant Professor of Communications, 1974.

MC COY, DAN W., B.S, J.D. (University of Alabama, University). Adjunct Assistant Professor of Business Administration, 1976, 1978.

MIRAKHOR, ABBAS, B.A., M.A., Ph.D. (Kansas State University). Associate Professor of Economics; Chairman, Department of Economics, 1968, 1970.


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MUNSON, WILLIAM F., B.A. (Oberlin College), M.A., Ph.D. (Yale University). Associate Professor of English, 1974.


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.


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TARTER, DONALD E., B.S. (Middle Tennessee State College), Ph.D. (University of Tennessee). Associate Professor of Sociology, 1966, 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.


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WILLIAMS, LEE E., II., B.A. (Knoxville College), M.A. (East Tennessee State University), Ph.D. (Mississippi State University). Assistant Professor of History, 1972, 1975.


School of Science and Engineering


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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.

BRADLEY, WILLIAM G., B.S.E.E. (University of Vermont), M.S.E.E. (Northeastern University), Ph.D. (University of Vermont). Assistant Professor of Electrical Engineering, 1978.

BRAINERD, JEROME J., B.S., M.S. (University of Notre Dame), Ph.D. (Cornell University). Associate Professor of Aerospace Engineering, 1965.


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.

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CHUNG, T.J., Engineering Diploma (Seoul National University), M.S., Ph.D. (Oklahoma State University). Professor of Mechanical Engineering; Acting Chairman, Department of Mechanical Engineering, 1970, 1975.

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.

COMFORT, HUGH RICHARD, A.B. (Harvard University), M.S., Ph.D. (The University of Alabama in Huntsville). Assistant Research Professor of Physics, 1977.

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

DAVIS, JACK H., B.S. M.S., Ph.D. (Clemson University). Associate Professor of Physics, 1966.
DODSON, CHARLES L., B.S. (Emory and Henry College), M.S., Ph.D. (University of Tennessee). Associate Professor of Chemistry, 1966, 1968.


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.

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.

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

FOSTER, LARRY M., B.S. (Oklahoma Baptist University), M.S., Ph.D. (Oklahoma State University). Assistant Professor of Mathematics, 1978.


GROHSE, EDWARD W., B.Ch.E., Ch.E. (Cooper Union Institute of Technology), Ph.D. (University of Delaware). Professor of Chemical Engineering, 1960.


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 Mechanical Engineering, 1959, 1976.

HENDRICKS, JOHN B., B.S. (University of Alabama, University), M.S. (Southern Methodist University), Ph.D. (Rice University). Associate Research Professor of Physics, 1973.


HSIA, PEI, B.S. (National Taiwan University), M.S. (Pennsylvania State University), Ph.D. (University of Texas at Austin). Associate Professor of Computer Science, 1974, 1978.

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.


JOHANNES, JAMES D., B.S. (Arizona State University), M.S. (The University of Alabama in Huntsville), Ph.D. (Vanderbilt University). Associate Professor of Computer Science; Chairman, Department of Computer Science, 1974, 1978.


JOOST, MICHAEL G., B.S. (Harvey Mudd College), M.S., Ph.D. (Purdue University). Assistant Professor of Industrial and Systems Engineering, 1976.


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.

LEHNIK, 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.


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MODLIN, RICHARD F., B.S., M.S. (University of Wisconsin, Milwaukee), Ph.D. (University of Connecticut). Assistant Professor of Biology, 1976.

NAKAGAWA, YOSHINARI, M.S., Ph.D. (University of Tokyo). Adjunct Professor of Mechanical Engineering, 1977.

PEGDEN, CLAUDE DENNIS, B.S., M.S., Ph.D. (Purdue University). Associate Professor of Industrial and Systems Engineering, 1975, 1979.

PENGRA, ROY W., B.A. (Grinnell College), M.A., Ph.D. (University of Wisconsin). Assistant Professor of Mathematics, 1974.

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PETRY, FREDERICK E., B.S. (Loyola University), M.S. (Louisiana State University). Ph.D. (Ohio State University). Assistant Professor of Computer Science, 1975.


RILEY, CLYDE, B.S. (University of Rochester), Ph.D. (Florida State University). Professor of Chemistry; Chairman, Department of Chemistry, 1967, 1979.


