Alabama Agricultural and Mechanical University
Graduate Bulletin
2009-2011

4900 Meridian Street
Normal, Al 35762
256-372-5266
www.aamu.edu/gradschool

Students are REQUIRED to read and become familiar with the information contained in this Bulletin. Students are RESPONSIBLE for knowing and understanding regulations and policies, and for meeting all deadlines and requirements of admission, registration, and degree programs. FAILURE TO READ THE INFORMATION PROVIDED WILL NOT BE AN EXCUSE FOR NONCOMPLIANCE.

The Alabama A&M University Bulletin is typically published every two years, effective from the beginning of a fall semester to the end of a summer session. The information contained in this publication is current and accurate at the time or printing. However, because changes in economic conditions and/or student program needs may occur at any time within the two-year period, AAMU reserves the right to adjust fee schedules, admission requirements, academic policies, curricula, and other institutional regulations and requirements as necessary. Students will be notified of changes through office and departmental correspondence and/or institutional posting through traditional or electronic means.

Alabama Agricultural and Mechanical University (AAMU) is committed to equal opportunity in employment and education. AAMU does not discriminate in any program or activity on the basis of race, color, religion, sex, age, or national origin, or against any qualified individual with a disability.

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CORRESPONDENCE DIRECTORY

Admissions
School of Graduate Studies
P. O. Box 998
300 Patton Building
Alabama A&M University
Normal, AL 35762
Phone (256) 372-5277
Toll free (866) 497-1689
Fax (256) 372-5269
E-mail: gradschool@aamu.edu
Website: www.aamu.edu/gradschool

Housing
University Accommodations
P. O. Box 630
113 Carnegie Building
Alabama A&M University
Normal, AL 35762
Phone (256) 372-5797
Fax (256) 372-5614

Teacher Certification
P. O. Box 283
223 Carver Complex North
Alabama A&M University
Normal, AL 35762
Phone (256) 372-5540
Fax (256) 372-5543

Career Development
P. O. Box 997
101 Patton Building
Alabama A&M University
Normal, AL 35762
Phone (256) 372-5690
Fax (256) 372-5689

Financial Services
Business Office
P. O. Box 324
105 Patton Building
Alabama A&M University
Normal, AL 35762
Phone (256) 372-5203
Fax (256) 372-5192

Transcripts
Registrar
P. O. Box 908
204 Patton Building
Alabama A&M University
Normal, AL 35762
Phone (256) 372-5254; Fax (256) 372-5253
E-mail: AAMSBC01@aamu.edu

Financial Aid
P. O. Box 907
209 Patton Building
Alabama A&M University
Normal, AL 35762
Phone (256) 372-5400
Fax (256) 372-5407
E-mail: financialaid@aamu.edu

E.T.S. (GRE/GMAT/TOEFL)
P. O. Box 6004
Princeton, NJ 08541-6004
Phone (800) 473-2255
Fax (609) 771-7165
www.ets.org

Prometric Testing Services (local)
2699 Sandlin Road
Decatur, AL 35601
(256) 350-8324

THE SCHOOL OF GRADUATE STUDIES

History

Alabama Agricultural and Mechanical University (AAMU) was organized in 1875 through the untiring efforts of its founder and first President, William Hooper Council, an ex-slave. The school doors opened on May 1, 1875, as the Huntsville Normal School. Industrial education was added in 1878, generating widespread attention, which helped to garner financial support from the Slater and Peabody Funds and private contributors. Under the second Morrill Act of 1890, AAMU became a land grant institution and moved to its present location on "the Hill" in 1891.

The university has undergone four name changes during its 130 years of existence. Upon earning junior college status in 1919, the name was changed to the State Agricultural and Mechanical Institution for Negroes. Senior college level courses were added in 1939; the first graduating class received the bachelor's degree in 1941, and the name was changed to Alabama A&M College in 1949. The college became a fully accredited member of the Southern Association of Colleges and Secondary Schools in 1963. Subsequently, the name was changed to Alabama Agricultural and Mechanical University in 1969.

Mission

Alabama Agricultural and Mechanical University reflects the uniqueness of the traditional land-grant institution, combining teaching, research service, liberal arts, and vocational fields. The university offers baccalaureate, masters, and doctoral degrees that are current with the times to all qualified and capable individuals who are interested in further developing their technical, scientific, professional, and scholastic skills and competencies. The university operates in the three-fold function of teaching, research, and extension and other public service. Alabama A&M University, a center of excellence, provides an educational environment for the emergence of scholars, scientists, leaders, critical thinkers, and other contributors to a global society. In cooperation with business, industry, governmental agencies, and other private and community-based institutions, Alabama A&M University provides a laboratory where theory is put into practice globally. Alabama A&M University is committed to:

1. Excellence in education and the creation of a scholarly environment in which inquiring and discriminating minds will be nourished.
2. Education of students for effective participation in local, state, regional, national, and international societies.
3. Search for new knowledge through research and its applications.
4. Provision of a comprehensive outreach program designed to meet the changing needs of the larger community outside the campus.
5. Programs necessary to adequately address the major needs and problems of capable students who have experienced limited access to education.
6. Integration of state-of-the art technology into all aspects of University functions.

ACCREDITATION

Alabama A&M University is accredited by the COMMISSION ON COLLEGES: Southern Association of Colleges and Schools. Inquiries regarding the institution's accreditation status may be addressed to:

Southern Association of Colleges and Schools
1866 Southern Lane
Decatur, GA 30033-4097
Telephone (404) 679-4500 Fax (404) 679-4558
www.sacscoc.org

ADMISSION

APPLICATION FOR ADMISSION

Application for admission must include the following:

1. Completed OFFICIAL AAMU Application for Admission to Graduate Studies and a non-refundable application fee of $25.00 (on-line) or $40.00 (hardcopy).
2. Two official transcripts from each collegiate institution attended directly mailed to the School of Graduate Studies Office, P. O. Box 998, Normal, AL 35762.
3. Official transcripts of the Graduate Record Examination (GRE) are required for all programs except for an MBA for which the Graduate Management Admission Test (GMAT) scores are required (University Code: 1003).
4. Two letters of recommendation that speak to the applicant's potential for successful completion of the graduate program to which he/she is applying.
5. Details on any professional work experience.
6. Other requirements specified by the particular degree program to which the applicant is applying.

GRADUATE ADMISSION REQUIREMENTS

To gain admission to the School of Graduate Studies, applicants must meet the following minimum requirements:

Regular/Full Admission Status - To be admitted unconditionally, applicants must meet the following criteria:

1. Have a minimum grade point average of 2.5 on a 4.0 GPA scale at the undergraduate level from a regionally accredited college/university.
2. Have a minimum score of 400 on the verbal and a combined verbal and quantitative score of 800 on the GRE. Some programs may require higher GRE scores. MBA students are required to have a minimum GMAT score of 350.
3. Must have completed undergraduate requirements for admission to the proposed graduate program.
4. Must have met any program-specific requirements.

NOTE: Individual departments may require higher GRE/GMAT scores or other specific requirements; see departmental sections for details.

Conditional Admission Status - Students who do not meet one of the two main requirements (GPA or GRE test score) for Regular Admission may be admitted to the Conditional Admission category for one semester until completion of the Graduate Record Examination (GRE). A student in Conditional Admission status will not be allowed to enroll in courses other than those

specified by their program of study. Students are required to earn a minimum of 'B' grade in these courses to progress to Regular Admission. Otherwise, the student will be dismissed from the School of Graduate Studies.

Deficiency or remedial courses do not contribute toward completion of graduate degree requirements.

Provisional/Special Admission Status - Students may be granted temporary admission for one semester under the following conditions: Special students, who are unable to meet the deadline for filing an official application for admission may be granted temporary admission, provided they present acceptable evidence concerning their qualifications for graduate study. Regular admission must be accomplished within the first term of registration or the student may be terminated. Departmental degree programs may have more specific requirements; see departmental sections for details.

Non-Degree Status (Undeclared Major) - This is a category for graduates of regionally accredited institutions in the United States with a 2.5 undergraduate GPA but do not intend to seek an advanced degree from Alabama A&M University. It grants permission to register for graduate courses provided that all prerequisites have been met. Such students usually include:

1. Those who intend to transfer graduate credit earned at Alabama A&M University to other institutions.
2. Those who intend to use graduate credits earned for professional certification.
3. Those that enroll for personal satisfaction.

Students admitted on a non-degree basis may not wish to declare a major. Applications and schedules for such students with an undeclared major are processed directly by the School of Graduate Studies Office; no departmental signatures are required.

A non-degree student who subsequently seeks a full admission must satisfy requirements for admission to the specific program. Students initially granted permission to take graduate courses on a non-degree basis, are permitted to take up to 9 semester hours of graduate credit. If a student later chooses to undertake a graduate degree program, no more than nine semester hours taken as a non-degree student may be applied to that program.

ADMISSION OF STUDENTS FROM OTHER COUNTRIES

Alabama A&M University welcomes applications for admission from students of other countries. Applications should be initiated three to six months before the registration date for each term. All applicants must meet School of Graduate Studies and departmental requirements listed in the full admission requirements as described above. In addition, international students need to meet specific requirements listed below.

Official academic credentials accompanied by official/or notarized English translations must be directly forwarded from the institution(s) attended; personal copies are not acceptable. Also, all non-English transcripts must be translated and evaluated by the World Education Services (WES) or

a similar transcript translation service. Included must be evidence of the receipt of a degree comparable to the American bachelor's degree, which normally terminates 16 years of full-time study, 4 years of which are at the post-high school level. The official transcripts must show all post-high school work attempted, including grades or marks in each course, examination grades and standing in examinations and classes, or whatever other credentials are available to give a clear description of the student's academic accomplishments.

1. Scores of the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT), as appropriate; must be sent directly to the School of Graduate Studies from the Educational Testing Services (ETS) (Alabama A&M University Code: 1003).

2. The Test of English as a Foreign Language (TOEFL) is required if the applicant's first language is not English; the minimum score for admission is 173 (computer-based test), 500 (paper-based test) or 61 (internet-based test) (Alabama A&M University Code: 1003). This applies where English is not the native language even if English has been the medium of instruction.

The Educational Testing Service, Princeton, New Jersey 08540, administers these tests in testing centers all over the world. Further information about the test and testing dates may be obtained at www.ets.org or from the nearest U.S. Embassy, Consulate or United States Information Service, United States Educational Commission and foundations abroad and bi-national centers.

Admission to graduate study does not carry any implication concerning the award of financial aid. Assistance for graduate students in the form of assistantships is available from some departmental programs and administrative units, but applicants from abroad are in competition with U.S. students for available awards. Applicants who will be supported by other organizations or private funds will be required to submit certification of the non-University sources of support. A certified financial statement is required as evidence of sufficient finances to cover fees and personal expenses.

The University reserves the right, even after the arrival and enrollment of students from another country, to make individual curricular adjustments whenever particular deficiencies or needs are found. Students may be required to take such courses without credit and at their own expense. This could also apply to additional course work in English as a foreign language whenever necessary.

NOTE: All admitted international students are required to maintain an international student health insurance. Coverage for a spouse and/or dependents is available and must be purchased separately at the Student Health Center. A brochure explaining the coverage of the student health insurance program is available at the Student Health Center.

READMISSION

A student who has not registered for at least three credits during a twelve-month period will be transferred to inactive status and must file an application for readmission to graduate study before being permitted to register again. Readmission is not automatic, nor does it necessarily reinstate the student in the status accorded prior to becoming inactive. When readmitted, the student must be prepared to demonstrate proper preparation to meet all current degree requirements.

ADMISSION OF UNDERGRADUATES TO GRADUATE COURSES

Senior undergraduate AAMU students who have completed all required courses, who are within 6 hours of graduation and have a 2.5 GPA may enroll for a maximum of six semester hours of graduate work, provided a letter is received from the student's advisor indicating permission is granted to enroll in two graduate courses.

When graduate courses are taken for undergraduate credit, they may not be used as part of a future graduate program. Seniors who are completing their final semester at other institutions will be considered for admission when they present the following documents:

1. Official undergraduate transcript.
2. Letter from the institution Registrar stating the student has applied for graduation and will graduate that semester if the courses enrolled in are successfully completed.

Admission, if granted, will be contingent upon the receipt of the diploma or a letter from the Registrar indicating that the student has completed the requirements for the degree and when the degree will be awarded. The student will also be required to provide the School of Graduate Studies, Office of the Dean with an official transcript within 30 days of registration.

REGISTRATION

Once admission has been granted, students are required to complete registration within the set time period stipulated by the university calendar. It is imperative that students enter accurate and complete information on all registration cards/forms.

CROSS-REGISTRATION

Alabama Agricultural and Mechanical University and the University of Alabama at Huntsville offer graduate students in the Biological Sciences the opportunity to cross register. Each department at each institution retains the authority to establish the prerequisites for admission and the maximum enrollment in its home courses and to grant priority in registration to its own graduate students.

GENERAL GRADUATE DEGREE REGULATIONS

Every graduate student is expected to become familiar with the general university and School of Graduate Studies' regulations and with the specific regulations of the major department of graduate study and to accept responsibility for the completion of degree requirements as prescribed.

GRADUATE GRADES AND CREDITS

Letter Grades: One of two types of grading systems is assigned to each course for recording the evaluation of each student's performance on his or her official transcript: (I) the Letter Grade

System, and (II) the P-No Quality Point System. Each department has the responsibility for developing supplemental procedures that will enable the student and interested persons to learn about the faculty's judgment of the student's competence.

Type I	A	Superior Attainment
	B	Satisfactory Graduate Attainment
	C	Attainment below Graduate Expectations
	D	Failure
	F	Failure
Type II	P	Satisfactory Graduate Attainment (A or B quality).

Type II (explanation and authorization for its use): The "P" grade is a critical and evaluative grade indicating at least satisfactory graduate attainment. Each department, in cooperation with the School of Graduate Studies, determines when Type II grading will be available for a graduate course. With respect to each of its graduate courses, each department may forbid or request the use of the Type II system.

In addition, the following non-evaluative letters are used, when appropriate:

W	Withdrawal from course
WM	Military Withdrawal
X	non-credit audit
I	Work incomplete
IP	In Progress: Projects (Thesis, Dissertation, Research)

Auditing: A student may register to audit a course only with the approval of the instructor. The letters "X" will be recorded on the transcript if the student satisfies the conditions agreed upon with the instructor. All students who audit courses are required to be registered as auditors.

Incomplete Work: The letter "IP" is recorded for incomplete work in programmatically designated research, thesis and fieldwork courses. The letter "I" may be given in other courses in which the scope of the student's project requires more time for its proper completion. An "I" grade given for courses other than thesis or dissertation research is to be removed within one term after the end of the term of registration for the course. A course for which an "I" or "IP" is recorded is not included in the calculation of the GPA, and no credit is awarded until the course is completed with a quality grade. Removal of an "I" must be authorized by the instructor and approved by the School Dean on a Grade Change Authorization Form. A student may not graduate without removing "I" or "IP" grades from his/her record.

Credits and Quality Points: Each credit for which the grade “A” is recorded has a quality point value of 4 while B=3; C=2; D=1 and F=0 quality points. The GPA is defined as the total number of

quality points earned in courses divided by the total number of credits attempted. Each credit for which "P" is recorded carries no designated number of quality points but implies a performance in the range of 3 or 4. Courses for which "W", "I", or "AU" are recorded do not contribute either credits or quality points toward graduation. When a course is repeated, only the last grade received is counted in computing the GPA.

Graduate students must achieve the minimum GPA established by their programs, in no case less than 3.00, in order to be eligible to take the comprehensive examination, to be admitted to candidacy or to be eligible for graduation.

Withdrawal: A student may withdraw from a course under the conditions listed below:

1. Classes dropped after the first week of the regular semester and through the end of the withdrawal period specified in the course schedule will carry a grade of "W".
2. Classes dropped after the withdrawal period will carry the actual grades obtained.

Repetition of Courses: In every case all "D" and "F" grades must be repeated **(graduate and undergraduate courses)**. Graduate students normally are not permitted to repeat courses for which they have received credit, but, under unusual circumstances, a department may authorize an exception to this policy. When a graduate student repeats a course in which the subject matter has not changed, only the last grade received is counted in computing the quality point average.

Grade Changes: A grade given by an instructor for completed work will not be changed unless an error has been made in reporting or recording the grade. Re-examination or extra work may not be used as a basis for a change of grade.

Independent Study: Students who are using University facilities to an extent greater than represented by their formal course load (and those required by a fellowship or other appointment to be full-time students) are required to register for an appropriate number of additional credits of Independent Study to reflect their correct status. All graduate study not under the direct supervision of a specific faculty member is, by definition, Independent Study. This includes study for comprehensive and overview examinations, the preparation of research proposals, etc. Before a student is permitted to take an independent study course, the student must have completed a minimum of 12 semester hours of graduate work.

Field Research: Registration for Directed Study is limited to students in good academic standing who wish to study or carry out a project in an area not normally available in a formal course. The work must be under the direct supervision of a faculty member who has approved the proposed work in advance of registration. A detailed description of the work should be recorded in the student's file in both the department and the School of Graduate Studies, Office of the Dean by the directing faculty member.

Transfer Credit: Transfer credit must be acceptable to the student's advisory committee and be pertinent to the student's planned degree program. A petition for transfer of graduate credit and one

official transcript upon which the transfer courses are recorded must be submitted to the Graduate Dean. Only courses with grade "B" or better will be approved. Courses with a "P" grade are not acceptable.

Students seeking **Master**'s degrees may, upon departmental approval, transfer *a maximum of twelve semester hours* of approved graduate credits from an accredited institution. Credits must have been earned within the past six years. A student who has completed course credits in a certification program at Alabama A&M University may transfer such credits into a master's degree program with the consent of the departmental program or school. Such credits may be transferred only if they fall within the past six years set for the master's degree.

For students admitted to the Educational Specialist program, previous and appropriate post- master's degree credit earned at the Alabama A&M University or any regionally accredited university before a student applies for admission to the Ed.S. Program can be applied toward the Ed.S. Degree provided 1) it meets the time limitation test, 2) the student meets residency requirements, and 3) the Graduate Dean of Alabama A&M University approves such credit for acceptance.

Because the purpose of the Ed.S. degree may differ from that of the AA-Certificate, credit earned in an AA program at Alabama A&M is not automatically applicable to an Ed.S. program. Instead, if a holder of an AA-Certificate enters an Ed.S. program at a later date; the Ed.S. Advisory committee will recommend to the School of Graduate Studies, Office of the Dean how much of the credit earned in the AA certificate should be credited toward the Ed.S. program. The Ed.S. Committee and the School of Graduate Studies, Office of the Dean, in light of the objectives of the department, will decide to accept toward an Ed.S., as much as all, or as little as none, of the credit earned in an AA-Certificate program. The only exception is the residency requirement.

Students seeking a **Ph.D.** may transfer credits subject to the following conditions:

1. All credits submitted for transfer must be evaluated by the department and approved by the Dean of the School of Graduate Studies.
2. Only such courses, which are the same or similar in content as the courses listed for the particular specialization, will be approved for transfer.
3. A student who has earned the Master's degree can transfer up to a maximum of 24 semester hours of credit, whereas a student who does not have a master's degree can transfer up to a maximum of 12 semester hours of graduate credit.

Foreign Transfer Credits: Transfer of foreign graduate credit hours must be in accordance with regulations set forth above.

ACADEMIC PROBATION AND DISMISSAL

Any graduate student who fails to maintain an overall GPA of 3.00 or to make satisfactory progress in a degree program will be dismissed from graduate study at the University. Prior to dismissal, the student will be placed on automatic academic probation normally for one semester of full-time graduate study or its equivalent to provide an opportunity to return to good standing (3.00 GPA or better). Students on academic probation are not eligible for appointment to assistantships or fellowships.

Graduate students are expected to have a very high level of integrity and honesty in all the matters pertaining to academics; some examples include developing and writing original field reports, lab reports, term papers, thesis/dissertations, etc. Further, any information or statement made by a student to gain admission into the School of Graduate Studies, if found to be false, the student will be subject to disciplinary action, up to and including dismissal from the School of Graduate Studies.

QUALITY OF WORK

The candidate must do work of high quality and must earn a cumulative average of "B" (3.00 GPA) or better in courses for which credit is given towards the graduate degree. No grade below "C" is acceptable for graduate credit; the maximum number of C's that will be accepted for graduate credit is two. A student whose overall GPA falls below 3.0 will be put on automatic academic probation for one semester; failure to raise the GPA to 3.0 or above by the end of that semester will result in the dismissal of the student from the program.

STATUTE OF LIMITATIONS

Graduate students must complete requirements for graduation within six years from the date of their first enrollment, exclusive of any time spent in the Armed Forces of the United States. Students enrolled in programs that require more than 36 credit hours will have seven years to complete all requirements. Any graduate work completed by extension or transferred from another institution must have commenced not more than six years prior to graduation in order for the credits to be applied toward the graduate degree.

FEDERAL REGULATIONS

Alabama A&M University as an educational institution and as an employer does not discriminate on the basis of race, color, religion, ethnicity, national origin, age, sex, marital, or handicapped status. This commitment is made by the University and required by federal, state, and local laws and regulations, including Title IX, 86.9.

Each student at the University has the right to inspect his/her student records as per Federal Register, Vol. 40 Number 3, Part III, Privacy Rights of Parents and Students.

COURSE ENROLLMENT

A minimum of seven and a maximum of ten graduate credit hours are considered a full academic load during the regular academic semesters, Fall & Spring. Six graduate credit hours are considered a full academic load during the Summer Session. Any exceptions to these guidelines need to be pre-approved by the advisor and the School of Graduate Studies.

To maintain a graduate assistantship (Teaching or Research) a student must be enrolled in a minimum of 6 graduate hours during the regular academic semester and a minimum of 3 during the summer session. Enrollment in more than 9 hours is not permitted for graduate assistants.

FEES AND EXPENSES*

2009-2011 TUITION AND FEES (Per Semester)

The University reserves the right to change fees, charges, rules and regulations without prior notice.

Graduate Hours	Resident	Non-Resident
1	446	664
2	664	1100
3	881	1536
4	1100	1972
5	1318	2408
6	1536	2844
7	1754	3380
8	2072	3816
9	2290	4252
10	2508	4688
11	2726	5124
12	2944	5560
13	3162	5996
14	3380	6432
15	3598	6868

OTHER FEES AND DEPOSITS

These fees are required only when applicable and are non-refundable.

Add/Drop Fee (per form)	$ 25.00
*Application Fee (on-line)	$ 25.00
*Application Fee (hardcopy)	$ 40.00
Campus Parking Permit (student per year)	$ 60.00
Campus Parking Permit (student summer)	$ 5.00
*I-20 Application Fee	$ 50.00
Audit Fee (per hour)	$130.00
Extended Payment Exam (per transaction)	$ 25.00
Graduation Fee (Graduate Masters)	$ 50.00
Graduation Fee (Graduate Ph.D.)	$ 60.00
ID Card Replacement (Non-Boarding Student)	$ 25.00
Late Registration Fee	$ 50.00
*Matriculation Fee	$150.00
*Registration Fee (Applicable to all graduate students)	$ 5.00
Thesis Binding ($10.50 per copy)	$ 42.00
Transcript (each)	$ 3.00

Mandatory part-time student fees: Building Use Fee $25.00. Insurance Fee $40.00 and Information Technology Fee $50.00. International students require international health insurance. If entry to student activities and athletic events is desired, then those fees must be paid as assessed to full-time students.

Mandatory full-time student fees: Building Use Fee $25.00. Health Insurance Fee $40.00. Student Activity Fee $15.00. Recreation and Athletic Fee $60.00. Information Technology Fee $50.00 and Yearbook Fee $10.00.

RESIDENCY STATUS FOR IN-STATE TUITION

Definition of Residency

For the purpose of assessing tuition and fees, AAMU classifies students as Alabama residents or non-residents. Residency, for this purpose, means domicile; domicile means living in the state of Alabama with the intent to make Alabama a fixed and permanent home. By way of example, students may have more than one home address but only one domicile. All out-of-state students must pay non-resident fees. In general, a student who comes to Alabama for the purpose of attending an institution of higher education is considered a non-resident student. Registration for voting, obtaining an Alabama driver's license, purchasing of property, and employment in Alabama are necessarily in and of themselves sufficient grounds on which to establish residency

for the purpose of attending an institution. Students from outside of Alabama will be assumed to be non-resident students, unless they affirmatively fall within the criteria specified below.

Requirements for Residency

Information to assist AAMU in its administrative responsibility for determining student's residency status must be provided by the students. Residents of Alabama, as well as categories of non-residents hereinafter identified, may be enrolled upon payment of resident tuition and fees as follows:

1. a) A student may register as an Alabama resident for tuition purposes only upon showing that he/she has been a resident of Alabama for a period of at least 12 months prior to initial registration.

   b) No emancipated minor or person 19 years of age or older shall be deemed to have gained or acquired Alabama residency status for tuition purposes while attending any educational institution in this state, in the absence of a clear demonstration that he/she, in fact, has established residency in this state.

2. If a person is under 19 years of age and living with a parent or guardian, he/she may register as an Alabama resident for tuition purposes only upon showing that his/her parent(s) or guardian has been a bona fide resident of Alabama for a period of 12 months prior to initial registration.

3. A full-time faculty member of AAMU, his/her spouse and dependent children under age 25, may register for the payment of resident fees, even though they have not been bona fide residents of Alabama for the preceding 12 months.

4. The spouse of any person who is classified as or who is eligible for classification as an Alabama resident student for tuition purposes, except spouses of those granted residency as a result of graduate assistantships, are entitled to Alabama residency classification for tuition purposes.

5. Military personnel and their dependents stationed in Alabama and on active military duty are entitled to Alabama residency classification for tuition purposes.

6. A student/applicant, spouse, parent, or guardian, who is not a resident of Alabama but who has been employed full-time in Alabama for at least 12 months and has filed his/her Federal Personal Income Tax form jointly with a qualifying spouse for the tax year prior to the year in which the student is either admitted or registered for classes, is entitled to Alabama residency classification for tuition purposes.

7. International students shall be classified as non-resident students. However, that a non-US citizen living in this country under a visa permitting the establishment of a permanent residence shall have the same privilege of qualifying for Alabama residency status for tuition purposes as a citizen of the United States.

8. Any Alabama resident student who remains in the state after his/her parent(s) or guardian (previously legal residents of Alabama or stationed in Alabama on military orders) move(s) from the state shall be entitled to remain classified as an Alabama resident for tuition purposes as long as attendance is uninterrupted. Such students need not attend the summer session in order to render attendance uninterrupted.

9. In the event that a bona fide resident of Alabama is appointed as guardian of a non-resident minor, such minor will not be permitted to register as an Alabama resident for tuition purposes until the expiration of one year from the date of court appointment, and then only upon proper evidence that such appointment was not made to avoid payment of non-resident fees.

10. Students determined to be eligible for resident tuition purposes by an Alabama state-supported college or university retains their resident eligibility for one academic year upon transfer to AAMU.

11. Any student granted status as an Alabama resident student for tuition purposes whose status is based on a sworn statement which is false, is subject to disciplinary sanctions as may be imposed by AAMU.

Changes in Residence Status

Applicants who are classified by AAMU as non-residents but who later claim to qualify as bona fide residents of Alabama for tuition purposes must file a Petition for Alabama Residency Classification for Tuition Purposes with the Office of Graduate Studies. With few exceptions, a student can change his/her status from a non-resident to an Alabama resident student for tuition purposes only by actually residing in the state for the period required, with the intention of assuming residence within the state indefinitely and by establishing a physical presence and place in the state which he/she, true, has fixed a permanent home place of habitation. **In determining whether the student is in fact an Alabama resident for tuition purposes, the burden of proof rests with the student.**

To receive consideration, petitions for change of status and all supporting documentation must be filed with the Office of Graduate Studies for the prospective session on or before:

Fall Semester	**July 15**
Spring Semester	**November 15**
Summer Sessions	**April 15**

When a petition is approved, classification as a resident for tuition purposes will not be retroactive to the prior semester; however, any non-resident fees paid in advance for succeeding semesters will be adjusted. The Office of Admissions and School of Graduate Studies will have the responsibility for classifying a student as an Alabama resident or non-resident for tuition purposes.

Appeals of Residency Status

A student who wishes to appeal the decision resulting for his/her petition for Alabama residency may request a review of that decision before AAMU Residency Review Committee. Appeals must be made in writing to the chairperson of that committee within 10 working days of the decision.

REFUND POLICIES

TUITION AND FEES

The tuition and fees and non-resident fees are refundable in accordance with the following schedule when a student withdraws from the University after completing the registration process:

Fall and Spring Semesters

From the first day of class through the seventh calendar day	90%
From the eighth calendar day through the fourteenth calendar day	80%
From the fifteenth calendar day to the twenty-first calendar day	70%
From the twenty-second calendar day through the thirtieth calendar day	60%
After the thirtieth calendar day	None

Summer Semester

Before classes begin	90%
From the first day of class through the fifth day of class	75%
From the sixth day of class through the twelfth day of class	50%
From the thirteenth day of class to the end of the semester	None

Note: A full refund will be issued, if course is cancelled by AAMU. Fees paid by MasterCard/Visa will be credited to the customer's card.

Students scheduled to receive financial aid who do not plan to attend a session for which they have pre-registered must notify the Financial Aid Office in writing prior to the first day of classes to cancel their pre-registration and financial aid. Students who fail to notify the Financial Aid Office prior to the first day of class will be enrolled and subject to academic and financial penalties.

FINANCIAL AID

Alabama A&M University, attempts to provide financial support for as many graduate students as possible. The University has a complete financial aid program composed of the following forms of aid:

1. Assistantships (Research and Teaching Assistantships)
2. National Direct Student Loans
3. Work-study Jobs
4. Guaranteed Student Loans
5. Fellowships

Assistantships: A number of Graduate Fellowships and Assistantships are available in departments that offer graduate degree programs.

Students interested in Graduate Fellowships, the L.W. Bonner Scholarship and Teaching/Research Assistantships should address inquiries to: the Dean, School of Graduate Studies, Alabama Agricultural and Mechanical University, P.O. Box 998, Normal, AL 35762 or inquire directly with the Department/Programs they desire to join.

Loans and Part-Time Employment: Student part-time jobs are open to graduate students. Students interested in loans or part-time employment may obtain detailed information by writing to: Director of Financial Aid, Alabama Agricultural and Mechanical University, P.O. Box 907, Normal, Alabama 35762.

Graduate School Scholarship: The University has designated a limited amount of scholarship funds as Graduate Dean Scholarship for graduate student. This scholarship is awarded through an application process. The application is available in the Graduate Office. The application for the Graduate Dean Scholarship can be made at the same time as the admission application. Each school also has limited number of scholarships available for Graduate Students.

GENERAL REQUIREMENTS FOR DEGREE PROGRAMS

The Department Chairperson or Dean, School of Graduate Studies assigns each graduate student admitted to a degree program an advisor prior to formation of a graduate committee, if applicable. Each student must consult his or her major advisor before enrolling in courses.

Credit Hour Requirements: Candidates for the Master of Science degree must complete a minimum of 30 semester hours of course work. Some programs may require additional course work or a thesis. (See specific requirements listed in this catalog under each degree program.) Candidates pursuing the Master of Education degree should expect to complete a minimum of 33 semester hours of course work. The Master of Science in Education requires completing 30 semester hours plus 6 hours of thesis credit.

Candidates for Education Specialist Degree (Ed.S.) and Ph.D. degree should review appropriate departmental guidelines in this regard.

Program of Study: Each graduate student is required to prepare a Program of Study in consultation with his or her major advisor(s) and graduate committee and submit it to the office of Graduate Studies during the first semester of admission to the program. The advisor only under EXTREME circumstances and with adequate justification should request changes in REQUIRED courses with the concurrence of the Chairperson and the Dean of the respective School.

All changes in the planned degree program should be made prior to the student's application for graduation; the **ONLY** exception will be if a course is canceled after the student's application for graduation.

Under no circumstances should a change in the Program of Study be requested for failing a required course.

English Writing Proficiency: Each graduate student must demonstrate a minimum level of competency in written communication. Students may meet this requirement by:

1. Scoring a minimum 400 in the verbal section of the Graduate Record Examination.
2. Scoring 24 or more on the verbal section of the Graduate Management Admission Test for students entering the MBA Program.

In every case, the English Writing Proficiency requirement must be fulfilled before the student completes 12 semester hours of graduate work, including transfer credits.

Students who complete 12 semester hours before completing their English Writing Proficiency requirement will be required to enroll in ENG 500, Writing for Graduate Students, and pass it with a B or A grade.

Basic Mathematics Skills: Each graduate student must demonstrate a minimum level of competency in mathematics. Students may meet this requirement by:

1. Scoring a minimum combined (verbal and quantitative) score of 800 or a minimum 400 in the quantitative section of the Graduate Record Examination.
2. Scoring a combined score of 350 in the Graduate Management Admission Test for students entering the MBA Program.

In every case, the Mathematics skills requirement must be fulfilled before the student completes 12 semester hours of graduate work, including transfer credits.

Students who complete 12 semester hours before completing their Mathematics Skills requirement will be required to enroll in MTH 500, Quantitative Review for Graduate Students, and pass it with a B or A grade.

Graduate Record Examinations/Graduate Management Admission Test: Each student must take the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT), if the student intends to pursue an MBA program. Students accepted without the GRE/GMAT on conditional basis **must complete this requirement during the first semester of their enrollment**.

Students should make application for the examination directly to the Educational Testing Service, Box 955, Princeton, New Jersey 08540, (800) 473-2255 or the local test centers and should designate Alabama Agricultural and Mechanical University, Normal, Alabama 35762, as the institution to receive the score (AAMU Test Code: 1003).

COMPREHENSIVE EXAMINATION ELIGIBILITY REQUIREMENTS

MS/MED: All non-thesis Master's students with the exception of MBA students are required to pass a written comprehensive examination designed to evaluate the candidate's proficiency in the theory and practice of their field. This examination is taken in both major and minor fields. Before sitting for the Comprehensive Exam, student must do each of the following:

1. Have Regular/Full admission status.
2. Maintain a 3.00 or better GPA.
3. Complete all required deficiency courses for the degree.
4. Complete all required courses for the degree.
5. Remove all I's, except thesis grades.
6. Remove all "D" and "F" grades.

Ed.S: All Ed.S. students are required to pass the written comprehensive examination and write a thesis.

Ph.D: All Ph.D. students are required to write a dissertation and defend it successfully. They are also required to pass qualifying and /or candidacy examination(s) as required by the department. Eligibility requirements for these tests are defined in the departmental section of this bulletin.

Students eligible for taking Comprehensive Examination must formally apply for the test on the prescribed form in the office of Graduate Studies.

If a student fails the Comprehensive Examination, at least one semester must intervene before the second examination is given. If the student fails this examination two times, referral will be made to a departmental committee, which will determine the appropriate action; this action should not eliminate the student from retaking the comprehensive examination for a **third and final time**.

THESIS/DISSERTATION REQUIREMENTS

Those students who choose the option of writing a thesis must adhere to the following:

1. Each student is responsible for selecting a major professor, choosing a research topic, and writing and editing the thesis, or dissertation. The major professor serves as the Chairperson of the student's advisory committee. The student and the major professor select the members to serve on the research advisory committee. The committee usually consists of four to five members; at least one comes from outside of the student's major area of emphasis. Once the

advisory committee has been selected and approved, they will serve as advisors for the candidate in the development of the research proposal. Before the end of the second semester of enrollment, the student must complete 1) a Planned Degree Program and 2) a thesis or dissertation proposal, and receive approval of that proposal by the advisory committee and the Dean of the School of Graduate Studies.

2. The subject of the thesis/dissertation should be chosen from the candidate's field of major interest and must be approved by the departmental advisory committee. The thesis/dissertation should reveal a capacity to carry on independent study or research.

3. The student is advised to consult the School of Graduate Studies and the publication "Thesis and Dissertation Guidelines for Graduate Students" for general information regarding the preparation of a thesis/dissertation.
4. Each student is required to enroll in at least one semester hour of thesis/dissertation writing during the semester he/she expects to defend his/her thesis/dissertation. The student must also submit a committee-approved final draft to the Dean of Graduate Studies two weeks prior to the scheduling of the oral defense.
5. Immediately following the candidate's oral defense examination, the student should consult either the advisor or the Graduate Office for specific directions concerning binding, labeling and other routine procedures. At least one month prior to graduation, the student must submit four unbound copies of the thesis/dissertation to the Graduate Office.

Application for Graduation: Students must apply for graduation before the deadline dates given below. However, **if they fail to meet requirements for semester applied, they must reapply.**

DEADLINE DATES:

December Graduation.....…September 30
May Graduation.....……January 31
July Graduation.....……May 31

Clearance For Degree: Each candidate for a degree will receive a letter from the Graduate Office verifying clearance after final grades are submitted.

Conferring of Degree: Advanced degrees are conferred at Commencement Exercises at the close of each spring semester and summer session. A student completing requirements during a fall semester receives a diploma at the Spring Commencement.

Attendance at the Commencement Exercise is strongly encouraged.

Second Master's Degree: With the approval of the appropriate department/program and the Graduate Dean, a graduate student who has completed a master's degree from Alabama A&M University may **transfer up to ten appropriate credits** from the first program to the second. All requirements for the master's degree in the second program must be met.

SCHOOL OF AGRICULTURAL AND ENVIRONMENTAL SCIENCES

Dr. Robert W. Taylor, Dean
Room 300 Dawson Building

MISSION

The School of Agricultural and Environmental Sciences operates in the land grant tradition with teaching, research, and extension programs in agriculture, community planning, environmental science, family and consumer sciences, and related scientific areas. The School fulfills its teaching mission by offering undergraduate and graduate level programs, workshops, seminars, and experiential training opportunities. The School conducts basic and applied research addressing problems in the State of Alabama and the regional North Alabama area for the benefit of all citizens. Moreover, in conformance with the University's own and national mandates, the School also conduct instructional, research, and demonstration programs of national and global importance, with both immediate and long-term impacts. The extension program is committed to assisting North Alabama's urban and rural citizens in community resource development, family life, agriculture, and natural resource management.

OBJECTIVES

- To provide students with a fundamental understanding of the basic principles of the physical, biological, and social sciences as applied to agriculture, environmental science, community planning, and family and consumer sciences; and

- To produce graduates who are trained in elements of research design, data analysis and interpretation as applied to the food and agricultural sciences.

DEPARTMENT OF AGRIBUSINESS

Dr. Willie Cheatham, Chairperson
Room 316 Dawson Building

MISSION

The Department of Agribusiness, as a unit of the School of Agricultural and Environmental Sciences, functions in the land-grant tradition of teaching, research, and extension by providing baccalaureate and graduate studies that are compatible with the times and within the reach of all qualified and capable individuals who are interested in further developing their technical and professional skills and competencies. The department endeavors to provide a cohesive, dynamic, forward looking and market-driven educational process for the emergence of scholars, leaders, thinkers, and other contributors to society. Specifically, the Department is committed to:

1. Excellence in education and creation of a scholarly environment in which inquiring and discriminating minds may be nourished.
2. The education of candidates for effective participation in local, state, regional, national, and international societies.
3. The search for new knowledge through research and its applications.
4. The provision of a comprehensive outreach program designed to meet the changing needs of the larger community. In cooperation with business, industry, governmental agencies, other educational institutions, and other schools within the University, the Department provides a laboratory where theory is put into practice in a productive environment. Currently, graduate degree programs are offered in Agribusiness and Agriscience Education.

DEGREE REQUIREMENTS

The graduate program leading to the M.S. degree in Agribusiness is designed to meet the needs of candidates who wish to pursue careers in agribusiness or related industries. Its flexibility provides candidates the opportunity to concentrate in areas of their individual interests.

Each candidate in the program will be required to take an eight-course core program and select four other courses from the list of electives. There is a thesis option and a non-thesis option. Candidates electing the thesis option must write an acceptable thesis after meeting the course requirement. Those electing the non-thesis option must take two additional courses to bring the total number of credits to 36 hours and write an acceptable research paper. All candidates must pass a comprehensive examination.

AGRIBUSINESS MANAGEMENT

REQUIRED COURSES

AGB 531	Agricultural Economics	3 sem. hrs
AGB 532	Advanced Farm Management	3 sem. hrs
AGB 533	Advanced Agricultural Marketing	3 sem. hrs
AGB 590	Research Methods in Agribusiness	3 sem. hrs
AGB 623	Advanced Agribusiness Management	3 sem. hrs
AGB 625	Agricultural Policy	3 sem. hrs
MBA 501	Mathematical Economics	3 sem. hrs
MBA 505	Managerial Economics	3 sem. hrs

PARTIAL LIST OF ELECTIVES

AGB 509	Advanced Studies	3 sem. hrs
AGB 599	Agribusiness Thesis	6 sem. hrs
AGB 606	Rural Development	3 sem. hrs
AGB 624	Agricultural Financial Analysis	3 sem. hrs
ECO 502	Microeconomics Theory	3 sem. hrs
MBA 504	Macroeconomics for MBA	3 sem. hrs
ECO 505	Applied Economics Statistics	3 sem. hrs
MGT 564	Personnel Administration	3 sem. hrs
MBA 515	Management Information Systems	3 sem. hrs
FIN 543	International Finance	3 sem. hrs
MKT 538	International Marketing & Logistics	3 sem. hrs

AGRISCIENCE EDUCATION

PROGRAM OBJECTIVES

The Department of Agribusiness, in cooperation with the Department of Curriculum and Instruction and the Graduate School, offers a curriculum leading to the master's and Educational Specialist degrees in Agriscience Education. The programs are designed to help the candidates accomplish the following:

1. Achieve broader foundational knowledge and understanding in the field of education.
2. Develop competency in the use of basic tools of educational investigation.
3. Increase proficiency across the broad spectrum of teacher activity in accordance with current thinking in Agriscience.

ADMISSION

The admission requirements for all the programs in Agriscience Education are the same as those outlined under the general requirements for admission to the Graduate School. Additional requirements are related to particular programs as noted. All candidates are required to be admitted to Teacher Education.

ADVISEMENT

After the candidate is admitted to the appropriate graduate study program, a major advisor is assigned. The advisor ascertains the candidate's needs and interests and assists in planning and implementing a program in keeping with the unique pattern of needs, interests, goals, potentialities, and capabilities. Because of changes in the State Department of Education guidelines and regulations which result in program changes, students are advised to check with the department regarding the latest State approved checklists for programs.

MASTER'S DEGREE PROGRAM

Candidates must complete a minimum of 39 semester hours of graduate credit including the following: FED 500, FED 501, or FED 521, FED 503, FED 504, SED 527, FED 529, FED 542 and 12 semester hours of advisor-approved courses in agriscience & related areas. SPE 501 is also required if not previously completed.

ALTERNATIVE-FIFTH-YEAR PROGRAM

Candidates must complete 42-45 semester hours of graduate credits including the following: AGB 508, FED 500, FED 501 or FED 521, BED 515, FED 504, SED 515, AGB 595 and 15 semester hours of advisor approved courses in agriscience education and related areas. SPE 501 is also required if not previously completed.

EDUCATIONAL SPECIALIST DEGREE PROGRAM

Candidates must complete 36-39 semester hours of graduate credits including the following: FAS 563, FED 600, FED 601, FED 603, FED 604, FED 605, AGB 698, AGV 699 and 12 semester hours of advisor-approved courses in agriscience and related areas.. SPE 501 is also required if not previously completed.

COURSE DESCRIPTIONS

AGB 502 Advanced Rural Electrification - Three semester hours. Advanced wiring with emphasis on planning, designing the wiring system; building service entrance; wiring the home and utility buildings; appliance wiring and trouble shooting.

AGB 505 Teaching Vocational Education to the Disadvantaged and Handicapped - Three semester hours. Special methods and techniques of teaching vocational education to the disadvantaged with emphasis on the sociological, psychological and physiological factors that influence learning.

AGB 508 Planning, Organizing and Teaching Agribusiness Mechanics - Three semester hours. Selection of teaching materials, tools, training aids, methods, and techniques of teaching Agribusiness Mechanics.

AGB 509 Advanced Studies - One to three semester hours. Individual field study in partial fulfillment of needs for research experience.

AGB 510 Vocational Guidance - Three semester hours. Need for and the nature of vocational guidance; their duties and relations; programs and evaluation of results.

AGB 512 Small Gasoline Engines - Three semester hours. This course deals with the maintenance, overhauling and trouble shooting of 2 and 4 cycle gasoline engines.

AGB 515 Agricultural Surveying - Three semester hours. This course provides practical application in the use of the transit and land measuring devices. The student will gain experience in land measurement, profile and topographical mapping, and the use of the transit in soil and water conservation.

AGB 520 Advanced Welding and Metalwork Technology - Three semester hours. This course covers basic gas and arch welding principles, procedures, and application in maintenance and construction; selection of machines, equipment, materials for welding and safe operation of metal-joining machines.

AGB 521 Vocational Education Program Planning, Development and Evaluation - Three semester hours. Principles, theories and practices in planning, developing and evaluating state and local programs in vocational education.

AGB 522 Adult Vocational Education - Three semester hours. The characteristics of adults as learners and the history, philosophy and nature of adult education. Emphasis will be placed on planning, developing and implementing a comprehensive adult vocational education program.

AGB 523 Advance Farm Power and Field Machinery - Three semester hours. Advanced study of power units, designs, principles of operation, economic applications and adaptation of field machines.

AGB 524 Advanced Wood and Machine Technology - Three semester hours. This course is designed for those who have a need for knowing about the several related factors involved in the fabrication of wood and wood major power woodworking machines and hand tools as related to wood fabrication.

AGB 525 Advanced Wood Design and Assembly - Three semester hours. This course is designed specifically for teachers of specialized secondary and post-secondary woodworking programs. Attention will be given to design and assembly of wood products that are used in the Agricultural industry.

AGB 531 Agricultural Economics - Three semester hours. This course is designed for graduate students who have had no previous training in agricultural economics. It emphasizes the application of basic economic concepts such as profit maximization, cost minimization, resource substitution, demand and supply to the production and distribution of agricultural commodities. The focus is on management and decision making but attention is also given to persistent policy issues and international trade.

AGB 532 Advanced Farm Management - Three semester hours. The analysis of farm business records and the application of economic concepts in decision making in farm planning, farm organization and farm management. Emphasis will be on enterpriser selection and combination; resource combination, substitution and valuation; the relationship between the production function and supply; cost minimization and profit maximization.

AGB 533 Advanced Agricultural Marketing - Three semester hours. A study of the marketing system and the market for farm products. Methods of reducing cost and improving marketing processes; a review of the activities of government agencies and their effects on the marketing system; the role and problems of cooperatives in agricultural marketing.

AGB 540 Vocational Education for Special Needs Students - Three semester hours. Analysis of educational procedures and practices appropriate for teaching individuals with special needs. Attention is focused on characteristics and learning styles, curriculum modification, evaluation, IEP and student placement.

AGB 550 Personal Financial Management - Three semester hours. This course deals with short term as well as long term planning and management of personal financial resources. It provides students with a working knowledge of personal finance from a managerial perspective with emphasis on the application of financial management to personal or family financial problems. Focus is on budgeting, purchasing, borrowing, saving and investing but attention is also given to other topics such as the financial aspects of weddings, divorce, retirement, funerals and insurance, as well as the effects of tax on investment decision.

AGB 590 Research Methods in Agribusiness - Three semester hours. Principles and techniques appropriate for planning, designing, conducting and reporting research in Agribusiness.

AGB 599 Research in Agribusiness Education - Six semester hours. Thesis credit only.

AGB 600 Computer Applications in Agribusiness - Two semester hours. Theory and practice in computer applications and equipment as it relates to the secondary and technical school level. Emphasis is placed on word processors and spreadsheets in the DOS and Windows environment.

AGB 601 Continuing Education in Agriculture - Three semester hours. Principles and practices involved in developing vocational and technical programs in agriculture for out-of-school youths and adults, with emphasis on the disadvantaged.

AGB 602 Occupational Experience in Vocational Education in Agriculture - Three semester hours. Approved principles and procedures used by the vocational agribusiness teachers in selecting, planning, conducting and evaluating occupational work experience programs for students in vocational agribusiness. Emphasis will be placed on the transition from school to work.

AGB 603 Organization and Implementation of Vocational Education Programs for Disadvantaged and Handicapped - Three semester hours. Methods and techniques of developing and implementing vocational job training programs for the disadvantaged and handicapped. Emphasis will be placed on locating and securing state and federal funds for educating and training the disadvantaged. This course will also stress writing proposals.

AGB 604 Seminar in Agricultural Education - Three semester hours. This course is designed to investigate and analyze the current problems, issues and developments in Agribusiness Education.

AGB 605 Supervision of Student-Teacher in Agribusiness Education - Three semester hours. Principles and techniques for directing the laboratory experience of student-teachers in Agribusiness Education.

AGB 606 Methods and Techniques of Rural Development - Three semester hours. This course will deal with approved methods of developing human and natural resources in rural areas, with emphasis on conducting feasibility studies to determine needs.

AGB 608 Vocational Youth Organizations - Three semester hours. Methods and techniques of developing, implementing and conducting vocational youth organizational youth organization activities will be examined in this course. Emphasis will be placed on how vocational youth organizations contribute to the total educational program.

AGB 609 Instructional Media in Vocational Education - Three semester hours. Theory and practice in developing and using instructional media and equipment at the secondary and technical school level is the focus of this course.

AGB 610 Advanced Teaching Methods in Agribusiness Education - Three semester hours. This course examines theory, principles and procedures associated with effective instruction in agriculture at secondary and technical levels. Emphasis is placed on what research says about effective teaching.

AGB 611 Internship in Agribusiness - Two to six semester hours. Guided participation in selected areas to further enhance professional and/or technical competency needed by Agribusiness teachers.

AGB 612 Farm Structure Planning and Construction - Two semester hours. This course is designed to keep Agribusiness and Cooperative Extension personnel abreast of new innovations in planning and construction of farm structures.

AGB 613 Modern Plumbing - Two semester hours. This course is designed to keep Agribusiness and Cooperative Extension Personnel abreast of new developments in planning and installing a rural plumbing and sanitation system.

AGB 614 Metrics in Agriculture - One semester hour. This course is designed to introduce students to basic metric units and show how these are applied to various phases of Agriculture. A deliberate effort will be made to get the students to use metric units so that they can apply them with ease and confidence.

AGB 617 Advanced Woodwork - Two semester hours. This course is designed to keep in-service agriculture personnel abreast of the latest developments in woodworking.

AGB 618 Small Gasoline Engine Theory and Practice - Two semester hours. Specific attention will be given to trouble shooting, adjusting and repairing new systems as they are installed on new four cycle models.

AGB 619 Applied Techniques in Electric Energy Utilization - Two semester hours. This course is designed to provide knowledge and technical skills in the operation, maintenance and efficient use of electrically operated agricultural machines and tools. Special emphasis will be placed on the safe and energy efficient operation of these items.

AGB 620 Advanced Electric Motors and Controls - Two semester hours. This course is designed to develop an appreciation and gain knowledge of the electrical machines used in

our electrical industries; how to connect electrical machines into electrical circuits; develop and appreciation in planning circuits and procedures of jobs in electrical machine wiring problems; and to develop a safety-first attitude in the students.

AGB 621 Advanced Metal Fabrication - Two semester hours. This course covers advanced metal fabrication techniques. It includes advanced welding processes. Metallurgy of welding, strength of materials and design of weldments.

AGB 622 2 Cycle Engines - Two semester hours. Specific attention will be given to trouble shooting, adjusting and repairing new systems as they are installed on new 2 cycle models.

AGB 623 Advanced Agribusiness Management - Three semester hours. The application of managerial methodology in decision making in an agribusiness firm and computer application in management are emphasized. Financial strategies, capital budgeting, long range planning for growth and profit and the evaluation of the agribusiness industry will be covered.

AGB 624 Agricultural Financial Analysis - Three semester hours. An economic study of the acquisition and use of capital in agriculture with focus on the use of financial statements to analyze risks, returns and repayment capacity. Emphasis will also be given to risk management strategies, capital budgeting and capital allocation over time, financial markets and institutions serving agriculture.

AGB 625 Agricultural Policy - Three semester hours. A solid foundation in economic principles and theory is important and assumed. Agricultural policy is dynamic and constantly evolving, particularly at this time. The economic, scientific and political basis of the policy process is examined by reviewing the current methods and prescriptions of the contrasting positions and how they finally converge in new policy that is both actionable and appropriate. Case studies of how this is achieved will be the subject of individual graduate student research papers.

DEPARTMENT OF FAMILY AND CONSUMER SCIENCES

Dr. Cynthia M. Smith, Chairperson
104 Carver Complex - Hobson Wing

MISSION

Family and Consumer Sciences operates within the total mission of the University's land-grant function of research, service, and instruction. More specifically, the main thrust of the Department's program is individual and family well being as impacted by various environmental settings and factors. The knowledge base includes basic concepts and principles regarding individual and family structures, functions and systems. Specialized programs incorporate the knowledge base.

OBJECTIVE

The graduate programs in Family and Consumer Sciences (FCS) are guided by the following objectives:

- To provide students with the basic fundamentals of research design, analysis and interpretation.
- To provide students with advanced scholarly development through a concentrated area of study for advanced graduate studies or positions in education, industry, or government service.

DEGREE REQUIREMENTS

The Unit offers the Master of Science, Master of Education and Educational Specialist degrees in concert with the School of Education. The program for the Master's degree in Family and Consumer Sciences is flexible to allow students the opportunity to achieve professional and personal goals. Students are required to complete a total of 34 semester hours of course work, 13 of which are common core courses. The remaining courses (21 hours) may be taken through one of the Area Concentrations:

1. Apparel, Merchandising and Design
2. Human Development and Family Studies
3. Nutrition and Hospitality Management

In addition to this flexibility, a student has the choice of pursuing a thesis or non-thesis option. For the **thesis option**, students are required to take 13 hours of core courses, 15 hours in their technical subject area and 6 hours of thesis research (FCS 599), which includes completion of the thesis.

Students pursuing the **non-thesis option** are required to enroll in the 13 hours of core courses, 21 hours in an option area and complete a comprehensive project to be reported on in FCS 514 - Seminar. The project should be started after completion of courses in statistics, research, and nine hours of course work in the major area.

The Master's degree in Family and Consumer Sciences Education is offered in conjunction with the School of Education. Students are required to complete a minimum of 36 semester hours of course work, including 13 hours of core courses and 23 hours of approved courses in Education and areas of Family and Consumer Sciences.

The alternative (Fifth-Year) Master's degree in Family and Consumer Sciences Education is also available through the School of Education and FCS. A minimum of 39 semester hours are required. Both the regular and fifth-year program in FCS Education leads to "A" Certification for those who qualify.

The Educational Specialist degree program in Family and Consumer Sciences is also offered in cooperation with the School of Education. The Educational Specialist degree program requires a minimum of 39 semester hours beyond the master's degree. For additional details, see the School of Education section.

DEGREE PROGRAMS

Master of Science (non-teaching)

Students must complete a minimum of 34 semester hours of graduate credit, including the following graduate core courses: FCS 508, FCS 511, FCS 514, a three hour statistics course, and a three hour research course. Any graduate level statistics and research course approved by the student's advisor and the Family & Consumer Sciences Graduate Coordinator may be taken to satisfy the research and statistics requirements. In addition, 21 semester hours must be selected from one of the options below:

Concentrations

Apparel, Merchandising, and Design - AMD 527, AMD 528, AMD 530, FCS 530, AMD 533, AMD 534, AMD 535, AMD 537, AMD 540, FCS 512, AMD 618, FCS 600, AMD 650.

Human Development and Family Studies - HDF 500, FCS 512, HDF 515, HDF 517, HDF 518, HDF 519, HDF 520, HDF 521, HDF 524, HDF 526, HDF 530, FCS 530, HDF 544, HDF 604, FCS 600, HDF 610.

Nutrition and Hospitality Management - NHM 501, NHM 502, NHM 503, NHM 504, NHM 505, NHM 511, NHM 530, FCS 512, FCS 530, NHM 548, FDS 542, FDS 546, FCS 600, NHM 610, NHM 612, MGT 564, FIN 511, MGT 515.

Family and Consumer Sciences Education

Master of Education in Secondary Education
Students must complete a minimum of 36 hours of graduate credit, including the following graduate courses: FCS 505, FCS 508, FCS 511, FCS 514, EDU 501, FED 502, FED 503, EDU 536, SPE 501, and EDU 542. They must also select 6 semester hours of courses from AMD, FCS, HDF, NHM, TTE and 3 semester hours of courses from PSY 563, PSY 514, SED 527, SPE 530, PSY 587, EDU 521, EDU 573 or HDF 610.

Students must complete a minimum of 36 hours of graduate credit, including the following graduate courses: FCS 505, FCS 508, FCS 511, FCS 514, FED 500, FED 501 or FED 521, FED 502, FED 503, FED 504, FED 529 and SED 527. They must also select a 3 semester hour, 500 or 600 level course from either AMD, FCS, HDF or NHM. Students who have not previously completed a course in Special Education must take SPE 501.

Fifth-Year
Students must complete a minimum of 42 semester hours of graduate courses, including the following: FCS 505, FED 500, FED 501/521, FED 503, FED 504, FED 529, and SED 515. They must also select 15 semester hours from advisor-approved 500 and 600 level courses in FCS, AMD, HDF, and NHM. Students who have not previously completed a course in Special Education must take SPE 501.

Educational Specialist in Secondary Education
Students must complete a minimum of 36 semester hours of graduate courses beyond the master's degree, including the following: FCS 600, FCS 603, FCS 610, FED 601, SPE 501, FED 600, FED 604 and SED 698. They must also select 12 semester hours from advisor approved 500 and 600 level courses in FCS, AMD, HDF and/or NHM.

COURSE DESCRIPTIONS

APPAREL, MERCHANDISING AND DESIGN

AMD 527 Consumer Textiles - Three semester hours. The physical and chemical examination of fibers, yarns, structures, color and finishing techniques of textiles with major emphasis on the comparison and evaluation of fabrics for specific consumer uses. Theory and laboratory experience are provided which focus on decisions, processes and materials directly related to textile performance.

AMD 528 Social Psychological and Economic Aspects of Clothing - Three semester hours. The study of clothing as it relates to the behavior of individuals and groups with emphasis on the production, consumption and use of clothing and textiles as related to social science theories.

AMD 530 Special Problems - One to three semester hours. An investigation of problems in clothing, or issues and problems related to Apparel, Merchandising and Design and family well-being.

AMD 533 Historic Costume - Three semester hours. A comprehensive study of dress throughout periods of history, including the cultural and economic factors associated with the development, adoption and abandonment of styles.

AMD 534 Advanced Costume Design - Three semester hours. Creative problems in dress design tailored to individual needs; the application of flat pattern theory and Computer-Aided Design to garment design, incorporating the relationship of fabric geometry, hand, and surface ornamentation to garment design.

AMD 535 Advanced Tailoring - Three semester hours. The application of tailoring techniques to the construction of suits/coats for women and men. Traditional and contemporary tailoring techniques are explored.

AMD 537 Fashion Merchandising Study Tour - One to three semester hours. A study of the many facets of the fashion industry, including tours of primary and secondary suppliers, apparel manufacturers, designer showrooms, fashion press, accessory showrooms, buying offices, testing laboratories, pattern companies, merchandising centers, museums, etc. Pre- and post-tour seminars and written assignments are required.

AMD 540 Clothing for the Elderly - Three semester hours. A study of the social, psychological, and economic aspects of clothing for the elderly.

AMD 618 Textile Economics - Three semester hours. An in-depth study of the economics of the textile and apparel industry with emphasis on the production and distribution of goods. Focus is placed on current, national and international problems.

AMD 650 New Directions in Clothing and Textiles - Three semester hours. A comprehensive approach to the study of current instructional and research trends and issues in the area of clothing and textiles.

FAMILY AND CONSUMER SCIENCES

FCS 505 Curriculum Planning and Development in Family and Consumer Sciences - Three semester hours. An overview of philosophies of curriculum development and the identification of principles, practices, and internal/external forces impacting the curriculum development process. Special emphasis is placed on methods and techniques of curriculum designed for specific target audiences in Family and Consumer Sciences.

FCS 508 Trends and Issues in the Profession - Three semester hours. Designed to evaluate and synthesize trends and issues of the profession and society as a whole, and their impact and/or implications for the family and consumer sciences profession and various Family and Consumer Sciences related organizations.

FCS 511 Administration, Leadership and Supervision in the Profession – Three semester hours. Principles of administration and leadership to include an analysis of

management/leadership styles, and roles and responsibilities of individuals in various supervisory positions.

FCS 512 Technological Advances and Application in the Profession - Three semester hours. Critique of current technology used in the various program areas in Family and Consumer Sciences. Emphasis is placed on acquiring basic computer skills and computer integration and application in various specializations.

FCS 514 Seminar - One semester hour. Presentation of thesis and comprehensive reports by graduate students. A discussion of current research trends and issues in the various specializations is provided.

FCS 530 Special Problems - One, two, or three semester hours. An investigation of problems in one of the specialized areas of the profession, or issues and problems related to family well-being.

FCS 590 Research Methods in the Agricultural Sciences - Six semester hours. Thesis credit only.

FCS 599 Master's Thesis - One to six semester hours. An investigation of a research problem for the completion of the master's thesis in an area of concentration (Apparel, Merchandising and Design; Human Development and Family Studies; or Nutrition and Hospitality Management) under the supervision of an assigned advisor.

FCS 600 Program Planning and Evaluation - Three semester hours. Designed to acquaint students with the principal elements and steps necessary to plan and evaluate formal and non-formal educationally-related Family and Consumer Sciences programs.

FCS 601 Public Policy and Issues - Three semester hours. An identification of the role of family and consumer professionals in community, state and national public policy issues related to the family. Analysis of how to develop interactions with related local, state and national organizations to facilitate finding solutions to individual and family problems and concerns.

FCS 603 Philosophical Issues in the Profession - Three semester hours. A study of the theoretical and conceptual bases of Family and Consumer Sciences.

FCS 610 Internship - Three semester hours. Supervised work experience.

FCS 699 Thesis Research - Six semester hours. An investigation of research problems for the Specialist degree.

HUMAN DEVELOPMENT AND FAMILY STUDIES

HDF 500 Family Development and Culture - Three semester hours. A review of theoretical approaches in studying the family. Emphasis is placed on the family life cycle and family systems as impacted by culture.

HDF 515 Social and Emotional Development of Children - Three semester hours. Concerned with how family and community elements affect the social and emotional development of children. Topics will include the agents and outcomes of socialization, such as values, morals and self-esteem.

HDF 517 Consumer Behavior - Three semester hours. Topics will include facts important to individuals as purchasing agents.

HDF 518 Parenting Perspectives - Three semester hours. An analysis of theories, practices and research related to parent-child interactions. Attention will focus on parenting with regard to family structure, goals, values, styles of parenting and the developmental characteristics of children from birth through adolescence.

HDF 519 Child Development Programs - Three semester hours. Provides an analysis of programs for children from birth to six years of age. Concerned with the arrangement of the physical environment in addition to the instructional program that promotes children's physical, social, emotional, cognitive and language development.

HDF 520 Family Resource Management - Three semester hours. Explores the principles and methods of managing family resources. The analysis, planning and management of resources will be studied.

HDF 521 Youth Programs - Three semester hours. Concerned with the developmental characteristics and needs of children during the middle childhood and teenage years. Emphasis will be placed on the development of appropriate activities for both in-school and out-of-school groups.

HDF 524 Adults and their Relationships - Three semester hours. Analysis of the stages of adulthood and relationships during those years.

HDF 526 Multi-Sensory Approaches to Learning - Three semester hours. The development of the sensory avenues and concomitant processes in infancy and childhood, including concept information.

HDF 530 Special Problems - Three semester hours. An investigation of problems related to family and individual child development.

HDF 544 Support Systems for the Elderly - Three semester hours. A study of ways to involve family and community organizations in meeting the needs of the elderly.

HDF 604 Readings in Child Development and Early Childhood Education – Three semester hours. This course provides a study of all facets of child growth, development and learning.

HDF 610 Strategies of Parent Involvement - Three semester hours. Covers the importance and utilization of parents in programs that serve children and adolescents. Students will evaluate some of the practices that are currently in use.

NUTRITION AND HOSPITALITY MANAGEMENT

NHM 501 Advanced Maternal and Child Nutrition - Three semester hours. A study of the nutritional requirements in relation to the biological and physical changes during pregnancy, lactation and infancy through adolescence. Emphasis will be placed on the analysis and application of dietary standards relative to each population group and survey of the latest research.

NHM 502 Advanced Quantity Food Production - Three semester hours. (Practicum Included.) A study of various quantity food system operations in relation to food purchasing, storage, preparation and service. Experience is gained in quantity food preparation and use of institutional food service equipment through a quantity food laboratory and practicum assignments.

NHM 503 Experimental Foods - Three Semester Hours. Experimental studies of the effects of variation of ingredients and preparation treatments on the quality characteristics of food.

NHM 504 Breastfeeding and Human Lactation - Three semester hours. A comprehensive review of the theoretical background and the clinical management of breastfeeding and human lactation.

NHM 505 Contemporary Problems in the Hospitality Industry - Three semester hours. Consideration and analysis of relevant industry problems and issues facing management personnel in the hospitality industries.

NHM 511 - Nutrition Education Program Planning and Implementation –Three semester hours. The development and implementation of nutrition education programs for grades K-12. Students will gain experience in developing program objectives, learning strategies, teaching materials and resource files for a nutrition education program.

NHM 530 Special Problems - Three semester hours. An investigation of problems in nutrition or on issues and problems related to food and/or nutrition and family well-being.

NHM 548 Workshop - Three semester hours. Topics will vary. Selected phases of food, nutrition and institutional management will be addressed focusing on current trends and issues in the area.

NHM 610 Current Trends in Food and Nutrition - Three semester hours. Critical evaluation of research in food and nutrition.

NHM 612 Adolescent and Geriatric Nutrition - Three semester hours. Nutritional problems of adolescents and aging individuals, nutritional requirements and dietary requirements of these age groups. The effect of nutrition on the developmental processes of adolescents and the rate of biological aging.

DEPARTMENT OF FOOD AND ANIMAL SCIENCES

Dr. Lloyd T Walker, Chairperson
100 Carver Complex South, Thomas Wing

MISSION

As a part of the School of Agricultural and Environmental Sciences, the Department of Food and Animal Sciences operates within the total mission of the University's land-grant function of instruction, research, and extension service. The specific mission includes offering graduate training at M.S. and Ph.D. levels in Food Science. The M.S. degree program is offered with a thesis or non-thesis option.

OBJECTIVES

1. To offer comprehensive instructional and research programs in existing and new fields in Food Science.
2. To train graduate students in both basic and applied research in Food Science.

GENERAL PROGRAM INFORMATION

Degree programs offered by the department include thesis and/or non-thesis options for an M.S. degree in Food Science and a Ph.D. with dissertation in Food Science. Students electing to pursue a Master of Science degree are expected to have as their objective preparation for professional career employment in areas of food chemistry, food microbiology, food engineering, food processing, food product development, food Sensory evaluation, nutrition, food toxicology and food biotechnology. Employment opportunities for graduates are generally available in the food industry, animal industry, governmental research and regulatory agencies, public or private research facilities, and academia or extension services.

Students electing to pursue a Doctor of Philosophy degree in Food Science will select their interests from similar listings in food science as mentioned above. They will be expected to develop increased refinements of understanding in their emphasis in order to have the more specialized positions in research and/or education.

The following are brief guidelines for admission and degree requirements. Further details are available in the Handbook on Graduate Degree Programs available from the Graduate Program coordinator.

ADMISSION TO M.S. DEGREE PROGRAM

For admission, a student must have a Bachelor of Science degree in an area of agricultural or other sciences, nutrition, engineering or mathematics. Students with bachelor's degree preparation in areas other than food science will have to take prerequisite courses to satisfy any

deficiencies of core courses considered vital for food science undergraduate majors. Candidates must satisfy the general admission requirements of the School of Graduate Studies, which include a **minimum GPA of 2.75** in their undergraduate degree program for regular admission. Graduate Record Examination scores must be submitted.

DEGREE REQUIREMENTS FOR MASTER OF SCIENCE

Thesis Option: A minimum of 30 semester hours to include 24 hours of coursework including at least one hour of graduate seminar and 6 semester hours of thesis research are required for g3raduation. Of these, at least 12 hours of coursework should be at 600 level, with a minimum of 9 hours at 600 level in the major area of emphasis. Students without an undergraduate degree in the major will be guided by their graduate student advisory committee to take additional courses that will generally extend the hours in the program beyond 30 semester hours. The students are expected to complete the degree within a period of two calendar years. **During the course of graduate study, the student will be required to maintain a minimum GPA of 3.0.** A successful defense of the thesis and a completed thesis document prepared according to the Guidelines of the School of Graduate Studies will complete the degree requirements.

Non-Thesis Option: A minimum of 36 semester hours to include 32 hours of coursework and 4 hours of master's report as determined by the student's advisory committee are required. Eighteen (18) hours must be in the student's major area and, of these, 9 hours must be at the 600 level or higher. An additional 3 credits required at the 600 level or higher may be in supporting areas. The master's report is prepared in the form and style of the thesis document but limited in scope as guided by the student's advisory committee. Passing a comprehensive examination administered by the student's advisory committee is required to complete the degree requirements.

ADMISSION TO Ph.D. PROGRAM

An applicant must satisfy the general admission requirements of the School of Graduate Studies and meet the specific requirements of the program area, including a **minimum GPA of 3.25** at the M.S. degree level from an approved science program, a minimum Graduate Record Examination score of 1200, three letters of reference, and a personal statement on career objectives. One of the reference letters should preferably be from the student's major advisor from the previous graduate program. Admission status will be provisional until a qualifying examination is successfully passed. The qualifying examination will be delayed until any deficiencies in background courses are taken with a minimum GPA performance of 3.25.

DEGREE REQUIREMENTS FOR DOCTOR OF PHILOSOPHY

Degree requirements will be in excess of satisfaction of background courses and will be determined by the graduate student advisory committee after a careful review of the student's background. The advisory committee will consist of five or more graduate faculty members with

a majority of them being from the food science area. A comprehensive examination must be completed within five years of the student's initial enrollment and after completing at least 80 percent of the coursework and completion of language requirements. A dissertation proposal will be completed with the guidance of the advisory committee. Admission to candidacy is an indication of completion of all coursework, successful passing of written and oral comprehensive examinations, and having filed an approved dissertation proposal with the Dean of the School of Graduate Studies. Candidacy marks the achievement in which the student's major attention is to focus on the dissertation efforts. Each Ph.D. student must complete the following program requirements:

1. A total of 28 credit hours (minimum GPA of 3.00) beyond the Master's level at the 600 level or above, including 9 semester hours or more at the 700 level, are required. An additional two credit hours of FAS 797 Seminar, are required of all doctoral students.
2. A reading knowledge of at least one foreign language in which there exists a significant body of literature relevant to the major field of study or at least 3 semester hours of a scientific computer programming language. The foreign language requirement is satisfied by a grade of "B" or better in a 200 level or higher language course.
3. A meaningful teaching experience is required in which the Ph.D. student works under the supervision of a faculty member in the regular conduct of the organization, delivery and evaluation of a course.
4. Successful completion of written and oral comprehensive examinations after completing at least 80 percent of the prescribed course work.
5. Completion of a doctoral dissertation involving a minimum of 12 semester hours of dissertation research on a topic determined through the collaborative efforts of the major advisor and the graduate student advisory committee. The effort must be scholarly and make a significant contribution to the field of study.
6. A final oral examination is required and must be taken at least two weeks prior to graduation. The examination will be concerned primarily with the candidate's dissertation but may include other aspects of the student's graduate work.

COURSE DESCRIPTIONS

FAS 503 Food Microbiology - Four semester hours. Theoretical and practical studies on the role of microorganisms in foods pertaining to processing, preservation, spoilage and Pathogenicity. Quantitative and qualitative microbial evaluation procedures applicable to food industry and science. Term paper and presentation of current topics in the subject area are required. (Prerequisite: BIO 330 and BIO 330L**) Fall.**

FAS 504 Animal Hygiene and Parasitology - Four semester hours. This course has a comprehensive background in the housing and management of farm animals, including parasitic diseases in farm animals. The laboratory is intended to give practical training in the identification of parasites. (Prerequisite: BIO 103, BIO 103L) **Spring.**

FAS 505 Meat Science and Technology - Three semester hours. Histological and physiological aspects of skeletal muscle affecting meat quality. Principles of processing and preservation of

meat and meat products. Methods of studying and evaluating meat characteristics and composition. Selection, identification and utilization of wholesale and retail cut of meat. Term paper and presentation of current topics in the subject area are required**. Even Fall.**

FAS 507 Food Chemistry - Four semester hours. Provides a broad overview of the chemistry of food constituents and their contribution to functional, flavor and textural characteristics as well as chemical and physical changes in food components during processing and storage. (Prerequisites: CHE 301, CHE 301L or Consent of Instructor)
Fall.

FAS 508 Food Analysis - Four semester hours. Methods of analysis of foods and the application of these methods in the food industry. Analytical procedures using current equipment for the detection and quantification of nutrients, anti-nutrients and other components will also be discussed. (Prerequisite: FAS 507 or Consent of Instructor) **Spring.**

FAS 521 Poultry Products Technology - Three semester hours. Factors affecting poultry products quality, their identification, control and maintenance. Information on procurement, processing, packaging and distribution of poultry products will be disseminated. A term paper and presentations of current topics in the subject area are required. **Odd Fall.**

FAS 528 Physiology of Reproduction - Four semester hours. A study of early fetal growth, differentiation and development of the gonads, secondary sex organs and the gametes. Comparative anatomy and physiology of the male and female reproductive tracts of the common domestic species; including mechanism of endocrine control of reproduction, fertilization, cleavage, implantation and parturition. Advantages of cryo-preserving sperm, ova and embryos are also discussed. **Spring.**

FAS 538 Fruits, Vegetables and Cereal Products Technology - Three semester hours. The post harvest handling of fruits, vegetables and cereals including storage, preservation and utilization; post harvest physiology, controlled atmosphere storage, processing and preservation etc. will be discussed. Experience is provided in developing appropriate information and applying it to the decision making process in the food industry. Odd **Spring.**

FAS 550 Regulation of Food Safety and Quality - Three semester hours. History of food laws and regulations; various agencies involved in enforcing the food laws; and how these agencies carry out their assigned duties. This course is open to other majors. (Prerequisite: Consent of Instructor) **Spring.**

FAS 551 Food Quality Assurance - Three semester hours. Basic principles of quality assurance related to the food processing industry. Various attributes and characteristics of food quality and product quality evaluation methods will be presented to set forth examples of producers', processors', consumers' and regulators' concerns in maintaining food quality. **Odd Fall.**

FAS 553 Agricultural Biochemistry - Four semester hours. Introduction to the fundamentals of biochemistry. Intermediary metabolism, mechanism of inheritance and gene manipulation

techniques will be discussed. Accompanying laboratory deals with basic techniques in biochemistry. (Prerequisites: CHE 204, CHE 301 or equivalent) **Fall.**

FAS 561 Food Engineering - Four semester hours. Principles of elementary mechanics, physical properties of food and processing materials, heat transfer, fluid mechanics, psychrometrics, refrigeration and dehydration for design of food processing systems. Steady and unsteady-state heat transfer problems. Analysis of different aspects of a food system from the engineering viewpoint. (Prerequisites: MTH 126 and PHY 103) **Fall.**

FAS 572 Food Processing - Four semester hours. Application of basic principles and practices of unit operations for food processing and preservation. Understanding of prediction methods for design of food processes such as canning, freezing and dehydration. Effect of processing on food quality, food storage. Class presentation and a term paper are required. (Prerequisite: FAS 461L/FAS 561) **Spring.**

FAS 605 Special Problems - Two to three semester hours. Involves a detailed experimental study of a chosen problem in food science or animal science. (Prerequisite: Consent of Instructor)

FAS 611 Food Toxicology - Three semester hours. Principles and problems in evaluating the wholesomeness and safety of foods, food components, food additives and food contaminants; selective toxicity, detoxification mechanisms, structure and biological activity of food toxicants. **Fall.**

FAS 615 Food Enzymes - Three semester hours. Even though the course will deal with properties of enzymes in general, emphasis will be placed on those properties of enzymes used specifically in food processing and practical application of enzymes at the various phases of the food industry. **Fall.**

FAS 617 Food Flavors and Pigments - Three semester hours. A detailed study of the chemistry and organoleptic characteristics of flavor compounds, food colors and pigments, their formulations, modification, methods of incorporation and regulatory considerations. **Odd Spring.**

FAS 622 Advanced Livestock Judging - Two semester hours. Advanced instruction and training for prospective livestock judging instructors. In depth study of criteria involved in accurate evaluation, objective and fundamental measurements for assessing the breeding or market value of different livestock species. Special emphasis is placed on proper procedures for giving oral reasons in comparing beef cattle, dairy cattle, horses, poultry, rabbits, sheep, goats and swine. (Prerequisite: FAS 355 or Consent of Instructor)

FAS 623 Quantitative Genetics - Four semester hours. Advanced principles of animal and plant breeding with emphasis on quantitative techniques used to augment genetic improvement. Access to computer facilities and software programs, which simulate various selection strategies based upon biological genetic systems, will be available. **Spring.**

FAS 626 Ruminant Nutrition and Metabolism - Three semester hours. Principles of ruminant digestion and metabolism with emphasis on nutritional factors in production and fundamentals of evaluative research. **Odd Spring.**

FAS 630 Advanced Reproductive Physiology of Vertebrates - Three semester hours. This course presents topics associated with relevant advances in mammalian reproduction and biotechnology research. Topics include: physiology, morphology and development of gametes; transport and survival of gametes; fertilization, cleavage and implantation; experimental manipulation of embryos; the ovary-folliculogenesis, egg maturation and ovulation; the testes - spermatogenesis and androgen synthesis; maternal recognition and maintenance of pregnancy, induction of parturition and causes of abortion. (Prerequisite: FAS 430 or Consent of Instructor) **Even Spring.**

FAS 632 Monogastric Nutrition and Metabolism - Three semester hours. Review of recent advances in monogastric nutrition and metabolism. Discussion of nutrient requirements, balanced rations for livestock animals and balanced diets for human beings. Student seminars on current topics in monogastric nutrition. **Fall.**

FAS 640 Product Development and Research - Three semester hours. Art, science and technology of developing and marketing new food products through lecture and hands-on experience. Each student will be responsible for submitting a proposed topic, literature review and proposed methodology for manufacturing the product. Product models will be further tested. **Spring.**

FAS 642 Minerals and Vitamins in Foods and Nutrition - Three semester hours. Chemical structures and analytical methods applicable to minerals and vitamins. Role of minerals and vitamins in the food industry and their importance in nutrition and diseases. **Spring.**

FAS 644 Proteins in Foods and Nutrition - Three semester hours. Supply of and the need for proteins in the world; characteristics of proteins from animal and plants; processing and preservation of protein foods; unconventional protein sources; assimilation and importance of proteins in nutrition including effects of toxic proteins, peptides and amino acids. **Odd Spring.**

FAS 646 Carbohydrates and Lipids in Foods and Nutrition - Three semester hours. Physical and chemical structures; analytical methods applicable to research; and reactions, interactions and metabolism of carbohydrates and lipids in food industry and diseases. **Spring.**

FAS 654 Food Microbiological Techniques - Three semester hours. An advanced laboratory techniques course stressing analytical examination of microorganisms in food systems. (Prerequisites: FAS 503 and FAS 507) **Odd Spring.**

FAS 657 Analytical Techniques and Instrumentation - Three semester hours. Review of modern techniques and instrumentation used in analyzing and characterizing food components. **Odd Spring.**

FAS 658 Food Microstructure - Three semester hours. Microstructure of foods will be studied using scanning and transmission electron microscopy, light microscopy and fluorescence microscopy. Effects of various processing methods in relation to the microstructure, identification and characterization of macromolecules and use of x-ray microanalyses in evaluating mineral composition of foods will be covered. Preparation methods for food samples for studying microstructure, interpretation of micrographs, and identification of food components will also be covered. **Even Spring.**

FAS 662 Food Rheology - Three semester hours. Concepts, principles and application of rheology with focus on food and related biological materials. Study of standard rheological methods and mathematical relationships describing major rheological variables. Relationship between rheology and texture. Principles and application of extrusion to food materials. **Fall.**

FAS 671 Introduction to Biotechnology - Three semester hours. Provides an assessment of the accomplishments and future of biotechnology and genetic engineering and their application to human health, food, plants and animals. The student will learn the basic principles of recombinant DNA technology, plant and animal biotechnology, Federal regulation of biotechnology, job categories and more**. Fall.**

FAS 676 Food Processing and Nutrients - Three semester hours. Deals with those principles that relate processing procedures to the nutritional value of foods. The effects of various production, processing, storage and packaging techniques on nutrient availability and retention, including nutrition labels on foods. **Even Spring.**

FAS 686 Advanced Topics in Animal Science - One to three semester hours. Students may choose to study selected topics in animal breeding, animal nutrition, poultry production, animal physiology or dairy science. A comprehensive study of the selected topic will be made. **Fall.**

FAS 697 Seminar - One semester hour. A review and discussion of current literature in food science and animal science. Students will prepare a presentation to students, colleagues and faculty. **Fall and Spring.**

FAS 698 Master's Report - Research Paper - One to four semester hours each.

FAS 699 Research for Master of Science - One to six semester hours each.

FAS 701 Advanced Food Microbiology - Three semester hours. This course is open to advanced graduate students. Current literature discussions will include: newly emerging food pathogens and their control, food spoilage microbes and the utility of microorganisms in processing and preservation of food and their potential health benefits. **Even Summer.**

FAS 707: Advanced Food Chemistry - Three semester hours. Recent advances in chemistry and biochemistry of foods including chemical reactions occurring during food processing, storage and utilization by man. **Odd Summer.**

FAS 711 Advanced Food Toxicology - Three semester hours. Review of recent advances in food toxicology including methodology of evaluation of toxicants, detoxification mechanisms, biological activities and regulatory and legal considerations. **Spring.**

FAS 736 Advanced Sensory Evaluation - Three semester hours. An experimental study of the effects of variations in treatments on the quality of food, with an emphasis on panel training, product optimization and correlations of sensory data with objective measure of foods. Activities in sensory laboratory are integral to instruction. **Even Summer.**

FAS 741 Advances in Nutrition - Three semester hours. Discussion topics in this course will encompass advances in nutritional methodologies (heavy isotopes, noninvasive techniques), current aspects of impact of food processing on nutrition and health, and other topics of interest to the students. **Fall.**

FAS 761 Advanced Food Engineering - Three semester hours. Thermodynamics, reaction kinetics and transport phenomena fundamentals in food rheology, heat transfer, freezing and melting processes, evaporation and dehydration, and other physical separation processes employed in food industry will be considered. **Odd Spring.**

FAS 771 Advanced Food Biotechnology - Three semester hours. Provides an assessment of the accomplishments and future of food biotechnology. The students will study how specific genes are isolated, cloned and used to transform plants, animals and micro-organisms to enhance or produce new ingredients and how fermentation technology, genetic engineering, bioprocessing, and monoclonal antibody production can be of benefit to human health and nutrition. FDA regulations and social and ethical ramifications of biotechnology will be discussed. **Spring.**

FAS 772 Advanced Food Processing - Three semester hours. Methods of food preservation and ingredient manufacture by radiation, heat processing, dehydration and chilling with emphasis on the unit operations including design and operation of the various food processing equipment used in the food industry will be studied. **Even Summer.**

FAS 796 Advanced Topics in Food Science - One to three semester hours. Students may choose to study the selective topics in cereals, meats, food product development and formulation, food microbiology, sensory evaluation, dairy products technology or postharvest physiology and processing of fruits and vegetables. A comprehensive study of the selected topics will be made. **Fall.**

FAS 797 Seminar - One semester hour. Food science faculty and Ph.D. students reviewing current developments in food science and related topics through visiting presenters and by reviews of current literature.

FAS 799 Research for Ph.D. - Three to twelve semester hours each. Individual research work towards dissertation requirements. **Each Semester.**

DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL SCIENCES

Dr. Teferi Tsegaye, Chairperson
200 Carver Complex South, Thomas Wing

MISSION

The Department of Natural Resources and Environmental Sciences in the land-grant tradition undertakes teaching, research and extension functions and offers B.S. degree programs in plant science, forestry, and environmental science. The Department fulfills its instructional mission by also offering M.S. and Ph.D. degree programs in Plant and Soil Science.

Both programs derive their principal impetus from the strong commitment to research of the Department's faculty and research staff. The M.S. degree in Plant and Soil Science is designed to further the specialized professional training of the students through formal courses while at the same time teaching the student how to conduct research and present pertinent results.

The Ph.D. program is designed to meet specific career objectives of the students. This degree focuses on research, which must reflect the student's original thinking and should demonstrate the ability of independent investigation.

In both of these degree programs (M.S. and Ph.D.), students may specialize in one of the following areas: Plant Breeding, Tissue Culture, Plant Genetics and Cytogenetics, Molecular Biology, Bioinformatics, Sustainable Crop Production, Seed Science and Technology, Plant Physiology, Plant Pathology, Horticulture, Forestry, Wildlife Biology, Entomology, Environmental Science, Remote Sensing and Geographic Information Systems (GIS), Soil Physics, Soil & Water Science, Soil and Environmental Chemistry, Soil Fertility, Watershed Hydrology, Soil Microbiology, Soil Genesis & Morphology and Soil Conservation. Interaction between human and ecosystems is an emerging area of specialization. Students can also take courses in related subjects such as Biology, Chemistry, Biochemistry, Mathematics and Computer Science, Food Science and Agricultural Economics.

In addition, a specialization/minor is offered in:

i) Remote Sensing and Geographic Information Systems (18 hours required; must include NRE 574, 576/776, 775; other courses include NRE 571, 581, and CMP 501, 503, 515).

ii) Wildlife Biology (21 hours required; must include NRE 286, NRE 386, and NRE 387; other courses include 12 hours of zoology or ecology courses).

ADMISSION REQUIREMENTS

Master's Degree: For admission to the Master of Science program in Plant and Soil Science, the candidate must satisfy the general requirements of the Graduate School. In addition, the candidate must have a minimum GPA of 2.75 (based on a 4.00 system), or a 3.00 in the student's

major area of concentration, for regular admission. Students may be admitted conditionally with a provisional admission if they have a GPA of 2.50 to 2.75, or 2.75 to 3.00 in the major area of concentration. Subject area deficiencies must be removed during the student's M.S. program.

Doctor of Philosophy: An applicant must satisfy the general admission requirements of the Graduate School to be admitted in the doctoral program. In addition, prospective candidates must have:

1. An M.S. degree in agronomy, horticulture, plant science, soil science, or related area.
2. A minimum overall GPA of 2.75 in B.S. course work and 3.00 in M.S. courses taken (based on a 4.00 system).*
3. A minimum combined score of 1000 on the verbal and quantitative sections of the GRE.*
4. Three letters of reference indicating the student's academic background and ability to pursue the Ph.D. program.
5. A letter of application which includes a personal statement on career objectives and research interest.

*Candidates who have some deficiencies in their background but meet most of the requirements for admission may be granted a provisional admission into the program. Upon completing preliminary work with a minimum GPA of 3.00, regular admission will be granted.

DEGREE REQUIREMENTS

Master's Degree

Thesis Option: A minimum of 30 hours at graduate level is required for the Master of Science degree. Only 6 thesis credits can be applied toward the minimum 30 credit. All candidates are required to enroll in a graduate seminar course and to present at least one seminar. All candidates must successfully pass a final oral thesis examination after completion of their thesis and approval by their committee.

Non-Thesis Option: A minimum of 32 semester hours of course work is required. The student will also be required to complete 4 semester hours of comprehensive report (NRE 598) and complete a written or oral comprehensive examination.

Doctor of Philosophy

To fulfill the Doctor of Philosophy requirements, at least 50 percent of the credit hours required for graduation must be earned within a period of two consecutive calendar years on Alabama A&M University's campus. The Department’s Graduate Committee and the School of Graduate Studies must approve deviations from this. Additionally, each candidate must complete the following program requirements:

1. Complete a set of core courses as recommended by the advisory committee.

2. Demonstrate competence in the area of interest (depending upon the student's background and specialization). A minimum of 36 semester hours of graduate course work must be completed beyond the master's level of which a minimum of 30 credit hours must be at the 500 level or above. Nine credit hours, excluding doctoral dissertation, must be completed at the 700 level. All courses have to be selected from the approved list and as recommended in the program of study by the student's advisory committee.
3. Complete a written dissertation involving a minimum of 12 semester hours of dissertation credits beyond the master's level. To be acceptable, the dissertation must constitute a significant contribution to current knowledge and be approved by all members of the student's advisory committee.
4. Satisfy a language requirement by either (a) demonstrating a reading knowledge of at least one foreign language, or (b) satisfactorily complete (grade of "B" or better) one 200 or higher level course in a foreign language or (c) complete 6 semester hours of computer science languages.
5. Participate in a meaningful teaching experience for at least one semester.
6. Successfully complete both a written and oral comprehensive examination after the completion of at least 80 percent of the prescribed course work. The comprehensive examination will cover the course work taken by the student and any subject logically related to an understanding of the subject matter within the student's area of concentration.
7. Present a seminar on the dissertation research results, normally immediately prior to the final defense of the dissertation.
8. Successfully pass a final defense of the dissertation. Permission to hold the final defense is granted by the Dean of the School of Graduate Studies after the candidate has fulfilled all the aforementioned conditions. Following the examination, the advisory committee will submit its recommendations to the Dean of the School of Graduate Studies regarding the acceptability of the candidate for the doctoral degree.

COURSE DESCRIPTIONS

NRE 500 - Techniques for Teaching Horticulture in K-12 - Three semester hours. Provides horticultural education as a supplement to general science and botany. Experiences with ornamentals, floriculture, fruits, vegetables and soil to improve understanding of nature and horticulture. **Summer.**

NRE 501 - Floral and Garden Center Management - Three semester hours. Management of garden centers, including financing, selection of a location, design of the facilities, greenhouse construction, selection of plant materials, personnel management, marketing, and maintenance of plant materials. Principles and practices of establishment and management of a retail flower shop. (Prerequisite: NRE 101 or consent of instructor) **Odd Spring.**

NRE 502 Scientific Writing - Three semester hours. Preparation of scientific evidence for the thesis or dissertation or for publication in scientific journals, parts of the scientific paper, graphical and tabular presentation of data, sources of funding to support research, writing research grants, the editorial process, elements of style, and ethics (Prerequisite: ENG 304) **Fall.**

NRE 503 Techniques for Land Judging - Three semester hours. Fundamental principles of soil science as related to land, differences in soils and their capabilities, methods of soil conservation and improvement, treatments to improve productivity and selection of suitable home sites. **Summer.**

NRE 505 Instrumental Techniques for Plant and Soil Science - Three semester hours. The principles and practice of Atomic absorption spectrophotometry, Kjeldahl digestion, gas chromatography, amino acid analysis, electrophoretic separation techniques, inductive couple plasma mass-spectroscopy (ICPMS), inductive couple plasma (ICP), ion chromatography (IC), scanning electron microscopy, thermocouple psychrometry, porometry, and immunoassay. One-hour lecture with a four-hour lab per week. (Prerequisite: Consent of instructor) **Even Spring.**

NRE 506 Soil Microbiology - Four semester hours. A study of the properties and classes of microorganisms as related to soil and crop production. Effects of microorganisms on the fertility, and chemical and physical properties of soil. (Prerequisite: BIO 101, 102, 330) **Odd Spring.**

NRE 510 Forage Management - Three semester hours. A study of the soil-plant-animal complex as it relates to the morphology, physiology and utilization of forages. Emphasis will be on agronomic practices and physiological considerations in forage management in Alabama. (Prerequisite: NRE 101 or BIO 203-204) **Odd Spring.**

NRE 511 Weed Science and Herbicide Technology - Three semester hours. Phenology of weeds, habitat management by cultural, mechanical, biological and chemical means, dissipation and phytotoxicity of herbicides. Application and physiological relationships of herbicides and recent advances in weed control problems. (Prerequisite: NRE 101 or BIO 204 and BIO 204L) **Odd Fall.**

NRE 512 Field Research Techniques in Agronomy - Two semester hours. Principles of field plot research, Hypothesis and treatments, procedures in large/small plot experimentation, such as laying out of experiments, size and shape of plots, border effects, selection of valid error term, parameters, technique of data collection, their summarization and publication of results or research paper (Prerequisite: Consent of instructor) **Even Spring**.