RUSH, JOHN EDWIN, JR., B.S. (Birmingham-Southern College), Ph.D. (Vanderbilt University). Associate Professor of Physics, 1967, 1969.

SCHROER, BERNARD J., B.S. (Western Michigan University), M.S. (University of Alabama, University), Ph.D. (Oklahoma State University). Adjunct Assistant Professor of Environmental Science, 1977.

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.


SHIVA, SAJJAN G., B.E. (Bangalore University, India), M.S.E.E., Ph.D. (Auburn University). Associate Professor of Computer Science, 1978.

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

STEPHENS, WILLIAM D., B.S. (Western Kentucky State University), Ph.D. (Vanderbilt University). Adjunct Associate Professor of Chemistry, 1974.

STETTLER, JOHN D., B.S. (Notre Dame), Ph.D. (Massachusetts Institute of Technology). Adjunct Professor of Physics, 1965, 1974.

STUHLINGER, ERNST, Ph.D. (Tubingen, Germany). Adjunct Professor of Physics and Environmental Science, 1976.

SUNG, CHI-CHING, B.A. (National Taiwan University), Ph.D. (University of California, Berkeley). Professor of Physics, 1972, 1978.

TANDBERG-HANSSEN, EINAR A., Cand, Mag., Cand, Real., Doctor Philosophiae (Oslo). Adjunct Professor of Physics, 1976.

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.


WILSON, HAROLD J., B.S. (Alabama A&M University), M.S. (Iowa State University), Ph.D. (University of Arizona). Associate Professor of Biology; Chairman, Department of Biology, 1972.

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


School of Nursing  
Dean: VACANT  


ANDERSON, KAY T., R.N. (Georgia Baptist Hospital), B.S.N. (The University of Alabama in Huntsville). Temporary Instructor of Nursing, 1976.

APPLETON, PAMELA, B.S. (Mt. Saint Mary's College), M.N. (University of California). Assistant Professor of Nursing, 1977.


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.

COPELAND, H. DONALD, B.S.N., M.S.N. (Medical College of Georgia). Assistant Professor of Nursing, 1977, 1979.


ERMERT, MARY GAYLE, B.S.N. (McNeese State University), M.A.T. (Athens College). Assistant Professor of Nursing, 1975.


HENZE, REET L., B.S.N. (Gustavus Adolphus College), M.S.N. (University of Colorado). Associate Professor of Nursing, 1975, 1979.


LLOYD, MARY A., B.S.N., M.Ed. (University of Florida). Associate Professor of Nursing; Chairman, Lower Division, 1972, 1977.


PASE, MARILYN N., B.S.N. (The University of Alabama in Huntsville), M.S.N. (Vanderbilt University). Assistant Professor of Nursing, 1975, 1978.

PEARSON, BONNIE C., R.N. (St. Joseph School of Nursing), B.S., M.N.Ed. (University of Minnesota). Assistant Professor of Nursing, 1974.


RUBIN, LINDA JEAN, B.S.N. (University of Alabama, University), M.S.N. (University of Alabama in Birmingham). Associate Professor of Nursing, 1972, 1977.

SMELSER, NANCY B., B.S.N., M.S.N. (University of Alabama in Birmingham). Assistant Professor of Nursing, 1978.


WILLIAMSON, JOAN, R.N. (Birmingham Baptist Hospital), B.S.N. (University of Alabama, University), M.S.N. (University of Alabama in Birmingham). Associate Professor of Nursing, 1973, 1979.


Library


CHITWOOD, LERA, B.A. (Carson-Newman College), M. Libr. (Emory University), Assistant Professor of Bibliography, 1979.


School of Primary Medical Care

AARON, MAUREEN M., M.D. (Saskatoon, Saskatchewan, Canada). Assistant Professor of Family Medicine, 1979.


BANAHAN, BENJAMIN F., M.D. (Tulane University). Associate Professor of Family Medicine, 1979.


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 and Adjunct Professor of Family Medicine; Chairman, Community Medicine Programs, 1974, 1978.

BLACK, J. KENDALL, B.S. (University of Alabama, University), M.D. (Medical College of Alabama). Clinical Assistant Professor of Surgery, 1976, 1979.