NRE 514 Crop Production Technology - Three semester hours. Emphasis on techniques for different soil, climate, moisture, and temperature requirements for successful crop production. (Prerequisite: NRE 101 and NRE 310) **Even Fall.**

NRE 515 Seed Biology - Four semester hours. Biological and physiological aspects of seed development, maturation, longevity, dormancy, storability, invigoration treatments, and process of germination in agriculture (crop, vegetable, and tree seeds will be emphasized). (Prerequisites: NRE 440 and consent of instructor) **Odd Fall.**

NRE 517 Sustainable Crop Production – Three semester hours. Principles of sustainable agriculture with modern crop production practices, management of biological, physical, and human resources to optimize field crop production in a sustainable and cost-effective manner.

Emerging biotechnologies, precision agriculture, etc. are highlighted. (Prerequisite: None**) Spring.**

NRE 521 Plant Propagation - Three semester hours. Principles, processes, methods and materials involved in sexual and asexual propagation of plants. (Prerequisite: NRE 101 or consent of instructor) **Odd Spring.**

NRE 522 Landscape Design and Construction - Four semester hours. Advanced landscape design, including finished drawings, selection and arrangement of plants, design of construction features, preparation of bills of materials, and cost estimates. (Prerequisite: NRE 423) **Even Spring.**

NRE 523 Ornamentals I – Trees and Shrubs – Three semester hours. Type, characteristics, adaptation, maintenance, and functional uses of ornamental plants used in landscape design with a special emphasis on trees, shrubs, vines and groundcovers. (Prerequisite: NRE 101 or consent of instructor) **Odd Fall.**

NRE 524 Horticulture Marketing and Management - Three semester hours. An analysis of produce marketing, pricing, postharvest handling, supply and demand, and marketing crops through produce outlets and differing management and scenarios. Resource "game playing." (Prerequisite: Consent of instructor) **Even Summer.**

NRE 525 Lawn and Turf Management – Methods and principles of establishing and maintaining residential lawns as well as special-purpose turf grasses for commercial landscapes, golf courses or athletic fields, including weed and pest control. **Even Spring.**

NRE 527 Ornamentals II – Flowers and Foliage Plants – Three semester hours. Identification, culture, and use of herbaceous annuals and perennials, bulbs, herbs and ornamental grasses. Flower bed and border preparation and maintenance; selection, installation, and care of tropical foliage plants in interior settings; use of light, plant acclimatization, growing media, fertilizers, containers, and pest control (Prerequisites: SPS 101 or consent of instructor) **Even Fall.**

NRE 528 Fruit and Vegetable Production - Three semester hours. Commercial fruit and vegetable culture, including site selection and preparation, classes of vegetables, species of fruits, establishment, pest control, and harvesting are emphasized. (Prerequisite: SPS 101 or consent of instructor). **Even Spring.**

NRE 529 Statistics - Three semester hours. Concepts and methods of statistical data analysis. Descriptive statistics, probability distributions, estimation, confidence intervals, hypothesis testing, chi-square, analysis of variance, simple linear regression, and correlation. (Prerequisite: MTH 113) **Fall.**

NRE 530 Principles of Experimentation - Three semester hours. Principles in planning experiments to minimize error variance and avoid bias. Designs and models to accomplish these objectives will be examined in detail. (Prerequisite: SPS 529 or equivalent statistics course) **Spring.**

NRE 531 Principles of Plant Breeding - Three semester hours. Principles, methods and techniques involved in plant breeding and its application to field crops. (Prerequisites: BIO 203-204 and BIO 311) **Spring.**

NRE 532 Plant Disease Diagnosis - Four semester hours. General principles and methods in identification, epidemiology, etiology and control of major plant diseases. (Prerequisite: Consent of instructor) **Fall.**

NRE 533 Introduction to Molecular Genetics - Four semester hours. Prokaryotic DNA structure and replication, restriction analysis, sequencing, transcription, translation, gene regulation, and gene expression. Co-requisite: must be taken with NRE 533L (Prerequisite: At least one course each in biology and genetics or consent of instructor) **Fall.**

NRE 533L Introduction to Molecular Genetics Laboratory – One semester hour. Basic techniques used in molecular genetics and provides a step-by-step approach and hands-on experience in the field of recombinant DNA technology. (Co-requisite: NRE 533) **Fall.**

NRE 534 Cytogenetics - Four semester hours. Chromosome structure, mechanics and behavior, their significance for problems of genetics, evolution and the origin of species. Emphasizing inter- and intrachromosomal aberrations and heteroploidy. (Prerequisite: A course in genetics**) Even Fall.**

NRE/CMP 535 Introduction to Bioinformatics – Four semester hours. An interdisciplinary course melding information from molecular biology and computer/information sciences. Structure and function of proteins and nucleic acids, retrieval and interpretation of bioinformation, algorithms and software use for sequence alignment, similarity searching of nucleic acid/protein sequence databases, and exposure to JAVA and PERL. **Fall.**

NRE 536 Regression Analysis - Three semester hours. Analysis and interpretation of linear, multiple and polynomial regression models using standard computer programs. Correlation, stepwise methods, and use of dummy variables included. Emphasis on application and use of analysis. (Prerequisite: NRE 529 or equivalent) **Summer.**

NRE 537 Plant Tissue Culture Methods and Applications - Three semester hours. Application of tissue culture techniques for the improvement of economic plants; hands-on laboratory procedures will be emphasized. (Prerequisite: CHE 102, BIO 204 and consent of instructor) **Even Spring.**

NRE 538 Plant Genetics - Two semester hours. Both qualitative and quantitative gene actions are considered. Methods of testing hypotheses, chromosome mapping, selection procedures, gain from selection procedures, measuring heritability and other factors are covered. (Prerequisite: A course in genetics) **Odd Fall.**

NRE 539 SAS-Programming - Three semester hours. Statistical analysis of data using the Statistical Analysis System (SAS). Data entry and manipulation, report writing, and effective

use of SAS manuals will be emphasized, along with selection and execution of important SAS procedures. (Prerequisite: NRE 430 or NRE 529) **Spring.**

NRE 540 Seed Production Practices - Four semester hours. Principles and practices in the production of pure seeds, with emphasis on harvesting, drying and storage, crop and weed seed identification and laboratory practices in seed testing, official rules for testing seeds, and seed laws for marketing. (Prerequisite: NRE 101 or NRE 310) **Even Fall**.

NRE 541 Phyto-physiology - Four semester hours. A study of the environment-plant growth interaction in the physiology of plants with emphasis on whole plant processes. (Prerequisite: NRE 101) **Even Fall.**

NRE 545 Bioinformatics Applications – Three semester hours. Analysis of genomic data, high-throughput sequencing, functional genomics, and proteomics. Emphasizes mastering of various tools for analyzing DNA, RNA, and protein data, understanding of underlying algorithms, and their application to biological problems. **Spring**

NRE 550 Earth Science – Three semester hours. Overview of earth science concepts, processes, and categories, with emphasis on plate tectonics, volcanism, weathering and erosion, global weather and climate, vegetation, and soil. Emphasis is placed on human interactions and relationships with the physical environment and resulting public policy and management conflicts, and strategies. (Prerequisite: None) **Even Fall.**

NRE 551 Environmental Toxicology - Three semester hours. Toxic effects of environmental chemicals on living systems, the chemical and biological characteristics of major pollutants, their origins and uses, and the exposure, transformation and elimination of toxic substances by biological systems. (Prerequisite: CHE 102, CHE 302 or consent of instructor) **Odd Fall.**

NRE 552 Soil Fertility and Fertilizers – Three semester hours. Relationship of soil chemistry, forms of nutrients in soils and role of plant nutrients in crop production, and other factors associated with soil productivity; basic concepts of fertilizer application and manufacturing. (Prerequisite: CHE 102 and NRE 251) **Even Fall.**

NRE 553 Hazardous Waste Management - Three semester hours. The impact, technologies, problems and issues associated with hazardous wastes and management practices. Case studies of hazardous waste spills, risk assessments, and remediation techniques (Prerequisite: Consent of instructor**) Odd Spring.**

NRE 560 Soil Chemistry - Three semester hours. Chemical and mineralogical composition of soils, fundamental chemical properties of soils, soil colloids, exchange phenomena in soils, and soil reactions. (Prerequisite: CHE 102 and NRE 251) **Odd Spring.**

NRE 561 Soil Physics - Four semester hours. Study of physical make-up and properties of soil, including structure, thermal relationship, consistency, plasticity, water, and how they are related. (Prerequisite: PHY 103 and NRE 251) **Even Fall.**

NRE 562 Plant Pathology Techniques - Four semester hours. General principles and methods of isolation, culture and inoculation of plant pathogens (bacteria, fungi, nematodes, and plant viruses). (Prerequisite: NRE 101 or BIO 204) **Even Spring.**

NRE 563 Plant Nutrition and Water Relations - Three semester hours. Mineral nutrition, function and metabolism, ion and water relations, translocation in vascular plants, and physiological responses to biotic stresses. Photosynthesis, respiration, and other aspects of plant metabolism are covered (Prerequisite: NRE 101 and NRE 251). **Even Fall.**

NRE 564 Plant Growth and Development - Three semester hours. A study of recent developments related to growth regulation and plant development as influenced by auxins, gibberellins, cytokines, ethylene, inhibitors, and environmental factors. (Prerequisite: NRE 441) **Odd Spring.**

NRE 565 Applications of Geostatistics – Three semester hours. Concepts and methods to describe and analyze environmental data. Use of geostatistical models in sampling experimental design, mapping contaminant concentration, risk analysis, remediation, planning and probability analyses. Conceptual development of relationships between theory, research and action in managing natural resources. (Prerequisites: MTH 112, MTH 113, NRE 430 or equivalent) **Even Spring.**

NRE 567 Plant Virology - Three semester hours. Principles and methods of detection, isolation, chemical constitution, replication, transmission, and control of plant viruses. (Prerequisite: NRE 432 or NRE 562) **Odd Spring.**

NRE 570 Soil, Plant and Water Analysis - Four semester hours. Principles and application of chemical and instrumental methods in the analysis of soil, plant, and water samples; experimental and descriptive inorganic and organic analyses; spectrophotometry, atomic and molecular absorption and emission spectroscopy, mass spectrometry, X-ray diffraction and fluorescence, gas and ion chromatography, and ion-selective electrodes (CHE 102, CHE 202 and NRE 251) **Even Spring.**

NRE 571 Aerial Photo-Interpretation - Three semester hours. Detection, identification, and analysis of objects or features from aerial photographs. Sensing devices and other equipment related to photogrammetry application. Interpretation of terrain, vegetation, and cultural features. (Prerequisite: Consent of instructor) **Fall.**

NRE Soil, Water and Air Pollution - Three semester hours. Fate of chemical fertilizers, pesticides, and other agricultural and industrial pollutants in relation to environmental quality. Effects of these factors on checks and balances of natural terrestrial and aquatic ecosystems. (Prerequisite: CHE 102 and NRE 251**) Even Spring**.

NRE 574 Quantitative Approaches in Remote Sensing - Three semester hours. A "hands-on" approach with computer analysis or remotely-sensed data, software design, classification algorithms, and image pre-processing overlay and enhancement. Theory and concepts of field instrumentation will be demonstrated and discussed. (Prerequisite: NRE 476) **Odd Spring.**

NRE 575 Principles of Wetlands – Three semester hours. Wetlands as important environments, their importance to surface and ground water quality and to aquatic and terrestrial wildlife; use of constructed wetlands in waste treatment applications, and principles of wetland delineation. (Prerequisite: Consent of instructor) **Even Fall.**

NRE 576 Remote Sensing of the Environment I - Four semester hours. The principles of remote sensor systems and their utility, natural resource inventory and management, land use planning and environmental monitoring. Interpretation of color infrared photos, multispectral and thermal scanners, and radar imagery (Prerequisite: Consent of instructor) **Odd Fall.**

NRE 577 Insect Biology and Pest Management – Three semester hours. Biology of insects, emphasizing taxonomy, basic structure and function, ecology and the management of insect pest populations. The course includes a weekly three-hour laboratory for developing skills in identification and collection of insects. (Prerequisite: Consent of instructor) **Odd Spring.**

NRE 578 GIS, Spatial Analysis and Modeling – Four semester hours. Provides theoretical and practical skills needed for using GIS for analyzing spatial phenomena at different scales. Focuses on principles and methods of spatial analysis and their application to different disciplines such as urban planning, environmental science, and natural resource management. Prepares students for advanced GIS course. **Spring.**

NRE 580 Natural Resource Policy - Three semester hours. Evaluation of land and forest problems and policies in the United States; analysis of current social and resource characteristics that have shaped policy (Prerequisite: Consent of instructor) **Spring.**

NRE 581 Hydrology & Watershed Management - Three semester hours. Occurrence and movement of water over the earth's surface. The hydrologic cycle, runoff relations, relationship of precipitation to stream flow with frequency analysis, unit hydrograph theory, flood routing, and probability in hydrology, hydrologic simulation and stochastic methods in hydrology. (Prerequisite: Consent of instructor) **Odd Spring.**

NRE 582 Forest Tree Improvement - Three semester hours. Practical problems, concepts and techniques to genetic improvement of forest trees (Prerequisite: Consent of instructor) **Even Spring.**

NRE 583 Forest Resource Economics - Three semester hours. Discussion of the market, price, and cost affecting factors as they relate to timber harvesting techniques for determining the best economic alternative (Prerequisite: Consent of instructor) **Fall.**

NRE 584 Ecological Processes - Three semester hours. Review of ecological concepts and processes. Investigations into the ecological role of fire and wetlands. (Prerequisite: NRE 374 or consent of instructor) **Odd Fall.**

NRE 586 Wildlife Techniques – Three semester hours. Introduces students to broad range of methods and equipment used by wildlife professionals to gather information on wild animals and their habitats. **Fall.**

NRE 587 Landscape Ecology – Three semester hours. Study of ecological science with emphasis on interactions between spatial patterns and ecological processes characterized by spatial explicitness and scale multiplicity. Provides integrative theoretical basis, technical tools, and applications for land management. **Fall.**

NRE 589 Forest Ecological Management - Three semester hours. Integrated management of forest resources including plant, site, and landscape processes. Interrelationships of forestry practices, wildlife and range management, hydrology, recreation, and other demands. (Prerequisite: NRE 373 or consent of instructor) **Spring.**

NRE 590 Advanced Topics in Soil and Plant Science - One to three semester hours. Independent research on current advanced topics of interest in the area of soil and plant science. Topics to be selected by the student and work performed under supervision of a faculty member. (Prerequisites: Graduate standing and consent of instructor) **Each Semester.**

NRE 591 Graduate Seminar - One semester hour. (Prerequisite: Consent of instructor) **Each Semester.**

NRE 598 Master's Report - Four semester hours. A literature review, survey or a report of experimentation. A requirement for all non-thesis majors.

NRE 599 Master's Thesis - One to six semester hours. Research work towards completing the thesis requirements for M.S. in Plant and Soil Science. **Each Semester.**

NRE 701 Applied Forest Ecology – Three semester hours. Ecological and silvicultural foundations for conservation and sustainable use of forest resources, enhancement of wildlife habitat, water and soil protection, and increase recreational value of forest ecosystems with emphasis on upland, hardwood forest ecosystems. **Even Fall.**

NRE 710 Plant Ecology - Three semester hours. Physical and biotic environment of crops in relation to crop culture, production, and geographic distribution, relation among the human population, crop productivity, and the environment. (Prerequisites: NRE 251 and NRE 310) **Odd Fall.**

NRE 715 Seed Biology - Four semester hours. Biological and physiological aspects of seed development, maturation, longevity, dormancy, storability, invigoration treatments, and process of germination in agriculture (crop, vegetable, and tree seeds will be emphasized). (Prerequisites: NRE 440 or consent of instructor) **Odd Fall.**

NRE 716 Modeling Natural Resources Management – Three semester hours. This course is designed to use computer models in managing natural resources. Experience in model development and validation will be provided (Prerequisite: Consent of instructor) **Odd Spring**.

NRE 724 Horticulture Marketing and Management - Three semester hours. An analysis of produce marketing, pricing, postharvest handling, supply and demand, and marketing crops

through produce outlets and differing management and scenarios. Resource "game playing." (Prerequisite: Consent of instructor) **Even Summer**.

NRE 725 Stress Physiology of Crops - Three semester hours. Responses of plants to environmental stresses including drought, heat, cold, chilling, biotic and mechanical stress. The mechanism for adaptation or tolerance to these stresses, the metabolic and hormonal responses to onset of stress (Prerequisite: NRE 541) **Even Spring.**

NRE 730 Applied Multivariate Analysis - Three semester hours. Use of MANOVAs, canonical correlation, discriminate analysis, principal component analysis, and factor analysis. Emphasis on applications and interpretation of computer outputs (Prerequisites: NRE 530 and NRE 536) **Odd Fall.**

NRE 731 Advances in Ecological Research – Three semester hours. Further develop graduate student's knowledge, critical thinking, and research skills in forest ecology. The course emphasizes scientific approaches, review of current issues and developments in ecological research. **Fall.**

NRE 733L Advanced Molecular Genetics Laboratory - Two semester hours. Recombinant DNA technology, DNA and mRNA isolation, Genomic and cDNA cloning, physical analysis of recombinants, DNA sequencing, oligonucleotide synthesis and design. (Prerequisites: NRE 533/533L, NRE 663) **Odd Spring.**

NRE 734 Cytogenetics - Four semester hours. Chromosome structure, mechanics and behavior, their significance for problems of genetics, evolution and the origin of species. Emphasizing inter- and intra-chromosomal aberrations and heteroploidy. (Prerequisite: A course in genetics) **Even Fall.**

NRE 735 Advanced Soil Classification - Three semester hours. Principles of the comprehensive system of soil classification and other classification systems, advanced study of soil formation, soil characterization and methods of studying soil genesis. (Prerequisite: NRE 350) **Even Fall.**

NRE 738 Plant Genetics - Two semester hours. Both qualitative and quantitative gene actions are considered. Methods of testing hypotheses, chromosome mapping, selection procedures, gain from selection procedures, measuring heritability and other factors are covered. (Prerequisite: A course in genetics) **Odd Fall.**

NRE 750 Advanced Soil Chemistry - Four semester hours. Surface chemical reactions of colloidal particles in the soil such as the adsorption phenomenon, zeta potential, and surface charge. Thermodynamics of soil reactions, cation exchange reactions, and clay organic complexes and interactions. A one credit hour lab included. (Prerequisites: NRE 460 and CHE 401-402) **Odd Fall.**

NRE 751 Advanced Soil Physics - Four semester hours. A mathematical study of the physical properties of the soil, to water flow in both saturated and unsaturated soil, soil temperature and

heat flow, internal drainage and water redistribution, solute transport and their effects on water uptake by plants. A one credit hour laboratory included (Prerequisite: Consent of instructor) **Odd Fall.**

NRE 763 Advanced Molecular Genetics - Three semester hours. Molecular cloning by recombinant DNA, restriction enzyme and mapping, isolation of recombinant clones, isolation of MRNA from eukaryotes, synthesis of CDNA oligonucleotide site directed mutagenesis, and state of the art DNA sequencing (Prerequisite: Consent of instructor) **Even Spring.**

NRE 767 Plant Virology - Three semester hours. Principles and methods of detection, isolation, chemical constitution, replication, transmission, and control of plant viruses. (Prerequisite: NRE 432 or NRE 562) **Odd Spring.**

NRE 774 Quantitative Approaches in Remote Sensing - Three semester hours. A "hands-on" approach with computer analysis of remotely-sensed data, software design, classification algorithms, and image pre-processing overlay and enhancement. Theory and application of field instrumentation. (Prerequisite: NRE 476) **Odd Spring.**

NRE 775 Advanced Principles of Geographic Information Systems - Four semester hours. GIS applications in environmental and natural resource inventories and analyses; major components of GIS; raster and vector data structures; modules for data input, verification, storage and output; digital terrain models; spatial analysis and modeling. (Prerequisite: CMP 409, URP 526 or their equivalent) **Even Spring.**

NRE 778 Remote Sensing of the Environment II – Three semester hours. Remote sensing of the environment and microwave remote sensing using active and passive sensors. Data analysis and interpretation of the electromagnetic response of the radiometers and radars. Concepts of microwave brightness temperature from passive systems, radar backscatter and emission models. (Prerequisite: NRE 476 and NRE 576) **Even Fall.**

NRE 779 Advanced Environmental Geostatistics – Three semester hours. Application of geostatistics to environmental problems. Methods for determining number of environmental samples and their distribution. Extensive use of the U.S. Environmental Protection GEO-EAS and GEOPACK software for variogram analysis and Kriging. (Prerequisites: MTH 170, NRE 529, NRE 465 and NRE 565) **Even Fall.**

NRE 781 Advanced Hydrology – Study of physical hydrological processes and interactions among hydrology, ecology, biogeochemistry, and human activities. Provides a hands-on experience in various aspects of professional and research hydrology.

NRE 799 Doctoral Dissertation - One to six semester hours. Individual research work towards completing the dissertation requirements for the Ph.D. in Plant and Soil Science. **Each Semester.**

DEPARTMENT OF COMMUNITY PLANNING AND URBAN STUDIES

Dr. Chukudi V. Izeogu, Chairperson
308 Dawson Building

MISSION

Alabama A & M University (AAMU) is a land grant institution that combines education, research and service in professional, vocational and liberal arts fields. The Department of Community Planning and Urban Studies (DCPUS) fulfills the mission of AAMU by providing a nationally accredited research and practice-oriented planning education for training of students from diverse backgrounds for careers in the planning profession so that they can address pressing problems and issues of physical, environmental, economic and social change in urban and rural communities in this age of advancing technology.

MASTER OF URBAN AND REGIONAL PLANNING (MURP)

ADMISSION REQUIREMENTS

Applicants for admission into the Master of Urban and Regional Planning (MURP) program must meet all requirements as prescribed by the Graduate School, and have attained an undergraduate cumulative **GPA of 2.80** (based on a 4.00 system). Applicants with an undergraduate GPA less than the minimum requirement may be considered for Provisional admission. Provisionally admitted students must take recommended deficiency courses, and bring their GPA to 3.0 within the first semester of enrollment in order to qualify for full graduate admission.

PROGRAM OBJECTIVES, STRUCTURE AND DEGREE REQUIREMENTS

The Master of Urban and Regional Planning Program (MURP) is accredited by the Planning Accreditation Board (PAB). The program is designed to prepare students to become professional planning practitioners who formulate plans and policies to meet the social, economic, and physical needs of urban and rural communities. The objectives of the program are:

- to offer a core planning curriculum that provides a firm foundation for the generalist planner;
- to provide students the choice of four areas of concentration to strengthen and focus their generalist background;
- to expose students to current local, national and international planning issues and situations through applied research and the practical application of the principles and techniques of planning,
- to enhance students analytical and critical thinking skills as well as an understanding and appreciation of human diversity and the manner in which planning decisions affect the lives of people, and
- to prepare students to enter the planning profession as competent practitioners.

Program Structure

The MURP degree is a two-year, 46 semester hour program, organized into three major components:

(i) A core of required courses,
(ii) An area of specialization, and
(iii) A terminal research or project component with a 3 hour elective course and comprehensive examination or thesis without the comprehensive examination.

Core Course Requirements:

The core requirements consist of **28 credit hours** in urban and regional planning courses, which provide the essential knowledge, skills and values for the student to function effectively as a planning professional. The courses focus on physical, economic, social, and legal factors which provide the basis for planning that shape human settlements. Also, they cover the basic processes of planning research and analysis as well as plan preparation and implementation.

The core course requirements may vary for persons with an undergraduate degree in planning. Such students must complete **42 credit hours** to graduate from the program. Students who demonstrate competencies in specific subject areas such as Computer Applications in Planning or Geographic Information Systems (GIS) and Quantitative Methods or Statistics as well as students who have documented experience in planning practice may be granted a waiver of related courses by the faculty body. Upon exemption, the student may substitute approved electives to make up the 46 credit hours required for graduation.

Areas of Specialization:

Areas of Specialization are offered to provide students with the opportunity to develop knowledge, expertise and professional competency within a specific area of planning practice. The purposes of specializations are several including:

(i) enabling students to develop their academic interests and professional skills,
(ii) enabling students to take advantage of course offerings in the University community,
(iii) improving the marketability of students upon graduation

The specializations are:

Environmental Planning, Housing and Community Development, Transportation Planning, and International Planning and Development.

The area of specialization and the courses which satisfy the requirements are chosen by the student in consultation with a faculty advisor. All specializations must include at least two urban and regional planning courses.

Terminal Research, Thesis or Project Requirements:

In addition to the planning core courses and specialization electives, students must complete one of the following: thesis, terminal research, or terminal project for the MURP degree. The thesis, terminal research or project component can be met under one of three plans.
Plan A - a faculty directed terminal research paper with a comprehensive examination;
Plan B - a planning project with comprehensive examination;
Plan C - a thesis option with no comprehensive examination.

Plan A - The terminal research option is a three credit hour study of a planning related subject of interest to the student. Plan A consists of one credit hour of terminal research proposal (URP 555) and a 2 credit-hour research paper (URP 557), enrolling in one elective and passing a comprehensive examination.

Plan B - This option is a three credit hour individual project oriented course which culminates in presentation of an original planning project, taking one elective (3 credits), plus passing a comprehensive examination. The student chooses the problem with the final approval of his/her committee chairman.

Plan C - The thesis option involves conducting a scholarly study of a planning related issue which culminates in writing a Master's thesis. The thesis option requires an original research supervised by a Thesis Committee composed of at least four faculty members. The thesis option is recommended for students who would like to go for advanced degrees in planning or related areas.

Students with less than the minimum admission requirement who have been granted provisional admission status to enter the MURP program and subsequently raised their GPA to 2.8 or higher upon entering the program cannot opt for the thesis option. Only students who initially met the regular admission requirement of at least a 2.8 GPA and have a minimum score of 400 on the verbal and combined verbal and quantitative score of 800 on the GRE can select the thesis option.

The Comprehensive Examination:

The comprehensive examination provides opportunities for students to demonstrate competencies in knowledge, skills and values gained during the course of their study and their readiness to function as a generalist/specialist planner. Students are eligible to take the examination after they have completed all core courses or are currently enrolled in their remaining core courses in the planning program. The examination is graded on a pass/fail basis. A student who fails to pass any specific section of the examination need repeat only that element.

MURP CORE COURSES:

COURSE #	COURSE TITLE	CREDITS
URP 500	Fundamentals of Urban Planning	1 sem. hr.
URP 510	Planning Theory & History	3 sem. hrs.
URP 511	Planning Research Methods I (Quantitative Analysis)	3 sem. hrs.
URP 520	Legal Basis of Planning	3 sem. hrs.
URP 521	Planning Research Methods II (Applied Research Methods in Planning)	3 sem. hrs.
URP 525	Planning Studio I (Land Use/Site Design)	3 sem. hrs.
URP 526	Computer Applications in Planning	3 sem. hrs.
URP 527	Planning Studio II (Comprehensive Planning at Local and Regional Levels)	3 sem. hrs.
URP 529	Professional Practice	3 sem. hrs.
URP 531	Population and Economic Analysis	3 sem. hrs.
TOTAL CREDIT HOURS		**28**

AREAS OF SPECIALIZATION AND ELECTIVES

Students must complete 12 semester hours in his/her specialty area.

Environmental Planning

URP 533	Land Use Planning	3 sem. hrs
URP 523	Site Planning	3 sem. hrs
*URP 545	Environmental Assessment	3 sem. hrs
*URP 542	Environmental Planning	3 sem. hrs
URP 534	Community Facilities Planning	3 sem. hrs
NRE 580	Natural Resource Management Policy	3 sem. hrs
NRE 553	Hazardous Waste Management	3 sem. hrs
URP 556	Independent Research	3 sem. hrs
NRE 775	Advanced Principles of GIS	3 sem. hrs

Note: ***Students must take courses in asterisks and two other courses one of which must be in the above in specialty list. If the fourth course is outside the specialty list, the student must obtain the advisor's approval.***

Housing and Community Development

*US 506	Urban Economics	3 sem. hrs
*URP 543	Housing Issues in Planning	3 sem. hrs
URP 544	Historic Preservation and	3 sem. hrs
URP 534	Community Facilities Planning	3 sem. hrs
URP 553	Community Development Process	3 sem. hrs

SWK 630	Needs Assessment and Program Evaluation	3 sem. hrs
ECO 530	Economic Development	3 sem. hrs
URP 556	Independent Research	3 sem. hrs

Note: Students must take courses in asterisks and two other courses one of which must be in the above in specialty list. If the fourth course is outside the specialty list, the student must obtain the advisor's approval.

Transportation Planning

URP 533	Land Use Planning	3 sem. hrs
*URP 535	Transportation Planning	3 sem. hrs
*URP 538	Transportation Modeling	3 sem. hrs
URP 539	Public Transportation Services Administration	3 sem. hrs
SPS 775	Advanced Principles of Geographic Information Systems (Prerequisite: URP 526)	3 sem. hrs
URP 556	Independent Research	3 sem. hrs

Note: Students must take courses in asterisks and two other courses one of which must be in the above in specialty list. If the fourth course is outside the specialty list, the student must obtain the advisor's approval.

Planning and International Development

*URP 564	Urban and Rural Planning in Dev. Nations	3 sem. hrs
URP 561	Seminar on Economic Development Planning	3 sem. hrs
URP 560	International Project Planning, Mgt. & Eval.	3 sem. hrs
AGB 606	Methods and Techniques of Rural Dev.	3 sem. hrs
URP 515	Regional Development Theory	3 sem. hrs
URP 556	Independent Research	3 sem. hrs
*URP 566	Global Environment and Populations Issues	3 sem. hrs

Note: Students must take courses in asterisks and two other courses selected from Environmental, Housing, and Transportation Specialties approved by advisor.

REQUIRED OPTIONS:

URP 555/557 Terminal Research Paper	3 sem. hrs
or	
URP 559 Planning Project	3 sem. hrs
or	
URP 599 Thesis	6 sem. hrs

Special Electives:

URP 504 Internship	3 sem. hrs
URP 513 Urban Geography	3 sem. hrs
US 519 Seminar on Social Policy Issues	3 sem. hrs

COURSE DESCRIPTIONS

URP 500 Fundamentals of Planning - One semester hour. The course provides a fundamental understanding of the field of urban and regional planning, the actors in the planning process, and contemporary planning issues and methods for beginning students. The parameters of planning and the contexts within which the profession is practiced are stressed.

URP 504 Internship - Three semester hours. The purpose of this course is to provide on-the-job training for students who have not had any prior work experience in the field for which they are training. Students perform a pre-determined work assignment under direct agency supervision of ten hours during fall and spring semesters, and 20 hours during the summer. Individual work plans and learning outcomes are established to support the internship experience. (Pre-requisite-six semester hours in the MURP program)

URP 506 Urban Economics - Three semester hours. A study of the economic forces underlying urban phenomena or problems; industrial and residential location, urban transportation, waste disposal and pollution, urban government finance, poverty, crime and income, maintenance programs. (Pre-requisite: ECO 232 or ECO 231)

URP 510 Theory and History of Planning - Three semester hours. This course examines the evolution of the urban and regional planning profession. It presents alternative theories of planning and critically examines procedural, substantive, and decision-making theories of planning practice. The course also explores the relationship of history and theories of planning to equity, diversity, ethics and values issues in the society and in the profession.

URP 511 Planning Research Methods I (Quantitative Analysis) - Three semester hours. A basic graduate course on statistical concepts and methods with applications in urban and regional planning. It is intended to give the student a broad understanding of the meaning, purpose, methods and use of descriptive and inferential procedures in urban analysis and planning. It includes a review of basic mathematical concepts fundamental to quantitative methods, linear and nonlinear functions focusing on growth curves, data measurement and display, descriptive statistics and probability, and introduction to use of computer software packages (SPSS) as a tool in analysis of planning related data.

URP 513 Urban Geography - Three semester hours. This course analyzes the location, evolution (including decline and rebirth) of cities, and functional classification of cities. Urban growth theories and economic influence of cities over larger geographic areas are also studied.

URP 515 Regional Development Theory - Three semester hours. This course provides an introduction to regional development theory, issues and policy. The topics covered in the course include location of economic activities, trade and other forms of contact between regions, processes of regional growth and decline, reasons for different levels of economic development, relations between more or less developed regions, the effects of globalization on development, and implication for regional planning policy.

US 519 Seminar of Social Policy Issues - Three semester hours. This course provides the student with the opportunity to analyze demographic changes, needs and ideological debates which affect social policy in the US compared with other societies.

URP 520 Legal Basis of Planning - Three semester hours. The course focuses on statutory law, policies and the constitutional framework which support the authority for planning and guiding urban and regional development. Through the examination of enabling legislation models, general plans, zoning, development reviews systems, and planning law, this course provides an understanding of how law and urban policy intersect and thus influence the planning process.

URP 521 Planning Research Methods II (Applied Research Methodology) – Three semester hours. This course presents a range of concepts which provide a foundation for the student to understand and apply appropriate research methods according to the research need. Both quantitative and qualitative research designs are explored along with techniques of data collection, treatment, analysis and interpretation which support development and preparation of professional plans and reports and their evaluation in the practice of planning. (Pre-requisite: Instructor's approval required)

URP 525 Planning Studio I - Three semester hours. This course focuses on local land use planning and site design. It is designed to provide the students with practical experiences in urban development process, the basic methods and tools of site and land use planning, evaluation, and implementation strategies. (Pre-requisite- Instructor's approval required)

URP 526 Computer Applications in Planning - Three semester hours. This course is designed for beginning graduate students in urban and regional planning. It begins with an overview of excel and exploration of GIS web resources. It advances to application of Arc GIS desktop in local and regional planning. Approximately half of the class time during the semester is dedicated to teaching Arc GIS while the other half focuses specifically on the application of Arc GIS in the development, preparation and presentation of a database containing tables, maps and graphs typically required for the preparation of comprehensive plans in planning agencies. (Prerequisite- Instructor's approval required)

URP 527 Planning Studio II - Three semester hours. The course focuses on comprehensive plan making at the municipal and multi-jurisdictional (regional) levels. It is designed to build on the skills and concepts learned in Planning Studio I. The course provides the students with practical experiences in integration and application of various components of the planning process into a holistic policy plan. It emphasizes the use of research, analytical, forecasting and evaluation methods in plan-making. Also both collaborative and individual student products are emphasized. (Pre-requisite- Instructor's approval required)

URP 529 Professional Practice - Three semester hours. The purpose of the course is to assist students in understanding the professional responsibility of the practicing planner. The objectives are to teach the concept of professionalism, to train students in the ethical conduct of a professional planner, and to prepare students for careers as a practitioners within private and public domains, and to meet requirements of membership in the American Institute of Certified

Planners (AICP). The course teaches students how to develop, implement and plan projects; how to prepare budgets and how to work in a bureaucratic organization. (Pre-requisite – URP 500, URP 510, URP 520; URP 525 and URP 527 OR Instructor's approval)

URP 531 Economic and Population Analysis for Planners - Three semester hours. The course examines the interactive relationships between demographic, economic and other social processes which impact on the quality of life, and influence planning policies and programs. Topics covered in the course include the vital processes of population change, economic processes and activity forecasting, and their cumulative impacts on urban and regional structures and planning policies.

URP 533 Land Use Planning - Three semester hours. This course focuses on analysis of major determinants of land use, growth potentials and land use alternatives for urban regions. Current policy issues, and approaches and techniques of land use planning at the national, state and local levels, and their impact on community revenues and outlays will also be explored.

URP 534 Community Facilities Planning - Three semester hours. This course is designed to set forth and explore the methods, techniques, analysis and planning for the delivery of basic community facilities in terms of programs, policies, and physical facilities. Areas of exploration include community parks, water and sewage, airports, fire protection, solid waste, and related special community facilities. In addition, community organizational structures are also described as they related to the delivery of services and facilities operation.

URP 535 Transportation Planning - Three semester hours. This course is designed to provide an overview of the transportation planning process together with a detailed understanding of the techniques used to assess the transportation impacts of land development. Components of the long range metropolitan area transportation planning process will provide an understanding as to how area wide transportation plans are generated, tested, evaluated, and implemented. The course will focus on the project level of land use and transportation system interaction.

URP 536 Health and Urban Planning - Three semester hours. This course examines federal legislation and legislative actions which have influenced the broad spectrum of health planning services, emergency medical services, nursing home standards, health maintenance organizations and relevant responsibilities of planners in the broadening health planning field.

URP 538 Transportation Modeling - Three semester hours. This course is designed to present an in-depth orientation to contemporary transportation planning computer model packages and analytical techniques. Practical applications are provided to gain experience in transportation data generation, data management, program execution and interpretation of computer output. (Pre-requisite: URP 535)

URP 539 Transportation Administration - Three semester hours. This course will focus on a broad examination of mass transit issues including legislation, funding, technology assessment planning, and planning process, implementation, and management
of public transportation operations.

URP 542 Environmental Planning - Three semester hours. This course explores the relationship between the natural environment and physical planning. Ramifications of federal, state, and local environmental analysis and impact assessment are also discussed. Broad aspects of the environment including physical, social, economic, cultural, and aesthetic are presented as a means of ensuring environmental stability for future generations.

URP 543 Housing Issues in Planning - Three semester hours. This course provides an introduction to housing markets and existing housing programs. It examines the structure of the demand and supply of housing and the various methods used by the public sector to intervene in the housing market. The different programs and policies used by governments at all levels to serve different housing goals and how well they work are analyzed. In addition, it examines the methodology and techniques for assessing housing conditions and needs, and presents case studies of current innovative approaches for addressing community housing problems. (Pre-requisite URP 506)

URP 544 Historic Preservation and Neighborhood Conservation - Three semester hours. Overview of the historic preservation field including topics such as taxation, gentrification, minority displacement, aesthetic revitalization, structural rehabilitation, alternative uses and other issues relevant to the conservation and preservation of historic facilities and neighborhoods are addressed.

URP 545 Environmental Assessment -Three semester hours. This course focuses on how to assess the likely impacts of land use plans and projects on the bio-physical and socio-economic environment. It examines federal, state and local environmental regulations with an emphasis on translating environmental assessment results into public policy, conceptualization of the mitigation of identifiable environmental conflicts.

URP 553 Community Development Process - Three semester hours. Elements of community resource development strategies based on developmental practices of private investors and governmental agencies. Special attention is given to the political, business and citizen organizational structure at the local level and their relevant impact on code enforcement practices and developmental practices.

URP 555 Terminal Research Proposal Preparation - One semester hour. This course is the initial development stage of the terminal research paper. The research proposal outlines the approach for conducting the research, with focus on the research design. The proposal is developed under the supervision of the student's approved research committee.

URP 556 Independent Research - Three semester hours. A formal presentation of an investigation directed by an assigned faculty member within the department with respect to the student's specialization. It is intended to meet the needs of students for study in urban planning beyond the regularly scheduled courses. The research will consist of either a survey of existing research on a given and specific area of study, an area of the student's interest beyond the scope of instructional courses or work on a problem approved by the faculty of the department. Registration for this course requires a written approval of the faculty advisor and the Chairman of the department.

URP 557 Terminal Research - Two semester hours. Non-thesis, faculty guided research paper developed independently by the student. The paper must thoroughly explore a relevant issue (topic or question) which shall be substantiated by data derived from primary or secondary sources. The research topic or issue must be related or derived from the student's specialty area. (Prerequisites: URP 511; URP 521; URP 555)

URP 559 Planning Project - Three semester hours. This is an applied research focused on the examination of a planning issue or problem under the supervision of the student's project committee culminating in the presentation of a report on the planning project. (Prerequisites: URP 511; URP 521; URP 555)

URP 560 International Program Management and Evaluation - Three semester hours. This course is intended to enable the student to gain an understanding of the principles, issues, processes and problems involved in the planning, management and evaluation of international programs. Specific examples are provided from projects and programs supported by the U.S. Agency for International Development (USAID) and other principle public and private agencies.

URP 561 Interdisciplinary Seminar in Economic Development - Three semester hours. The course is designed to provide a common understanding of methods and issues involved in planning for economic development. Emphasis will be placed upon national and international development .

URP 566 Global Environment and Population Issues in Planning - Three semester hours. This course will examine the main problems of global environment change and world population dynamics including population control, rural-urban population flows and its impact, population and environment issues. This course will also examine the challenges and problems involved in the national development process, where planning for effective utilization of national resources must incorporate elements of environmental management in conjunction with national economic goals. Contemporary and potential environmental problems, such as desertification, soil erosion, water, health, and urban pollution are examined.

URP 599 Thesis - Six semester hours. Preparation of a scientific research report evidencing a significant contribution to the candidate's special area of interest and study. The thesis is based on the compilation and analysis of primary and secondary data including actual "field related" research approved by the thesis committee and accepted by the Dean of the School of Graduate Studies and Extended Education. (Prerequisites: URP 511; URP 521; URP 555 and Departmental faculty approval)

SCHOOL OF ARTS AND SCIENCES

Dr. Matthew E. Edwards, Dean
323 VM Chambers Science Building

MISSION

The primary mission of the School of Arts and Sciences is to provide high quality educational offerings in the fields of arts and sciences for capable students, including those who have experienced limited access to education. This is accomplished within the University's traditional land-grant mission of teaching, research and service.

OBJECTIVES

The objectives of the School of Arts and Sciences are to:

1. Provide courses of instruction and experience which seek to develop the student's ability to engage in analytical and critical thought and expression.
2. Provide opportunities and experiences that will enable the student to become a creative, versatile person who is capable of functioning as a productive member of a profession and society.
3. Provide experiences that will enable the student to develop satisfactory qualifications for entrance to graduate and professional schools.
4. Provide opportunities for the student to recognize the conceptual relationship of disciplines and knowledge through interdisciplinary programs.
5. Promote the advancement of knowledge in all its curricula through research and creative activity among students and faculty in the departments.
6. Provide the student with an increasing awareness and perspective of the rapidly changing global society.

ORGANIZATION AND DEGREES OFFERED

The School of Arts and Sciences is organized into seven departments – Behavioral Sciences, English, Foreign Languages and Telecommunication, Mathematics, Military Science, Physics, Natural and Physical Sciences, and Social Work. Master's degrees are awarded in Biology (Department of Natural and Physical Sciences), Physics (Department of Physics), and Social Work (Department of Social Work). A doctoral degree (Ph.D.) is offered in the area of Applied Physics with an emphasis in optics or materials science. The requirements for each of these graduate programs are listed below.

In cooperation with the School of Education, each of the major programs in the Arts and Sciences offers an array of graduate courses designed to provide the content major for graduate degree programs in education. The listings of these courses are provided elsewhere in this catalog.

THE DEPARTMENT OF NATURAL AND PHYSICAL SCIENCES
BIOLOGY PROGRAM

Dr. Florence Okafor, Interim Chairperson
309 Carter Hall

MISSION

The Master of Science degree program in Biology offers students opportunity for advanced learning in their chosen area of Biology. The Program is committed to excellence in education, research and service by offering students innovative and diverse educational environments.

OBJECTIVES

Our objectives are based on a philosophy of educating graduate students broadly in various areas of biology. These objectives are as follows:

1. To prepare graduates for professional work and research in general biology or in a specialized areas of Biology including Ecology, Genetics, Molecular Biology, Entomology, Microbiology and Physiology.
2. To improve the competence of teachers, experimentalists and researchers in Northern Alabama and across the nation.
3. To provide opportunities for the enhancement of qualification of students and professional biologists of the Tennessee Valley. The Biology Program in cooperation with the Department of Biology at the University of Alabama Huntsville, offers a curriculum leading to the Master's degree in Biology.

COOPERATIVE PROGRAM WITH UNIVERSITY OF ALABAMA in HUNTSVILLE

ADMISSION REQUIREMENTS

An applicant who has received a Baccalaureate degree from an accredited college or university may apply for admission to the Biology Graduate Program in accordance with the admission criteria of the university. (See AAMU and UAH admission requirements). Additional requirements for this program include:

1. Clear evidence of scholastic competence to meet the requirements for an advanced degree.
2. A minimum GPA of 2.50 (based on a 4.00 system) in the major area of concentration.
3. One year of chemistry, including one term of organic chemistry and or biochemistry.

Applicants who do not meet these requirements may apply for conditional admission.

Degree Requirements: Master's Degree

1. **Master of Science (with thesis), Plan I**---The degree of Master of Science in biology will be conferred upon candidates who have met the prescribed requirements for this degree with major study in the field of biology. A candidate must submit an acceptable thesis, which shows creative thinking and independent judgment in developing a problem from primary sources. All Master of Science degree candidates must satisfactorily complete a minimum of 24 semester hours of course work and, in addition, a minimum of 6 hours of thesis.

2. **Master of Science (Non-Thesis), Plan II**---A student who elects the non-thesis degree will be required to write a Master's report. The nature of the report can be a library search, survey, or experimentation as determined by the student's advisory committee. For the Master of Science degree, a student must complete a minimum of 33 semester hours of course work, unless the student is a full-time student (full-time for three terms at UAH or two semesters at AAMU), under which circumstances the student must complete a minimum of 30 semester hours.

3. **Master of Education in Secondary Education, Plan III***---Option for an individual seeking to earn a Master's degree and receive Class A certification. Such a program will consist of 24 semester hours in biology and 9 semester hours in education. The committee chairman of the advisory committee for the Master's student will be primarily responsible for advising the student on the program of courses required in Biology and an education advisor will be primarily responsible for advising the student on the program of courses to be taken in Education. The mutual advisor ship would be suggestive in terms of each of the advisor's respective disciplines, but not in terms of control outside each of the advisor's allotted hours within the 33 hours required for this degree program EDU 502 and 503 may be required at AAMU. The 9 hours of course work in the Department of Education will be required for each master's student seeking Class A Secondary Teaching Certification. However, additional hours in education beyond the 9 hours may be taken if the advisory committee so agrees.

*** Students interested in Plan III must consult an advisor in the School of Education.**

Comprehensive Examination

A written comprehensive examination composed jointly by the faculties of both institutions will be administered to each student. This examination will normally be taken (a) **(for non-thesis students)** after the student has completed the required course work, or (b) **(for thesis students)** before the student has progressed well into his or her research and thesis problem. A subsequent oral examination is required and will be administered by the student's Graduate Committee.

Policy Statement

1. The degree is a cooperative degree (M.S. with three plans) awarded by AAMU or UAH.

2. Initial registration may be at either institution. Later registration will be according to the major professor's assignment.
3. As a requirement for a degree, each Graduate Teaching Assistant enrolled for a degree must conduct one or more laboratory or lecture sections, as decided by his/her Graduate advisory committee, in an area related to his/her field of concentration.
4. An advisory committee for an individual enrolled at one of the two schools shall have at least one representative from the other school.
5. Students will be admitted in accordance with admission criteria of the respective institutions.

a) Except for the purpose of taking courses, conducting research and other strictly academic matters, students will not be encouraged to transfer back and forth between schools (see 'b" below).

b) Students will need to declare the School of intent (from which they wish to receive a degree) by the end of nine semester hours taken or by the end of their first academic term.
Thereafter, a student may not transfer between schools and must remain in the same area of emphasis.

c) Equipment and facilities at the two respective departments shall be available to all graduate students in the program without regard to the institution at which the students are enrolled.

COURSES FOR GRADUATE CREDIT

Note: ***For all four semester hour courses, three credit hours are for lecture while one credit hour is for the laboratory component. The lab component will be taught separately from the lecture in the schedule.***

MICROBIOLOGY

BIO 522:	Microbial Physiology	3 sem. hrs.
BIO 523:	Principles of Virology	3 sem. hrs.
BIO 524:	Mycology	4 sem. hrs.
BIO 525:	Parasitology	5 sem. hrs.
BIO 526:	Microbial Ecology	4 sem. hrs.
BIO 621:	Pathogenic Bacteriology	5 sem. hrs
BIO 622:	Applied and Industrial Microbiology	4 sem. hrs.
BIO 623:	Advanced Virology	4 sem. hrs.
BIO 624:	Immunology	4 sem. hrs.
BIO 625:	Medical Mycology	4 sem. hrs.

PHYSIOLOGY

BIO 531:	Plant Physiology	4 sem. hrs.
BIO 532:	Animal Physiology	4 sem. hrs.

BIO 533:	Advanced Physiology I (Human Physiology)	4 sem. hrs.
BIO 534:	Advanced Physiology II (Human Physiology)	4 sem. hrs.
BIO 535:	Endocrinology	4 sem. hrs.
BIO 631:	Pharmacology	4 sem. hrs.
BIO 632:	Cardiovascular Physiology	3 sem. hrs.
BIO 633:	Endocrinology	4 sem. hrs.

ENTOMOLOGY

BIO 551:	Insect Physiology	4 sem. hrs.
BIO 552:	Insect Pest Management	4 sem. hrs.
BIO 553:	Insect Taxonomy and Morphology	4 sem. hrs.
BIO 651:	Medical Entomology (UAH)	4 sem. hrs.
BIO 652:	Advanced Applied Entomology	4 sem. hrs.
BIO 653:	Taxonomy of Immature Insects	4 sem. hrs.

MOLECULAR BIOLOGY

BIO 540:	Molecular Biology	4 sem. hrs.
BIO 541:	Cell Physiology	4 sem. hrs.
BIO 542(L):	Analytical Biochemistry	2 sem. hrs.
BIO 543:	Cell & Development Biology (UAH)	4 sem. hrs.
BIO 544:	Cell & Development Biology (UAH)	3 sem. hrs.
BIO 546:	Cytogenetics	4 sem. hrs.
BIO 641:	Advanced Cell Biology	4 sem. hrs.
BIO 642:	Advanced Cell Physiology	4 sem. hrs.
BIO 643:	Microscopy (UAH)	4 sem. hrs.
BIO 644:	Topics in Cellular and Developmental Biology & Biological Fine Structure (UAH)	2 sem. hrs.
BIO 645:	Human Cytogenetics and its Clinical Application	3 sem. hrs.
BIO 646:	Molecular Genetics	3 sem. hrs.
BIO 647:	Enzymology (UAH)	3 sem. hrs.
BIO 648:	Enzymology Laboratory (UAH)	2 sem. hrs.
BIO 649:	Advanced Genetics I	4 sem. hrs.
BIO 650:	Advanced Genetics II	4 sem. hrs.

ECOLOGY AND SYSTEMATICS

BIO 560:	Environmental Biology	3sem. hrs.
BIO 561:	Physiological Ecology	4 sem. hrs.
BIO 562:	Community Ecology (UAH)	4 sem. hrs.
BIO 563:	Population Ecology (UAH)	4 sem. hrs.
BIO 564:	Limnology (UAH)	4 sem. hrs.
BIO 565:	Phycology	4 sem. hrs.
BIO 570:	Plant Pathology	4 sem. hrs.
BIO 571:	Plant Anatomy	4 sem. hrs.

BIO 572:	Plant Taxonomy	4 sem. hrs.
BIO 580:	Advanced Invertebrate Zoology (UAH)	4 sem. hrs.
BIO 660:	Ecosystem Dynamics (UAH)	4 sem. hrs.
BIO 661:	Advanced Population Ecology (UAH)	4 sem. hrs.
BIO 620:	Applied Environmental Phycology (Toxicology)	4 sem. hrs.

GENERAL COURSES

BIO 510:	Radiation Biology	4 sem. hrs.
BIO 511:	Biological Control	4 sem. hrs.
BIO 512:	Histotechniques	3 sem. hrs.
BIO 590:	Problems in Biological Science	3 sem. hrs.
BIO 690:	Seminar	1 sem. hrs.
BIO 691:	Special Topics	1-4 sem. hrs.
BIO 692:	Research	1-4 sem. hrs.
BIO 699:	Master's Thesis	1-3 sem. hrs.

COURSE DESCRIPTIONS

BIO 510 Radiation Biology - Four semester hours. Characteristics of radioisotopes; detection and counting techniques and instrumentation; tracer techniques, health and safety system. (Prerequisite: consent of instructor)

BIO 511 Biological Control - Four semester hours. 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.

BIO 512 Histotechniques - Three semester hours. Microscopic study of the various tissues and organs of the animal system.

BIO 522 Microbial Physiology (AAMU and UAH) - Three semester hours. The fundamentals and basic principles of microbial cell structure, growth and cellular responses to environmental changes. Topics include macromolecular synthesis of cell structures, metabolism, the genome, environmental effects, and regulation. The topics also cover the depth and range of physiological diversities found in microorganisms as well as their biotechnological exploitation. Lab Fee: level 4. (Prerequisites: Microbiology, Organic Chemistry, and Biochemistry)

BIO 523 Principles of Virology - Four semester hours (3 hours of lecture and 1 hour of lab). The course will give a broad introduction into the concepts and techniques of molecular virology, which are applicable to research on human, animal and plant viruses. Topics include the principles of viral infectivity, multiplication and chemical constitution; laboratory techniques for viral isolation, cultivation, identification, and enumeration. Fundamental principles related to the interaction of viruses with host cells will be emphasized. Fee: Level 4

BIO 524 Mycology - Four semester hours. Study of the various lines of the phycomycetes using representative species; the various series of the actinomycete, and representative pathogenic (crop and vegetable pathogens) and non-pathogenic heterobasidiomycetideae. Ontogenetic, cellular and structural study applied to all divisions, classes, series, orders, and families. Lab Fee: Level.

BIO 525 Parasitology - Five semester hours. The protozoa and helminthes parasitic for humans and their laboratory identification are discussed. Arthropods are studied in relation to their roles as vectors. Two three-hour labs per week. Lab fee: Level 4. (Prerequisite: BIO 221)

BIO 526 Microbial Ecology - Four semester hours. The relationship of soil and aquatic microorganisms and their importance in ammonification, nitrification, and other biological processes. (Prerequisite: BIO 221)

BIO 531 Plant Physiology (AAMU and UAH) - Four semester hours. A general introductory study of life processes of plants, including water relations, mineral utilization, metabolism, photosynthesis, digestion, respiration, assimilation, and growth as affected by growth hormones. One three-hour lab per week. Lab Fee: Level 3. (Prerequisites: BIO 13, 371 or 372, CH 113 or 331)

BIO 532 Animal Physiology (UAH) - Four semester hours. Basic course in organism 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.

BIO 533 Advanced Physiology I (Human Physiology) - Four semester hours. Study of nerve and muscle cell function, fluid and electrolyte environment of body tissues, blood, heart, circulatory, nervous systems and alternative healing methods for diseases. (Prerequisite: Organic Chemistry, preferably Biochemistry).

BIO 534 Advanced Physiology II (Human Physiology) - Four semester hours. Continuation of Advanced Physiology I with consideration of kidney function, human respiratory, digestive, reproductive, endocrine systems and disease alternative healing methods. (Prerequisite: Organic Chemistry, preferably Biochemistry)

BIO 535 Endocrinology - Four semester hours. Current developments in anatomy, physiology, chemistry, and regulation of major endocrine glands. Laboratory sessions in biological and chemical assays of hormones. (Prerequisite: BIO 409)

BIO 540 Molecular Biology - Four semester hours. Study of structure, behavior and function of the large biological molecules, including biological oxidations, metabolism of carbohydrates, lipids, amino acids, and the genetic aspects of metabolism. (Prerequisite: CHE 301)

BIO 541 Cell Physiology - Four semester hours. Study of the inter-conversions and functions of Biomolecules in cells, including the major metabolic pathways, bioenergetics, and interrelations of various pathways, and various mechanisms of metabolic regulation. One three-hour lab per week. Lab Fee: level 4. (Prerequisites: BIO/CHE 361 and 362 or Consent of Instructor)

BIO 542 Analytical Biochemistry Laboratory - Two semester hours. Advanced laboratory course dealing with modern techniques of molecular biology and biochemistry.

BIO 543 Cellular and Development Biology (UAH) - Four semester hours. Broad and comprehensive integrated approach to cellular and development 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: BIO 113, 114, 319, CH 101, 105, 113 or CH 123, 126 and 331) May be taken concomitantly.

BIO 544 Cellular and Developmental Biology (UAH) - Three semester hours. Continuation of BIO 543.

BIO 545 Cellular and Developmental Biology Lab (UAH) - Two semester hours. Should be taken after BIO 543 and concurrently with BIO 544. Lab Fee: Level 4.

BIO 546 Cytogenetics - Four semester hours. Detailed analysis of composition, morphology and behavior of genes, especially as they relate to function, development, and heredity. (Prerequisite: BIO 406)

BIO 551 Insect Physiology - Four semester hours. Metabolism and utilization of carbohydrates, lipids and nitrogen compounds; energy production, neuromuscular mechanics, hormones and morphogenesis; role of organs and organ systems in metabolism. (Prerequisites: General Entomology or equivalent and Advanced Biochemistry)

BIO 552 Insect-Pest Management - Four semester hours. Insect surveys, ecological basis for control, plant and animal resistance to insects, control by parasites, predators, microorganisms, and management by genetics principles, chemical attractants, chemical repellents, sterilization, insecticides, and integrated systems of pest management. (Prerequisite: General Entomology or Advanced Applied Entomology)

BIO 553 Insect Taxonomy and Morphology (AAMU and UAH) - Four semester hours. Classification of insects, external and internal anatomy of insects, with emphasis on the comparative and functional aspects. (Prerequisite: BIO 455)

BIO 560 Environmental Biology - Three semester hours. 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.

BIO 561 Physiological Ecology (UAH) - Four semester hours. 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. (Prerequisite: BY 312 or Consent of Instructor. Recommended: BIO 361 or 532).

BIO 562 Community Ecology (UAH) - Four semester hours. 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. (Prerequisites: BIO 312 and Taxonomy)

BIO 563 Population Ecology (UAH) - Four semester hours. 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. (Prerequisites: BIO 312 and Organic Chemistry)

BIO 564 Limnology (UAH) - Four semester hours. 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: BIO 312, 315, 371 or 378, or Consent of Instructor)

BIO 565 Phycology - Four semester hours. Morphology of classes; growth requirements; physical and chemical stresses on growth and productivity. Succession and bioassay of pollutants. Systematic physiology and metabolism of ecology and environmental stress factors. Productivity culturing methods and economics. Man's use of biotechnology and industry. Terrestrial monitoring.

BIO 570 Plant Pathology - Four semester hours. History of non-parasitic and parasitic diseases incited by bacteria, fungi, plasmodiophorales, nematodes, and viruses will be discussed. Disease control through exclusion, eradication, protection, and post-resistance mechanisms will be mentioned. (Prerequisite: BIO 344)

BIO 571 Plant Anatomy - Four semester hours. 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: BIO 372 or Consent of Instructor)

BIO 572 Plant Taxonomy - Four semester hours. Principles of classifying, naming, and identifying vascular plants with special emphasis on flowering plants, including a consideration of ecological factors influencing vegetation distribution.

BIO 580 Advanced Inveterate Zoology (UAH) - Four semester hours. Phylogenetic consideration of the invertebrate, including structural, functional, embryological, and

physiological relationships, leading to an understanding of the complexity of animals. Includes laboratory and field trips. (Prerequisite: Invertebrate Zoology or Consent of Instructor)

BIO 590 Problems in Biological Sciences - Three semester hours. 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.

BIO 620 Applied Environmental Phycology (Toxicology) - Four semester hours. Detailed study of hazardous pollution in the environment: heavy metals, pesticides, radiation, ozone, hydrocarbons, their fate and impact on the ecosystem; assay of pollutants and their bioremediation. Risk assessment of pollutants in the environment and their management. (Prerequisites: Consent of Instructor)

BIO 621 Pathogenic Bacteriology (UAH) - Five semester hours. Detailed study of bacteria that cause infections in humans. Mechanisms of pathogenicity and host-parasite relationships are emphasized. Two three-hour labs per week. Lab Fee: Level 4. (Prerequisites: BIO 361, 421, and 430 or Consent of Instructor)

BIO 622 Applied and Industrial Microbiology - Four semester hours. Physiological studies and fermentation processes. Function of microorganisms of industrial importance in the biological production of antibiotics, vitamins, organic acids, alcohol, amino acids, waste treatment and their assay. (Prerequisite: Microbiology)

BIO 623 Advanced Virology - Four semester hours. Outline of field of virology stressing the molecular biology of virus replication. Topics include immunology, genetics, and epidemiology. Emphasis on bacteria and vertebrate viruses, although plant and insect viruses may be discussed. (Prerequisites: Microbiology and Principles of Virology)

BIO 624 Immunology - Four semester hours. 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: BIO 361 and 430 or Consent of Instructor)

BIO 625 Medical Mycology (AAMU and UAH) - Four semester hours. Comprehensive study of fungi pathogenic to man with emphasis on their properties, pathogenesis, and laboratory diagnosis. Topics will include interrelationship between fungi, the environment and food. Two hour labs per week: level 4; (Prerequisites: BIO 421 and 430)

BIO 631 Pharmacology - Four semester hours. 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: Advanced Physiology I and II).

BIO 632 Cardiovascular Physiology - Three semester hours. Mechanisms of cardiac muscle excitation and interaction. Analysis of peripheral circulation. Neural regulation of circulation. Angiography, Electrocardiography, and Vectorcardiography as diagnostic tools. (Prerequisites: Medical Physiology I & II).

BIO 633 Endocrinology - Four semester hours. 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 Consent of Instructor).

BIO 641 Advanced Cell Biology (AAMU and UAH) - Four semester hours. Integrated approach to the fine structure and function of various cellular processes. Special attention to particular aspects of cellular process each term; e.g., motility in cells, cellular differentiation, etc. Laboratory included. Lab fee: Level 4. (Prerequisite: Cellular and Development Biology or Consent of Instructor).

BIO 642 Advanced Cell Physiology - Four semester hours. 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, hypothesis of cellular origins. (Prerequisites: Molecular Biology, Physics, Cytology, and Biochemistry) Includes laboratory.

BIO 643 Microscopy (UAH) - Four semester hours. Introduction to the various methods of preparation for transmission electron microscopy and an analysis of electron micrographs. 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 Consent of Instructor)

BIO 644 Topics in Cell and Development Biology and Biological Fine Structure (UAH) – Two semester hours. Discussion of current topics in cell biology with emphasis on student participation. Both plant and animal cells will be emphasized. Depending on the number of students, some terms may be devoted to short research problems. (Prerequisites: BIO 543 and 643 or Consent of Instructor)

BIO 645 Human Cytogenetics and its Clinical Application - Three semester hours. Review of normal human chromosome structure and normal chromosome segregation and morphology with clinical considerations.

BIO 646 Molecular Genetics (AAMU and UAH) - Three semester hours. 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: BIO 319 and CHE 361)

BIO 647 Enzymology (UAH) - Three semester hours. Detailed study of enzymes including protein synthesis, primary, secondary, tertiary, and quaternary structure, nomenclature, physiological and catalytic functions, enzyme kinetics, and metabolic regulations of enzyme activity. (Prerequisites: BIO 542 or CHE 561 or Consent of Instructor)

BIO 648 Enzymology Lab - Two semester hours. Techniques of isolation, purification, and characterization of enzymes. Lab Fee: Level 4. (Prerequisite: BIO 647)

BIO 649 Advanced Genetics I - Four semester hours. Three hours lecture and one hour laboratory. This is the first of the two-course sequence and will provide instruction in genetics of viruses, bacteria and fungi. This instruction will emphasize a comparative approach of structure, function and expression of genetic material, genetic code, protein synthesis and transposable elements. Methods of cloning recombinant DNA in these groups will be discussed. (Prerequisites: Principles of Genetics, BIO 311: Microbiology, BIO 430; Biochemistry, BIO 407)

BIO 650 Advanced Genetics II - Four semester hours. Three hours of lecture and one hour of laboratory. This is the second of the two-course sequence and will include classical and molecular instruction in animal genetics, population genetics and evolutionary genetics. The emphasis will be on the use of modern molecular techniques, such as allozyme and restriction fragment length polymorphism, and DNA sequencing information in studying modern population and evolutionary genetics. (Prerequisites: BIO 591, BIO 430, BIO 407, and BIO 649)

BIO 651 Medical Entomology (UAH) - Four semester hours. Insects and other arthropods as parasites and disseminators of disease. Mechanisms of life cycles, biology and control of insect parasites of humans. Lab Fee: Level 3. (Prerequisite: BIO 361 and 455 or Consent of Instructor)

BIO 652 Advanced Applied Entomology - Four semester hours. Economic thresholds, economic injury levels, population dynamics, residues in food crops, chemical control, insect transmission of plant and livestock diseases. (Prerequisite: General Entomology)

BIO 653 Taxonomy of the Immature Insect (AAMU and UAH) - Four semester hours. Studies of the literature, comparative morphology, and techniques of identification of the immature stages of the insect, methods of collecting and preserving the immature stages. (Prerequisite: BIO 455 or Consent of Instructor)

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

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

BIO 690 Seminar (AAMU and UAH) - One semester hour. Students report on current journal articles and research.

BIO 691 Special Topics (AAMU and UAH) - One to four semester hours. Literature search relative to topics of special interest under direct supervision of an instructor. For graduate students.

BIO 692 Research (AAMU and UAH) - Two or four semester hours. Individual investigations at 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.

BIO 699 Master's Thesis (AAMU and UAH) - One to three semester hours. Individual research towards completing the thesis requirement for the M.S. degree in Biology. **Each Semester.**

DEPARTMENT OF PHYSICS

Dr. Mohan Aggarwal, Chairman
133 V. Murray Chambers

MISSION

The primary mission of the Department of Physics is teaching and research of the highest quality at the graduate level for students pursuing their higher studies leading to Master's and Ph.D. degrees in Physics. The Department provides an excellent educational experience for the graduate students who work in high technology research in optics/materials science/space sciences programs and provides outreach and service as an academic institution. The Department of Physics strives to provide support for its faculty in utilizing their expertise to the benefit of the regional, national and international scientific communities.

OBJECTIVES

- To offer specialization in optics/lasers and material science areas of applied physics as well as space sciences and train qualified students for careers in academics, government, and in industries which are heavily involved in space sciences research as well as research and development in the areas of modern optics, lasers, optical communication and in the science and applications of new materials.
- To increase the opportunities for students, teachers and scientists in the United States and, particularly, in North Alabama to obtain training in the area of physics and applied physics.

ADMISSION REQUIREMENTS

Master of Science

For admission to the Master of Science program in physics/applied physics, applicants must have received a bachelor's degree from a recognized university with a major in any of the physical sciences or engineering and must have an overall GPA of 3.00 (based on a 4.00 system). Also, students with bachelor's degrees in optical science or optical engineering, or materials science or materials engineering programs and space sciences will be eligible for admission into the graduate program with optics/lasers and materials science and space science concentrations. Students with a degree in an area other than physics may be required to take prerequisite undergraduate physics courses. The Graduate Record Examination (GRE) score of at least 600 in the quantitative section of the general area is required. Students from non-English speaking countries are required to have a minimum score of 550 on the Test for English as a Foreign Language (TOEFL). All graduate students must demonstrate proficiency in English via the University English Competency test for graduate students.

DEGREE REQUIREMENTS

Master of Science (Thesis option): Students must complete at least 24 semester hours of course work with a minimum of 12 hours in an area of concentration, write a thesis on an approved topic under the supervision of a thesis advisor, and satisfactorily defend the thesis before an advisory committee appointed by the department and approved by the Dean of the School of Graduate Studies.

Master of Science (Non-Thesis option): Students must complete at least 30 semester hours of course work, with at least 15 of these being in the area of concentration, and pass a comprehensive examination given by the department.

Master of Science (Physics Education option): Students must complete a minimum of 36 semester hours of graduate credit including the following core courses: 12 semester hours of advisor-approved 500 level courses in Physics, and 24 semester hours from the following courses: SPE 501(0-3 Hr.), EDU 501(3 Hr.), EDU 502(3 Hr.), EDU 503(3 Hr.), EDU 536(3 Hr.), EDU 542(3 Hr.) or *EDU 529, EDU 615(3 Hr.), SED 530(3 Hr.), SED 527(3 Hr.), or EDU 532, and advisor-approved electives (1-3 Hr.) or *EDU 531.

* Required electives for students in State Scholarship Technology program.

ADMISSION REQUIREMENTS

Doctor of Philosophy

The program is open for admission to students who satisfy the general criteria for admission to the School of Graduate Studies and who also meet the departmental requirements for admission to the graduate program in the specialization of choice. The admission to the doctoral program requires a Master's degree in physics or any field of physical sciences or engineering or a closely related field. An undergraduate physics major with a GPA of 3.5 on a scale of 4.0, and a strong recommendation of the Graduate Admission Committee, could be admitted directly to the Ph.D. program. The Graduate Record Examination (GRE) score of at least 600 in the quantitative section of the general area is required. The GRE Advanced in Physics is strongly urged. These applicants, as well as applicants with master's degrees, must pass the various examinations described later. Students from non-English speaking countries are required to have a minimum score of 550 on the Test for English as a Foreign Language (TOEFL). All graduate students must demonstrate proficiency in English via the University English Competency test for graduate students.

DEGREE REQUIREMENTS

In order to earn the Ph.D. degree in applied physics, a graduate student must earn a total of at least 60 semester hours of credit including 15 semester hours in the area of general physics. In addition to this, a student must pass a departmental qualifying examination before completing 24 semester hours of graduate credits and must also pass a depart-mental candidacy examination before being considered as a Ph.D. candidate. Also, the student must do research on an approved

topic, earn a minimum of 12 semester hours of credit for the dissertation, and defend the findings of research before an advisory committee. A student cannot register for more than 6 credit hours of dissertation during a given semester. There is no foreign language requirement for the degree.

A student must pass three examinations in the following sequence before the degree is awarded:

1. All students seeking for a Ph.D. degree must pass a qualifying examination before completing 24 semester hours of graduate credits. A person who has been admitted on the basis of a master's degree may take the qualifying examination after the first semester in the program.

2. All students must take a written departmental candidacy examination in the area of specialization before filing for candidacy. This examination must be passed at least nine months before the expected graduation date. A student is considered as a Ph.D. candidate only after passing the departmental candidacy examination.

3. A Ph.D. candidate must make an oral presentation on the dissertation and must defend the findings before a committee of examiners as stated earlier. The presentation of the dissertation must be completed at least six weeks before the intended graduation date.

COURSES FOR GRADUATE CREDIT

GENERAL COURSES
*Required courses for all students.

*PHY 500	Analytical Mechanics	3 sem. hrs.
PHY 503	Methods of Mathematical Physics	3 sem. hrs.
PHY 504	Physics in Modern Technology	1-3 sem. hrs.
*PHY 505	Electromagnetic Theory I	3 sem. hrs.
PHY 506	Electromagnetic Theory II	3 sem. hrs.
PHY 518	Thermodynamics and Statistical Mechanics	3 sem. hrs.
PHY 519	Advanced Statistical Mechanics	3 sem. hrs.
*PHY 521	Quantum Mechanics I	3 sem. hrs.
PHY 522	Quantum Mechanics II	3 sem. hrs.
PHY 525	Solid State Physics I	3 sem. hrs.
PHY 531	Mathematical Methods in Applied Physics I	3 sem. hrs.
PHY 532	Mathematical Methods in Applied Physics II	3 sem. hrs.
PHY 537	Advanced Laboratory	3 sem. hrs.
PHY 600	Solid State Physics II	3 sem. hrs.
PHY 601	Seminar/Colloquium 1-	3 sem. hrs.
PHY 701	Applied Solid State Electronics I	3 sem. hrs.
PHY 791	Applied Solid State Electronics II	3 sem. hrs.
PHY 792-94	Selected Topics	1-4 sem. hrs.

All Master's degree candidates must complete at least 12 semester hours, and all Ph.D. degree candidates must complete 15 semester hours from these general courses.

OPTICS COURSES

*PHY 649	Geometrical Optics	3 sem. hrs.
PHY 650	Instrumental Optics	3 sem. hrs.
PHY 651	Spectroscopy	4 sem. hrs.
PHY 655	Optics Laboratory	4 sem. hrs.
*PHY 657	Physical Optics and Interferometry	4 sem. hrs.
PHY 660	Quantum Optics	3 sem. hrs.
PHY 663	Electro-Optical Systems	4 sem. hrs.
PHY 665	Lens Design	4 sem. hrs.
PHY 670	Non-Linear Optics	3 sem. hrs.
*PHY 671	Laser Physics I	4 sem. hrs.
PHY 672	Laser Physics II	4 sem. hrs.
PHY 675	Thin Films & Integrated Optics I	4 sem. hrs.
PHY 680	Holography	3 sem. hrs.
PHY 690	Introduction to Biophotonics	3 sem. hrs.
PHY 692	Nanophotonics	3 sem. hrs.
PHY 699	Master's Thesis	1-3 sem. hrs.
PHY 703	Laser Systems	4 sem. hrs.
PHY 712	Optical Phase Conjugation I	3 sem. hrs.
PHY 714	Optical Phase Conjugation II	3 sem. hrs.
PHY 715	Fiber Optics	3 sem hrs.
PHY 725	Optical Fiber Communications	3 sem. hrs.
PHY 750	Laser Spectroscopy	3 sem. hrs.
PHY 755	Optics Laboratory II	3 sem. hrs.
PHY 771	Signal Processing	3 sem. hrs.
PHY 775	Thin Films & Integrated Optics II	3 sem. hrs.
PHY 799	Dissertation	1-6 sem.hrs.

Students specializing in optics must earn: (1) for the M.S. degree, a minimum of 18 hours for a non-thesis option and 12 hours for a thesis option and (2) for the Ph.D. degree, a minimum of 45 hours.

MATERIALS SCIENCE COURSES

*PHY 632	Elements of Materials Science	3 sem. hrs.
PHY 633	Physical Metallurgical Principles	3 sem. hrs.
*PHY 634	Crystal Physics and Crystal Growth	3 sem. hrs.
*PHY 635	Magnetic and Optical Properties of Materials	3 sem. hrs.
PHY 636	Semiconductor Physics	3 sem. hrs.
PHY 637	Special Topics in Materials Science	3 sem. hrs.
PHY 638	Imperfections in Solids	3 sem. hrs.
PHY 639	Electron Spectroscopy and Electron Diffraction	3 sem. hrs.
PHY 640	Mechanical Behavior of Solids	3 sem. hrs.
PHY 642	Materials for Energy Production Devices	3 sem. hrs.

PHY 644	Modern Composite Materials	3 sem. hrs.
PHY 648	Advanced Materials Science Laboratory	3 sem. hrs.
PHY 699	Master's Thesis	1-3 sem. hrs.
PHY 705	Solid State Diffusion	3 sem. hrs.
PHY 710	Thermodynamics of Materials	3 sem. hrs.
PHY 720	Radiation Effects in Crystalline Solids	3 sem. hrs.
PHY 730	Solidification Process	3 sem. hrs.
PHY 735	Materials for Radiation Detector	3 sem. hrs.
PHY 796-97	Advanced Topics in Materials Science	1-4 sem. hrs.
PHY 799	Dissertation	1-6 sem. hrs.

Students specializing in materials science must earn: (1) for the MS, (non-thesis option) 18 semester hours, and (thesis option) 12 semester hours from the above list; (2) for the Ph.D., 45 semester hours from the above list.

*Required courses.

SPACE SCIENCE

*PHY 610	Introduction to Solar-Terrestrial Physics	3 sem. hrs.
PHY 612	Physics of the Sun and the Solar Wind	3 sem. hrs.
PHY 614	Physics of the Magnetosphere	3 sem. hrs.
PHY 617	Physics of the Ionosphere and Thermosphere	3 sem. hrs.
PHY 620	Radio Wave Propagation in the Ionosphere	3 sem. hrs.
PHY 625	Planetary Atmospheres and Ionospheres	3 sem. hrs.

Students specializing in space science must earn: (1) for the MS (non-thesis option) 18 semester hours, and (thesis option) 12 semester hours from the above list and a combination of general physics, optics, materials sciences, and graduate computer science courses; (2) for the Ph.D., 45 semester hours from the above list and a combination of graduate optics, materials science, general physics, and graduate computer science courses.

OTHER GRADUATE LEVEL COURSES IN PHYSICS

PHY 501	Concepts in Modern Physics	3 sem. hrs.
PHY 502	Biophysics	3 sem. hrs.
PHY 552	Problems in Physical Science	3 sem. hrs.

COURSE DESCRIPTIONS

GENERAL COURSES

PHY 500 Analytical Mechanics - Three semester hours. Generalized coordinates, ignorable coordinates, conservative fields, velocity dependent potentials, canonical transformations, and Hamiltonian mechanics. Hamilton's equations of motion and application to simple dynamical

systems. Hamilton-Jacobi theory, small oscillations, Larmor precession, asymmetrical top (Prerequisite PHY 321 or equivalent)

PHY 503 Methods of Mathematical Physics - Three semester hours. Vector analysis, matrix analysis, functions of a complex variable, calculus of residues, differential equations, special functions of mathematical physics, Fourier series, Fourier transforms, tensor analysis. (Prerequisite PHY 303 or equivalent)

PHY 504 Physics in Modern Technology - One to three semester hours. Physical basis of computers, communication systems, propulsion and power generation; energy and environment, properties of special materials, infrared detecting devices, satellites and long range weather predictions, transistors, chips and printed circuits. This course will be taught through seminars by invited specialists in each of the areas. However, there will be a faculty member coordinating the course who will design techniques for student participation and methods for evaluation of student performance. (Prerequisite PHY 201 or equivalent)

PHY 505 Electromagnetic Theory I - Three semester hours. Maxwell's equations, electrostatics, magnetostitics, wave propagation, radiation, waves in transparent and conducting media, resonant cavities, electrodynamic potentials, multi-pole expansions, covariant formulation of electrodynamics. (Prerequisite PHY 331 or equivalent)

PHY 506 Electromagnetic Theory II - Three semester hours. Radiation from a moving charge, scattering, radiation damping and electrodynamics in material media, special theory of relativity, motion of charged particle in electric and magnetic fields. Cherenkov radiation. Bremsstrahlung, classical theory of dispersion and dispersion relations, electrodynamics of moving media. Magneto- hydrodynamics and plasma physics. (Prerequisite: PHY 505)

PHY 518 Thermodynamics and Statistical Mechanics - Three semester hours. A survey of thermodynamics from classical and statistical mechanics point of view. (Prerequisite PHY 341 or equivalent)

PHY 519 Advanced Statistical Mechanics - Three semester hours. Foundations of classical and quantum statistical mechanics, kinetic theory of gases, Liouville and Boltzman H theorems, ensembles, quantum statistical mechanics, statistics of independent particles, applications to magnetic phenomena and cooperative interactions, non-equilibrium statistical mechanics.
(Prerequisite: PHY 518)

PHY 521 Quantum Mechanics I - Three semester hours. Postulates of quantum mechanics. Schrödinger equation. Simple systems, elementary scattering theory, potential wells and tunneling, bound states, Hillbert's Space, matrix mechanics. (Prerequisite PHY 421 or equivalent)

PHY 522 Quantum Mechanics II - Three semester hours. Angular momentum, coupling, Wigner-Eckart theorem, Application to atomic spectra, elementary quantum theory of electromagnetic fields; elementary perturbation theory. (Prerequisite: PHY 521)

PHY 525 and PHY 600 Solid State Physics I and II - Three semester hours. Classification of solids by forces, properties and symmetries, lattice vibration and its quantization in terms of phonons, interaction of phonons with electromagnetic fields. Bloch theorem, band structure, optical, dielectric and magnetic phenomena. (Prerequisite PHY 451 or equivalent)

PHY 531-532 Mathematical Methods in Applied Physics I and II - Three semester hours. Review of analysis in the complex plane, evaluation of definite integrals, contour integration, differential equations and special functions. Green's function, Fourier integrals, linear vector spaces. (Prerequisite PHY 503 or equivalent)

PHY 537 Advanced Laboratory - Three semester hours. Selected experiments in optics, atomic and nuclear and solid-state physics, high vacuum and machine shop experience.

PHY 699 Thesis - One to three semester hours. Research work towards completing the thesis requirement.

PHY 701 and PHY 791 Applied Solid State Electronics I and II - Three semester hours. Semiconductor devices, rectifier and amplifier circuits, logic control, analog and digital transducers, optoelectronics, VLSI circuit fabrication memory devices, computer aided engineering of VLSI systems, VLSI microprocessor system design. (Prerequisite PHY 451 or equivalent)

OPTICS COURSES

PHY 649 Geometrical Optics - Three semester hours. Review of image formation, ray tracing, optical invariants, monochromatic and chromatic aberrations, geometrical image evaluation. (Prerequisite PHY 401 or equivalent)

PHY 650 Instrumental Optics - Three semester hours. Optical systems design, testing optical components, fabrication, coating, mirrors and prisms, introduction of Fourier Optics. (Prerequisite PHY 401 or equivalent)

PHY 651 Spectroscopy - Four semester hours. Spectra of atomic and molecular systems, energy levels, vibrational and rotation levels, lifetimes, Raman spectra, molecular and atomic lasers. (Prerequisite PHY 401 or equivalent)

PHY 655 Optics Laboratory - Four semester hours. Selected experiments in interference, diffraction, optical imaging systems, holography, lasers, detectors, UV, visible and IR spectroscopy.

PHY 657 Physical Optics and Interferometry - Four semester hours. Propagation and vector nature of light, dipole radiation, Lorentz atom, Rayleigh scattering, dispersion, Coherence and interference, design and use of conventional two beam and multibeam interferometers, evaluation of interferograms. (Prerequisite PHY 649)

PHY 660 Quantum Optics - Three semester hours. Planck's radiation law and Einstein coefficients, quantization of radiation field, photon concept, photon statistics, interaction of radiation with matter, spontaneous emission, Dicke super-radiance. (Prerequisite PHY 521 or equivalent)

PHY 663 Electro-Optical Systems - Four semester hours. Theory, design and use of electro-optical devices and system optical properties, performance criteria, applications of electro-optics, magneto-optic and acousto-optic devices, behavior of electro-optic devices as circuit elements, modulators rotators, and isolators. (Prerequisite PHY 657 or equivalent)

PHY 665 Lens Design - Four semester hours. Paraxial Optics, aberration theory, image assessment, Fourier optics, merit function, mathematical methods, least squares, damped lest squares, decent methods, metric. (Prerequisite PHY 649 or equivalent)

PHY 670 Non-Linear Optics - Three semester hours. Photon echo, self-induced transparency, self-focusing, scattering of light, parametric amplification, harmonic generation, damage effects. (Prerequisite PHY 657 or equivalent)

PHY 671-672 Laser Physics I and II - Four semester hours. Density matrix-formulation of interaction of radiation with matter, laser threshold condition, optical resonators, pressure effects, survey of laser types and mechanisms. (Prerequisite PHY 657 or equivalent)

PHY 675 Thin Films and Integrated Optics - Four semester hours. Semiconductor and metallic films, design methods of multilayer interference filter coating, guided waves in dielectric films and fibers, beam-to-guide couplers, survey of devices for integrated optics. (Prerequisite PHY 671 or equivalent)

PHY 680 Holography - Three semester hours. The Gabor hologram, hologram as a zone plate, Fresnel image, Fourier-transform and reflection holograms, applications to interferometry, information storage, and optical processing. (Prerequisite PHY 657 or equivalent)

PHY 690 Introduction to Biophotonics – Four semester hours. This is an interdisciplinary course dealing with applications of laser techniques to biology and medicine. Topics include fundamentals of light matter interaction, principles of lasers and laser technology, interaction of light with cells and tissues, bioimaging applications, optical biosensors including fluorescence sensing and fiber-optic biosensors, light activated therapy, tissue engineering with light, microarray technology for genomics and proteomics, principle of laser tweezer action and manipulation of single DNA molecules, Bionanophotonics and Biomaterials for photonics.

PHY 692 Nanophotonics – Three semester hours. This will be an interdisciplinary course dealing with applications related to fusion of nanotechnology with photonics. Topics include nanoscale optical and electronic interactions, near field optical interactions, quantum dots, quantum wells, quantum wires, metallic nanoparticles and metallic nanostructures, rare-earth doped nanostructures, epitaxial growth and nanochemistry, nanostructured polymeric media, photonic crystal sensors, near-field nanolithography, and bioderived materials.

PHY 703 Laser Systems - Four semester hours. Survey of a variety of laser systems, and prepares the student to contribute to the design of new laser systems. The course starts with a general description of lasers and optical amplifiers in terms of relatively simple rate equations. Various classes of lasers (e.g., optically-pumped solid lasers, gas lasers, organic dye lasers, etc.). Designs of specific laser systems from each class will be described in detail (e.g., CW Nd: YAG laser, argon ion laser, rhodamine 6G dye laser, etc.). Other topics, which will be covered, include: optical resonator mode theory, techniques for controlling and modifying laser outputs, and techniques for measuring the spectral and temporal properties of laser beams. (Prerequisite PHY 671 or equivalent)

PHY 712 Optical Phase Conjugation I - Three semester hours. Conjugation by parametric mixing in transparent media, transient response of Kerr-like phase conjugation, degenerate four wave mixing, optical phase conjugation in photo refractive crystals stimulated Raman scattering and Brilliouin scattering, wave front reversal, and phase conjugation under stimulated scattering. (Prerequisite PHY 670 or equivalent)

PHY 714 Optical Phase Conjugation II - Three semester hours. Phase conjugation and high resolution spectroscopy by resonant degenerate four wave mixing in semiconductors, wave front reversal by a reflecting surface optical resonator using phase conjugate mirrors, applications of optical conjugation. (Prerequisite PHY 712 or equivalent)

PHY 715 Fiber Optics - Three semester hours. Basic principles of optical fiber communication and applications, materials and fiber preparation, propagation in optical fibers, wave guides and their fabrication, fiber optic cables and cable connectors, detectors and measurement techniques, semi-conductor light sources for optical fiber communications, system design. (Prerequisite PHY 657 or equivalent)

PHY 725 Optical Fiber Communications - Three semester hours. Basic concepts of fiber-optic communications, channel multiplexing and modulation formats, light emitting diodes and semiconductor lasers, receiver noise, bit-rate error, system architecture, local-area networks, dispersion broadening, coherent lightwave systems, multichannel communication systems, multiplexing and demultiplexing, crosstalk, optical amplifiers, soliton communication systems, communication systems of future. (Prerequisite PHY 715 or equivalent)

PHY 750 Laser Spectroscopy - Three semester hours. Turnable coherent light sources, Doppler limited absorption and fluorescence spectroscopy with lasers, Laser Raman as Brillouin Spectroscopy, High resolution sub-Doppler spectroscopy, trim-resolved laser spectroscopy, optical Ramsay fringes, ultra-high resolution. (Prerequisite PHY 651 or equivalent)

PHY 755 Optics Laboratory II (Sample List) - Three semester hours.

(1) Growth and decay of holographic grating formed in photo-refractive crystals with coherent laser beams.
(2) Optical phase conjugation through degenerate four wave mixing in photo-refractive crystals.
(3) Laser photo acoustic spectroscopy of I2 using N2 laser-pumped dye laser
(4) Holography

(5) Laser photo-acoustic studies in gases using Ar-ion laser
(6) Optogalvanic spectrum of Ne using tunable dye laser
(7) Laser-excited fluorescence in laser material crystals

PHY 771 Signal Processing - Three semester hours. Fourier analysis and two dimensional line, a systems-scalar diffraction theory, Fresnal and Fraunhofer diffraction frequency analysis of optical imaging systems, optical filters, coherent optical processing, incoherent optical processing, hybrid processors, and linear and non linear optical data processing. (Prerequisite PHY 505 or equivalent)

PHY 775 Thin Film and Integrated Optics II - Three semester hours. Optical wave guide modes, wave guide fabrication techniques: deposited thin films, molecular beam epitaxial crystal growth, substantial dopant atoms, wave guide losses, input and output couplers, electro-optic modulators, acousto-optic modulators, semiconductor laser and modulation, hetero-structure lasers, and integrated optical detectors. (Prerequisite PHY 675 or equivalent)

MATERIALS SCIENCE COURSES

PHY 632 Elements of Materials Science - Three semester hours. Engineering requirements on materials, arrangement of atoms in materials, metallic phases and their properties, ceramic phases and their properties, multi-phase materials. The effect of macrostructure upon properties of materials, corrosion and thermal behavior of materials in service. (Prerequisite PHY 451 or equivalent)

PHY 633 Physical Metallurgical Principles - Three semester hours. Principles underlying the structure and behavior of metals, equilibrium and non-equilibrium phase relations in metal and alloys, kinematics of diffusion and nucleation. Phase transformations, heat treatment and hardenability. (Prerequisite PHY 632)

PHY 634 Crystal Physics and Crystal Growth - Three semester hours. Description and determination of atomic arrangement in perfect and imperfect crystals, binding forces elastic waves in solids, photons and lattice vibration, Brilliouin zones, thermal properties of solids, X-ray diffraction, Fourier analysis in diffraction. Basic principles and phenomena involved in the growth and perfection of crystalline solids from melt, solution, vapor, electrodeposition, etc. Discussion of the merits of various preparation methods. (Prerequisite PHY 632)

PHY 635 Magnetic and Optical Properties of Materials - Three semester hours. Dia-, para- and ferro-magnetism, magnetic relaxation and resonance phenomena. Electronic and thermal conductivity of metals, superconductivity. Relationship between electronic structure and optical properties of solids, magneto-optics infrared photoconductivity, excitations, infrared and Raman spectra due to lattice vibrations, impurity-induced lattice absorption, spectra of ions in crystals. (Prerequisite PHY 632)

PHY 636 Semi-conductor Physics - Three semester hours. Semiconductor principles, electron band theory of solids. Electronic properties of insulators and semiconductors, Hall effect. Defect states and interaction in semiconductors, elemental and compound semiconductors. Recombination and trapping, organic semiconductors. (Prerequisite PHY 632)

PHY 637 Special Topics in Materials Science - Three semester hours. Topics will be selected in accordance with the special interest of students. (Consent of Instructor)

PHY 638 Imperfection in Solids - Three semester hours. General theory of imperfections, relation of lattice defects to the physical properties of crystals, point defects and their relation to transport properties in metallic, covalent and ionic crystals, geometric and energetic aspects of dislocation theory, relation between dislocation mechanics and mechanical properties of crystals, structure and properties of interfaces. (Prerequisite PHY 632)

PHY 639 Electron Spectroscopy and Electron Diffraction - Three semester hours. Principles and techniques of electron microscopy. Use and maintenance of electron microscopes, preparation of specimens for electron microscopy by replication transmission, study of fine structures in hardened alloys, demonstration of dislocation movements, distribution and identification as to type, Burger's vector. (Prerequisite PHY 632 or equivalent)

PHY 640 Mechanical Behavior of Solids - Three semester hours. Behavior of materials under stress, elastic/plastic deformation in single crystals, critical resolved shear stress, microscopic yield, ductility, mechanical twinning, effect of temperature and rate of deformation, mechanical properties in tension, true stress-strain, work hardening compression, creep, fracture mechanics. (Prerequisite PHY 632)

PHY 642 Materials for Energy Production Devices - Three semester hours. Material limitations for the operation of fossil fuel and nuclear power generation systems, microstructure and properties of materials in terms of current and future demands on temperatures, stresses and chemical and radiation attacks, possible future materials. Solar cells and selective solar radiation filters. (Prerequisite PHY 632 or equivalent)

PHY 644 Modern Composite Materials - Three semester hours. Fundamental aspects of modern composite materials, particulate and fibrous reinforcement, micro-mechanics, failure modes, fiber- reinforced plastics and metals, inorganic particulate composites and dispersion-strengthened metals, testing and analysis concepts. Ceramic materials and applications. (Prerequisite PHY 632)

PHY 648 Advanced Laboratory in Material Science - Three semester hours. Experiments will be conducted out of the following: X-ray diffraction, Hall effect and transport properties, Dielectric constant measurement as a function of frequency. Study of dislocations using microscope, specific heat measurements with DSC-4.