BURSON, ROBERT A., B.S. (Tennessee Technical University), M.D. (University of Tennessee). Adjunct Assistant Professor of Medicine, 1975, 1976.

CANALE, DANIEL, A.B. (Notre Dame), M.D. (Vanderbilt University). Adjunct Assistant Professor and Chairman for Pathology Programs, 1978.


DIPLACIDO, JOHN A., B.S. (Spring Hill College, Mobile), M.D. (University of Alabama School of Medicine). Assistant Professor of Obstetrics and Gynecology, 1978.

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.

FLEMINING, JAMES W., B.S. M.Ed. (Indiana University, Pennsylvania), Ph.D. (Michigan State University). Associate Professor of Pediatrics, Adjunct Assistant Professor of Family Medicine, 1974, 1979.

FRANCO-BROWDER, SALVADOR, M.D. (National Medical School, National University of Mexico). Associate Professor of Internal Medicine, 1977, 1978.

FREEMAN, ROBERT, B.S., Ph., M.C., Ph.D. (University of Mississippi). Assistant Professor of Community Medicine, 1978.

FRIERSON, WALLACE B., B.S. (Tennessee Technical University), M.D. (University of Tennessee). Clinical Assistant Professor of Family Medicine, 1976, 1979.

FROELICH, ROBERT E., A.B., M.D. (Washington University). Professor of Psychiatry; Chairman, Psychiatry Programs, 1974.

GELULA, MARK H., B.A. (Syracuse University), Ed.M., S.E.A., Ph.D. (The State University of New York at Buffalo). Assistant Professor of Family Medicine and Adjunct Assistant Professor of Community Medicine, 1978.
GRANT, SILAS W., B.S., M.D. (University of Texas). Professor of Family Medicine; Associate Dean, School of Primary Medical Care, 1973.

GRAY, EDWIN R., B.S., M.D. (University of Alabama School of Medicine). Adjunct Assistant Professor of Family Medicine, 1978.

HARRIS, LEROY, M.D., (University of Iowa Medical School). Assistant Professor of Internal Medicine, 1978.


HINTON, BENJAMIN, B.S. (Howard College), M.D. (Medical College of Alabama). Adjunct Assistant Professor of Pediatrics, 1976.


KINZER, GILBERT M., B.A. (Vanderbilt University), M.D. (University of Tennessee). Clinical Assistant Professor of Family Medicine, 1976, 1979.

KAUKENHOUS, EDWARD E., JR., B.E., M.D. (Vanderbilt University) Clinical Assistant Professor of Pathology (P/T), 1974, 1979.

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 KENZIE, LUSANNE, B.A. (Murray State University), M.D. (Vanderbilt University). Assistant Professor of Pediatrics, 1976.

MC KENZIE, THOMAS A., III, B.S. (Davidson College), M.D. (Vanderbilt University). Adjunct Assistant Professor and Chairman for Radiology Programs, 1979.

MONTGOMERY, JOHN R., B.S. (University of Alabama, University), M.D. (Medical College of Alabama). Professor of Pediatrics and Chairman for Pediatric Programs, Adjunct Professor of Immunology, School of Science and Engineering, 1975.


PLOUSSARD, JOHN H., M.D. (St. Louis University). Clinical Assistant Professor of Pediatrics, 1975, 1979.


ROBERTS, M. DIANE, B.S., M.S. (Mississippi State University), Dr. P.H. (University of Texas School of Public Health, Houston). Associate Professor of Community Medicine and Family Medicine, 1978.
SELAH, CHARLES, E., B.S. (University of Oklahoma), M.D. (Tulane University). Clinical Associate Professor of Surgery; Chairman for Surgical Programs, 1975, 1979.

SLOYER, JOHN, JR. Ph.D. (West Virginia University School of Medicine). Assistant Research Professor of Pediatrics (P/T), 1977.

SMITH, HERBERT T., B.S. (University of Houston), M.D. (Baylor School of Medicine). Professor of Family Medicine and Adjunct Associate Professor of Community Medicine; Chairman, Family Medicine Programs, 1973, 1978.

SPARKS, J. ELLIS, M.D. (Medical College of Alabama). Professor of Medicine; Chairman for Internal Medicine Programs, 1974.

STEWART, ROBERT E., B.S., M.D. (University of Tennessee). Clinical Assistant Professor of Pediatrics, 1975, 1979.