PHY 699 Masters Thesis - 1-3 hours. Research work towards completing the thesis requirements.

PHY 705 Solid State Diffusion - Three semester hours. Fundamentals of diffusion in the solid state. Special emphasis to diffusion kinetics for atoms and crystals. (Prerequisite PHY 634)

PHY 710 Thermodynamics of Materials - Three semester hours. Advanced treatment of thermodynamic properties of inorganic materials. Introductory thermodynamics. Application of laws of thermodynamics to chemical behavior of elements, compounds and solutions. Discussion of heterogeneous equilibrium, chemical reactions and thermodynamics of structural defects and interfaces. (Prerequisite PHY 518 or equivalent)

PHY 720 Radiation effects in Crystalline Solids - Three semester hours. A unified treatment based on governing principles in defect structure thermodynamics and kinetics of equilibrium and nonequilibrium systems. Discussion of radiation effects in metals and semiconductors. (Prerequisite PHY 632 or equivalent)

PHY 730 Solidification Process - Three semester hours. Principles of control of structure, properties and shape in processes involving liquid-solid and vapor-solid transformations. Heat flow, solute redistribution, nucleation, growth kinetics. Resultant structures and properties. (Prerequisite PHY 634)

PHY 735 Materials for Radiation Detectors - Three semester hours. This course will be more extensive rather than intensive. Discussion of materials problems for devices using ceramics, semiconductors and pyroelectric materials. Materials for detectors for ranges in x-ray, gamma-ray, ultra-violet, visible, near-infrared and far–infrared. (Prerequisite PHY 632 or equivalent)

PHY 796-97 Advanced Selected Topics in Materials Science - One to four semester hours. (Consent of Instructor)

PHY 799 Dissertation - One to six hours. Individual research towards completing dissertation requirements.

Other Graduate Courses:

PHY 501 Concepts of Modern Physics - Three semester hours. Basic concepts; special theory of relativity, wave-particle duality. The Atom: atom structure, introduction of quantum mechanics; properties of matter; physics of molecules, the solid state; the nucleus, the atomic nucleus, nuclear transformation, elementary particles.

PHY 502 Bio-Physics - Three semester hours. Some physical forces exemplified in man, matter waves, sound and ultrasound, electromagnetic radiation and matter, radioactivity; biological tracers, big molecules - structure of macromolecules and living membranes, speeds of some processes in biological studies on nerve and muscle, the language and concepts of control.

PHY 552 Problems in Physical Science - Three semester hours. Physics of particles and aggregate physics of fields, wave physics, quantum physics.

SPACE SCIENCE COURSES

PHY 610 Introduction to Solar-Terrestrial Physics - Effects of solar disturbances on the Earth's environment. Distinct modes of energy and momentum transfer from the Sun's surface to

the Earth. Formation of solar wind. Interplanetary magnetic field and magnetic sectors. Formation of the magnetosphere. Effects of quiet and disturbed solar wind on the magnetosphere, ionosphere and thermosphere. Solar flares and coronal mass ejections. Effects on man-made facilities. Space weather forecast and prediction.

PHY 612 Physics of the Sun and the Solar Wind - The structure of the Sun. Heat transport and convection inside the Sun. The solar atmosphere and its structure: the photosphere, chromosphere and corona. Solar spectrum and chemical composition. The Sun's magnetic fields. Quiet and active Sun. Sunspots and solar cycle. Solar flares and particle acceleration. Coronal mass ejections. The solar wind, its dependence on solar cycle and heliographic latitude. The interplanetary magnetic field and its transport to the Earth. Solar events and space weather.

PHY 614 Physics of the Magnetosphere - Formation and structure of the magnetosphere. Cold and hot plasma in the magnetosphere. Electric and magnetic fields and motion of charged particles in the magnetosphere. Transverse and field-aligned currents in the magnetosphere. Magnetospheric convection. Geomagnetic disturbances and storms. Waves and resonant oscillations in the magnetosphere. Geomagnetic pulsations. Particle acceleration and particle precipitation into the ionosphere. Types of auroras and global distribution of auroral activity. Acceleration of particles to high energies and generation of the radiation belts. Indices for geomagnetic activity, their meaning and importance for space weather prediction.

PHY 617 Physics of the Ionosphere and Thermosphere - Survey of the upper atmosphere and ionosphere. Stratifications based on composition, temperature and ionization. Morphologies. Diurnal, seasonal, annual and solar cycle variations. Solar and geomagnetic control of the ionosphere and atmosphere. Effects of solar electromagnetic and corpuscular radiation and cosmic rays. Neutral atmospheric and ionospheric modeling. Active and passive remote sensing of the atmosphere and ionosphere.

PHY 620 Radio Wave Propagation in the Ionosphere - Historical perspective. Characteristics of electromagnetic waves and plasmas. Propagation electromagnetic of waves through homogeneous and inhomogeneous media, isotropic and anisotropic media, and dispersive media. Plasma properties. Motion of charged particles in electric and magnetic fields. Magnetoionic theory and Appleton's formula. Radio sounding of the ionosphere: ionosonde and incoherent scatter sounders. Topside sounding from satellites.

PHY 625 Planetary Atmospheres and Ionospheres - Atmospheres of inner planets (Mercury, Venus, Earth and Mars) and outer planets (Jupiter, Saturn, Uranus and Neptune): Composition, pressure and temperature structures. Circulation and convection. Similarities and differences. Photochemistry in Jovian atmospheres. History and evolution. Atmospheric escape. Atmospheric clouds. Ionospheres and magnetospheres of inner and outer planets. Similarities and differences. Planetary spacecraft missions. Atmospheres of Pluto, Titan and Triton.

DEPARTMENT OF SOCIAL WORK

Dr. Christopher Chacha, Interim Chair
Room-104 Bibb Graves Hall

MISSION

The mission of the Graduate Social Work Program of Alabama A&M University is to prepare students, particularly minority students, to become competent, ethical and advanced professional social work practitioners capable of assuming a wide range of roles and functions in working with vulnerable individuals, families, groups, public and private organizations and institutions in rural and urban communities. The Graduate Social Work Program is accredited by the Council on Social Work Education.

OBJECTIVES

- To prepare advanced-level social work practitioners who have incorporated social work values and ethics and who demonstrate the application of these standards in their professional practice.

- To prepare advanced-level social work practitioners who will utilize the ecological perspective and problem-solving process model and the empowerment perspective as conceptual frameworks, and who will apply critical thinking skills, synthesizing and applying appropriate theories and knowledge to multiple levels of interventions in meeting needs and addressing problem with a wide range of client systems, including individuals, families, groups, public and private organizations, and rural and urban communities.

- To prepare advanced-level social work practitioners who have acquired the knowledge, skills, values and ethics of the professional foundation and who will apply the knowledge, skills, values and ethics of the generalist social work perspective in practice with systems of all sizes.

- To prepare advanced-level social work practitioners who have acquired specialized knowledge in an area of concentration and who will apply this knowledge, including values, ethics, and skills, in their professional practice.

- To prepare advanced-level social work practitioners who understand and appreciate human diversity and understand the forms and mechanisms of oppression and discrimination as well as change strategies and skills that advance social and economic justice, and who are committed to practice on behalf of the poor, minority populations, oppressed and other socially disadvantaged and vulnerable people and who will work toward the elimination of social and economic injustices, including poverty, oppression, discrimination, and stereotyping.

- To prepare advanced-level social work practitioners who demonstrate mastery of knowledge and skills of social work practice, including the professional use of self, relationship and communication skills, and the differential use of communication skills with a variety of client populations, colleagues, and the community at large.

- To prepare advanced-level social work practitioners who critically analyze, synthesize and apply knowledge of human behavior in the social environment, including the positive value of diversity, the interrelatedness of the biological, psychological, sociological and cultural systems, and the environmental influences on diverse populations and who apply theoretical frameworks to understand client systems, and the interactions between client systems (individuals, families, groups, organizations, and communities).

- To prepare advanced-level social work practitioners who are knowledgeable about the research process and who use research methods to assess, improve, monitor and evaluate relevant research and apply findings to social work practice, to conduct empirical evaluations of their own practice and those of relevant systems, and contribute to the development of theory and the social work knowledge base.

- To prepare advanced-level social work practitioners who understand social welfare policies and services, including the nature and scope of politics, power and the bureaucracy, and who will analyze the impact of social policies on client systems, workers, and agencies, and who demonstrate skills for influencing policy formation and change.

- To prepare advanced-level social work practitioners who have the knowledge, values, ethics, and skills of the generalist social work perspective in their area of concentration, and who synthesize and apply these standards in the field.

- To prepare advanced-level social work practitioners who use supervision and consultation appropriately to advance practice in the area of their concentration.

- To prepare advanced-level social work practitioners who function within the structure of organizations and service delivery systems and seek necessary organizational change.
- To prepare advanced-level social work practitioners who critically apply knowledge of rural and urban characteristics and populations to their advanced professional social work practice; and to encourage students to practice in rural areas.

- To attract, recruit, prepare for advanced practice, and graduate students from historically oppressed populations.

ADMISSION REQUIREMENTS

To be considered for the Master of Social Work (MSW) program, applicants must submit documents demonstrating they have:

1. A grade point average of 2.5 or more (on a 4.0 scale) and meet the general requirements for admission to the School of Graduate Studies at Alabama A&M University.

2. A Bachelors Degree from an accredited College or University.

3. Official transcripts of all undergraduate and graduate work.

4. Completed the Graduate Record Examination and any additional evaluations required by the Social Work Program.

5. Written two essays not to exceed 500 words each on the following topics:

    a) Why do you wish to pursue the MSW degree and become a professional social worker?

    b) Identify a major contemporary social problem that is of concern to the profession of social work; state why, in your opinion, it is a problem for the profession, and how you would intervene to ameliorate and/or eradicate this problem.

6. Three letters of reference that reflect the applicant's academic and professional potential, and ethical and value orientation.

7. A broad liberal arts background with a minimum of 24 credits in social, behavioral, and natural sciences and humanities.

8. College courses in human biology and statistics.

It is recommended that the major undergraduate preparation of applicants should be in one of the following:

- Social Work
- Psychology, Sociology, or other Social Services
- Other human service areas (health sciences, teaching, nursing, special education)
- Liberal arts (e.g., humanities, philosophy, history, literature)

While there is no requirement for a specific undergraduate major to qualify for graduate study in social work, applicants are expected to have had preparation in the liberal arts, usually through undergraduate coursework in the social and behavioral sciences, humanities, and life sciences. At least 24 credits are required in these areas.

Note: Credit for life experience is not granted.

Work and Volunteer Experience

The Program does NOT grant social work course credit(s) for life experiences, voluntary work or previous work experience.

ANNUAL APPLICATION DEADLINE

SUMMER ADMISSIONS FEBRUARY 15
FALL ADMISSIONS MARCH 1

Please Note: Admission to the Graduate Program will occur twice annually in Summer, and in the Fall. There will be no Spring admission.

THE MSW PROGRAM

The Graduate Social Work Program provides an integrated curriculum that leads to the Master of Social Work degree. Students will have a solid base in the professional foundation courses: social welfare policy; human behavior and the social environment; social work practice; research and field instruction. Students will have the opportunity to select one of two advanced concentrations.

1. Direct Practice (Family & Child Welfare or Community Mental Health)
2. Policy, Planning, and Administration

The field instruction component of the program will complement the student's concentration.

DEGREE REQUIREMENTS

The Two Year and Part-Time Programs

The Master of Social Work (MSW) degree requires 60 semester hours over a two year period of full-time study. For part-time students, there are extended three and four year programs. The 60 hours involve 48 hours of classroom instruction and 12 hours of field instruction in community-based social welfare agencies.

Advanced Standing

Applicants with a B.S.W. degree from a CSWE-accredited program and a minimum 3.0 cumulative GPA may apply for advanced standing. Qualified applicants are required to take 39 semester hours over 3 semesters, instead of the 60 hours required for the two-year program. Of these 39 hours, 8 are required in field instruction. In order to complete the degree in the Spring semester, the students should enroll in three bridging courses (SWK 522, SWK 523, SWK 587: eight credits) in the summer, prior to the regular Fall semester.

Comprehensive Examination

In addition to the successful completion of all classroom and field instruction, a student is required to pass a written comprehensive examination. In lieu of the comprehensive examination, students have the option of writing a thesis.

MSW CURRICULUM

The 60 (39 credit hours for advanced standing students) credit hours Master of Social Work degree program consist of foundation and advanced concentration courses and electives. The purpose of the graduate social work curriculum is to prepare students for professional social work practice within a multi-system perspective based upon the EPPSE framework. This preparation is consistent with the Department and Program Mission, Goals, and Objectives and CSWE's Educational Policy and Accreditation Standards (EPAS).

Admission requirements include completion of a minimum of twenty-four liberal arts courses in biology, social sciences and humanities within the past five (5) years from the date of admission into the Advanced Standing Program. Advanced standing students must have graduated from a CSWE Accredited BSW Program with a minimum G.P.A. of 3.0.

MSW CURRUCULUM
PROFESSIONAL FOUNDATION

SWK 500	Social Work Practice I	3 credit hours
SWK 501	Social Work Practice II	3 credit hours
SWK 510	Social Welfare Policy & Services I	3 credit hours
SWK 511	Social Welfare Policy & Services II	2 credit hours
SWK 520	Human Behavior and the Social Environment I	3 credit hours
SWK 521	Human Behavior and the Social Environment II	3 credit hours
SWK 522	Race, Ethnicity, Gender and Diversity	3 credit hours
SWK 523	Rural-Urban Social Work	2 credit hours
SWK 530	Applied Social Work Research	3 credit hours
SWK 581	Field Practicum & Seminar I	4 credit hours
		29 credit hours

MSW CURRICULUM
ADVANCED STANDING BRIDGE COURSES

SWK 522	Race, Ethnicity, Gender and Diversity	3 credit hours
SWK 523	Rural-Urban Social Work	2 credit hours
SWK 587	Social Work Empowerment	3 credit hours
		8 credit hours

ADVANCED COMPOSITION
DIRECT PRACTICE (Family and Child Welfare)

SWK 600	Social Work Intervention Strategies	3 credit hours
SWK 601	Social Work Practice with Groups	3 credit hours
SWK 610	Family and Child Welfare Policies	3 credit hours
SWK 621	Family Theories and Processes	3 credit hours
SWK 630	Needs Assessment and Program Evaluation	3 credit hours
SWK 660	Personality Theories & Psychopathology	3 credit hours

SWK 680	Field Practicum & Seminar II	4 credit hours
SWK 681	Field Practicum & Seminar III	4 credit hours
SWK 689	Integrative Seminar	3 credit hours
SWK **	**Elective**	**2 credit hours**
		31 credit hours

DIRECT PRACTICE (Mental Health)

SWK 601	Social Work Practice with Groups	3 credit hours
SWK 602	Social Work Practice in Health & Mental Health	3 credit hours
SWK 616	Issues and Policies in Community Mental Health	3 credit hours
SWK 621	Family Theories and Processes	3 credit hours
SWK 630	Needs Assessment & Program Evaluation	3 credit hours
SWK 660	Personality Theories & Psychopathology	3 credit hours
SWK 680	Field Practicum & Seminar II	4 credit hours
SWK 681	Field Practicum & Seminar III	4 credit hours
SWK 689	Integrative Seminar	3 credit hours
SWK **	**Elective**	**2 credit hours**
		31 credit hours

POLICY, PLANNING AND ADMINISTRATION

SWK 604	Theory of Practice of Social Welfare Administration	3 credit hours
SWK 605	Organizational Behavior & Management	3 credit hours
SWK 613	Budgeting & Financial Management	3 credit hours
SWK 614	Principles of Planning	3 credit hours
SWK 615	Grant Writing	2 credit hours
SWK 630	Needs Assessment & Program Evaluation	3 credit hours
SWK 680	Field Practicum & Seminar II	4 credit hours
SWK 681	Filed Practicum & Seminar III	4 credit hours
SWK 689	Integrative Seminar	3 credit hours
SWK **	**Policy elective (610-616, or course approved by advisor)**	**3 credit hours**
		31 credit hours

ELECTIVES

SWK 615	Grant Writing	2 credit hours
SWK 641	Crisis Intervention	2 credit hours
SWK 643	Intervention with Children and Adolescents	3 credit hours
SWK 642	Sexual Abuse Assessment and Intervention	2 credit hours
SWK 652	Social Work and the Law	2 credit hours
SWK 658	International Social Welfare and Social Work	2 credit hours
SWK 663	Substance Abuse	2 credit hours
SWK 667	Social Work Practice and Aging	2 credit hours

The professional foundation courses have been designed and structured to assure that students receive content essential to entry level social work practice and advanced concentration courses. Four (4) hours of Field Practicum are included in the professional foundation. The electives are designed to support the concentration areas. Each elective includes knowledge and skills for advanced practice with diverse client systems and problems.

COURSE DESCRIPTIONS

SWK 500 Social Work Practice I - Three semester hours. The course focuses on the history, foundation domains and roles of social work practice. It introduces the generalist social work practice model with emphasis on an overview of the social work profession, discussion of social work values and ethics, and applications of the generalist model to individuals and families. Required of all students in the 60 hour degree program. (Prerequisites: Admission to the MSW program.)

SWK 501 Social Work Practice II – Three semester hours. Continuation of SWK 500. Explores further the roles, domains, philosophy and roles of social work practice. Basic theory, values, ethics and methods generic to social work practice at various system levels are presented with an emphasis on practice with mezzo and macro systems (e.g., families, groups organizations and communities). This course is required all students in the 60 hour degree program. (Prerequisites: SWK 500)

SWK 510 Social Welfare Policy & Services I - Three semester hours. Examines the historical evolution of social welfare institutions; political, economic, religious, social and ideological perspectives will be analyzed. This course is required all students in the 60 hour degree program.

SWK 511 Social Welfare Policy & Services II - Two semester hours. Continuation of SWK 510 - Social Welfare Policy & Services I. Emphasizes analytic models of welfare policies and lays framework for decision making. Contemporary issues will be discussed and international policies examined. This course is required for all students in the 60 hour degree program. (Prerequisites: SWK 510)

SWK 520 Human Behavior in the Social Environment I - Three semester hours. Theories concepts, and knowledge about human development and behavior within the context of the social environment through the study of life cycle development in the ecological system. Major social and cultural institutions and their impacts on diverse individuals, families, groups and organizations will be examined. This course is required for all students. This course is required for all students in the 60 hour degree program

SWK 521 Human Behavior in the Social Environment II - Three semester hours. This is the second of a two-course sequence dealing with adult development, including old age and death. The societal impact of families, groups, and organizations on the elderly and the elderly interaction with these systems and their diverse impacts will also be discussed. This course is required for all students in the 60 hour degree program. (Prerequisites: SWK 520, 500 and 510).

SWK 522 Race, Ethnicity, Gender and Diversity - Three semester hours. This course will introduce and sensitize students to the major concepts of culture, sub-culture, race, ethnicity and gender, cultural diversity, and pluralism and conflicts caused ethnocentrism, discrimination and prejudice. Further, it will emphasize public policies as well as interpersonal responses and the relationship between race, ethnicity, gender, diversity and social work practice. Emphasis is placed on the examination of major ethnic sub-cultures as well as sub-cultural groupings based on such factors as gender, race, ethnicity, religion, national origin, age, sexual orientation, physical and mental abilities and other differences in human populations. The common elements of oppressions are emphasized and prejudicial and discriminatory practices are evaluated from both micro - and macro theoretical frames of reference. This is a course is required of all students.

SWK 523 Rural-Urban Social Work - Two semester hours. Develop and apply theoretical knowledge and skills used in Urban and Rural Social Work Practice. Overall, the course assumes general knowledge of basic concepts in issues/problems, policies, community organizations, administration, service delivery systems, resource allocation, sociological knowledge, and program implementation in both urban and rural environments. Students will engage in projects that involve assessing the needs of rural communities and suggest intervention strategies. Teamwork reflecting professional standards of individual performance will be stressed as a means of accomplishing the objectives. Group and individual assignments will be used to assist students to develop teamwork, personal practice skills and competencies in evaluating practice. Thus, a group project involving rural-urban issues and problems, policy formation, planning, implementation, evaluation and issues feedback is used as a medium for the application of knowledge and skills. This course is required of all students. (Prerequisites: SWK 500, 510, 520 or Advanced Standing).

SWK 530 Applied Social Work Research - Three semester hours. This outline covers the general content and assignments included in the syllabus. During the regular academic year, completion of this course typically requires about 14 to 16 weeks. Successful completion requires the ability to consume a great deal of written information, the use of complex thinking skills to understand social work applications, and advanced conceptualization and organization skills for preparation of the assignments. For most students this course represents and introduction to research but it is, nevertheless, a graduate level course. Therefore, all students are expected to perform accordingly. For these reasons, all assignments are required, and work must be submitted in a timely manner. This outline was prepared for students' ease in moving toward a successful completion of the course. This is the first of two research courses. This course is required of all students in the 60 hour degree program.

SWK 581 Field Practicum & Seminar I - Four semester hours. This is the first practicum course in the three-part practicum sequence. The purpose of this sequence is to expose students to the professional application of theory practice in community- based human service organizations. This course can be taken concurrent with or subsequent to classroom instruction. The field practicum courses must be taken in sequence and is a requirement for all students. (Prerequisites: SWK 500, 510, 520, 522 and 530; co-requisites SWK 501, 511, 521 and 523).

SWK 587 Social Work Empowerment - Three semester hours. This is a bridge course, which strengthens and assures a common core of professional knowledge for all advanced standing students prior to the beginning of coursework in Concentration areas. It explores the foundations, domains, values, ethics, philosophy, and roles of generalist social work. The foundations include human behavior in the social environment, social work and social welfare policy, practice, research, and fieldwork. Understanding the relationship of each of the foundation areas to the others, as well as their impact and interactive effects on social work practice will be important in this course. The historical and contemporary use of empowerment and strengths perspectives will be examined along with the impact of factors such as race, sex, gender, class, and other diversity issues on practice decisions made in these contexts. Classroom learning and assignments will include application of ecological perspectives and problem solving processes; assessment and planning skills; differential utilization of knowledge of the impact of race, ethnicity, class, culture, gender, sexual orientation, and varying abilities on social work relationships. This is a required introductory course exclusively planned for all advanced standing students. Other students may not take this course without permission from the Program Chair/Coordinator.

SWK 600 Social Work Intervention Strategies With Vulnerable Clients - Three semester hours. This practice seminar focuses on relationship-building, assessment and interventions with vulnerable individuals and families. Theories and Empowerment Strategies are addressed for vulnerable clients (e.g., persons living in poverty, survivors of violence, trauma and natural disasters, and survivors of abuse and neglect). Required of all students in the Family & Child Welfare Specialization. (Prerequisites: ALL foundation year courses or consent of the instructor)

SWK 601 Social Work Practice with Groups - Three semester hours. Methods and skills for engaging, assessing and intervening with task and treatment groups are explored. Concepts and ethics applied to group work are emphasized. Also discussed are therapeutic interventions and theories appropriate for group work. Required of all students in the Direct Practice Concentration. (Prerequisites SWK 600, 602 or consent of the instructor)

SWK 602 Social Work Practice in Health & Mental Health - Three semester hours. This course highlights critical issues faced by social workers within the mental health system and the worker's accountability in various practice settings. Engagement, assessment and intervention strategies will be explored. Theoretical perspectives and treatment models useful in mental health practice are emphasized. Prerequisites: SWK 500, 501, 520, 521 or permission of the professor. This course is a requirement for all students in the Community Mental Health specialization.

SWK 604 Theory and Practice of Social Welfare Administration & Planning - Three semester hours. Provides the knowledge base and beginning competency required for the mid-level administration of a social welfare organization within the community. Theoretical perspectives on the evolutionary development of administration and grounded principles of management will be discussed. Social Work ethics, values, methods, knowledge and skills introduced in earlier courses will lay the foundation for additional work in these areas. Contemporary issues impacting on modern organizations, including but not limited to economic

and social justice, diversity issues including race, women, gays and lesbians, and people who are physically and mentally challenged, will be discussed. The student will gain a comprehensive view of Administration in the macro environment, and will solidify his/her perception on the administrative style of choice. Course prerequisites include ALL the foundation courses or consent of the instructor.

SWK 605 Organizational Behavior and Management - Three semester hours. This course is predicated on the assumption that people are truly the most valuable asset in any organization; therefore, management must demonstrate a realistic appreciation of workers, individually and collectively. This course deals with the management of people, inter-personal interactions, and relationships within organizations including, but not limited to, individual and group behavior, motivation, learning, leadership, supervisory behavior, communication, role, status and conflict resolution. Professional social work values and ethics including and abiding respect for the dignity and worth of the individual will be emphasized. The role of diversity (ethnic, racial, sexual orientation, religious, physical and mental abilities and gender) and the social policy of affirmative action will be discussed. 2nd year standing.

NOTE: Students **must** register for this course in the Psychology Dept. (PSY 627) or the Department of Management (MBA 515).

As a concentration course prerequisites include ALL the foundation year courses or consent of the instructor.

SWK 610 Family & Child Welfare Policy - Three semester hours. The predominant focus of this course is to identify, discuss and integrate family and child welfare issues and policy. Although the course discussions will be on child welfare policies affecting children and families in general, the emphasis will be on children and families with special needs, e.g. protective services, foster care and adoption. The concept of the "best interest of the child" will be analyzed in depth. This course traces the historical development of child welfare services in the U.S. from the beginning of the twentieth century until the present time. Five areas of services, programs and policies will be discussed: adoption, teenage pregnancy and parenthood, children with special needs (e.g., mental illness, delinquency, and physical handicaps), foster care, and protected services for abused and neglected children. Social Work values and ethics will be infused throughout the course. This course is required of all students in the Family and Child Welfare concentration. (Prerequisites: SWK 510, 511, 520, 521, or Consent of Instructor)

SWK 613 Budgeting and Financial Management - Three semester hours. Basic knowledge and theoretical underpinnings required to manage the fiscal and budgetary aspects of human service organizations. The course emphasis is the development and administration of fiscal resources to effectively meet the mission and goals of the organization. Along with the practical aspects of budget planning, development and implementation, the course will address major funding sources for human service organizations, and the strategies of influencing and accessing these sources. The role of politics and its impact on social services within our society will be explored, and students will be taught to manage with decreasing resources especially in rural areas. Required of all Policy, Planning and Administration concentration students. (Prerequisites: **All** foundation year courses or Consent of Instructor)

SWK 614 Principles of Planning and Program Implementation - Three semester hours. The focus of this course is on the concept of planning within social welfare agencies institutions for the purpose of program implementation. Students acquire knowledge and understanding of planning concepts, strategies, and objectives for program development, implementation and evaluation. An ecological system perspective is applied to promote understanding of the interrelationships among individuals (micro systems), families, groups (mezzo systems), organizations/institutions and communities (macro systems). Likewise, a problem solving approach is used to provide content for understanding the differential strategies for resolving needs of individuals, families, and small groups, and larger organizational or community systems. Theoretical, empirical, and experimental contents are utilized to provide the student with an awareness of both comparative and contrasting aspects of systemic planning with other activities required in program implementation and program evaluation. Required of all Policy, Planning and Administration concentration students. (Prerequisites: **All** foundation year courses or Consent of Instructor)

SWK 615 Grant Writing - Two semester hours. Explores various grant writing theories and skills and demonstrates practical application of the process. Students will assist agencies and organizations to apply for local, state, federal, and international grants for their programs or projects. Required of all students in the Policy, Planning and Administration concentration, (Prerequisites: **All** foundation year courses or Consent of Instructor)

SWK 616 Issues & Policies in Community Mental Health - Three semester hours. Examines the impact of policies on social work practice in mental health settings, including local, state and national policies from which services are derived. Also examines the differential impact of race, ethnicity and social class on policy formulation and service delivery in mental health settings. This course is required of all students in the Community Mental Health concentration. (Prerequisites SWK 500, 501, 520, 521, or Consent of Instructor)

SWK 621 Family Theories and Processes- Three semester hours. This advanced level practice course explores sociological concepts of marriages and families in contemporary society; vulnerable families; family preservation; and the assessment and treatment of marriages and families. Treatment models, techniques, and strategies are highlighted. Social work values and ethics, research on marriages and families and the treatment thereof, and cultural diversity issues are emphasized. This course is required of all students in Direct Practice. (Prerequisites: SWK 500,501,520,521,601,602,610 or Consent of Instructor)

SWK 630 Needs Assessment and Program Evaluation - Three semester hours. This course builds on foundation courses and the need for scientific problem-solving, decision-making and accountability in professional social work practice. Knowledge of the social work research process is the foundation upon which students will develop needs assessment and program evaluation skills. Understanding of social work knowledge, values, skills and ethics associated with practice, policy, and human behavior perspectives will be articulated in the student's conceptualization and development of either a need assessment or a program evaluation. Additionally, these skills will be applied to a variety of social systems and social problems for the purposes of promoting, sustaining, and enhancing individuals, families, groups, communities, and societal well-being. (Prerequisites: SWK 530, or Consent of Instructor)

SWK 631 & 632 Research Project/Thesis - Two to six semester hours. This course offers students the opportunity to prepare an empirically based research thesis derived from a practice problem. The thesis is designed to make a significant contribution to a special area of interest within the students concentration. Upon approval by the student's Thesis Committee, or the research project panel, and acceptance by the Dean of the School of Graduate Studies (Graduate Bulletin, 1999-2000), students complete their research and thesis under the guidance of a graduate faculty member and thesis committee. Upon completion of the research project, the thesis is defended before the student's thesis committee. (Prerequisites: Completion of all first-year courses, or Advanced Placement status, and Registration for SWK 631: Research Project)

SWK 641 Crisis Intervention and Short Term Psychotherapy - Two semester hours. In-depth exploration of the history and theory of crisis intervention and brief therapies. Crisis intervention and short-term theoretical models and techniques are applied to diverse and vulnerable populations. Also examined are social work values and related ethical dilemmas, legal and professional issues and social work research, particularly the evaluation of practice effectiveness. (Prerequisites: SWK 500, 510, 520 or Consent of Instructor)

SWK 642 Sexual Abuse: Assessment & Intervention - Two semester hours. Issues of sexual abuse and rape across cultures. The emphasis is on childhood sexual abuse, incestuous and non-familial, and its effects on the developing child and the adult survivor. Protective service issues as well as psychotherapeutic issues will be addressed. Course content includes: assessment of sexual abuse; treatment philosophies and techniques for children and adult survivors, including individual, family and group therapy; assessment of childhood sexual abuse in custody and visitation cases; false memory syndrome; offender treatment; and social work roles, including protective services worker, therapist, and witness. Building on the knowledge of human behavior and diversity, social work practice, and social welfare policy acquired in the study of the core curriculum, this course emphasizes the application of this knowledge in the area of childhood sexual abuse and rape. It is an elective in the Direct Practice concentration, and builds upon this body of knowledge, especially SWK 600, 602, 610 and 616. (Prerequisites: SWK 500, 501, 521 & 522 or Consent of Instructor)

SWK 643 Interventions with Children and Adolescents – Three semester hours. Provides an overview of practice with emphasis on physical, psychological, and cultural developmental engagement, processes and characteristics unique to children and adolescents. The course also explores assessment and intervention strategies useful with children/adolescents in family, group, and institutional settings. Critically examines values, ethics, research and other issues regarding effective practice with this vulnerable population. (Prerequisites: SWK 500, 510, 520 or Consent of Instructor)

SWK 652 Social Work and Law – Two semester hours. This seminar examines the judicial system and its relevancy to social welfare and social work. The focus is on skills and knowledge needed for effective participation in the legal process as a social work professional. (Prerequisites are SWK 500, 501, 510, 511, 520, 521 or Consent of Instructor)

SWK 658 International Social Welfare and Social Work – Two semester hours. Sensitizes students to the knowledge base required in international social welfare and social work practice

and international social work education. Further, it will emphasize the significance of traditional and modern ways of foreign welfare and social work practices in developed and developing countries. Emphasis is placed on the examination of macro, mezzo and micro social systems and their interaction. Further, these concepts will be discussed in class: demography, social issues/problems, community development, community organization, transfer of technology, non-governmental organizations (NGOs), governmental organization (GOs) and the like. (Prerequisites: SWK 510, 511, 520, 521 or Consent of Instructor)

SWK 660 Personality Theories and Psychopathology - Three semester hours. In-depth focus on assessment and diagnosis in social work practice with some attention to change personality theories. Includes in-depth discussion and critique of DSM-IV-TR and its use in social work practice. Information on assessment etiology and treatment of mental illnesses is provided. Required of all students in direct practice concentrations. (Prerequisites: Completion of **ALL** foundation courses or Consent of Instructor)

SWK 663 Substance Abuse – Two semester hours. Examines the impact of substance abuse on individuals, families, groups, organizations/institutions and communities. Also, societal responses, contributing factors, social problems, policies, programs, services, intervention strategies, and needed resources will be examined. (Prerequisites: SWK 500, 501, 520, 521, or Consent of Instructor)

SWK 667 Social Work Practice with Aging - Two semester hours. Discusses impact of mental illness on the elderly. Focuses on demographic issues and problems of the aged will be infused into the course content with a special emphasis on Alzheimer's disease and other mental illnesses. Assessment and intervention strategies used by social workers will be examined. (Prerequisites: SWK 500, 501, 520, 521, 522 or Consent of Instructor)

SWK 680 Field Practicum & Seminar II - Four semester hours. This is the second practicum course in the three part sequence. (Prerequisites: **ALL** foundation year courses, co-requisites SWK 600 or 616 and 621)

SWK 681 Field Practicum & Seminar III - Four semester hours. This is the last course in the three-part practicum sequence. (Prerequisites: SWK 680)

SWK 689 Integrative Seminar - Three semester hours. Focuses on social work as a profession and on integration of all curriculum areas in the professional practice of social work. Emphasis will be placed on all aspects of professional social work practice including methods, knowledge, values, ethics, skills and legal issues. This course is required of all students and should be taken during the semester that students are graduating from the program.

SWK 698 Independent Study - One to three semester hours. Students may register for one to three hours of independent study with a professor competent in the area of student's interest. An application for Independent Study **must be approved** by both the instructor consenting to supervision and the MSW program coordinator. An independent study must not replicate another course in the MSW curriculum.

SCHOOL OF BUSINESS

Alabama A&M University
Dr Amin Sarkar, Dean
309 School of Business Building

MISSION STATEMENT

The mission of the Alabama A&M University School of Business is to provide a high quality management education that promotes the development of students' potentials as managers, entrepreneurs, leaders, as well as productive employees and socially responsible individuals.

Consistent with the University's history and contemporary mission, the School concentrates on instruction while seeking to combine the classic goal of intellectual development with the land-grant tradition of service. Applied and interactive educational experiences are emphasized in both the graduate and undergraduate programs. While the School of Business and the University are committed to graduate education, the School emphasizes undergraduate education as its first responsibility. In addition to the coverage of basic business principles, all programs develop students' computer, communications, interpersonal relations, and leadership skills, thereby, preparing graduates for success in local, state, national, and global business environments. The AAMU School of Business builds on its historic mission of providing education for African-Americans to an expanded mission of educating a student body that is diverse in terms of ethnicity, national origin, and socio-economic background.

DEGREE OFFERING

The School of Business, through its Departments of Accounting and Office Systems Management; Economics and Finance; and Management and Marketing, offers courses that lead to the master of business administration (MBA). The MBA prepares students for immediate employment in business, government or the not-for-profit sectors of the economy.

MASTER OF BUSINESS ADMINISTRATION PROGRAM

Dr. Uchenna Elike, Director
MBA Program
110 New School of Business Building

OBJECTIVES

The primary objective of the MBA Program is to prepare men and women for responsible administrative positions in industry, the non-for-profit sector, as well as the public sector. Other objectives include:

- To help graduates realize their career and leadership potential.
- To prepare graduates for leadership in a business and social environment.
- To prepare graduates to fulfill their responsibilities to their companies, their local communities, and the global community.
- To prepare graduates for doctoral programs.

ADMISSION REQUIREMENTS

Applicants must meet all requirements for admission to the Graduate Studies as well as specific requirements for admission to the MBA program. Admission to the MBA Program will be based on the following:

Regular Admission

The applicant must submit a minimum GMAT score of 350.

Conditional Admission

1. The applicant must have at least 2.7 undergraduate GPA on a 4.0 scale and submit a minimum GMAT score of 325.
2. The applicant must have at least 2.7 undergraduate GPA on a 4.0 scale, at least 3 years of managerial experience and with no GMAT required.

In addition, all applicants are required to submit:

1. Academic records,
2. Two letters of reference,
3. Resume,
4. 200 to 250-word statement of purpose for graduate studies

Applicants should have their completed application form, along with official copies of their GMAT scores and official academic transcripts sent directly to the Dean of Graduate Studies.

Those granted conditional admission, however, will attain full admission status earning a minimum cumulative GPA of 3.0 in their first nine credit hours in courses recommended by MBA Director in order to continue in the program.

DEGREE REQUIREMENTS

A minimum of 33 graduate-level credit hours beyond the basic core is required to complete the MBA Program. The Program is divided into three sections: the Basic Core, the Professional Core, and Electives. The Basic Core of 12 credit hours and is designed to serve as a leveling mechanism for students whose previous programs are not in business or do not provide adequate preparation. Depending upon their previous academic records, students may be exempted from part or all of the Basic Core courses by the Director of the MBA Program. The Professional Core is 27 credit hours of mandatory courses, which focus on the internal and organizational business environments, the functional areas, quantitative techniques, and managerial communications. Students also choose 6 credit hours of electives.

To complete the MBA degree, students must have a 3.0 GPA or higher for all courses taken at Alabama A&M University as part of the MBA program. They must also have a 3.0 GPA or higher for all courses taken at Alabama A&M University in the MBA Program beyond the Basic Core requirements. Transfer credit is not considered in the GPA for the MBA program. In addition, only students who have full admission and appropriate prerequisites will be admitted into courses in the Professional Core.

REQUIREMENTS FOR GOOD ACADEMIC STANDING, SUSPENSION, AND EXPULSION

Students with a cumulative GPA of 3.0 or higher in all courses taken toward the MBA degree are in good academic standing. Students with less than a 3.0 GPA are placed on probation and will be allowed to re-enroll up to two semesters with probationary status. A student with grades below "C" in more than two MBA courses, however, will be suspended from the MBA program. While suspended, the student cannot register for any MBA courses. In addition, no courses taken whether at Alabama A&M University or at any other institution during the period of suspension will be counted toward the MBA degree. If granted permission to return following suspension, a student will have two semesters to raise his/her GPA to at least 3.0. The failure to do so will lead to the student being expelled from the program. Appeals for reinstatement following suspension should be sent to the MBA Director.

THE MBA DEGREE

Basic Core
ECO 500 Survey of Economic Analysis
MBA 503 Quantitative Methods for Business
MBA 506 Foundations of Accounting and Finance

MBA 507 Basics of Management and Marketing

Professional Core
ACC 512 Accounting Analysis for Management
ECO 514 Managerial Economics
FIN 511 Financial Management and Policy
MBA 517 Global Issues in Business
MGT 510 Operations Management
MGT 515 Organizational Behavior
MGT 516 Strategic Management
MKT 514 Management of Marketing Activities
OSM 519 Managerial Communications

Electives
Students must complete 6 credit hours of electives from the list of courses below:
ACC 571 Tax Issues in Business
ACC 572 Accounting Information Systems
ECO 503 Macroeconomics
ECO 509 International Economics
FIN 541 Security Analysis and Portfolio Management
FIN 542 Money and Capital Markets
FIN 543 International Finance
LSM 536 Logistics and Supply Chain Management
LSM 572 Logistics and Supply Chain Risk Management
MGT 554 Training and Development
MGT 564 Human Resources Management
MGT 565 Entrepreneurship/Small Business Management
MGT 566 Labor and Management Relations
MGT 545 Foundations of Database Management
MGT 580 Emerging Information Technology
MKT 532 Consumer Behavior
MKT 538 International Marketing and Logistics
MBA 550 Independent Research in Business

COURSE DESCRIPTIONS

BASIC & PROFESSIONAL CORE COURSES

ACC 512 Accounting Analysis for Management - Three semester hours. This course deals with concepts, theory, and applications of managerial accounting. Stress is on planning, control, problem solving, and decision-making. (Prerequisite: MBA 506 or at least two undergraduate courses in principles of accounting)

ECO 500 Survey of Economic Analysis - Three semester hours. This course is designed for students with limited or no background in economic theory at the undergraduate level.

ECO 514 Managerial Economics - Three semester hours. Managerial economics is designed to provide the student with a working knowledge of economic theories of consumer and producer behavior and their application to the decision-making process of firms in allocating their resources. Among the topics included are: the firm as an economic entity, consumer choice, demand, decision making under uncertainty, production, cost theory, pricing theory, and the effects of different competitive environments (with emphasis on market structure analysis). (Prerequisite: ECO 500 or an undergraduate two-course sequence in principles of economics)

FIN 511 Financial Management and Policy - Three semester hours. This is an introductory graduate course in the art of money and capital management at the level of the firm. Topics covered include methods used to maximize the value of the firm, financial statement analysis, capital budgeting, the cost of capital, working capital management, dividend policy, and lease financing. The mathematics of finance will also be explained to the student. (Prerequisite: MBA 506 or an undergraduate course in principles of finance)

MBA 503 Quantitative Methods for Business - Three semester hours. This course covers descriptive and inferential statistical methods used in business. Students would learn about the appropriate statistical techniques for describing and analyzing data, as well as the interpretation of the results. Statistical software will be used. Topics include graphical and quantitative description of data, probability theory, important discrete and continuous probability distributions, estimation of parameters, testing of hypotheses using sample data, analysis of variance, chi-square test, regression methods, and other quantitative decision-making tools. (Prerequisite: Pre-calculus algebra)

MBA 506 Foundations of Accounting and Finance - Three semester hours. This course provides non- business students coming into the program with a basic understanding of the concepts of accounting and finance. It covers the techniques of the preparation and use of financial statements, the basic concepts of corporate finance, the structure of financial markets, and the process of financial analyses.

MBA 507 Basics of Management and Marketing - Three semester hours. The primary objective for this course is to introduce those MBA students who lack formal undergraduate courses in management and/or marketing to the basic management and marketing fundamentals before they plunge into advanced theoretical courses. The course is an exploratory one that will help students to answer the basic questions: What does a manager do? What is management? How did it evolve? What is marketing? What is the marketing concept? What is target marketing? What is the marketing mix?

MGT 510 Operations Management - Three semester hours. This course covers the study of the concepts and techniques related to the operations function. The operations function is responsible

for planning, organizing, and controlling resources in order to efficiently and effectively produce the goods and services customers want, as well as meet the goals of the organization. Topics include operations planning, forecasting, process analysis, quality management, materials management, scheduling, MRP/ERP, project management, just-in-time and lean techniques, supply chain management, and other decision-making tools for management. (Prerequisite: MBA 503 or equivalent)

MBA 517 Global Issues in Business – Three semester hours. This is an integrative course that not only focuses on the study of the environment and management of international business but also on the strategy, environment-assessment, and cross-functional processes designed to implement a strategy as management deals with contemporary global issues that confront the business such as legal/political policies, socio-cultural differences and social changes, financial and economic institutional development demands upon marketing, management, finance, accounting, and human resources. (Prerequisite: ACC 512, ECO 514, FIN 511, MGT 515, MKT 514)

MGT 515 Organizational Theory and Behavior - Three semester hours. This course will deal with the macro and micro aspects of organizations. It will emphasize the behavior of people within organizations. The impacts of environment on human behavior are examined. Conditions of organization viability and renewal, as well as structures used in their internal and external elaboration, are also considered. (Prerequisite: MBA 507 or an undergraduate introductory course in management)

MGT 516 Strategic Management - Three semester hours. This course is designed to develop an understanding of strategy, policy, and decision-making as applied to the overall management of large corporations or other formal organizational structures. The course objectives are achieved through the integration of economic, marketing, accounting, finance, and management fundamentals. The case method is used. (Prerequisites: (MBA 517)

MKT 514 Management of Marketing Activities - Three semester hours. This course develops the societal, managerial, and strategic underpinnings of marketing. It presents concepts and tools for analyzing any market and marketing environment to discern opportunities, as well as principles for researching and selecting target markets. It also deals with strategic marketing and describes how firms can develop their marketing strategies. In addition, the course is concerned with tactical marketing, describes how firms handle each element of the marketing mix, and examines the administrative side of marketing, namely how firms organize, implement, and control marketing efforts. This course also features a unit on the global environment and a unit on customer satisfaction. (Prerequisite: MBA 507 or an undergraduate introductory course in marketing)

OSM 519 Managerial Communications - Three semester hours. This course is designed to provide MBA students a broad range of managerial communication fundamentals. A review of the theory of human communications, behavioral concepts, communication through letters and

memos, and communication about employment will be presented. Major emphasis will be on international business communications, including demographic diversity, the communication technology revolution, oral communications, the report process and research methods, and communication management.

ELECTIVES

ACC 571 Tax Issues in Decision-Making - Three semester hours. A study of federal tax structure, including legal, economic, and governmental implications, the central focus will be on business decisions, research methodology, and tax planning. (Prerequisites: Federal Tax Accounting I and II and ACC 512 or consent of instructor)

ACC 572 Accounting Information Systems - Three semester hours. A study of accounting information systems, including small to medium to large computer-based systems, the central focus will be on design and implementation of systems to meet all accounting informational needs for managers. This course carries a $10 lab fee. (Prerequisite: ACC 512 or consent of instructor)

ECO 503 Macroeconomic Theory - Three semester hours. Examination of the modern theory of income, employment, and the price level along with their principal determinants, interaction of the product and money markets and changes in the level of economic activity over time. (Prerequisite: ECO 500 or its equivalent)

ECO 509 International Economics - Three semester hours. An analysis of the forces that determine international specialization; balance of payments analysis; exchange rates systems; and evaluation of current international economic policies and programs.

FIN 541 Security Analysis and Portfolio Management - Three semester hours. A study of the various analytical techniques used to appraise the value of various securities, including marketing analysis and industry analysis. This course also covers the methods and practices used in selecting and administering the securities of institutional and large individual investors. (Prerequisite: FIN 511)

FIN 542 Money and Capital Markets - Three semester hours. A study of the theoretical concepts and actual operations of money and capital markets, the central focus will be on interest rate determination, role of financial intermediaries, and the operations of short- and long-term capital markets. (Prerequisite: FIN 511)

FIN 543 International Finance - Three semester hours. A detailed analysis of the treasurer's functions and controller's activities in managing the finance function of multinational firms. In particular, flow of short-term funds, Euro and Petro-dollars, floating exchange rates, and problems of recurring parity changes are emphasized. (Prerequisite: FIN 511)

LSM 536 Logistics and Supply Chain Management - Three semester hours. Critical examination of logistics and supply chain management (SCM) role in both the commercial and military sectors; strategic foundations that support supply chain and operational skills required to develop and/or design an effective supply chain. The cross-functional integration of premier business processes within the organization and across the network of enterprises that make up the supply chain. Additional topics include demand management, procurement and supply chain, performance based logistics, data warehousing, reverse supply chain logistics, transportation management, supply chain logistics information systems, logistics outsourcing, third-party logistics, supply chain performance measurement, supply chain economics, and supply chain finance.

LSM 572 Logistics and Supply Chain Risk Management - Three semester hours. The focus is on global sourcing issues, risk and uncertainties, supply chain logistics vulnerability and disruption, enterprise-wide risk management, crisis response logistics management, and Homeland Security's global supply chain logistics measures within the context of the commercial and military environments. (Prerequisite: LSM 536)

MGT 554 Training and Development - Three semester hours. This course emphasizes the broadening role of training in corporate life. Training is a systematic process of altering the behavior of employees in a direction that will achieve organizational goals. Training and development is an attempt to improve current and future employee performance by increasing an employee's ability to perform through learning, usually by changing the employee's attitude or increasing his or her skills and knowledge. (Prerequisite: MGT 515)

MGT 564 Human Resource Management - Three semester hours. A critical examination will be made of personnel functions, such as selection, training, placement, transfers and promotions, performance appraisal policies, motivation, inventory of skills, and human resource development.(Prerequisite: MGT 515)

MGT 565 Entrepreneurship/Small Business Management - Three semester hours.
Interdisciplinary course dealing with various aspects of starting a small business; selecting promising ideas, initiating enterprises, exploiting opportunities, obtaining initial financing, site selection, and licensing. (Prerequisite: MGT 515)

MGT 566 Management and Labor Relations - Three semester hours. This course introduces students to substantive topics that define and explain the relationship between labor and management. It examines the history of the labor movement and the rights and duties of both parties as defined by various labor laws. It also examines the labor relations process as it relates to negotiating and administering the labor agreement, and resolving issues related to employee discipline, rights and prerogatives of management and employee groups, wage issues, administrative issues and the use of arbitration to resolve labor disputes and maintain labor peace. Moreover, it examines how the labor relations process works in the public, federal and non-traditional sectors of the economy. (Prerequisite: MGT 515)

MGT 545 Foundation of Database Management Systems - Three semester hours. This course focuses on the important process of database design. A highly useful methodology for designing databases is presented and illustrated through a variety of examples. On the completion of this course, the student should be able to use database management systems such as Access to set up and manipulate data files, query a data file, and format a report. The student should also be able to compare the capabilities of a single file record management system with database management system.(Prerequisites: MGT 502 or equivalent, or consent of instructor)

MGT 580 Emerging Information Technologies - Three credit hours. This course examines various managerial and technical issues associated with the introduction of new information technologies within the firm. Topics include environmental scanning for new Information Technologies (IT) developments, assessment of new IT, and legal/ethical issues. (Prerequisite: MGT 545 or equivalent, or consent of instructor)

MKT 532 Consumer Behavior - Three semester hours. A review and evaluation of major theories of consumer behavior from the economics, behavioral science, and marketing literatures, topics include buyer behavior models, problem/need recognition, search behavior, information processing, involvement and motivation, learning theory , cultural-lifestyle-social class influence, role of consumer perceptions and attitudes in decision making, family decision making, adoption and diffusion of innovations, consumer trends, and behavioral influence strategies. (Prerequisite: MKT 514)

MKT 538 International Marketing and Logistics - Three semester hours. This course is an in-debt analysis of the specific issues, factors, and conditions which affect the marketing and logistic of products and services on a global, as opposed to a domestic basis. Attention will be focused on the challenges of identifying and evaluating opportunities in overseas markets, developing and adapting marketing strategies in relation to specific national market needs and constraints, and coordinating these strategies on a worldwide basis. (Prerequisite: MKT 514); cross-listed with LOG 538.

MBA 550 Independent Research in Business – This is for a major research project involving an in-depth study of an issue in any of the business areas. The project, conducted under the guidance of an instructor, will culminate into a detailed, comprehensive paper on the issue. (Pre-requisite: Consent of the MBA Director)

SCHOOL OF EDUCATION

Dr. Larry Powers, Dean
117 Carver Complex North

MISSION

Within the context of other units of the University, the School of Education views its mission as that of preparing P-12 teacher candidates and other school personnel to be effective educators as service professionals who can help all students learn. Through its programs of teaching, research, and service, the School of Education's mission is consistent with the land-grant mission of Alabama A&M University.

Teaching Mission: To provide P-12 undergraduate and graduate teacher candidates and other school personnel with professional and discipline-based knowledge, abilities, and dispositions to help all children learn and that lead to a State of Alabama Professional Educator's Certificate.

Research Mission: To promote and facilitate the development and dissemination of knowledge, abilities, and dispositions relating to effective teaching and learning.

Service Mission: To establish and maintain collaborations and partnerships with stakeholders that facilitate changes to improve education.

The teaching, research, and service missions are supported by a set of objectives that give meaning and direction for their attainment.

OBJECTIVES

Teaching Objectives:

- To create, select, and organize knowledge, abilities, and dispositions to be transmitted to candidates.
- To create and maintain a positive and supportive learning environment in which candidates will desire to acquire and process knowledge, abilities, and dispositions presented by the faculty.
- To engage candidates in a series of supervised teaching experiences to develop the requisite proficiencies of an educator as a service professional.
- To use a variety of assessment strategies for determining candidate proficiencies and unit effectiveness.

Research Objectives:

- To create and maintain an environment to support the engagement in research and other scholarly pursuits that result in newer and more effective approaches to teaching and learning.
- To maintain a high level of familiarity with current research and scholarly activity within the field of education.
- To disseminate up-to-date knowledge, abilities, and dispositions through classroom teaching, professional writing and through presentations to professional associations and other community groups.
- To conduct assessments for the improvement of programs and operations of the School of Education.

Service Objectives:

- To establish and maintain an advisory group to provide advice and counsel relating to improving educational services.
- To establish and maintain partnerships with accredited pre-school, elementary, middle, and high schools to improve the quality of teacher preparation.
- To form alliances with business, cultural, and other community groups in support of public education.
- Graduates of the School of Education are Educators as Service Professionals who (1) communicate proficiently and effectively, (2) have current professional knowledge and abilities, (3) create and maintain a positive and supportive learning environment, (4) facilitate learning by all students, (5) effectively assess student learning, (6) engage in continual professional development, and (7) exhibit professional dispositions at all times.

DESIGN OF GRADUATE EDUCATION PROGRAMS

Graduate programs in the School of Education consist of a Doctor of Philosophy degree, Educational Specialist degrees with Class AA certification; Masters degrees with Class A certification; and Alternative 5th Year Masters degrees with Class A certification. The Ph.D. program requires a minimum of 90 semester hours, 36 of which are in Reading/Literacy. All Educational Specialist degrees require a minimum of 36 semester hours. All Masters degree programs require a minimum of 33 semester hours, 12 of which are in the Foundations of Education. And, all Alternative Master's degree programs require a minimum of 45 semester hours, which includes an internship.

The Ph.D. in Reading/Literacy requires a minimum of 90 semester hours beyond the baccalaureate degree (72 hours in graduate level courses and 18 hours in doctoral dissertation courses. A minimum of 36 hours are required in the major field with a minimum of 24 semester hours in courses in the major field at the doctoral level. Other requirements include 12 semester hours in support courses (collateral field); 12 semester hours in Research Methods and Clinical

Application; a maximum of 12 semester hours in elective courses; and 18 semester hours in doctoral dissertation courses. Additional requirements include a preliminary qualifying examination, comprehensive examinations, required writings, and oral and written competency examinations.

Candidates for graduate degrees in Education must consult an advisor in the School of Education to develop a degree plan. The advisor must be consulted prior to each registration period for guidance and assistance in completing the planned degree.

A comprehensive written examination are required of candidates for Master's degrees in Education. A written comprehensive examination and a thesis are required of all candidates for the Educational Specialist (Ed. S.) degree

The Foundations of Education courses for the Master's degrees are the following:

FED 501 Foundations of Education (3) (or)
FED 521 Foundations of Multicultural Education (3)
FED 503 Introduction to Educational Research (3)
FED 504 Evaluation of Teaching and Learning (3)
FED 529 Computer-Based Instructional Technology (3)

The Educational Specialist (Ed.S.) degree requires a minimum of 36 semester hours, 12 of which are in the Foundations of Education (see below). The remaining 24 semester hours consist of 12 hours in the area of specialization, 6 hours of research (thesis), and 6 hours of electives.

The Foundations courses for the Educational Specialist (Ed.S.) degree are the following:

FED 600 Advanced Curriculum Development (3)
FED 603 Advanced Educational Research (3)
FED 604 Advanced Evaluation of Teaching and Learning (3)
FED 605 Qualitative Methods of Educational Research (3)

ACCREDITATION

The initial and advanced teacher education programs of the School of Education are accredited with the National Council for the Accreditation of Teacher Education (NCATE). All programs are approved by the Alabama State Board of Education.

DISCLAIMER STATEMENT

Teacher Education Programs are approved by the Alabama State Board of Education. Because of the nature of Teacher Education programs and because State Certification changes may occur, the School of Education reserves the right to change the requirements in each Teacher Education Program as necessary.

WARRANTY STATEMENT

Consistent with the policies of the Alabama State Department of Education, the School of Education warrants its graduates under the following conditions: warranties are provided to teachers and other school personnel who receive their initial professional certification through the School and who are employed by a public school district in Alabama in their area of specialization. The School of Education will provide assistance at no cost to such individuals who, if recommended for certification, and who are deemed to be unsatisfactory based on performance evaluations established and approved by the Alabama State Board of Education. A Local Education Agency must report individuals whose performance is judged to be unsatisfactory to the Dean, School of Education, within two years after program completion.

ADMISSION

Doctor of Philosophy in Reading/Literacy

Applicants for a Doctor of Philosophy Degree in Reading/Literacy must be admitted to the Graduate School. Applicants must have completed three years of P-12 teaching; must have an overall GPA of 3.0 on a 4.0 scale in undergraduate work for students without a master's degree or an overall GPA of 3.5 on a scale of 4.0 for students with a masters or educational specialist's degree. Also required are the following:

- Three letters of recommendation that address the applicant's academic and professional work
- A philosophy paper relative to the advanced degree and its relationship to the applicant's goals for personal and professional growth
- A sample of the applicant's professional writing in the form of a thesis, article, term paper, or other type of writing that demonstrates the candidate's writing ability
- An interview with the faculty admissions committee
- A score of 450 verbal and 850 total on the Graduate Record Examination

Master's Degree Programs

Applicants for Master's degree certification programs must be admitted to the School of Graduate Studies and to Teacher Education. Admission to Teacher Education requires the applicant to (1) present evidence of having completed a baccalaureate degree program in a teaching field, (2) present a copy of a Class B Professional Educator's Certificate (Regular Masters program), (3) present transcript(s) showing a baccalaureate degree grade point average of 2.50 or better (4.00 system), (5) Teacher Effectiveness Validation form (Regular Masters program) and, (6) the Graduate Record Examination (GRE).

Applicants for the Master's degree in Instructional Leadership must have a minimum of three full years of full-time experience in a P-12 setting.

Applicants for the P-12 Reading Specialist degree must have completed two years of teaching experience and present a copy of a Class B Professional Educator's Certificate in Elementary Education, Early Childhood Education, or Collaborative Teacher. Applicants may also hold a Class B Professional Educator's Certificate in Secondary Education, but must complete two courses in reading, including an introduction to reading.

Alternative Master's (5th Year) Programs

The Alternative 5th Year program is for one who does not hold a baccalaureate degree in a teaching field but wishes to obtain teacher certification. The program enables one to acquire the knowledge and skills of an entry-level teacher while at the same time earn a Master's degree. Applicants for the Alternative Master's (5^{th} year) degree program must be admitted to the School of Graduate Studies and to Teacher Education. Admission to Teacher Education requires the applicant to (1)present evidence of having completed a baccalaureate degree from a regionally accredited institution (2) a grade point average of 2.50 or better (4.00 point system), (3) official transcript(s) from all universities and colleges attended, (4) Graduate Record Examination (GRE), (5) completion of all undergraduate deficiencies, (6) passing of the speech, language and hearing screening, (7) TB skin test, (8) passing of all parts of the Alabama Prospective Teacher Test, (9) passing of the Praxis II in the appropriate area.

Educational Specialist (Ed.S.) Degree

Applicants to the Educational Specialist Degree must be admitted to the School of Graduate Studies and to Teacher Education. Admission to Teacher Education requires the applicant to (1) present evidence of having completed a Master's degree with Class A Certification in the same teaching field(s) in which the Ed.S. Degree is sought, (except in Special Education), (2) present transcript(s) showing a Master's degree grade point average of 3.00 or better (4.00 system).

DEGREE COMPLETION REQUIREMENTS

Ph.D. Degree in Reading/Literacy

Candidates for a Ph.D. degree in Reading/Literacy must complete the prescribed courses listed in the approved planned degree and attain an overall GPA of a 3.0 on a 4.0 point system, pass oral and written comprehensive and competency examinations, and complete the doctoral dissertation.

Educational Specialist (Ed. S) Degree

Candidates for the Educational Specialist (Ed.S.) degree must (1) complete the prescribed courses listed in the approved planned degree program and attain an overall grade-point average of 3.25 (4.00 system), (2) pass a written comprehensive examination on the content of the program, and (3) successfully complete the thesis requirement.

Master's Degrees

Candidates for Master's degree in Education must (1) complete the prescribed courses listed in the approved planned degree program and attain an overall grade-point average of 3.00 (4.00 system), (2) pass a written comprehensive examination on the content of the program, and (3) complete an internship, (4) meet the cut score on the Praxis II in the appropriate area (if required).

Alternative 5th Year Program Master's Degree

Candidates for the Alternative Master's degree in Education must (1) make up all undergraduate deficiencies in the teaching field, (2) complete the prescribed courses listed in the approved planned degree program and attain an overall grade-point average of 3.00 (4.00 system), (3) pass a written comprehensive examination on the content of the program, and (4) complete an internship.

FIELD EXPERIENCES

Alternative Master's (5^{th} year) students complete **205 hours** of **diverse** field experiences prior to enrolling in the **full semester** of internship. **Fifty hours** of field experiences are completed at **Level I** of the program. **Twenty hours, three full days**, are completed while enrolled in FED 501 Foundations of Education and/or FED 521 Multicultural Education courses. The three days of field experiences for these courses are completed in **Title I, high poverty, schools**. **Thirty**

hours, four full days, are completed while enrolled in SPE 501 Introduction to Individuals With Disabilities. Field experiences are completed in **special education** settings, with students with exceptionalities.

One hundred fifty-five hours of field experiences are completed during **Level II** of the program while enrolled in teaching field courses. Students alternate experiences between **urban and rural school settings**. **Fifty-five of the 155 hours** may be completed in **service learning** settings.

ELIGIBILITY CRITERIA FOR GRADUATE STUDENTS FOR THE INTERNSHIP (ALTERNATIVE MASTERS' (5TH YEAR)

Graduate Students who expect to participate in internship shall meet all the Teacher Education Program admission criteria described in the Alabama Administrative Code and be admitted to a Teacher Education program after the completion of FED 501 or FED 521, SPE 501 and EDU 529. The internship semester is defined as the semester in which the student is enrolled in an internship.

Only students who have a minimum of 3.00 grade point average (GPA) in the teaching field (all work used), in professional studies (all work used) and overall will be eligible for internship. Graduate students must obtain and maintain a minimum overall 3.00 grade point average (GPA) throughout their program.

An application for internship must be completed and filed in the Office of Field Experiences at least one year prior to the internship date. The deadline for the Spring is March 15 of the previous year, and for the fall semester, September 15 of the previous year.

Before a graduate student can participate in internship the following prerequisites must be met:

1. The student must have on file an application to a Teacher Education program.
2. The student must meet all requirements for admission to a Teacher Education program.
3. GRE score must be on file with the Teacher Service Center
4. The English requirement must be met.
5. The student must meet general studies requirements.
6. The student must have obtained and maintained a minimum 3.00 grade point average in professional studies, the teaching field and overall.
7. All undergraduate deficiencies must be completed.
8. Student must have completed all course work (excluding internship) from the State Approved Checklist.
9. The student must have removed all grades of "Incomplete.".
10. The student must not have any grades of "C" in courses.

11. Student must have repeated all courses in professional studies and the teaching field with grades of "C", "D" and "F".
12. Program of study must be on file with the Teacher Service Center and the Graduate Office
13. Official transcripts from other universities and colleges attended must be on file with the Teacher Service Center.
14. Must meet the cut score on the Praxis II in appropriate area of concentration.
15. Must clear the fingerprint/background check with the State Department of Education.

CERTIFICATION

All teacher education majors that have met the requirements **must** apply for Alabama Certification. A candidate who files an application must complete the curriculum approved by the State of Alabama. The completion of the curriculum approved for certification and all other requirements for graduation will qualify you for applying for a professional educator's certificate. The levels of Alabama Professional Educator Certificates for students in the graduate program are: Class A: Master's degree and Class AA: Ed.S. degree.

ORGANIZATION OF THE SCHOOL OF EDUCATION

The School of Education is organized into five academic departments, each headed by a department chair: (1)Elementary and Early Childhood Education; (2) Special Education, Psychology and Counseling, Communicative Sciences and Disorders; (3) Curriculum, Teaching & Educational Leadership; (4) Fine Arts; and (5) Health, Physical Education and Recreation. There are five service units, each headed by a director or coordinator: (1) Teacher Certification; and (2) Office of Field Experiences. The Dean of the School of Education provides executive leadership and is advised internally by a Teacher Education Council. A Community Advisory Council serves as the external advisory unit.

DEPARTMENT OF CURRICULUM, TEACHING AND EDUCATIONAL LEADERSHIP

Dr. Delores Price, Chairperson
207 Carver Complex North
(256) 372-5520

MISSION

The Department of Curriculum, Teaching and Educational Leadership offers coursework and field experiences leading to the Master of Education degree with teacher certification (Class A and Class A "Alternative") in Administration and Supervision, Reading Specialist and Secondary Education. Within the Secondary Education Degree programs leading to Class A certification include General Social Science, Biology, Chemistry, Physics, Mathematics, General Science, Agriscience Technology, Family and Consumer Science, Business Education, Technical Education, and Career Technologies.

The department also offers the Doctor of Philosophy degree in Reading/Literacy Education. In addition, the core courses for the Master's and Educational Specialist degree in Elementary Education, Early Childhood Education, Secondary Education and Educational Administration are offered within the department.

PH.D. PROGRAM IN READING AND LITERACY

Residency Requirements

The intent of doctoral residency is to ensure that doctoral students benefit from and contribute to the complete spectrum of educational and professional opportunities provided by the university. All Ph.D. students require at least two years of continuous residence. This allows students to concentrate exclusively on course work or research and acquire necessary skills and insights necessary for attaining the Ph.D. Also this provides opportunities to work closely with other students in the area and the advisory committee members. The doctoral residency requirement may be satisfied only after admission to the doctoral degree program and must be fulfilled by enrollment in at least 24 graduate semester hours within a span of four consecutive semesters (excluding summers). Enrollment in a summer term is not required to maintain continuity, but credits earned during summer terms will count towards residency.

Teaching Requirement

Teaching is a direct part and outcome of scholarly research and an integral part of Ph.D. degree training as researchers need to transmit the knowledge and train others in the specialization. While students on graduate teaching assistantships gain extensive teaching experience, other Ph.D. students are also required to participate in teaching at least one semester with a senior mentor in the area of specialization.

Expected Experiences Prior to Beginning the Program

To strengthen the doctoral experience in Reading, students will be expected to have course work equivalent to that expected for the Reading Specialist certification in the State of Alabama, excluding the internship. That is, students will be expected to complete (or have previously completed) at least 12 hours of reading courses at least at the master's level. These courses may be taken before beginning, or concurrently with, their doctoral level classes.

Program Information

The student's program will include a minimum of 72 semester hours of coursework. The student is required to complete twelve (12) semester hours of reading and literacy courses, twelve (12) additional hours in reading and literacy, fifteen (15) hours in research, fifteen (15) hours in elective course work, and twelve (12) hours for the dissertation.

Foreign Language Requirement

The applicant must have a reading knowledge of one foreign language or an approved alternative selected from the Department of Curriculum, Teaching & Educational Leadership language/research tool options.

Option A: Demonstrate competency in a foreign language or in an alternative language for the visually or hearing impaired by completion of one of the following courses with a grade of "B" or better:

Foreign Languages: 200-level course in French or Spanish or satisfactory performance on an examination administered by the Department of English & Foreign Languages
CSD 509 Habilitation and Rehabilitation of the Hearing Impaired **OR**
CSD 515 Language Development Communicative Disorders **OR**
CSD 520 Language Disorders in Children
(Substitute courses from other accredited institutions may be acceptable in place of CSD 509, CSD 515, or CSD 520.)

Option B: Demonstrate competency in a computer language with potential for research applications by the completion of CMP 517 Application of Statistical Methods with a grade of "B" or better.

Option C: Demonstrate competency in a computer-related area of study outside of the School of Education by completion of one of the following courses or sets of courses with a grade of "B" or better (please check description of courses in the Graduate School Catalog for prerequisites):

Programming: CMP 503 UNIX and C++ Programming and CMP 507 Data Structures and Algorithms Using C++

Artificial Intelligence: CMP 550 Artificial Intelligence

Online Databases: CMP 505 Application of Discrete Structures and CMP 551 Database Management Systems

PROCEDURES FOR FULL ADMISSION TO THE DOCTORAL DEGREE PROGRAM IN READING AND LITERACY

The student will fulfill all criteria for full admission to the Doctoral Program in Reading and Literacy leading to the doctoral qualifying examination. The applicant shall:

1. Complete an application to The Graduate School on the web at www.aamu.edu/gradschool;
2. Have official copies of transcripts sent from all institutions attended (a master's degree is required to apply to this program);
3. Have at least three positive letters of recommendation that address the applicant's academic and professional work.
4. A sample of the applicant's professional writing in the form of a thesis, article, term paper, or other type of writing that demonstrates the candidate's writing ability.
5. Have a Graduate Record Examination aptitude score of not less than 850 (verbal and quantitative) with not less than 450 on the verbal and 420 on the quantitative sections;
6. Have appropriate grade point averages for undergraduate and graduate work completed. An overall 3.0 on a 4.0 scale on undergraduate work completed and an overall 3.50 for applicant's master's and/or educational specialist degree work;
7. Submit a philosophy paper relative to the advanced degree and its relationship to the applicant's goals for personal and professional growth

To be considered for admission, the applicant must ensure that his or her file is complete. No action will be taken on incomplete files. Applicants wishing to check on the status of their files should contact The Graduate School in the L.R. Patton Building, Room 300, or call 256-372-4996.

Using the specific admission criteria outlined above, the Director of the Ph.D. program compiles a composite applicant profile for review and discussion by the Reading and Literacy graduate faculty. After applications are reviewed and if the above criteria are met, applicants will be called for an interview with members of the Reading and Literacy faculty. Since there are limited openings, the faculty carefully reviews each applicant's total profile including the interview and recommends the most qualified applicants for admission to a particular year's cohort. Applications are reviewed on a rolling basis.

Applicants Not Meeting the Admission Criteria

Applicants who have a Graduate Record Examination aptitude score of more than 700 but less than 850, with not less than 400 on the verbal and 350 on the quantitative subscales (but who fulfill all other program entrance criteria), may be granted "conditional admittance" status leading to the doctoral qualifying examination pending inclusion and acceptance of a Letter of Petition (see below) submitted with the application.

Letter of Petition: Applicants who do not meet doctoral program entrance requirements for full admission leading to the doctoral qualifying examination, but who do meet "conditional admittance" criteria must accompany their applications with a Letter of Petition. Students who neither meet full nor conditional acceptance criteria leading to the doctoral qualifying examination, but who request further consideration for acceptance to the Doctoral Program in Reading and Literacy, must accompany their applications with a Letter of Petition. The Letter of Petition should present alternative evidence of qualification for success in a doctoral program. Alternative evidence should not be a restatement of evidence that has already been taken into consideration on the admission form.

Alternative evidence may include, but is not limited to, the following:

1. High scores on alternative standardized examinations (e.g., PRAXIS) that measure ability in the domain in question.
2. Passing scores on program alternative examinations that measure ability in the domain in question as rated by at least two independent reviewers. For example, an on-site writing examination could provide alternative evidence regarding verbal skills.
3. Disaggregated data from the applicant's transcript described in context, such as:
    a. High grades in specific courses that contradict low test scores in that area (e.g., high grades in mathematics that contradict low quantitative GRE scores);
    b. Type and accreditation status of the institution(s) at which courses were taken or degrees obtained;
    c. GPA – degree of difficulty of major;
    d. Explanation of transcript such as improvement over time or specific circumstances for semesters of poor performance;

e. Clarification of the match between applicants' qualifications and the demands of the degree.
f. Evidence that the applicant does not score well on standardized tests, but it is still likely to be academically successful (e.g., low SATE scores and undergraduate success).

Final recommendation to admit, reject, or postpone the student's application to the Doctoral Program in Reading and Literacy shall be made by the faculty of the Reading and Literacy Program based on a total analysis of the applicant's profile and the availability of advisors.

SECONDARY EDUCATION PROGRAM

General Admission Requirements for the Master of Education (M.Ed.) Degree:

1. Bachelor's Degree from an accredited College or University;
2. Minimum undergraduate GPA of 2.5 (on a 4.0 scale)
3. **Two** official copies of transcripts of all undergraduate/graduate work attempted including junior/community colleges.
4. GRE minimum combined score of 400 on Verbal and 400 on quantitative OR 800 on the Verbal/Quantitative sections.

General Admission Requirements for the Educational Specialist (Ed.S.) Degree:

1. A Master's Degree from an accredited College or University;
2. Minimum GPA of 3.0 (on a 4.0 scale);
3. **Two** official copies of transcripts of all undergraduate/graduate work attempted including junior/community colleges.
4. GRE minimum combined score of 400 on Verbal and 400 on quantitative or 800 on the Verbal/Quantitative sections.

Degree Offerings in the Secondary Education Program

Certification Programs

1. The **Master of Education (M.Ed.) degree** in Secondary Education. This degree is designed for individuals who currently hold the Class B Professional Educator's Certificate in Secondary Education. With the completion of this degree, candidates are eligible for a Class A Professional Educator's Certificate. The M.Ed. degree is offered in Secondary Education with concentrations in the following teaching fields: Biology, Chemistry, General Science, General Social Science, Mathematics, and Physics. The M.Ed. in Secondary Education is also offered with concentrations in the following Career Tech areas: Agriscience Education, Business/Marketing Education, Family & Consumer Science, Technical Education, and Career Technologies.

2. The **Alternative Master of Education (M.Ed.) degree** in Secondary Education. This degree is designed for individuals who hold a Bachelor's degree in a teaching field but are not currently eligible for a Professional Educator's Certificate. With the completion of this degree, candidates are eligible for a Class A Professional Educator's Certificate. The candidate pursuing this degree must have 32 semester hours in the teaching field sought of which 19 semester hours must be teaching field courses at the 300-level and above. This degree program presumes that the candidate will be seeking to obtain certification in the teaching field in which the Bachelor's degree was awarded; however, this presumption is not a requirement. The Alternative Master's degree program can be pursued in any teaching field offered regardless of the teaching field in which the Bachelor's degree was awarded. Candidates should be aware, however, that if the Bachelor's degree is not in the teaching field pursued, the time completion for the degree will be extended. The M.Ed. degree is offered in Secondary Education with concentrations in the following teaching fields: Biology, Chemistry, General Science, General Social Science, Mathematics, and Physics. The M.Ed. in Secondary Education is also offered with concentrations in the following Career/Technical Education areas: Agriscience Education, Business/Marketing Education, Family & Consumer Science, Technical Education, and Career Technologies.

3. The **Educational Specialist (Ed.S.) degree** in Education with an option in Secondary Education. This degree is designed for individuals who hold the Master's degree in the teaching field in which the Ed.S. degree is sought. With the completion of this degree candidates are eligible for the Class AA Professional Educator's Certificate. The Educational Specialist Degree is offered in General Education with a concentration in Secondary Education and options in the following teaching fields: Biology, Chemistry, General Science, General Social Science, Mathematics, and Physics. The Ed.S. in General Education is also offered with concentrations in the following Career Technical areas: Agriscience Education, Business/Marketing Education, Family & Consumer Science, Technical Education, and Career Technologies.

Graduate programs in the area of Secondary Education consist of the Master of Education (M.Ed.) degree with Class A Certification; the Alternative Master of Education (M.Ed.) degree with Class A Certification; and the Educational Specialist (Ed.S.) degree with Class AA Certification. The M.Ed. degree programs leading to Class A Certification require 33 – 36 semester hours, including 12 – 15 semester hours of foundation courses, 12 semester hours of teaching field courses, and 9 semester hours of additional courses. The Alternative M.Ed. degree programs leading to Class A Certification require 42 – 45 semester hours, including 12 – 15 semester hours of foundation courses, 15 semester hours of teaching field courses, 6 semester hours of internship, and 9 semester hours of additional courses. The Ed.S degree programs leading to Class AA Certification require 36 – 39 semester hours, including foundation courses, teaching field courses, and other requirements or electives.

INSTRUCTIONAL LEADERSHIP PROGRAM

General Admission Requirements for the Master of Education (M.Ed.) Degree:

In addition to an earned baccalaureate-level professional Educator Certificate in a teaching field or earned master's-level Professional Educator Certificate in a teaching field or instructional support area, the applicant shall:

(a) Have a minimum of three (3) years of successful teaching experience.
(b) Submit an admission portfolio before an interview. The portfolio will contain the following:

1. Three (3) letters of recommendation to include the applicant's principal or supervisor. Each local superintendent will establish requirements for recommendations from the principal and/or supervisor.
2. Completed copy (all forms) of the most recent performance appraisal to include the professional development component, if available.
3. Evidence of ability to improve student achievement.(2 examples).
4. Evidence of leadership and management potential, including evidence of most recent accomplishments in the area of educational leadership.(2 examples).
5. Summary of candidate's reasons for pursuing instructional leadership certification.
6. Summary of what the candidate expects from the preparation program.

(c) Pass an interview conducted by a program admission committee that includes both P-12 instructional leaders and higher education faculty.

7. The candidate will also be required to take and pass a writing assessment.

* An applicant will not be considered for admission until all application requirements are met by the specified deadline.

* The decision from the Graduate Admissions Committee is communicated in writing to the applicant.

General Admission Requirements for the Educational Specialist (Ed.S.) Degree:

1. A Master's Degree in Instructional Leadership from an accredited College or University, **OR** a Master's Degree in any field **AND** Professional Certification in Education Administration from an accredited College or University;
2. Minimum GPA of 3.0 (on a 4.0 scale);
3. **Two** official copies of transcripts of all undergraduate/graduate work attempted including junior/community colleges.
4. GRE minimum combined score of 400 on Verbal and 400 on Quantitative OR 800 on the Verbal/Quantitative sections.

Degree Offerings in the Instructional Leadership Program

Certification Programs

1. The **Master of Education (M.Ed.) degree** in Instructional Leadership. This degree is designed for individuals who currently hold current teaching certification. With the completion of this degree, candidates are eligible for Class A Certification in Instructional Leadership.

2. The **Educational Specialist (Ed.S.)** degree in Education with a concentration in Instructional Leadership. This degree is designed for individuals who seek greater preparation for leadership in P – 12 schools and/or those who aspire towards pursuing doctoral level studies in educational administration.

Noncertification Programs

1. The Educational Specialist (Ed.S.) degree in Education with a concentration in Instructional Leadership and option in Higher Education. This program is designed for individuals seeking to enhance their skills in leadership positions in postsecondary institutions. The program is also designed for those individuals who aspire towards pursuing doctoral level studies in educational administration. This degree program does not lead to Class AA certification in Instructional Leadership.

Graduate programs in the area of Instructional Leadership consist of the Class A Endorsement in Instructional Leadership; the Master of Education (M.Ed.) degree with Class A Certification and the Educational Specialist (Ed.S.) degree with Class AA Certification and a non-certification option in Higher Education. The M.Ed. degree program leading to Class A Certification requires 33 – 36 semester hours, including 12 – 15 semester hours of foundation courses, 18 semester hours of instructional support courses, and 3 semester hours of internship. The Ed.S degree program leading to Class AA Certification require 36 – 39 semester hours, including 18 – 21 semester hours in foundation courses, 15 semester hours in instructional support courses, and 3 semester hours of mentoring.

The Instructional Leadership program also offers the Ed.S. degree in Education with a concentration in Instructional Leadership and an option in Higher Education not leading to Class AA certification. The non-certification program at the Ed.S. level is particularly designed for individuals whose primary interests are in teaching at the two-year college level and/or those who aspire towards pursuing doctoral level studies in curriculum & instruction in the teaching field. The Ed.S. program requires 36 – 39 semester hours, including 12 – 15 semester hours of foundation courses, 6 semester hours of thesis research, 12 semester hours of teaching field courses, and 6 semester hours of additional courses.

All degree programs are offered for the Master's and the Alternative Masters' degree. Some exclusions may apply for the Ed.S. degree. Art Education is not offered as an Alternative Master's degree.

The Core Foundation of Education courses for the Master's degree include the following:

FED 501 Social & Psychosocial and Cultural Foundations of Education (3 hrs.) **OR**
FED 521 Foundations of Multicultural Education (3 hrs.)
FED 503 Introduction to Educational Research (3hrs.) **OR**
FED 504 Evaluation of Teaching and Learning (3hrs.)
FED 529 Computer-Based Instructional Technology (3hrs.)
SPE 501 Introduction to the Study of Exceptional Individuals (3 hrs.)

The Core Foundation courses for the Educational Specialist degree include the following:

FED 600 Advanced Curriculum Development (3hrs.)
FED 605 Qualitative Methods in Educational Research (3 hrs.)
FED 604 Advanced Evaluation of Teaching and Learning (3hrs.)
FED 603 Advanced Educational Research (3)
SPE 501 Introduction to the Study of Exceptional Individuals (3 hrs.)

Foundations of Education

FED 501 Foundations of Education – Three semester hours. Bases of modern education studies from the standpoint of their historical development and interpreted in relation to their social, economic, philosophical and psychological foundations.

FED 502 Introduction to Educational Statistics – Three semester hours. The meaning and importance of statistics as a scientific tool in educational investigation; measures of central tendency, variability, and relation as descriptive devices; the computation of descriptive measure; and the presentation of data in graphic and tabular form.

FED 503 Introduction to Educational Research – Three semester hours. Aims to give the graduate student an introduction to the field of research; includes practical training in research and writing techniques in the field of education; bibliographical material; footnotes; and use of library resources. The course is designed for users as well as producers of research projects.

FED 521 Multicultural Education – Three semester hours. Prepares the educator for perceiving, believing, evaluating, and behaving in different cultural settings. It should help the educator become more responsive to the human condition, individual cultural integrity, and cultural pluralism in today's society.

FED 529 Computer-Based Instructional Technologies – Three semester hours. The course is designed to help teachers develop competency in the use of computer-based technologies in educational and non-educational settings. This course will include a

historical perspective of educational computing, computer terminology, proper techniques for operating computer systems, and practical classroom applications of the computer like word processing, spreadsheet, and databases. Students will have the opportunity to work with Macintosh and IBM formats. No prior computer knowledge or skills is necessary.

FED 531 Current and Emerging Instructional Technologies – Three semester hours.
The course is designed to help educators develop skills in using desktop publishing, computer graphics, hypermedia environments, telecommunications, and optical technology. (Prerequisite: ELE 530 or an equivalent graduate level course)

FED 532 Curriculum Integration of Technology – Three semester hours. The content will focus on the following major areas: principles of instructional design, techniques for integrating computers and related technologies into the school's curriculum, designing and evaluating software and coursework, hypermedia for instructional uses, and repurposing interactive video material. (Prerequisites: ELE 530 and FED 531)

FED 504 Evaluation of Teaching-Learning – Three semester hours. A complete exploration into the pertinent theories, research, procedures, and problems in learning and teaching evaluation. Various readings and experiments will be explored. Students will be required to do a terminal research.

FED 600 Advanced Curriculum Development – Three semester hours. This course is designed to assist teachers, administrators, supervisors, curriculum directors, and other instructional personnel in developing competencies as instructional leaders. Two critical factors in a program of curriculum development and improvement are examined: (1) an analysis of factors relative to the concept of change in education, and (2) the development of a concept of leadership for instructional improvement.

FED 601 Advanced Philosophy of Education – Three semester hours. Critical study in the examination of the various educational theories and philosophies of education, their relationships and implications for teaching; applicable for classroom teachers, practicing school administrators, and other certified, non-teaching school personnel.

FED 603 Advanced Educational Research. Three semester hours. An in-depth study of research methodologies and designs. Emphasis is placed on thesis preparation.

FED 604 Advanced Evaluation of Teaching and Learning – Three semester hours.
An in-depth study of the theories, processes and procedures relating to the evaluation of teaching and student learning.

FED 605 Qualitative Methods of Educational Research – Three semester hours. Through reading, research, discussion, writing and presentations students will learn the theoretical and practical aspects of qualitative research. The course content will cover ethics, IRB, letters of permission/consent,

theoretical approaches, research design, fieldwork, observations, interviews, surveys, questionnaires, data and analysis. Technical writing, thesis proposals and articles will be highlighted for form and content. Weekly projects will be required in this course. Surveys, interviews and observations will be highlighted in this course. Each students will write a qualitative research proposal he or she may expand into a thesis proposal.

Instructional Leadership

EDL 530 Data Driven Instruction – three semester hours. This course is designed for and restricted to graduate students seeking a master's degree in Educational Administration and Supervision and/or Secondary Education. The content of the course is drawn from current research data. The student has an opportunity to identify and analyze areas of interest, study issues, trends, problems, procedures, implications, and innovative programs identified in research data.

EDL 543 Legal and Ethical Aspects of School Operations – Three semester hours. Designed to provide (a) interpretation and understanding of the state and federal laws that affect individual schools and school districts and (b) competency in fulfilling and administering provisions of school laws for the State of Alabama.

EDL 547 Education Finance – Three semester hours. A study of the relationship of finance and business management to the quality of education, with emphasis placed on theories and principles of school support, including responsibility of federal, state, and local agencies, state foundation programs; preparation and administration of salary schedules, budgeting, and business administration including purchasing, accounting, insurance, and bonding.

EDL 563 Curriculum Development, Improvement and Assessment – Three semester hours. This course will emphasize planning, implementing, managing, and evaluation of the school's curriculum and instructional programs.

EDL 564 School Community Relations – Three semester hours. A critical study of the social context of school organization and development. Attention is given to the development of the school's staff, including the planning, operation, and evaluation of the development programs. Public relations, and the influences of the community are considered.

EDL 566 Management of School Operations – Three semester hours. This course includes all the managerial problems, duties, and responsibilities of the school administrator, including personnel, facilities, fiscal management, transportation, food service, athletic operations, and scheduling.

EDL 567 Instructional Leadership – Three semester hours. The duties, responsibilities, and problems of the educational leader are studied. The methods for effective leadership are included, as well as techniques for implementation, operation, and evaluation. The planning, operation, and evaluation of student services are included.

EDL 595-01 Internship in Educational Leadership – Three semester hours. This is a field laboratory, supervised experience in which advanced graduate students will be involved in actual working situations to gain experience in the structural organization, administrative or supervisory behavior and practices, and related problems. The internship will include experiences at the elementary, middle, and high school levels and also at the Central Office.

EDL 595-02 Internship in Education Leadership

EDL 596 Residency/ Internship in Instructional Leadership

EAS 631 School Organization in Personnel Development – Three semester hours. The techniques and procedures for effective staff development are studied. Included are procedures for developing, implementing, monitoring and evaluating a program of staff development consistent with school and system needs. The dynamics of effective school and community relations are explored, considering community diversity and the socio-emotional political influences on school operations.

EAS 632 Federal, State, Local Legislation and Policy Development – Three semester hours. Federal and state statutes are studied related to the rights of students and employees. State board and local policies are reviewed in light of statutory and judicial mandates pertaining to student classifications, employment, and contractual rights of teachers and other staff. All major federal legislation, state statutes and policies, and relevant court decisions will be used to critique local school policies and operations.

EAS 633 Management of Educational Support Services – Three semester hours. All management operations of the school are explored. Attention is given to personnel matters, line and staff operating relationships, managing material resources, facility operations, transportation, fiscal management, conflict resolution, student records, security, and scheduling for instruction.

EAS 634 Cultural and Organizational Leadership for Operations – Three semester hours. Effective procedures for administering student services and leadership skills will be explored. Included will be means of monitoring student attendance, health and nutrition needs, plans or monitoring discipline, providing guidance and counseling services, and providing library services. Also, leadership styles, planning strategies, accountability considerations, and accreditation standards are studied.

EAS 635 Mentoring for Educational Leaders – Three semester hours. On-site experiences will be provided at each school level and the Central Office supervised by University faculty and

local practicing administrators. These experiences are designed to assist students in the skills and abilities needed by the effective administrator. A minimum of 300 clock hours is required.

EAS 698 Thesis – One to six semester hours. Open to Ed.S. degree-level students only, based on their reading in that area. The study is done under the supervision of the student's advisor, with departmental approval. It culminates with an oral defense based on content of the research paper.

EAS 699 Thesis – One to six semester hours. Open to Ed.S. degree-level students only, based on their reading in that area. The study is done under the supervision of the student's advisor, with departmental approval. It culminates with an oral defense based on content of the research paper.

Higher Education Administration

HEA 622 Program Development in Higher Education – Three semester hours. A study of the background and development aims, and problems of the curriculum in junior colleges and universities.

HEA 623 Planning, Management, and Evaluation in Higher Education – Three semester hours. The study of the basic principles, concepts, and models in the establishment of goals assessing and analyzing needs; identifying resources and analyzing alternative strategies and selecting strategies; securing and allocating resources and formulating the program implementation plan; operating and evaluating programs in junior colleges, colleges, and universities.

HEA 624 American Education – Three semester hours. Overview and historical development of higher education in America; social context, unique characteristics, present status, scope, diversity, and current issues and trends in American higher education.

HEA 625 Community college – Three semester hours. Philosophy, history, organization, establishment and control, students, and curriculum of the two-year college; its teaching and learning environment, role in the community and career orientation.

HEA 626 Finance of Higher Education – Three semester hours. Financial aspects of the operation of junior colleges, colleges, and universities.

HEA 635 The Community College Curriculum – Three semester hours. Trends, problems, and issues in the development of the Community Junior College Curriculum, including vocational-technical education, continuing education, and community services, are studied.

HEA 680 Educational Supervision for the Practitioner – Three semester hours. This course is designed to provide specific, practical assistance to on-the-job supervisors in the successful

realization of their profession of instruction. The course deals with task areas and a collection of accepted patterns for supervision, definite procedures, techniques, and devices.

Reading Education

RDG 512 Language Arts Across the Curriculum - Three semester hours. This course provides students with the knowledge, skills, and dispositions required of a teacher of language arts. Course content includes the integration of the components of the language arts into the self-contained and departmentalized/content area classrooms at P-12 levels. Knowledge and practical insights for teaching language arts will be gained by examining scientifically based research and effective methods of instruction. Topics to be covered include reading, writing, listening, speaking, spelling, vocabulary, grammar and usage, and handwriting.