WALKER, WALTER Y., B.A. (Vanderbilt University), M.D. (Medical College of Alabama). Clinical Assistant Professor of Surgery, 1976, 1979.

**Division of Continuous Education**

Director: OLIVER, C. MICHAEL, B.S., M.S. (East Texas State University), Ed.D. (University of Southern Mississippi). Adjunct Assistant Professor of Education, 1977.

BAUDENDISTEL, RONALD, L., M.A.S. (The University of Alabama in Huntsville). Adjunct Assistant Professor of Administrative Studies, 1975.

FARACI, FRANCIS J., B.S., J.D. (University of Kentucky). Adjunct Assistant Professor of General Studies, 1975.

HUMPRHRIES, 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 Technical Studies, 1977.

MIKELL, LA MERLE S., B.S. (Auburn University). Adjunct Assistant Professor of General Studies, 1974.

SEITZ, ROBERT N., M.S., Ph.D. (Case Institute of Technology). Adjunct Assistant Professor of Technical Studies, 1978.

**Lecturers**

(Date refers to original appointment to the University.)

ADAMS, CURTIS L. V., B.S. (University of Alabama, University), M.D. (Medical College of Alabama). Lecturer in Psychiatry, 1976.


ATHA, L.C., B.S. (The University of Missouri at Rolla), Ph.D. (The University of Missouri at Columbia). Lecturer in Mechanical Engineering, 1974.
AYERS, ORVAL E., B.A. (Berea College), M.S. (Auburn University), Ph.D. (University of Alabama, University). Lecturer in Chemistry, 1974.


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), M.A.S. (The University of Alabama in Huntsville), Graduate, School of 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 Mechanical 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.

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 Administration Science, 1975.


ENGELER, ERICH E., B.S. (Berlin, Germany), M.S. (University of Alabama, University). Lecturer in Mechanical Engineering, 1971.

ESPY, PATRICK N., B.S. (University of Alabama, University), M.S., Ph.D. (University of Arkansas). Lecturer in Mathematics, 1975.


GREGG, KAREN, B.A. (East Tennessee State University), M.S. (University of Tennessee). Lecturer in Computer Science, 1976.


HAMILTON, DAVID R., B.S., M.A. (University of Alabama, University), C.P.A. Lecturer in Accounting, 1977.

HARPER, CHARLES DUDLEY, B.S. (McNeese State College, Louisiana), M.S. (The University of Alabama in Huntsville). Lecturer in Physics, 1977.


HINTZE, GEOFFREY C., B.S., M.S. (Virginia Polytechnic Institute and State University), M.S. (Stanford University). Lecturer in Computer Science, 1977.


HOPPER, JAMES W., B.S. (Florence State College), M.S. (Auburn University), M.S. Computer Science (University of Missouri). Lecturer in Computer Science, 1974.


HUGHES, CUTTER, A.B. (Davidson College), J.D. (University of Virginia), LL.M. (University of London). Lecturer in Communications, 1977.


KEEBLER, DOROTHY LYNN, B.S. (Fairleigh Dickinson University), M.S. (Upstate Medical Center). Lecturer in Pathology, 1976.


KHEIR, FERIAL M., B.A. (Ain-Shams University, Cairo), Ph.D. (Eotvos Lorand University, Budapest). Lecturer in English, 1970.


LACY, LEWIS L., B.S., M.S. (Virginia Polytechnic Institute), Ph.D. (University of Tennessee). Lecturer in Physics, 1972.


LAVAN, OLGA, B.A. (University of Texas), M.A. (University of Iowa). Lecturer in English, 1978.


LOWE, DAVID H., B.M. (Hardin-Simmons University), M.M. (University of Texas). Lecturer in Music, 1974.


MALKMUS, BERNARD R., B.S. (University of Kansas), M.B.A. (University of Wichita), C.I.A. Lecturer in Accounting, 1963.


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.


MC MILLAN, ROBERT S., B.S. (Case Western Reserve University), M.S., Ph.D. (University of Texas at Austin). Lecturer in Physics, 1978.

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.


MOORE, JOHN E., B.S. (Memphis State University), M.S. (Vanderbilt University), Ph.D. (University of Arkansas). Lecturer in Industrial and Systems Engineering, 1975.