RDG 515 Content Area Reading – Three semester hours. This introductory course provides students with the knowledge, skills, and dispositions required of a teacher to build comprehension in the content areas at the P-12 levels through the activation of prior knowledge; metacognitive strategies; schema theory; use of before, during, and after reading strategies; amount of reading; text structure; deep discussion and questioning; vocabulary development; writing connected to reading; and study skills

RDG 516 Assessing and Accelerating Reading Ability – 3 semester hours. Students will learn techniques for assessing reading ability and designing and implementing instruction to improve the reading ability of students reading below grade level at the P-12 levels. Topics to be covered include the role of the diagnostic teacher, gathering data formally and informally, designing diagnostic lessons, selecting appropriate instructional techniques and materials, and the role of technology. Cognitive, home, school, and other factors will be used to gather data to diagnose a student's strengths and weaknesses in reading and design a research-based program for acceleration of reading ability.

RDG 517 Children's and Adolescent Literature – Three semester hours. This course provides students with the knowledge, skills, and dispositions required of a teacher relative to the various genres of children's and adolescent literature and their relationship to beginning reading, enhancement of reading comprehension, and intervention instruction in the various content areas.

RDG 595 Internship for Reading Specialist Certification – Six semester hours. This internship provides students with opportunities to refine and implement the knowledge, skills, and dispositions required of a reading specialist in school and classroom settings. Students will demonstrate their competencies in providing and/or assisting with the implementation of effective, research-based developmental reading and reading intervention instruction, literacy programs at the P-12 grade levels, and professional development activities.

RDG 700 Trends and Issues in Reading/Literacy – Three semester hours. Students will learn about the historical movements (basal readers, whole language, phonics, multicultural influences, etc.) that have affected current practices in reading/literacy research theories and instruction. Various aspects of reading will be traced back to their beginnings.

RDG 701 Assessment in Reading/Literacy – Three semester hours. Political, social, economic, and psychological implications of reading/literacy assessment are explored through examination of the testing movement and of issues that have emerged from the movement.

RDG 702 Quantitative Research Methods in Reading/Literacy – Three semester hours. Students will learn quantitative research methods that are used to investigate reading/literacy. Students will work collaboratively with a faculty member in carrying out a research proposal by formulating questions, designing a study, creating testing instruments and approaches to data analysis.

RDG 703 Qualitative Research Methods in Reading/Literacy – Three semester hours. Students will learn qualitative research methods that are used to investigate reading/literacy. Students will work collaboratively with a faculty member in conducting a research proposal by formulating questions, designing a study, creating testing instruments, and approaches to data analysis.

RDG 704 Curriculum in Reading/Literacy – Three semester hours. Students will investigate research and practice relative to various aspects of reading/literacy such as teaching reading, writing, literature, grammar, usage, and spelling.

RDG 705 Seminar in Reading - Special Topics – Three semester hours. This curriculum is designed to meet the individual interests of students relative to topics in reading/literacy. Individually selected topics will be addressed in an in-depth manner.

RDG 706 Advanced Seminar in Reading/Literacy – Three semester hours. Major topics in reading/literacy will be studied. Emphasis will be placed on analysis, synthesis, and interpretation of original research.

RDG 707 Advanced Clinical Application in Reading/Literacy – Three semester hours.
This course will require the student to gain an in-depth understanding of formal and informal assessments used in diagnosis of reading difficulties. Under close supervision, the graduate student will work with children with serious reading problems by assessing, establishing a program of acceleration, tutoring, and recording and reporting results.

RDG 708: Leadership in School Program Development – Three semester hours. In this course students will examine leadership theory and research, leadership styles, coaching, and methods for affecting change in curriculum and instruction.

RDG 709 Advanced Study in Content Area Reading – Three semester hours. Students will examine the research that identifies the aspects of content area reading, which impact student achievement.

RDG 710 Doctoral Dissertation Research in Reading/Literacy – One, three, or six semester hours. The graduate student will complete a proposal for a detailed research study, conduct the study, and defend the completed dissertation during an oral examination.

Secondary Education

SED 521 English in the Secondary School – Three semester hours. This course will consider objectives of English in the secondary school, content and organization of the English curriculum, and direction of learning in the English program.

SED 522 Secondary School Mathematics – Three semester hours. Literature, research, and content in mathematics, current trends, experimental programs, graduation of subject matter, criteria for program evaluation, and basic issues.

SED 523 Social Science in the Secondary School Curriculum – Three semester hours. The course content, along with related material, will consist of the examination of the basic purposes and objectives of the social studies program in the junior and senior high school and recent trends and developments in the field, selecting and organizing content materials, planning various kinds of learning experiences, and exploring effective ways of teaching and learning democratic citizenship.

SED 524 Science in the Secondary School Program – Three semester hours. For teachers and supervisors of science in the junior and senior high school. Units of subject matter presented through assigned reading, lectures, demonstrations, and discussions will be studied. Students will participate in demonstrations, selected laboratory work, and field trips. There will be a comprehensive examination covering of the content of general science.

SED 527 Guiding Learning in the Secondary School – Three semester hours. Basic principles and techniques of learning as related to the various fields and levels of Secondary Education.

SED 530 The Secondary School Curriculum – Three semester hours. Principles of curriculum construction as they apply to the secondary school and the various subject areas; will be a critical study of recent efforts to combine fields of subject matters.

SED 552 Independent Research – One, two or three semester hours. This course is designed for and restricted to graduate students seeking the master's degree in Secondary Education and/or certification. The content of the course is drawn from current research data. The students have an opportunity to identify and analyze areas of interest, study issues, trends, problems,

procedures, implications, and innovative programs identified in research data. The course cannot be substituted for required courses.

SED 699 Thesis – One, three, or six semester hours.

Please consult the Teacher Service Center for a list of courses approved for the following teaching fields (Approved Program Checklist):

- Agriscience
- Biology
- Business/Marketing Education
- Chemistry
- English Language Arts
- Family and Consumer Sciences
- General Science
- General Social Science
- Mathematics
- Physics
- Technical Education
- Career Technologies

Agriscience Education
See the Department of Agribusiness section of this catalog for descriptions of Agribusiness courses.

Biology
See the Biology program section of this catalog for descriptions of Biology courses.

Business Education

BED 501 Principles of Teaching Business Subjects - Three semester hours. Organization and presentation of appropriate content in instructional strategies for business subjects in secondary schools. Internship experience in a school setting is required.

BED 512 Occupational Analysis - Three semester hours. Techniques for analyzing, describing, and classifying occupations.

BED 514 Internship - Three semester hours. This course includes ten weeks of full-time supervised observation and teaching in a public secondary school. Students will share their experiences and discuss problems during a weekly seminar held on the University campus with the University supervisor for one class hour per week for ten weeks.

BED 515 Management Information Systems - Three semester hours. An awareness of information and systems in the society. Introduces the student to concepts of system approaches to management and relates the management information system to operating systems of an organization.

BED 521 Foundations of Vocational Business Education - Three semester hours. Principles, philosophy, and objectives of vocational business education and the relationship of these factors to curriculum developments, tests and measurements, and guidance.

BED 522 Functions of the Business/Marketing Coordinator - Three semester hours. An evaluation of the history, status, and philosophy of administration and supervision, and the role of coordination in vocational business education at the state and local levels in high schools and colleges.

BED 523 Current Problems in Business Education - Three semester hours. A critical outlook on the administrative, curricular, evaluative, and instructional problems facing business educators at the high school and collegiate levels. The problems examined and evaluated in this course will be discerned from current research and literature in the field of business education.

BED 524 Business and Office Education Programs - Three semester hours. Program planning, organization, and implementation, curriculum construction, and evaluation in business and office education.

BED 526 Improvement of Instruction in General Business Subjects - Three semester hours. Objectives, teaching procedures, instructional materials, and curricular organization of basic business courses.

BED 527 Improvement of Instruction in Information Processing - Three semester hours. A course designed for experienced and prospective teachers of information processing. The course encompasses materials and methods basic to proficiency in information processing, availability of instructional materials, measurement of skills, standards, and achievement.

BED 528 Improvement of Instruction in Office Procedures - Three semester hours. Materials, methods, and organization or instructional materials used in the teaching of office procedures for today's office.

BED 529 Improvement of Instruction in Accounting - Three semester hours. A critical analysis of the instructional materials and methods, standards, research, and evaluative instruments in accounting. Emphasis is placed on computerized accounting.

BED 599 Thesis Writing in Business Education – One, three, or six semester hours. A course in which students enroll when writing a thesis. Students are permitted to write a master's thesis as partial fulfillment of the requirements for the Master of Science Degree. The student who

chooses to write a thesis must complete 15 hours in business education, 10 hours in the required professional courses, 5 hours of approved electives, and the thesis, which must be approved by the advisory committee.

BED 601 Curriculum Construction in Business Education - Three semester hours. Advanced concepts and criteria to be considered in curriculum construction, the method of conducting a curriculum study, and the ongoing process of evaluating the curriculum in business education.

BED 603 Coordination of Vocational Business Education - Three semester hours. Designed to provide a study of problems, materials, methods, history, and current theory and philosophy related to the coordination of vocational business education programs.

BED 604 Advance Applications in Information Processing - Three semester hours. Emphasizes advanced applications in information processing.

BED 606 Research Topics and Methods in Business/ Marketing Education – Three Semester Hours. This course deals with review, analysis, and application of research procedures and data analysis in business education. In addition, this course orients students to basic research procedures for research projects. Students will analyze research problems, synthesize research studies, and develop a proposal for a research study in their field of expertise in business education.

Chemistry

CHE 508 Chemistry in the Secondary School - Three semester hours. Current methodology, research problems, and findings in chemistry as applicable to the secondary school. The student will become familiar with supplementary materials such as American Chemical Society publications (e.g. Chem. Comm., SPICE) as well as use of the Journal of Chemical Education for obtaining useful instructional materials.

CHE 509 Laboratory Methods for Chemistry Teachers - Three semester hours. Emphasis is placed on safety in the laboratory and the design and implementation of chemical experiments for the secondary school laboratory with limited facilities, as well as for the traditional high school chemistry laboratory.

CHE 510 Current Development in Chemistry - Three semester hours. New developments selected from significant advances in chemistry are presented. Course content will vary from year to year with growth and development of the science.

CHE 511 History of Chemical Theory - Three semester hours. History of chemistry from its ancient beginnings up to contemporary experimenters and philosophies. Evidence for selected

theories is critically presented. Topics such as the periods of chemistry, the discovery of the elements, the role of chance in discoveries and historical aspects of fundamental laws are treated.

CHE 512 Energy From Chemistry - Three semester hours. Energy production from fossil fuel as well as nuclear energy and fuel cell technology. Other topics will include alternate energy sources, such as oil shale, battery research for electric vehicles, and other energy-producing facets of chemistry.

CHE 514 Analytical Chemistry For Teachers - Three semester hours. This course is designed for secondary school teachers who have not had a formal course in analytical chemistry. Emphasis will be placed on the basic fundamentals of analytical chemistry to include wet and dry methods as well as modern instrumental techniques.

CHE 515 Laboratory Design for Elementary Teachers - Three semester hours. This course is based on the use of the LESSON (Lawrence Livermore Laboratory Elementary Science Study of Nature) program. This program involves the use of specific inexpensive kit materials to allow experimentation with scientific principles on the elementary school level.

CHE 612 Theory of Nuclear and Radiochemical Techniques - Three semester hours. Introduction to the theory of nuclear and radiochemistry with practical experience with selected exercises, which illustrate fundamental properties of radio nuclides. Topics will include: atomic and nuclear structure, radioactive decay, interaction of radiation with matter and methods for detection of radiation.

CHE 613L Nuclear and Radiochemical Techniques Laboratory - One semester hour. Laboratory to accompany CHE 612. Radiation safety orientation, measurement of half-life, pulse height analyzers, and liquid scintillation counting techniques will be presented.

English Language Arts

ENG 500 Writing for Graduate Students - Three semester hours. This course meets during the regular sessions and during the summer session to help students gain competency in writing. The course cannot be used as credit toward a graduate degree.

ENG 501 History of the English Language - Three semester hours. Growth of the English Language from the Old English period to our time. Special attention is given to Old English and Middle English and those aspects most responsible for the present state of the English language.

ENG 502 Linguistics and Literature - Three semester hours. The close relationship between linguistics and literature. Further, it shows how and understanding of one enhances the study of the other.

ENG 503 Biography - Three semester hours. A study of either the history of biography or specific trends, such as mythical patterns. Emphasis is placed on critical analyses of examples.

ENG 504 Criticism - Three semester hours. A study of literary criticism which may vary from a survey of the history of literary criticism to criticism of a particular genre or period. Practical application of theory is stressed.

ENG 505 The Novel - Three semester hours. A study of selected novels designed to stress historical development of the genre, elements of the novel, or trends of a particular period.

ENG 506 The Essay - Three semester hours. A study of selected essays. The emphasis may vary from a historical study to a study of the categories, argumentation, description, exposition, and narration.

ENG 507 Drama - Three semester hours. A survey of the historical development of drama or concentration on the drama of a particular period. Includes critical analyses and reading plays as literature and/or theatre.

ENG 508 Shakespeare - Three semester hours. A study of at least eight plays with occasional attention to the poems.

ENG 509 Chaucer - Three semester hours. A study of The Canterbury Tales and other major works.

ENG 510 Milton - Three semester hours. A study of Paradise Lost and other major works.

ENG 511 Tennyson - Three semester hours. A study of In Memoriam and other major works.

ENG 512 Sixteenth Century English Literature - Three semester hours. A study of the writers in prose and poetry (exclusive of drama) with major concern given to the theory and practice of lyric and epic poetry, romance, epyllion, and the verse essay.

ENG 513 Eighteenth Century English Literature - Three semester hours. A survey of the major works of Pope, Swift, Johnson, Boswell, Goldsmith, and Burns. Writers of intellectual prose, including Hume, Gibbon, and Burke, are also studied.

ENG 514 Twentieth Century American Literature - Three semester hours. A survey of major figures and movements from Frost to the present. The emphasis varies from poetry to fiction to drama each time the course is offered.

ENG 515 Bibliography - Three semester hours. A study of bibliographical practices with reference to literary history, research, and criticism. This course must be taken by students who wish to write a thesis under the direction of a member of the English Faculty. It must be

completed before the student begins research for a thesis. Students who wish to substitute this course for EDU 503 should petition the Dean of Graduate Studies.

ENG 516 Poetry - Three semester hours. Elements of poetry and intellectual developments as reflected in poetry. This course may be approached as a survey of poetic development or may concentrate on a particular period.

ENG 517 Seventeenth Century English Literature - Three semester hours. Includes a study of essayists, poets, and dramatists from Francis Bacon through John Dryden, with major emphasis on the currents of thought that influenced the literature.

ENG 601 American Literature Before 1900 - Three semester hours. A critical, historical and appreciative study of the English Romantic Movement. Attention is given to Blake, Wordsworth, Coleridge, Scott, Byron, Shelley, Mary Godwin, Mary Shelley, Dorothy Wordsworth, Hazlitt, Lamb and DeQuincy.

ENG 602 Romantic Movement - Three semester hours. A survey of American literature from its beginning through the nineteenth century, concluding with Stephen Crane.

ENG 603 Composition Theory and Rhetoric - Three semester hours. This course emphasizes the study of rhetoric and composition as a means of fostering the development of writing abilities. Theoretical insights and practical approaches in the acquisition of composition skills will be explored. Special attention will be given to the relevant and current pedagogy that will help to provide practical approaches in the teaching of composition.

ENG 604 Shakespearean Tragedy - Three semester hours. A study of one or more early tragedies and five tragedies of 1602-1608, with attention to the most important critical and scholarly approaches.

Family and Consumer Science
See the Family and Consumer Science program section of this catalog for descriptions of Family and Consumer Science courses.

General Science
Students must complete 12 - 15 semester hours of advisor-approved, 500 level Science courses which must include at least two of the following areas: Biology, Chemistry or Physics.

General Social Science

The Department of Behavioral Science offers the following General Social Science courses:

HIS 501 Historiography - Three semester hours. Development of historical thought and history as a discipline. It seeks to provide students with an understanding of the nature of

history by examining the evolution of historical studies and the trends in historical thought.

HIS 509 Afro-American History - Three semester hours. A survey course of Afro-American history which emphasizes the Afro-American experience in modern American history. Post-Reconstruction is the essential background for turn of the century developments and those events that have determined the present role of Afro-Americans in society and the world.

HIS 510 Foundations of American Civilization - Three semester hours. A detailed analysis of the origin and development of American democracy, including economic and social institutions.

HIS 512 History of the South - Three semester hours. A reappraisal of the Old South and the Civil War and Reconstruction Period with special emphasis on the political, economic, and social problems of the New South.

HIS 513 Constitutional History of the United States - Three semester hours. A reappraisal of the formation of the United States Constitution and its operation in the early years, with special emphasis on recent interpretations by the United States Supreme Court covering current political, economic, and social problems.

HIS 514 Contemporary American History - Three semester hours. Specific considerations of the problems of the United States as a great world power, and the major political, economic, and social internal problems.

HIS 520 Contemporary European History - Three semester hours. A detailed study of the current forces of nationalism, regionalism, and internationalism operating within Europe, including Europe's use of these factors in relation to the rest of the world.

HIS 521 Modern Asia - Three semester hours. The emergence of new independent nations of the Far East, Middle East, and Near East will be analyzed as to their formation, development, and current problems, both foreign and domestic.

HIS 522 African History - A survey course which places special emphasis on modern Africa and seeks to understand the forces that have shaped African societies and are playing an important role in African history today.

HIS 523 Latin American History - A survey course which places special emphasis on modern Latin America and seeks to understand the forces that have shaped Latin American societies and are playing an important role in Latin American history today, including the Caribbean.

HIS 525 Philosophy of History - Three semester hours. A study of the principles of historical interpretation through an analysis of the major speculative theories of history and of the major critical issues in the field. Religious, secular, and scientific approaches to historical interpretation will be considered, including but not limited to, those of Augustine, Vico, Kant, Hegel, Herden,

Ranke, Ricbert, Dilthey, Collingwood, Spengler, Toynbee, Sorokin, Huxley, and Chardin. (Prerequisite: HIS 501)

HIS 609 Selected Topics in Afro-American History - Three semester hours. This course is designed to introduce students to some of the main topics growing out of the Afro-American experience. Although the Afro-American experience is part of the general history of America, this course places emphasis on those events that helped shape the African's experience in America. The topics discussed and analyzed, for the most part, are those that have reference to situations or issues posing unique and interesting problems, questions, or perspectives during major periods of Afro-American history.

HIS 614 Selected Topics in 20th Century U.S. History - Three semester hours. Each semester this course will focus on one major topic of 20th Century U.S. History, which will be examined in depth, both the necessary background and, particularly, the nature of the issue and its current developments.

HIS 615 Modern World History - Three semester hours. Background and significance of selected topics in twentieth century world history (e.g., the emergence of Africa, the crisis in the Middle East, developments in Southern Africa, etc.).

HIS 698 Individual Research in History - Three semester hours. Independent reading or research directed by assigned faculty involving a survey of existing research on a given topic, an area of interest to the student or a report on the early stages of work on a thesis.

GEO 503 Geography of Asia - Three semester hours. Physiographic and political divisions of Asia and the development of present cultural activities in each region. Reference is made to national and international problems in relation to the present world order.

GEO 505 Cartography for Elementary and Secondary Schools - Three semester hours. Principles of map construction and interpretations as related to the teaching of the Social Science in elementary and secondary schools. Problems of scale, projection, symbolization, and map reproduction are considered.

PSC 502 International Relations - Three semester hours. An evaluation of all types of international organizations and critical analysis of the foreign policies of the major nations and their relationship with each other. Particular attention will be given to the emerging nations of Africa and Asia.

PSC 511 American Political Thought - Three semester hours. American political thought from colonial Puritanism to the present, including the philosophies of John Cotton, Roger Williams, Thomas Paine, Jefferson, Hamilton, Garrison, Calhoun, Wilson, the Roosevelts, etc.

PSC 610 Contemporary Problems in American Government - Three semester hours. An inquiry into the nature of recently emergent sociopolitical phenomena and the fashion in which they impact the political process in the United States. Problems relative to the functioning of traditional political institutions and processes, the advent of unconventional modes of political activity, and the increased importance of international affairs as a constraint on political decision making, will be principal points of emphasis.

PSC 698 Individual Research in Political Science - Three semester hours. Independent reading or research directed by assigned faculty involving a survey of existing research on a given topic, an area of interest to the student, or a report on the early stages of work on a thesis.

Mathematics

MTH 501 Mathematics Seminar I - One semester hour. Investigation and discussion of problems related to mathematics instruction and/or special topics in mathematics.

MTH 504 A Survey of Higher Mathematics - Three semester hours. Concepts of sets, logic, probability, abstract algebra, and elementary function theory.

MTH 505 Selected Topics in Calculus and Analytic Geometry - Three semester hours. Principal ideas and techniques of calculus and analytic geometry from a contemporary point of view.

MTH 506 Computers and the Teaching of Mathematics - Three semester hours. A brief overview of basic concepts in computer science; mathematics materials for computers and computing; laboratory practice in programming mathematical curriculum materials.

MTH 507 Abstract Algebra - Three semester hours. Elementary theory of groups, rings, fields, vector spaces, and linear transformations. (Prerequisite: MTH 504 or Consent of Instructor)

MTH 508 Linear Algebra - Three semester hours. Systems of linear equations, vector spaces, matrices, linear transformations, change of basis, determinants, characteristic roots and vectors. (Prerequisites: MTH 504, MTH 507 or Consent of Instructor)

MTH 525 Computer Theory and Programming - Three semester hours. Advanced concepts in computer science; mathematics materials for computers and computing; and laboratory practice in programming mathematical curriculum materials.

MTH 533 Foundations of Geometry - Three semester hours. Euclidean geometry, non-Euclidean geometry, analytic geometry, finite geometry, and similarity in Euclidean space.

MTH 552 Analysis I - Three semester hours. Functions, sequences, limits, continuity, uniform continuity, derivatives, intermediate value theorem. (Prerequisite: MTH 505 or Consent of Instructor)

MTH 553 Analysis II - Three semester hours. Integration, bounded variation, series, convergences, elementary functions, and sequences and series of functions. (Prerequisite: MTH 552)

MTH 620 Topology - Three semester hours. The topology of the real line; Euclidean, metric, and topological spaces; connectedness; compactness; and continuity. (Prerequisite: MTH 552 or Consent of Instructor)

MTH 651 Mathematical Logic - Three semester hours. Principles of logic and the elementary structure of mathematics; connectives and quantifiers, sets and relations; negation; inductive and deductive reasoning. (Prerequisite: MTH 504 or Consent of Instructor)

MTH 665 Theory of Numbers - Three semester hours. Divisibility, congruencies, residues, Diophantine analysis, sieve methods, and geometry of numbers. (Prerequisite: MTH 507 or Consent of Instructor)

MTH 673 Probability and Statistical Analysis - Three semester hours. Algebra of sets; empirical frequency distributions; combinatorics; mathematical expectation; discrete and continuous probability distributions; probability densities; hypothesis testing; and estimation. (Prerequisite: MTH 504 or Consent of Instructor)

MTH 681 Mathematics Seminar II - One semester hour. A study, by seminar method, of additional topics in mathematics from the history of mathematics, algebra, linear algebra, geometry, or analysis.

MTH 682 Mathematics Seminar III - One semester hour. A study, using research methods, of current topics in mathematics and/or mathematics education.

Physics
See the Physics program section of this catalog for descriptions of Physics courses.

Technical Education
See the Technical Education program section of this catalog for descriptions of Technical Education courses.

Career Technologies Education
See the Career Technologies program section of this catalog for descriptions of Career Technologies courses.

DEPARTMENT OF ELEMENTARY AND EARLY CHILDHOOD EDUCATION

Dr. Rena N. Lott, Chairperson
222 Carver Complex North
(256) 372-5505

MISSION

The Department of Elementary and Early Childhood Education offers coursework and field experiences leading to the Master in Education with teacher certification (Class A and Class A "Alternative") in Early Childhood Education (P-3) and Elementary Education (K-6). The Department also offers coursework and research opportunities for the Educational Specialist (Ed.S.) degree in Early Childhood Education and Elementary Education with Class AA teacher certification.

EARLY CHILDHOOD AND ELEMENTARY EDUCATION

ECE 503 Learning Styles – Three semester hours. This course takes an in-depth look at the personal and behavioral characteristics of an individual which can be identified as learning styles.

ECE 504 Problems in Improving Reading – Three semester hours. Investigations of the practices and trends in the teaching of reading materials of instruction in reading, particularly remedial materials; techniques and materials for prevention of reading difficulties; and diagnosis and remediation of reading difficulties.

ECE 505 Problems in Improving Mathematics Skills – Three semester hours. This course presents materials, teaching, and teaching procedures for the improvement of learning in the new mathematics. The study of current problems affecting children's development of number concepts and skills will be addressed.

ECE 507 Children's Literature – Three semester hours. Consideration will be given to locating and evaluating children's books and to the method of organizing, teaching, and evaluating a literature program for children. The philosophy of the selection and study of literature, emphasizing appropriate content, good style, and suitability of various age groups are examined. Extensive reading and sharing of children's literature are required.

ECE 509 Trends and Issues in Social Studies – Three semester hours. A detailed consideration of problems concerned with selection of what to teach; the grade placement of content, methods, and materials of teaching; and means of evaluating achievements in social studies with particular attention given to recent trends.

ECE 510 Improving Science Teaching – Three semester hours. In this course, investigations and evaluations will be made of instructional methods designed to challenge pupils at each level of their elementary science and health program. The course will include such topics as the earth and universe, living things, matter and energy, magnetism and electricity, nutrition, hygiene, and other personal health components.

ECE 512 Investigation of Language Arts – Three semester hours. The course is a study of the total language arts program. Emphasis is on understanding the language processes, literacy development, and the interrelatedness of communication competencies—listening, speaking, reading/writing current research, goals, trends, issues, instructional strategies, programs, materials, and assessment/evaluation techniques are examined. Class sessions are designed to be interactive with class members giving demonstrations that involve fellow classmates in hands-on participation and active discussion.

ECE 514 Basic Skills – Three semester hours. This course is a critical evaluation of recent developments in the teaching of basic skills in the elementary school.

ECE 518 Environmental Education Across the Curriculum – Three semester hours. This course is designed to assist educators in improving their teaching of kindergarten through eighth grade levels, specifically as it relates to environmental education. Goals, objectives and teaching strategies associated with environmental education will be reviewed in keeping with the characteristic needs of learners at specific age levels. Emphasis will be placed on the interrelatedness of environmental education with traditional curriculum content areas, especially science. Participants also will explore practical applications of environmental education philosophies. The course incorporates "hands-on" habitat studies, inquiry-based learning, nationally acclaimed environmental education programs and a residential component stressing cooperative learning.

ECE 520 Foundations of Teaching Reading – Three semester hours. A fundamental course designed to establish a foundation of the essential reading skills that can be used effectively by pre-service teachers. This course focuses on teaching reading to a diverse population of elementary students using a variety of approaches.

ECE 521 Research in Elementary/Early Childhood Education – Three semester hours. This course is concerned with Reviewing the Literature around a topic of interest of the candidate, according to the latest APA Manual. This course makes it possible for a candidate to pursue an area of special interest and develop an understanding of how to study a topic in-depth. This research is done under the supervision of the instructor, and may culminate with an examination based on the content of the research.

ECE 602 Theoretical Foundations of Early Childhood Education – Three semester hours. This course traces the story of elementary and early childhood education. Candidates evaluate the theoretical basis for P-6 programs through research, readings, and class discussions.

ECE 603 Field Research – Three semester hours. This course is designed for Educational Specialist degree candidates in early childhood or elementary education for the purpose of developing research skills. Projects will involve models that draw upon teachers' own questions, knowledge, and concerns as a basis for exploration and action. Candidates will develop an understanding of research that is designed to both inform and support teachers' engagement in classroom issues. Candidates will identify an area of interest and move from conception of a field-based research topic to an analytic framework for analyzing data. All candidates will submit a substantial written research report that includes a thorough review of the scientific literature. Presentation of an informal oral report is required. Permission of the Chair of the Reading Program is required for candidates to receive credit for reading/literacy research.

ECE 612 Advanced Instructional Strategies for Young Children – Three semester hours. This course presents and explores a scientific approach to classroom instruction. It is designed to foster the development of a personal philosophy of teaching which will serve as a guide for action in all phases of traditional and innovative instruction and will involve strategies for analysis of teaching, individualized instruction, and mode of evaluation of learning.

ECE 625 Trends in Teaching Social Studies in Elementary Schools – Three semester hours. This course is concerned with a detailed consideration of problems concerned with selection of what to teach, the grade placement of content, methods, and materials of teaching, current research, and means of evaluating achievements in social studies with particular attention given to recent trends.

ECE 671 Advanced Research in Elementary and Early Childhood – Three semester hours. This course is concerned with guiding the candidate in the development of the first three chapters in the thesis, according to the latest APA Manual. This course makes it possible for a candidate to pursue an area of special interest and develop the foundation of a thesis completing the first three chapters (a thesis is directed by a major advisor who may choose not to use the three chapters developed in this course in the completion of the candidate's actual thesis). This study is done under the supervision of the instructor, and may culminate with an examination based on the content.

EARLY CHILDHOOD EDUCATION

ECH 502 Workshop in Early Childhood Education – Three semester hours. This course is designed to allow graduate candidates the opportunity to study or work on topics or projects of collective concern. Topics vary.

ECH 506 Curriculum Design – Three semester hours. Curriculum design in light of the latest understandings and needs in early childhood education with some experience in the implementation of certain aspects of the curriculum in laboratory school P-3.

ECH 516 Multi-Sensory Approaches – Three semester hours. The development of the sensory avenues and the concomitant processes in infancy and childhood, including concept information, development of these processes, and evaluating process are given consideration. Practical experiences identifying learning disabilities.

ECH 517 Theory, Methods and Materials in Early Childhood Education – Three semester hours. The philosophies and methods extant in early childhood education, their purposes and efficacy, including a look at special education and its involvement in the mainstream of education. It will include laboratory observation and participation.

ECH 595 Internship in Early Childhood Education – Six semester hours. This course is an intensive 14-week, full-time supervised internship in a public school. Weekly on-campus seminars are a required part of the course.

ECH 602 Strategies of Parent Involvement – Three semester hours. The importance and optimal role of parent involvement factors in the being and becoming of the child and adolescent through the various stages of the metamorphosis to maturity and beyond. The method will be competency-based and permit selection of a particular stage in the role of parent involvement for concentration at any given age and stage of human development by each of the class members, while at the same time pursuing a comprehensive knowledge of the role of parenting at all stages, with an emphasis on optimal strategies for involvement. The student will be required to demonstrate the ability to prescribe strategies for parent involvement at each stage of the child/adolescent development.

ECH 698 Thesis I – Three semester hours. Candidates will complete the proposed thesis.

ECH 699 Thesis II – Three semester hours. Candidates will complete the thesis.

ECH 602 Strategies of Parent Involvement – Three semester hours. The importance and optimal role of parent involvement factors in the being and becoming of the child and adolescent through the various stages to the maturity and beyond. The course will focus on parent involvement for concentration at any given age and stage of human of the metamorphosis to maturity and beyond. The method will be competency-based and permit selection of a particular stage in the role of parent involvement for concentration at any given age and stage of human development by each of the class members, while at the same time pursuing a comprehensive knowledge of the role of parenting at all stages, with an emphasis on optimal strategies for involvement. The student will be required to demonstrate the ability to prescribe strategies for parent involvement at each stage of the child/adolescent development.

In addition to other deficiencies, candidates seeking the Alternative Master's in Early Childhood Education (P-3) must complete the following undergraduate teaching field courses: ECE 304, ECE 305, ECH 300, ECH 405 and PSY 403. A state-required practicum is offered all day on

Wednesday when enrolled in undergraduate materials and methods courses ECE 304 and ECE 305 (Note: School of Education Policy prohibits the transferring in of materials and methods courses taken at other institutions). Early Childhood Education Alternative Master's candidates seeking the additional endorsement in Elementary Education must complete the following graduate courses: ELE 509 and ELE 519.

ELEMENTARY EDUCATION

ELE 509 Evaluation in Elementary Schools – Three semester hours. This course is designed to develop candidates' understanding of the principles and procedures of evaluation in elementary classroom settings. Both formal and informal methods of evaluation will be emphasized, including designing and constructing criterion-referenced tests, analyzing and interpreting results of norm-referenced tests, as well as developing portfolios, rubrics, checklists, and other performance assessments. National standards and the evaluation of personnel, programs, and curricula will be included in this course.

ELE 511 Workshop in Elementary Schools – Three semester hours. This course is designed to allow graduate candidates the opportunity to study or work on topics or projects of collective concern. Topics vary.

ELE 519 Elementary School Curriculum – Three semester hours. The course is designed to help students develop or extend their knowledge base regarding curricular and instructional concepts, designs, problems, and variables. Students will study the historical, psychological, philosophical and social foundations of the elementary school curriculum. The course will focus on characteristics of children/learners, curriculum designs, strategies for learning, and content areas in the elementary school.

ELE 595 Internship in Elementary Education – Six semester hours. This course is an intensive 14-week, full-time supervised internship in a public school. Weekly on-campus seminars are a required part of the course.

ELE 614 Teaching Strategies for the Affective Dimension of Reading – Three semester hours. The content of the course is centered around teaching strategies that motivate children to seek self-actualization through pleasure and knowledge acquired from reading. Techniques of bibliography and children's literature related to the affective domain are included.

ELE 698 Thesis I – Three semester hours. Candidates will complete the proposed thesis.

ELE 699 Thesis II – Three semester hours. Candidates will complete the thesis.

In addition to other deficiencies, candidates seeking the Alternative Master's in Elementary Education (K-6) must complete the following undergraduate teaching field courses: ECE 304,

ECE 305, ECE 407, ELE 300, and PSY 403. A state-required practicum is offered all day on Wednesday when enrolled in undergraduate materials and methods courses ECE 304, ECE 305 and ECE 407 (Note: School of Education Policy prohibits the transferring in of materials and methods courses taken at other institutions). Elementary Education Alternative Master's candidates seeking the additional endorsement in Early Childhood Education must complete the following graduate courses: ECH 506 and ECH 516.

DEPARTMENT OF FINE ARTS

Dr. Horace Carney, Chairperson
102 Morrison Building

MISSION

The Department of Fine Arts offers coursework and field experiences leading to the Master of Science in Education with teacher certification (Class A and A "Alternative") in Art Education and Music Education.

THE ART PROGRAM

ART 500 History and Philosophy of Art Education – Three semester hours. The historic and philosophical development of art education in public schools and the role of art in education is examined.

ART 501-511 Advanced Drawing – Three semester hours. Continued study in drawing for advanced students, students who have fulfilled basic drawing requirements. Prerequisite: One undergraduate course in drawing.

ART 502-512 Advanced Painting – Three semester hours. Continued study in painting for advanced students; advanced work in painting media will include traditional oil, tempera, acrylic, and mixed media techniques. Also, collage, assemblage, shaped canvasses, and more contemporary approaches. Exploration in multimedia and creative manipulation of imagery is investigated. Prerequisite: One undergraduate course in painting.

ART 503-513 Advanced Sculpture – Three semester hours. Continued study in sculpture for advanced students. Prerequisite: One undergraduate course in sculpture.

ART 504-514 Advanced Printmaking – Three semester hours. Continued study in lithography, intaglio, or relief printing. Prerequisite: One undergraduate course in desired area.

ART 505-515 Advanced Ceramics – Three semester hours. Continued study in ceramics for advanced students. Prerequisite: One undergraduate course in ceramics.

ART 506-516 Advanced Fibers – Three semester hours. The advanced course in fibers emphasizes personal development of skills and techniques, which exceed basic course requirements. The student may elect a loom or non-loom emphasis with concentration in one area or several related areas; macramé, basketry, batik, tie-dying, weaving.
ART 507-517 Advanced Photography – Three semester hours. Continued study in photography for advanced students. Prerequisite: One undergraduate course in photography.167

ART 508-518 Advanced Jewelry – Three semester hours. Continued study in jewelry for advanced students. Prerequisite: One undergraduate course in jewelry.

ART 520 Art Survey – Three semester hours. Examination of modern and contemporary art styles, movements, and techniques via trips to museums and galleries, visiting artists, lectures, and slide presentations.

ART 522 Origins of Modern Art – Three semester hours. A survey of the history of painting and sculpture from the mid-nineteenth century and its influence on twentieth century and contemporary art. Analysis will include the major artists, beginning with the Impressionists and continuing through contemporary conceptual installation art.

ART 524 African-American Art – Three semester hours. The study of major events, personalities, and influences germane to the creation of art by blacks in America, including visual slave themes. Pan-African Art, "Black Art", and blacks in mainstream art.

ART 526 Research in Art History – Three semester hours. Intensive study of selected periods, personalities, styles, and other characteristics considered important in world art history, as well as an examination of bibliographical, photographic, archival, and iconographical materials used in the study of art, and methodological approaches for historical analysis.

ART 528 Primitive Art - Three semester hours. An examination of the social and cultural qualities demonstrated in the art of various preliterate cultures throughout the world.

ART 532 Teaching and Supervision of Art in the Public Schools and Practicum – Three semester hours. Problems, issues, and procedures of art teaching and supervision in the elementary school and junior and senior high schools; art in life of school and community; development of programs and procedures; problems in selecting, organizing, teaching, and evaluating art activities; practicum.

ART 534 Art in Childhood Education – Three semester hours. Readings for and planning the analysis and development of art programs for children in preschools, elementary schools, and other community agencies.

ART 538 Workshop – Curriculum Development in Art Education – Three semester hours. Provides the art teacher an opportunity to explore innovative studio approaches and teaching strategies in a workshop setting with public school students. Reading, discussion, studio exploration, and actual teaching experience are facets explored. Prerequisite: One year teaching experience.

ART 552 Independent Study - Three semester hours. This course shall be available to all graduate art students who desire to continue work in any given area beyond the regular class offerings. Prior consent of the instructor is required.168

ART 595 Internship in Art Education - Six semester hours. This course consists of fourteen weeks of full-time teaching under the immediate direction of supervising teachers in an off-campus public or approved private school. Candidates share their experiences, discuss problems, and develop new techniques in a professional seminar for the duration of the teaching experience. The weekly seminar is required. Prerequisite: Art Program approval

THE MUSIC PROGRAM

Morrison Building, First Floor

MISSION

The mission of the graduate program in music education is to produce more effective music educators. This mission is accomplished by enhancing and expanding the knowledge, skills and teaching techniques gained during the undergraduate course of study. Students are provided with higher lever professional education studies as well as more in-depth study into the practical matters of administering a music education program.

OBJECTIVES

2. To develop an ability to articulate and communicate the goals of the music education program to pupils, colleagues, administrators and parents in an effective and professionally responsible manner.
3. To develop an awareness of contending aesthetic critical philosophies of music education and their development, both historical and contemporary.
4. To develop knowledge of various teaching-learning theories and their application to music at all levels.
5. To develop an ability to gather, correlate, interpret and implement research data in music education.
6. To enhance the pedagogical and performance skills of the student through the study of pedagogical techniques, theory skills and music history.
7. To expand professional knowledge and techniques for organizing and administering a music education program.
8. To acquaint students with available technology for music learning and research.

ADMISSION REQUIREMENTS

The Music Program may accept applicants who already hold a bachelor's degree and a teacher's certificate and those who hold bachelor's degrees in music areas other than music education. An applicant to the Music Education program in Music Education must do the following:

1. Present an official college transcript to the Graduate Office and a copy to the Music Program Office.
2. Produce documentation of a teaching certificate in music education.

3. Persons who do not hold a bachelor's degree in music and are seriously interested in pursuing a master's degree in music education may also apply; however, a consultation visit with the Music Program coordinator prior to the application is suggested.

** **Persons who hold a teacher's certificate must pursue the Class A Program from the state of Alabama approved checklist without an internship. Persons who do not have a teacher's certificate will follow the Alternative Masters Program check list., which includes an internship.**

DEGREE REQUIREMENTS

The master's program in Music Education is structured to maximize a student's talents and learning abilities in music education, theory, history and pedagogy. Students must successfully complete, with cumulative grades of "B" or better, 33-36 hours in music course work and 18 hours in relevant education courses. A Planned Degree Program is to be completed and submitted to the Graduate Office by the student and advisor in the first semester of study.

COURSE OFFERINGS

Music Education

MUS 517 Conducting – Two semester hours. A review of basic conducting coupled with a study of advanced techniques for choral and instrumental ensembles.

MUS 520 History and Philosophy of Music Education - Three semester hours. A study of the historical development of music education in the United States, and the philosophies that encouraged music education's growth.

MUS 530 K-12 Music Curriculum – Three semester hours. A course in the development and implementation of the music education curriculum.

MUS 543 – Advanced Keyboard Techniques – Three semester hours. This course is designed to improve technical proficiency, pedagogical skill and strategies for accompanying on keyboard instruments, acoustic and electric.

MUS 553 Advanced Vocal Diction – Two semester hours. A survey course dealing with the pronunciation and enunciation of English, Italian, French, German, Latin and Afro-American Dialects.

MUS 554 Advanced Vocal Diction – Two semester hours. A survey course dealing with the pronunciation and enunciation of English, Italian, French, German, Latin and Afro-American Dialects.

MUS 563 Advanced Woodwind Brass Techniques – Three semester hours.

MUS 573 Advanced Woodwind Techniques – Three semester hours.

MUS 583 Advanced Percussion Techniques – Three semester hours

MUS 593 Advanced String Techniques – Three semester hours. Each of these courses is designed to instruct and strengthen instrumental teachers in performance, pedagogical skills, acoustics and literature.

MUS 610 Survey of Music Theory – Three semester hours. A review of harmony and concepts of form with a goal toward analysis, improving aural skills in the classroom and arranging.

MUS 611 Analytical Techniques – Three semester hours. An intensive examination of how musical elements and concepts of sonata form are used in Classical and Romantic compositions. (Prerequisite: MUS 610)

MUS 612 Analytical Techniques – Three Semester hours. An intensive examination of how musical elements and concepts of sonata form are used in Classical and Romantic compositions. (Prerequisite: MUS 610)

MUS 620 Survey of Music History – Three semester hours. A general survey of the History of music from antiquity to the present.

MUS 621 History of Musical Styles – Three semester hours. An in-depth examination of music from 1600 to 1860. (Prerequisite: MUS 620)

APPLIED MUSIC – One semester hour each. Technique and literature stressed in accordance with the student's ability.

MUS 533-534 - One hour VIOLIN

MUS 535-536 - One hour VIOLA

MUS 537-538 - One hour CELLO

MUS 539-540 - One hour DOUBLE BASS

MUS 541–542 - One hour PIANO

MUS 551-552 - One hour VOICE

MUS 545-546 - One hour FLUTE

MUS 547-548 - One hour OBOE

MUS 547-548 - One hour SAXOPHONE

MUS 571-572 - One hour CLARINET

MUS559-560 - One hour FRENCH HORN

MUS 561-562 - One hour TRUMPET

MUS 583-584 - One hour TUBA

MUS 589-590 -One hour TROMBONE

MUS 581-582 - One hour PERCUSSION

DEPARTMENT OF HEALTH, PHYSICAL EDUCATION AND RECREATION

Dr. Kay Hamilton, Interim Chairperson
8 Elmore Health Science Building

MISSION

The Department of Health, Physical Education, and Recreation offers coursework and field experiences leading to the Master of Science in Education with teacher certification (Class A and A "Alternative") in Physical Education.

PHYSICAL EDUCATION

PED 501 Sociology of Sport and Physical Education – Three semester hours. This course is a comprehensive study in the fields of physical education with special emphasis on current issues, trends and problems. Students will also be provided with a broad perspective on the economic, political, and social aspects of sports in the western hemisphere. Prerequisite: none.

PED 502 Fitness/Research Application and Evaluation – Three semester hours. Investigation and comparative analysis of the latest research in contemporary areas of education such as competency based education, school-based management, fitness and wellness concepts and total quality education.

PED 503 Advanced Exercise Physiology – Three semester hours. In-depth background regarding the physiological effects of physical activity on the human body. This course represents a contingency-based approach to developing additional background information and skills specific to application, analysis, synthesis and evaluation levels of learning as required by the graduate program in physical education.

PED 504 Curriculum and Instruction in Physical Education – Three semester hours. Designed to assist with the development of specific analytical skills using various instructional constructs. The dynamics of curriculum building, formulation of a plan of evaluation and how to differentiate its components are discussed in detail.

PED 505 Procedures – Three semester hours. Develop specific skills in the total approach to self-appraisal and student success. In addition, the student is required to research the following topics and their interrelatedness: content, analysis, test-item analysis, test-banks, behavioral accountability, evaluation and computer-based instructions, mastery learning and personalized systems of instruction. Special seminars are included.

PED 506 Evaluation and Measurement in Physical Education & Sport – Three semester hours. This course is designed to enhance students understanding and ability to apply strategies used in evaluation and measurement of performance in physical education and exercise science. Emphasis will be placed on strategies appropriate for gathering data for research and assessment purposes.

PED 507 Management in Physical Education and Athletic Programs - Three semester hours. The purpose of this course is to promote the development of skills in planning, organizing, budgeting, supervision, evaluation and other essential management functions. Strategies for purchasing and managing equipment and facilities, maintaining a legal environment and developing effective lines of communication will also be examined.

PED 508 Psychomotor Foundations of Sport – Three semester hours. The course includes an overview of the relationships between psychological factors and motor performance; research methods associated with motor behavior and sport psychology; and review of the literature and current issues regarding the psychomotor variables related to sports participation and competitive athletics.

PED 509 Coaching Theory and Techniques – Three semesters hours. The course is designed to expose the student to new and/or different techniques, theories and philosophies of coaching. It includes an in depth examination of the philosophies factors that impact individuals and their performance in the athletic setting. The student will develop intervention strategies, techniques and skills to enhance their physiological effectiveness in the athletic domain.

PED 512 Advanced Biomechanics – Three semester hours. This course was designed to provide the student with a generalized, qualitative approach to mechanical kinesiology or biomechanics. This course will follow a systematic program to enable the student to build a foundation for understanding the science of motion.