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.


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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.


Clinical Faculty
School of Primary Medical Care


BAKER, GRADY L., M.D. (Louisville). Family Practice/General Practice.

BASORE, JOHN W., A.B., M.D. (Alabama). Family Practice/General Practice.


BESS, BARTLEY, Ph.D. (Texas Tech.). Psychology.

BLACKWELL, JACK, B.S., M.D. (Medical College of Alabama). Family Practice.

BOGGESS, JOHN W., III, B.S., M.D. (Emory). Family Practice/General Practice.

BOOHER, PETER C., B.A., M.D. (Emory). Radiology.


BRADLEY, EUGENE, M.D. (University of Alabama). Family Practice.


BROGDON, PAUL, M.D. (University of Arkansas Medical School). Family Practice.
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BUTLER, CHARLES L., B.S., M.D. (Maryland). Pathology.
CAMP, EPHRIAM E., Ph.D., M.D. (Tennessee). Radiology.
CAMPBELL, JAMES E., M.D. (Tennessee). Radiology.
CARTER, WILLIAM W., M.D., (St. Louis). Urology.
CHRISTIAN, PAUL M., B.S., M.D. (University of Alabama). General Practice.
CHRISTOPHER, NEIL, B.S., M.D. (University of Alabama). Family Practice.
COTTER, CLEMENT P., M.D. (The University of Texas Medical Branch at Galveston Medical School). Surgery.
CUNNINGHAM, JAMES E., B.A. (Southwestern), M.D. (University of Tennessee College of Medicine). Internal Medicine.
DANIEL, HUNTER B., B.S., M.D. (University of Tennessee). Family Medicine.
DITORO, PETER, B.S., M.D. (Hahnemann). Family Practice/General Practice.
DYE, WILLIAM B., M.D. (Medical School of South Carolina). Aerospace Medicine.
EICH, W. FOSTER, B.S., M.D. (Tulane University Medical School). Pediatrics.
ENGLISH, WILLIAM E., B.S., M.D. (University of Alabama). Family Practice.
FALWELL, STEPHEN, B.A. (Baylor University). M.D. (University of Tennessee College of Medicine). Radiology.
HEWETT, BILL V., B.S., M.D. (Texas). Radiology.
HOLLMAN, JAMES D., B.S., M.D. (Alabama). Dermatology.
HUBER, DONALD S., A.B., M.D. (Duke). Internal Medicine.
HULL, RICHARD P., M.D. (University of Mississippi). Neurology.
JOHNSON, S. MILLARD, B.S. (Samford). Administration.
LARY, JOHN, JR., B.S., M.D. (Tulane). Internal Medicine.

LETSON, LOUIS E., B.S., M.D. (University of Alabama). Family Practice.

LEWIS, THOMAS K., M.D. (Emory). Psychiatry.


MARTINEC, LEONARD W., B.S., M.D. (Mississippi). Family Practice/General Practice.

MAXWELL, OSCAR N., M.D. (Georgia). ENT-Otolaryngology.


MCGRANEY, JOHN, M.D. (Emory). Surgery.

MAXWELL, OSCAR N., M.D. (Georgia). ENT-Otolaryngology.


RAN, H. COTTON, M.D. (University of Tennessee). Radiology; Pediatrics.


RINN, ROGER C., B.A., M.A., Ph.D. (Georgia). Clinical Psychology.


ROSE, EDWARD R., B.S., M.D. (University of California in Los Angeles). Family Practice.

RUTLEDGE, JAMES W., B.S., M.D. (New York). Family Practice/General Practice.


SHOOK, BURTON, B.S., M.D., (University of Tennessee College of Medicine). Public Health, Preventive Medicine.
WEATHERLY, GEORGE I., JR., B.S., M.D. (Tulane). Family Practice.
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For Further Information
Address the following offices at: P.O. Box 1247, Huntsville, Alabama 35807

Admissions, Catalog Requests, Academic Information, Transcripts
Office of Admissions and Records
(205) 895-6210

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Financial Aids and Placement Office
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Office of Accounting and Financial Reporting
(205) 895-6422

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School of Humanities and Behavioral Sciences
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School of Primary Medical Care
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School of Science and Engineering
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Division of Student Affairs
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All Other Information
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