PED 595 Internship in Physical Education - Six semester hours. This course is an intensive fourteen (14) week, full-time supervised internship in a public school. Weekly on-campus seminars are an integral part of the course.

PED 598 Research in Physical Education and Sport– Three semester hours. Designed to provide the student with opportunities involving the use of scholarly and scientific inquiry. Topics may be selected from various interdisciplinary areas assigned to teach education and more specifically, physical education

DEPARTMENT OF PSYCHOLOGY, COUNSELING, SPECIAL EDUCATION AND COMMUNICATIVE SCIENCES & DISORDERS

Communicative Sciences & Disorders- MS

Mission

The purpose of the Communicative Sciences and Disorders (CSD) Program is to provide an education and scholarly environment in which undergraduate and graduate students receive quality academic training and professional experience in the field of Speech-Language Pathology. The Program functions within a student-centered environment devoted to learning, research, scholarship, creativity, professional expertise and personal development designed to ensure that students are ethical, knowledgeable, skillful and capable of working independently and in collaboration with clients, families and other professionals. The commitment of the CSD Program to the University's mission is reflected in the undergraduate and graduate academic course work in normal and abnormal development and behavior across the human life span; in course work that engenders awareness of issues in culturally diverse populations, in human communication disorders, in diagnostic and treatment methodologies, in clinical practica requirements and in technology-integrated course work teaching independent research skills that support lifelong learning.

Program Description

The Program offers the Master of Science degree in Communication Sciences and Disorders, and is nationally accredited by the Council on Academic Accreditation (CAA) of the American Speech-Language-Hearing Association (ASHA). AAMU is one of only eight Historically Black Institutions which offers a nationally accredited program in speech-language pathology.

The field of Speech-Language Pathology involves the identification, assessment and treatment of a wide variety of communication disorders (congenital, developmental, and acquired) in both children and adults. Such disorders may include phonological (articulation), language, voice, fluency (stuttering) and hearing problems. Speech-Language Pathologists also participate in the assessment and management of clients with swallowing difficulties. Speech-Language Pathologists work in a variety of locations including hospitals, schools, rehabilitation centers, community health centers, universities, skilled care facilities, and in private practice.

The wide varieties of disorders and treatment approaches pertinent to our field require a working knowledge of neuroanatomy, behavioral science, speech/language development, effective teaching strategies, methods for motivating people, and excellent communication skills. Therapists with a bachelor's degree can perform important duties in some settings, but a master's degree is essential for achieving professional independence, and some duties demand a doctoral degree.

This degree program contains both academic and clinical components. It is a two year program

if students have an undergraduate degree in CSD, and a three year program if the undergraduate degree is in another area.

Our graduate students and senior level undergraduate students gain experiences providing speech and hearing services in the campus-based AAMU Speech and Hearing Clinic and in externship sites across the state. The AAMU Clinic is a teaching clinic and has been serving the public since the late 1960s. Students complete a minimum of 400 clinical clock hours supervised by ASHA certified, Alabama licensed faculty members and external supervisors. Our clinic serves clients of all ages from within the community as well as the University campus

Objectives

Alabama A&M University's master's degree program in Communicative Sciences and Disorders has as its primary objective the education of highly competent speech-language pathologists who are capable of interacting in a variety of employment settings such as hospitals, clinics, public schools, rehabilitation centers, private practice, nursing facilities, or special centers/schools. The second objective is to provide training which allows persons with varying backgrounds to become fully qualified to apply for national certification through the American Speech-Language-Hearing Association (ASHA), for state licensure through the Alabama Board of Examiners in Speech-Language Pathology and Audiology (ABESPA) and for the alternative teaching certificate through the Alabama State Department of Education (ASDE). Individuals applying for teaching certification must take and pass the Alabama Prospective Teacher Test (APTT) Basic Skills Assessment. The third objective of the program is to increase the representation of ASHA certified minority speech-language pathologists.

Application for Admission and Notification of Admission

Selected applicants are admitted to the Program in the fall and spring semesters of the academic year for which they apply. Because the CSD Program is limited in its graduate enrollment, applications are reviewed carefully to assign priority to the most qualified students. It should be noted that not every student whose credentials meet stated quantitative standards will be admitted.

Application Deadlines (NOTE: CSD deadlines are different than the published Graduate School deadlines)

Fall - April 15

Spring - October 15

Selected applicants are admitted to the Program in the fall and spring semesters of the academic year for which they apply. To ensure that each application receives an unbiased, unhurried assessment, complete application packages for the Program must be received in the Office of Graduate Studies, Alabama A&M University, P.O. Box 998, Normal, Alabama 35762, no later than April 15th (for the following fall admission) and October 15th (for the following spring admission).

Notification of the decision for admission to the CSD Program will be sent to the applicant by the School of Graduate Studies no later than June 1st for fall admission and December 15th for spring admission. Two forms of notification are possible:

1. The applicant is admitted to the CSD Program.
2. The applicant is not selected for admission.

The successful applicant will notify the School of Graduate Studies and the CSD Program faculty, in writing, that the applicant accepts or rejects the position in the program within 30 days of date of notification. Those not selected for admission may apply again for future consideration.

If there are other questions concerning graduate admissions to the CSD Program please contact Dr. Jennifer H. Vinson, Program Director, P.O. Box 357, Normal, Alabama 35762 or call (256) 372-4035.

Requirements for Admission

Students **must** first meet all requirements for admission to the School of Graduate Studies **plus** the following criteria:

1. An undergraduate grade point average (GPA) of 3.0 or better (on a 4.0 grading scale).
2. Graduate Records Examination (GRE) minimum score of 400 on the Verbal portion and 400 on the Quantitative portion is required.
3. Transcripts of all undergraduate work attempted, including junior colleges and community colleges
4. Three letters of recommendation (on departmental or institutional letterhead, preferably from your undergraduate professors)
5. A letter, typed by the applicant, expressing a *Statement of Professional Goals and Objectives* (No specific format required at this time)
6. Prospective graduate students applying whose first language is not English require a minimum score on the Test of English as a Foreign Language (TOEFL) of 600 (paper- based), 250 (computer-based), or 100 (Internet-based) within two years prior to application. The TOEFL scores must be on file in the Graduate School **prior** to receipt of the application for graduate study.

Note: only completed packages will be reviewed.

Upon admission to the CSD program, decisions on clinical/academic performance and possible termination of students from the program will be based on factors such as course grades, demonstrated clinical competence, and personality/disposition factors.

Degree Requirements

The Communicative Sciences and Disorders degree is a 57-63 semester hour program for students holding a bachelor level degree in speech-language pathology, and an 87-93 semester hour program for students holding a bachelor level degree in an area other than speech-language pathology. Students are required to enroll in CSD 516 Advanced Clinical Practicum every semester of enrollment until all required clinical clock hours are completed in order to meet the current ASHA certification requirements. Students will not be permitted to graduate until all clinical clock hours are completed.

Each student's program is planned with the guidance of, and in consultation with, a departmental advisor in the area of Communicative Sciences and Disorders. The Program does not take responsibility for courses taken without program advisement and approval. A copy of the program of study can be obtained from the program office or on the CSD website.

All candidates must pass, with a score of 600 or above, the National Examination in Speech-Language Pathology (PRAXIS) to fulfill the requirements for graduation. The University must receive evidence of a passing test score by the official date of the comprehensive exam of final semester of registered enrollment.

Other Requirements

Speech, Language and Hearing Screening

1. CSD students must take and pass a speech-language-hearing screening examination during their first semester. The purpose of this screening is to identify any speech, language or hearing problem that may interfere with a students' academic or clinical progression in the Program.
2. Students must demonstrate the ability to speak Standard American English intelligibly including modeling of all English phonemes.
3. Students will be enrolled in the AAMU Speech and Hearing Clinic free of charge if test results deem intervention necessary.

Fingerprinting/Background Check

1. Graduate students enrolled in the CSD Program will, in their first semester, undergo a criminal background check which includes fingerprinting and a check of national and state criminal databases.
2. Fingerprint/Background Check is a requirement for all individuals in the School of Education including CSD students.

Communicative Sciences and Disorders
Course Listing

(57-63 Semester Hours, with CSD 516 repeated as needed to complete clinical clock hours)

CSD 504 Advanced Evaluation & Assessment of Communicative Disorders (3)
CSD 510 Stuttering and Other Disorders of Speech Flow (3)
CSD 513 Language Disorders in Adults (3)
CSD 515 Language Development in Communication Disorders (3)
CSD 516 Advanced Clinical Practicum (3)
CSD 520 Language Disorders in Children (3)
CSD 522 Voice Disorders (3)
CSD 525 Case Management in SLP (3)
CSD 534 Articulation and Developmental Phonological Disorders (3)
CSD 538 Neuroanatomy (3)
CSD 539 Craniofacial Anomalies (3)
CSD 544 Motor Speech Disorders (3)
CSD 545 Swallowing Disorders (3)
CSD 550 Seminar in CSD
CSD 598 Research Methodologies in Communication Disorders (3)
PSY 502 Descriptive & Inferential Behavioral Statistics (3)

If you do not have a bachelor's degree in speech-language pathology you will need to take the following prerequisite courses:

CSD 202/500	Survey/Intro of Communication Disorders (3)
CSD 203	Phonetics (3)
CSD 204	Anatomy and Physiology of Speech Mechanism (3)
CSD 205	Language Development (3)
CSD 215	Articulation and Phonological Disorders (3)
CSD 307	Principles of Diagnostic Assessment in Communication Disorders (3)
CSD 310	Clinical Procedures in Communication Disorders (3)
CSD 414	Advanced Speech Pathology (3)
CSD 323/509	Hab/Rehab of the Hearing Impaired (3)
CSD 308/514	Audiology (3)

GRADUATE COURSE DESCRIPTIONS

CSD 500 Introduction to Communication Disorders - 3 hours. An overview of the various disorders and current research and trends in the field of speech-language pathology and audiology.

CSD 504 Advanced Evaluation and Assessment Communicative Disorders - 3 hours. Emphasizes skills in the areas of measurement and evaluation, specification of goals and objectives, selection and development of measurement tools, delineation and execution of strategies for obtaining, analyzing, and interpreting test results for the speech-language pathologist.

CSD 509 Habilitation and Rehabilitation of the Hearing Impaired - 3 hours. Provides an overview of speech-language development characteristics of the hearing impaired child. Alternate communications will be explored.

CSD 510 Stuttering and Other Disorders of Speech Flow - 3 hours. Provides the information necessary to define and describe normal dysfluency, cluttering, and organic dysprosody and to distinguish them from stuttering.

CSD 513 Language Disorders in Adults - 3 hours. Designed to give students knowledge and skills in language dysfunction, such as in the assessment and treatment of dysphasia, the evaluation and management of dysarthria; rationale and methodology associated with group and individual counseling procedures and communication problems of the aged.

CSD 514 Audiology - 3 hours. Designed to give the student knowledge and skills in the complete auditory assessment of the peripheral mechanism, causes and characteristics of disorders of hearing, and types of remediation available.

CSD 515 Language Development – Communicative Disorders - 3 hours. The study of normal language development with special emphasis on development of phonological, syntactic, and semantic systems in children.

CSD 516 Advanced Clinical Practicum - 3 semester hours. Provides the student with clinical practice and experience under the direct supervision of faculty or supervisors who hold the CCC from the American Speech-Language-and-Hearing Association (ASHA).

CSD 520 Language Disorders in Children - 3 hours. Exploration of the nature of language disorders and their effects on the total child.

CSD 522 Voice Disorders - 3 hours. Designed to promote understanding of the etiology, diagnosis, and intervention strategies/treatment of voice disorders.

CSD 525 Case Management in Speech-Language Pathology - 3 hours. This course is designed as an extension of a student's experience at the graduate level into the speech clinic and/or real world job site. Students refine listening skills, counseling and psychotherapy techniques and examine the role of the SLP in assisting clients through grieving processes. Application techniques are taught to assist in programming for a variety of communication problems. Behavior therapy to modify speech behaviors of individuals with communication problems will be discussed.

CSD 534 Articulation and Developmental Phonological Disorders - 3 hours. Provides the student with theoretical and practical knowledge in the nature and etiology of articulation and developmental phonological disorders, as well as current assessment instruments and intervention strategies.

CSD 538 Neuroanatomy - 3 hours. Provides an overview of neuroanatomical structure, identification of the parts of the central nervous system, an understanding of brain circulation, composition of neurotissue, and anatomy and physiology of the spinal cord and nerves.

CSD 539 Craniofacial Anomalies - 3 hours. The purpose of this course is to provide the student with an understanding of problems in speech and voice production which are associated with abnormalities of the oro-facial development; upper respiratory functions; their relation to speech and voice production; identification of abnormal function and its affect on speech pathology assessment and treatment. Observation of a qualified clinician in diagnosis and remediation will be required.

CSD 544 Motor Speech Disorders - 3 hours. An advanced study of the symptoms and treatments associated with motor speech disorders. This course is designed to provide the student with a background in basic neuroanatomy and functional neurology so that the student will be able to utilize most effectively the therapeutic approaches that have been developed to provide appropriate intervention for individuals that have experienced neurologically related disorders. This course will also focus on the treatment and scope of practice associated with these disorders.

CSD 545 Swallowing and Swallowing Disorders - 3 hours. An advanced study of the symptoms and treatments associated with Dysphagia (swallowing disorders). This course is designed to provide the student with a background in basic neuroanatomy and functional neurology so that they will be able to utilize most effectively the therapeutic approaches that have been developed to provide appropriate intervention for individuals that have experienced neurologically related disorders. This course will also focus on the treatment and scope or practice associated with swallowing disorders in children and adults. This course will include a

survey of the research literature, current management trends and professional and health care industry standards utilized in the rehabilitation of patients within the medical setting.

CSD 550 Seminar in CSD - 3 hours. This course involves the discussion of current trends and topics in the field of communicative sciences and disorders. Topics will include, but are not limited to pharmacology, genetics, developmental coordination disorder (DCD), brain-based learning, and nonverbal learning disabilities (NLDs).

CSD 598 Research Methodology in Communication Disorders - 3 hours. Designed to provide an introduction to the conceptual framework of research, and research designs. The primary objective is an understanding of research methods to facilitate interpretation, evaluation, and application of research information.

PSYCHOLOGY AND COUNSELING PROGRAM AREA

Dr. James Stewart, Interim Chairperson
217 Carver Complex North
(256) 372-4764

The Department of Psychology, Counseling, Special Education and Communicative Sciences & Disorders offers coursework and field experiences leading to the Master's degree in Clinical Psychology, Counseling Psychology, Guidance and Counseling, and Communicative Sciences & Disorders. The Master of Education Degree is offered with teacher certification, in Collaborative Teaching K-6, and Collaborative Teaching 6-12. Class A certification only is offered in Early Childhood Special Education and Speech Language Impaired. The Education Specialist Degree is offered in School Counseling, School Psychology, Collaborative Teaching K-6 and Collaborative Teaching 6-12.

MISSION

The Department of Psychology/Counseling, Special Education and Communicative Sciences and Disorders is committed to provide instruction to undergraduate and graduate teacher candidates, other school personnel, and other university students in the fields of psychology, counseling, special education, and speech and language disorders. In addition to teaching concepts, principles, theories, and methods associated with subject matter content, the faculty places emphasis on integrating technology into teaching candidates who are being prepared for professional educational services to a diverse population of students and clients. The faculty also engages in research and service to a wide range of university, community, and professional organizations.

ORIENTATION AND OBJECTIVES

The Program in Psychology and Counseling is committed to providing the undergraduate psychology major with broad-based academic and experiential exposure to the science of behavior. While concerned with the assimilation of knowledge such as theories, principles, and concepts of psychology, competency development in the methodology and application of Social Science is stressed. With a perspective on research and application skills, the program incorporates use of human learning, animal behavior, and psycho-physiological laboratory experiences. The department is committed to the total development of students in their quest to learn psychology and to further the frontiers of the science either as paraprofessionals or through pursuit of graduate training.

DEGREE PROGRAMS

M.S.
Counseling Psychology

48 SEMESTER HOURS

PSY 502	Descriptive & Inferential Behavioral Statistics
PSY 514	Advanced Developmental Psychology
PSY 555	Personality and Counseling Theory
PSY 556	Group Dynamics/Techniques (Prerequisites PSY 555 & PSY 559)
PSY 558	Use & Interpretation of Tests
PSY 559	Counseling Techniques (Prerequisite PSY 555)
PSY 560	Occupational Psychology
PSY 585	Research in Psychology (Prerequisite PSY 502)
PSY 592	Professional Orientation/Issues
PSY 595	Counseling Diverse Populations
PSY 597	Practicum (Prerequisites PSY 514, 555, 556, 558, 559, 560, 592, 595)
PSY 620	Counseling Internship I
PSY 621	Counseling Internship II

Electives (9 hours)

Total Hours - 48

All required courses must be completed before internship can be taken.

Comprehensive or thesis option

Each course is 3 credit hours

M.S.

PSY 502 Descriptive & Inferential Behavioral Statistics
PSY 514 Advanced Developmental Psychology
PSY 555 Personality and Counseling Theory
PSY 556 Group Dynamics/Techniques (Prerequisites PSY 555 & PSY 559)
PSY 557 Organization & Administration of Guidance Service
PSY 558 Use & Interpretation of Tests
PSY 559 Counseling Techniques (Prerequisite PSY 555)
PSY 560 Occupational Psychology
PSY 585 Research in Psychology (Prerequisite PSY 502)
PSY 592 Professional Orientation/Issues
PSY 597 Practicum
PSY 660 Consultation
PSY 612 Internship in School Counseling

Electives
PSY 563 Learning Theory
PSY 587 Cognitive Behavioral Modification
PSY 512 Adolescent Psychology
PSY 521 Needs Assessment
PSY 555 Personality and Counseling Theory
PSY 594 Advanced Educational Psychology
PSY 599 Thesis
PSY 603 Introduction to School Psychology
PSY 605 Psychopharmacology
PSY 611 Motivation
PSY 627 Organizational Psychology
Total Hours - 45-48

All required courses must be completed before internship can be taken.
Comprehensive or thesis option
Each course is 3 credit hours

SPE 501 Intro to the Study of Exceptional Children (Required if not previously completed.)
Electives (6 hours)
*Permission of Advisor needed before taking Internship in School Counseling.

Graduates of the Rehabilitation Program meet the basic requirements to become a rehabilitation counselor under the Commission on Rehabilitation Counseling Certification.

PSY 502	Desc. and Infer. Behavioral Statistics
PSY 507	Introduction to Rehab. Counseling
PSY 508	Job Development and Placement
PSY 509	Vocational Assessment
PSY 556	Group Dynamics/Techniques
PSY 559	Counseling Techniques
PSY 560	Occupational Psychology
PSY 585	Research in Psychology
PSY 591	Psychosocial Aspects of Disability
PSY 597	Counseling Practicum
PSY 620	Counseling Internship I
PSY 621	Counseling Internship II
SPE 554	Medical Aspects and Adjustments
SPE 555	Case Management in Rehabilitation

Electives 6 Hours

PSY 510 Rehabilitation High & Low Technology (distance learning course- elective)

Additional Hours for Specialization

Mississippi State:	Specialization in Blindness	12 Hours
University of Tennessee, Knoxville:	Specialization in Deafness	15 Hours

Total Hours - 48

All required courses must be completed before internship can be taken.

Comprehensive or thesis option

Each course is 3 credit hours

Permission of Advisor needed before taking Internship in School Counseling.

CLASS AA Education Specialist Degree
School Counseling Certification
30 - 36 SEMESTER HOURS

Candidates in this program must have a Master's degree and hold Class A certification in School Counseling

PSY 594 Advanced Educational Psychology
PSY 595 Counseling Diverse Populations
PSY 627 Organizational Psychology
PSY 660 Consultant
PSY 661 Needs Assessment
PSY 665 Sem. In Psych. Counseling
PSY 682 Problem in Counseling Adoles.
PSY 683 Problem in Admin of Guidance
PSY 698 Thesis I
PSY 699 Thesis II
SPE 501 Intro to Exceptional Child (required if not previously completed)

Additional Course: (required if not previously taken)
PSY 585 Research in Psychology

Each course is 3 credit hours

CLASS A
School Counseling Certification
18 - 33 SEMESTER HOURS

This program leads to certification in School Counseling.

PSY 556 Group Dynamics
PSY 557 Organ. & Admin. Guidance
PSY 559 Counseling Techniques
PSY 560 Occupational Psychology
PSY 612 Sem. In Psych. Counseling
PSY 597 Practicum
SPE 501 Intro to Exceptional Child (required if not previously completed)

Additional Courses: (required if not previously taken)

PSY 514 Developmental Psychology
PSY 555 Personality Theories
PSY 558 Use and Interp. of Test
PSY 585 Research in Psychology

Each course is 3 credit hours

CLASS A
School Psychometry Certification
30-33 SEMESTER HOURS

This program leads to certification in School Psychometry.

PSY 502 Desc Behav**.** Statistics
PSY 514 Advanced Developmental Psychology
PSY 555 Person & Counseling Theories
PSY 558 Use & Interp. of Test
PSY 559 Counseling Techniques
PSY 561 Individual Testing
PSY 587 Cognitive Behavior Psychology
PSY 590 Personality Assessment
PSY 592 Professional Orientation/Issues
SPE 501 Intro to Exceptional Child (required if not previously completed)
PSY 618 Psychometry Internship

Additional Course: (required if not previously taken)

SPE 501 Introduction to Exceptional Child

Each course is 3 credit hours

CLASS AA Education Specialist Degree
School Psychology Certification
36-42 SEMESTER HOURS

This program leads to certification in School Psychometry.

PSY 564 Learning Theories
PSY 585 Research in Psychology
PSY 603 Intro to School Psychology
PSY 660 Consultation
PSY 661 Needs Assessment
PSY 682 Problems in Counsel. Adol.
SPE 520 Learning Strategies for Elementary **or**
SPE 522 Learning Strategies for Secondary School
PSY 645 School Psychology Internship
PSY 698 Thesis I

PSY 699 Thesis II

Additional Course: (required if not previously taken)
SPE 501 Intro. to Except. Children
PSY 590 Personality Assessment
PSY 530 Individual Testing

Each course is 3 credit hours

PSYCHOLOGY AND COUNSELING COURSE DESCRIPTIONS

PSY 502 Descriptive & Inferential Behavioral Statistics – Three semester hours. Methods of statistics; the meaning and importance of statistics as a scientific tool in social science research, including the following topics: sampling, frequency distributions, central tendency, graphic representation, reliabilities, hypothesis testing, standard deviation, regression, estimation, and application

PSY 512 Adolescent Psychology – Three semester hours. Study of the age period between 12 and 19. Physical, social, and psychological development during this period will be investigated. The overlapping of several theoretical orientations will be integrated

PSY 514 Advanced Developmental Psychology – Three semester hours. Study of the physical, mental, emotional and social growth of the individual and their relation to the learning process

PSY 515 Experimental Psychology – Three semester hours. Scientific investigation of motor learning, verbal learning, psychophysics, and individual differences.

PSY 516 Physiological Psychology – Three semester hours. A functional investigation of basic neural and endocrine processes and their correlation with behavior.

PSY 530 Individual & Family Therapy – Three semester hours. Application of major theoretical approaches and models of treating individuals and families with problems.

PSY 555 Personality Theory – Three semester hours. Major theories of psychology and counseling, their tenants of personality development, psychopathological personality development, and therapeutic intervention

PSY 556 Group Dynamics - Three semester hours. Basic understanding of group development, dynamics, and counseling theories; group structure, group leadership styles, and group counseling methods and skills. (Prerequisite: PSY 559)

PSY 557 Organization and Administration of Guidance Services – Three semester hours. Lectures, case methods, reading demonstration projects, group processes, and individual work used to explore the philosophy of guidance services, functions, and programs.

PSY 558 Use and Interpretation of Tests – Three semester hours. Methods of selecting appropriate group tests, understanding of individual tests and clinical reports, and application of testing results to learning situations.

PSY 559 Counseling/Techniques – Three semester hours. Intensive study of basic theories and techniques of counseling and psychotherapy, and their application in the counseling and psychotherapy settings. (Prerequisite: PSY 555)

PSY 560 Occupational Psychology – Three semester hours. Study of basic career development theories. Occupational and educational information sources and systems; career decision-making and leisure counseling; career development and effectiveness evaluation.

PSY 561 Individual Testing – Three semester hours. An intensive study of the construction, administration, and scoring of the Stanford Binet, the Wechsler Adult Intelligence Scale, and the Wechsler Intelligence Scale for Children. (Prerequisite: Consent of Instructor)

PSY 563 Learning Theory – Three semester hours. A study of the various learning theories and their application in counseling and education.

PSY 564 Independent Study – Three semester hours. The student with the major advisor may elect to study a particular problem area of breadth and depth of knowledge. A research paper is required as a product outcome of such study.

PSY 571 Abnormal Psychology – Three semester hours. Study of behavioral disorders classified in the Diagnostic and Statistical Manual.

PSY 585 Research in Psychology – Three semester hours. The design of research studies in psychology and guidance. The student designs a study and carries it out under the supervision of the instructor. Reports of research done by the student are read and evaluated by the instructor and suggestions are made as to their improvement. (Prerequisite: PSY 502)

PSY 587 Cognitive Behavior Psychology – Three semester hours. The design of research studies in psychology and guidance. The student designs a study and carries it out under the supervision of the instructor. Reports of research done by the student are read and evaluated by the instructor and suggestions are made as to their improvement.
(Prerequisite: PSY 502)

PSY 590 Personality Assessment – Three semester hours. Develop assessment capabilities of the student in the clinical setting an d provide a basis for clinical intervention in the patient's emotional.

PSY 592 Professional Orientation/Issues- Three semester hours. An introduction to the professional practice of psychology and counseling, including a broad survey of issues such as its history and trends, ethical and legal standards, preparation standards and credentialing, roles and functions, goals and objectives and organizations and associations of the profession.

PSY 594 Advanced Educational Psychology – Three semester hours. This course provides an exploration of the principles of psychology applied to teaching and learning, techniques of educational evaluation, and models of cognitive and social development.

PSY 595 Counseling Diverse Populations– Three semester hours. Emphasis on developing knowledge, skills, and attitudes for more effective counseling with person different from the counselor regarding characteristics such as cultural race, gender, sexual orientation, physical disability, and religious preference. Substantial attention is given to developing awareness of one's own values, attitudes, and beliefs as they relate to counseling in a diverse society. Provides an understanding of how diverse values and morals, interaction patterns, social conditions, and trends related to diversity affect counseling.

PSY 597 Practicum – Three semester hours. The goal of practicum is to provide students with a supervised counseling experience in individual group counseling. Emphasis will be placed on basic counseling skills and application of knowledge.
(Prerequisite: PSY 559)

PSY 599 Masters Thesis – Six semester hours. The presentation in proper format of an original piece of research. Four faculty members shall guide the student in the completion of the thesis.

PSY 602 Industrial Psychology – Three semester hours. Psychology as a functioning instrument in ascertaining work attitudes, motivations, job satisfaction, morale, production, potential, fitting the workers to the job, and establishing worker-employer rapport.

PSY 603 Introduction to School Psychology – Three semester hours. An introduction of the psychologist to the school setting. The cognitive role will be a major focus of attention.

PSY 605 Psychopharmacology – Three semester hours. Course designed to acquaint non-medical mental health professionals (counselors, social workers, and psychologist) with the category and therapeutic effects of drugs used to treat behavioral disorders, as well as the adverse effects of both prescribed and major illicit drugs.

PSY 607 Human Sexuality – Three semester hours. An intensive study of the physiological, psychological, sociological, and ethical considerations of human sexuality.

PSY 610 Psychopathology – Three semester hours. Acquaints the student with the behavioral disorders in the Diagnostic and Statistical Manual, and the gathering of clinical and psychometric data to make differential diagnoses.

PSY 612 School Counseling Internship – Three semester hours. This placement is in a school setting consistent with the intern's major area of concentration. The school's philosophy, organization, and yearly calendar of counseling or activities will be stressed. Academic, as well as personal-social counseling and vocational exploration, will be emphasized

PSY 614 Introduction to Vocational Rehabilitation Counseling – Three semester hours. Overview of the field of rehabilitation. It focuses on the institutional approach to the problems of clients.

PSY 616 & 617 Internship in Vocational Rehabilitation Counseling – Six semester hours. Supervised graduate internship in rehabilitation counseling.

PSY 618 School Psychometry Internship – Three semester hours. Satisfactory performance as a school psychometrist in a full-time internship of the equivalent in a school or schools supervised by a qualified school psychologist. (Prerequisite: Consent of Instructor)

PSY 620 & 621 Counseling Internship – Six semester hours. The first practicum experience is designed to acquaint the student with the working environment. Emphasis is on the acquisition of procedural skills in the work environment. The student is expected to learn the procedures for intake and case openings and the record keeping procedure, and to know all of the services of the comprehensive mental health clinic, as well as to be cooperative in carrying out assigned tasks. (Prerequisite: Consent of Instructor)

PSY 622 & 623 Clinical Internship — Six semester hours. The student is expected to learn the procedures for intake and case openings and the record keeping procedure, and to know all of the services of the comprehensive mental health clinic, as well as to be cooperative in carrying out assigned tasks. The student is expected to be a front-line therapist, utilizing the therapeutic techniques called for by the history and present symptoms. (Prerequisite: Consent of Instructor)

PSY 625 Personnel Psychology – Three semester hours. The principles of employee selection, retention, promotion, and compensation are covered in this course.

PSY 626 Seminar in Personnel Psychology – Three semester hours. This course seeks to cover all aspects of the personnel administrator's job. Topics covered include affirmative action, health care compensation packages, career ladder concepts, profit sharing, in-house educational programs, and company recreation programs.

PSY 627 Organizational Psychology – Three semester hours. Beginning and development of organizations and the role they play in society. It utilizes a systems approach to understanding the dynamics of an on-going organization.

PSY 645 & 646 Internship in School Psychology – Six semester hours. Supervised experiences in the school in actual professional situations as a school psychologist.

PSY 653 Counseling the Elderly – Three semester hours. A study of the unique needs of the elderly as seen in therapy. Specific techniques that have been tried and evaluated for their appropriateness either the elderly will be studied.

PSY 660 Consultation – Three semester hours. Strategy for counselors functioning as consultants within elementary schools, secondary schools, post-secondary schools, community agencies, and mental health facilities.

PSY 661 Needs Assessment – Three semester hours. Various uses of needs assessment, such as personal environment, program planning and evaluation, and exploration of various models of needs assessment.

PSY 665 Seminar in Psychology – Three semester hours. Seminar designed to meet the educational needs of current students in Psychology and Guidance. Subjects of contemporary interest will be explored in depth by students and reported to the class.
(Open to AA students only)

PSY 682 Problems in Counseling with Adolescents – Three semester hours. Consideration of the special problems encountered in counseling with adolescents. Methods of dealing with these problems and improving the counseling techniques (Open to AA students only)

PSY 683 Problems in the Administration of Guidance Services – Three semester hours. Dealing with the problem of administering a guidance service in educational or community agencies. Problems of leadership program evaluation and planning. (Prerequisite: Course in Organization and Administration of Guidance Services. Open to AA students only)

PSY 686 Advanced Social Psychology – Three semester hours. Group structure, topology, and dynamics. Communications within and between people and the improvement of impaired relationships. Group influence in changing behavior.

PSY 698 Field Research – Three semester hours. A quasi-experimental research project designed to evaluate or develop programs in schools. A research design and methodology must be approved as well as data analysis and techniques.

PSY 699 Research Thesis/Project – Six semester hours. An original research of sufficient magnitude to warrant the conclusion that candidates show evidence of mastery of research tools, techniques, and understanding.

SPECIAL EDUCATION

Dr. Shirley King, Chair
111 B Carver Complex North
256 372- 5522

MISSION

The Department of Special Education seeks to provide an education and scholarly environment in which graduate students receive quality academic training and professional experiences that emphasize areas of exceptional children.

OBJECTIVES

- To provide training in the skills, attitudes, and technologies necessary for professional competence in a variety of educational and clinical settings.

- To provide students with opportunities to acquire an understanding of the conditions which make students exceptional.

- To provide the associated behavioral characteristics of exceptional children, basic knowledge and methods of assessment, curriculum development and instructional procedures for exceptional children.

- To develop a knowledge of curriculum evaluation procedures for exceptional children and youth.

ADMISSION

Students must first meet all requirements for admission to the School of Graduate Studies. Additional requirements are related to programs as noted.

DEGREE CONCENTRATIONS

Areas of Concentration: Early Childhood Special Education "A"; Collaborative Teacher K-6 or 6-12; all of which can lead to "A" level certification. The "AA" certification and the Ed.S. program is offered in the area of Collaborative Teacher K-6 or 6-12. A nontraditional, fifth-year option is offered to those individuals who have a non-teaching degree and wish to obtain an Alabama Teaching Certificate in Special Education in the area of Collaborative Teacher K-6 or 6-12. Certain restrictions apply to these programs, and students should consult with an advisor for specific information.

DEGREE REQUIREMENTS

Each area of emphasis for the Master of Special Education is a 36-51 semester hour program. After satisfying general admission requirements, consisting of a GPA of at least 2.50 (based on a 4.00 system) and completion of the GRE (with a minimum score of 400 on the verbal section), students must successfully complete the prescribed program consisting of areas in foundations of professional studies, curriculum and teaching, evaluation of teaching and learning, specialization in the teaching field, and advisor-approved electives as approved by the State Department of Education.

Each student's program is planned with the guidance of, and in consultation with, a departmental advisor in the area of the major. The department does not take responsibility for courses taken without departmental advisement and approval. A copy of the state-approved program of study for each area of emphasis can be obtained from the department.

All candidates must pass a comprehensive on the content of the curriculum.

DEGREE PROGRAMS

Class "A" Certification
Early Childhood Special Education
42 SEMESTER HOURS

SPE 515 Language Development 3 semester hours
SPE 518 Application of Child Development 3 semester hours
SPE 541 Teaching ECSE w/Disabilities 3 semester hours
SPE 545 Intro to Early Childhood Special Education 3 semester hours
SOE 546 Parent and Family Assessment 3 semester hours
SPE 548 Assessment and Evaluation in ECSE 3 semester hours
SPE 549 Adaptive Techniques and Methods in ECSE 3 semester hours
SPE 550 Learning Strategies for Young Child w/Disabilities 3 semester hours
SPE 595 Internship in ECSE 6 semester hours
FED 501 Foundations of Education OR 3 semester hours
FED 521 Multicultural Education (3) semester hours
FED 503 Introduction to Educational Research 3 semester hours
FED 504 Evaluation of Teaching/Learning 3 semester hours
FED 529 Computer-Based Instructional Technology 3 semester hours

SPECIAL EDUCATION CERTIFIED STUDENTS MUST TAKE SIX SEMESTER HOURS OF COURSE WORK IN LIEU OF INTERNSHIP

Candidates holding a class "B" teaching certificate in a field other than special education may enter the traditional M.Ed. program but are required to take:

SPE 403 IEP Writing 3 semester hours
SPE 501 Introduction to the Study of Exceptional Children 3 semester hours

Class "A" Certification
Collaborative Teacher K-6
36 SEMESTER HOURS

SPE 516 Collaborative Consultation 3 semester hours
SPE 522 Learning Strategies for Elementary Schools 3 semester hours
SPE 530 Behavior Management 3 semester hours
SPE 540 Teaching Elementary Students w/Disabilities 3 semester hours
SPE 541 Teaching ECE Students w/Disabilities 3 semester hours
SPE 595 Internship in Special Education 6 semester hours
ECE 520 Foundations of Teaching Reading 3 semester hours
FED 501 Foundations of Education OR 3 semester hours
FED 521 Multicultural Education (3) semester hours
FED 504 Evaluations of Teaching/Learning 3 semester hours
FED 529 Computer Based Instructional Technology 3 semester hours
FED 503 Introduction to Educational Research 3 semester hours

SPECIAL EDUCATION CERTIFIED STUDENTS MUST TAKE SIX SMESTER HOURS OF COURSE WORK IN LIEU OF INTERNSHIP

Candidates holding a class "B" teaching certificate in a field other than special education may enter the traditional M.Ed. program but are required to take:

SPE 403 IEP Writing 3 semester hours
SPE 501 Introduction to the Study of Exceptional Children 3 semester hours

Class "A" Certification
Collaborative Teacher 6-12
36 SEMESTER HOURS

SPE 500 Teaching Secondary Students w/Disabilities 3 semester hours
SPE 516 Collaborative Consultation 3 semester hours
SPE 520 Learning Strategies for Adolescents 3 semester hours
SPE 525 Transitioning Students w/Disabilities 3 semester hours
SPE 530 Behavior Management 3 semester hours
SPE 595 Internship in Special Education 6 semester hours
FED 501 Foundations of Education OR 3 semester hours
FED 521 Multicultural Education (3) semester hours
FED 504 Evaluation of Teaching/Learning 3 semester hours
FED 529 Computer-Based Instructional Technology 3 semester hours
FED 503 Introduction to Educational Research 3 semester hours
SED 521 English in the Secondary Schools OR (3) semester hours
SED 523 Social Science in the Secondary Schools OR (3) semester hours
SED 524 Science in the Secondary Schools AND/OR (3) semester hours

SPECIAL EDUCATION CERTIFIED STUDENTS MUST TAKE SIX SEMESTER HOURS OF COURSE WORK IN LIEU OF INTERNSHIP

Candidates holding a class "B" teaching certificate in a field other than special education may enter the traditional M.Ed. program but are required to take:
SPE 403 IEP Writing 3 semester hours
SPE 501 Introduction to the Study of Exceptional Children 3 semester hours

Alternative Fifth-Year
Collaborative Teacher K-6
51 SEMESTER HOURS

SPE 501 Introduction to the Study of Exceptional Children 3 semester hours
SPE 515 Language Development 3 semester hours

SPE 516 Collaborative Consultation 3 semester hours
SPE 518 Application of Child Development to SPE 3 semester hours
SPE 522 Learning Strategies for Elementary Schools 3 semester hours
SPE 530 Behavior Management 3 semester hours
SPE 540 Teaching Elementary Students w/Disabilities 3 semester hours
SPE 541 Teaching ECE Students w/Disabilities 3 semester hours
SPE 595 Internship in Special Education 6 semester hours
FED 501 Foundations of Education OR 3 semester hours
FED 521 Multicultural Education (3) semester hours
FED 504 Evaluation of Teaching/Learning 3 semester hours
FED 503 Introduction to Educational Research 3 semester hours
FED 529 Computer-Based Instructional Technology 3 semester hours
ECE 503 Learning Styles 3 semester hours
ECE 512 Investigation of Language Arts 3 semester hours
ECE 520 Foundations of Teaching Reading 3 semester hours

Undergraduate prerequisites for Alternative Fifth-Year, Collaborative K-6:
SPE 303 Assessment of Children 3 semester hours
SPE 403 IEP Writing 3 semester hours
SPE 401 Corrective Reading 3 semester hours
EDU 305 Mat./Meth. of Teaching Math in Elem. Schools 3 semester hours

Alternative Fifth-Year
Collaborative Teacher 6-12
51 SEMESTER HOURS

SPE 500 Teaching Secondary Students w/Disabilities 3 semester hours
SPE 501 Introduction to the Study of Exceptional Children 3 semester hours
SPE 516 Collaborative Teaching 3 semester hours
SPE 518 Application of Child Development to SPE 3 semester hours
SPE 520 Learning Strategies for Adolescents 3 semester hours
SPE 525 Transitioning Students w/Disabilities 3 semester hours
SPE 530 Behavior Management 3 semester hours
SPE 595 Internship in Special Education 6 semester hours
FED 501 Foundations of Education OR 3 semester hours
FED 521 Multicultural Education (3) semester hours
FED 503 Introduction to Educational Research 3 semester hours
FED 504 Evaluation of Teaching/Learning 3 semester hours
FED 529 Computer-Based Instructional Technology 3 semester hours
SED 515 Reaching in the Content Area 3 semester hours
SED 521 English in the Secondary Schools OR 3 semester hours
SED 523 Social Science in the Secondary School or 3 semester hours
SED 524 Science in the Secondary Schools AND/OR 3 semester hours

SED 530 Secondary School Curriculum 3 semester hours

Undergraduate prerequisites for Alternative Fifth-Year, Collaborative 6-12:
SPE 205 Language Development 3 semester hours
SPE 403 IEP Writing 3 semester hours
SPE 436 Assessment of Secondary Students 3 semester hours
EDU 422 Teaching Math in Secondary Schools 3 semester hours

Class "AA" Certification (Education Specialist Degree)
Collaborative Teacher K-6
36 SEMESTER HOURS

SPE 609 Seminar in Special Education 3 semester hours
SPE 641 Evaluation Meth/Mat for Special Education 3 semester hours
SPE 643 Curriculum Planning K-6 3 semester hours
SPE 660 Advanced Collaborative Consultation 3 semester hours
SPE 664 Supervising Collaborative K-6 Programs 3 semester hours
SPE 667 Professional Writing 3 semester hours
SPE 698 Thesis I 3 semester hours
SPE 699 Thesis II 3 semester hours
FED 600 Advanced Curriculum Development 3 semester hours
FED 602 Advanced Educational Statistics 3 semester hours
FED 603 Advanced Educational Research 3 semester hours
FED 604 Advanced Evaluation of Teaching/Learning 3 semester hours

Class "AA" Certification (Education Specialist Degree)
Collaborative Teacher 6-12
36 SEMESTER HOURS

SPE 609 Seminar in Special Education 3 semester hours
SPE 641 Evaluation Meth/Mat for Special Education 3 semester hours
SPE 644 Curriculum Planning 6-12 3 semester hours
SPE 660 Advanced Collaborative Consultation 3 semester hours
SPE 665 Supervising Collaborative 6-12 Programs 3 semester hours
SPE 667 Professional Writing 3 semester hours
SPE 698 Thesis I 3 semester hours
SPE 699 Thesis II 3 semester hours
FED 600 Advanced Curriculum Development 3 semester hours
FED 602 Advanced Educational Statistics 3 semester hours
FED 603 Advanced Educational Research 3 semester hours
FED 604 Advanced Evaluation of Teaching/Learning 3 semester hours

COURSE DESCRIPTIONS

SPE 500: Teaching Secondary Students with Disabilities in General Classrooms (3)- This course is designed to introduce the graduate level teacher to principles useful for working with secondary students demonstrating a variety of academic, behavioral, and social needs.

SPE 501: Introduction to the Study of Exceptional Learners (3)- This course provides an overview of the various exceptionalities and an introduction to basic special education services and procedures.

SPE 515: Language Development (3)- This course involves the study of normal language development, with emphasis on the development of the phonological, syntactic, and semantic systems in children with disabilities.

SPE 516: Collaborative Consultation (3)- This course is designed to provide teachers with knowledgeable skills required to successfully facilitate intervention strategies with general education classroom teachers and other education support personnel in meeting the needs of children with disabilities in an inclusive educational setting. Additional skills are designed to facilitate efforts of special education teaching personnel in facilitating intervention strategies with parents and community agencies in assisting students with disabilities to make a successful transition from the school to employment and community living activities

SPE 518: Application of Child Development to Special Education (3)- An in depth study of the principles and theories of child development from early childhood through adulthood. Specific emphasis is upon the implications of child development theory on teaching exceptional students.

SPE 520: Learning Strategies for Adolescents (3)- This course is designed to provide teachers of children with disabilities in grades 6-12 with current strategies for assessing student learning styles and modifying instructional methods for optimal student learning.

SPE 522: Learning Strategies for Elementary Schools (3)- This course is designed to provide teachers of children with disabilities in grades K-6 with validated, research-based approaches to plan for and incorporate student learning styles in inclusive classrooms to for optimal student learning.

SPE 525: Transitioning Students with Disabilities (Secondary) (3)- This course the historical development of career education, model programs for individuals with disabilities, techniques for developing and implementing a career education program, and instructional strategies for providing career education to individual students with disabilities.

SPE 540: Teaching Elementary Students with Disabilities in Elementary Schools (3)- This course is designed to provide pre-service teachers an opportunity to plan methods and materials

to be used in inclusive settings, addressing the educational needs of students with disabilities in upper elementary school

SPE 541: Teaching Early Childhood Students with Disabilities In General Classrooms (3)- This course is designed to provide pre-service teachers an opportunity to plan methods and materials to be used in inclusive settings, addressing the educational needs of students with disabilities birth through grade three.

SPE 545: Introduction to Early Childhood Special Education (3)- This course covers the rationale for early childhood special education and provides a comprehensive overview of major principles and practices relating to the provision of services to young children with disabilities from birth through age eight.

SPE 546: Parent and Family Assessment, Support, and Cooperation (3)- This course is designed to investigate methods of family assessment and evaluation as well as methods in training, counseling, and support of young children with disabilities.

SPE 548: Assessment in Early Childhood Special Education (3)- This course emphasizes the basic skills and knowledge that are required to analyze, select, and implement effective assessment practices with children with disabilities.

SPE 549: Adaptive Techniques and Methods in Early Childhood Special Education (3)- This course involves the study of techniques and methods that are requisites to adapt early childhood curricula to the specialized needs of young children with disabilities from birth through age eight.

SPE 550: Learning Strategies for Young Children with Disabilities (3)- This course is designed to provide teachers of children with disabilities aged 0– 8 with current strategies for assessing student learning styles and modifying instructional methods for optimal student learning.

SPE 595 Internship In Early Childhood Special Education (3)- This course engages the candidate to practice learned proficiencies in an educational setting by providing supervised teaching experiences in an early childhood special education setting involving children from birth to age eight. Candidates will demonstrate competencies to develop and implement instructional strategies under the supervision of a certified teacher of children with disabilities from birth to age eight in a setting of service delivery designed to maximize children’s learning potential.

SPE 609: Seminar In Special Education (3)- This course is designed to stimulate the candidate's thinking in the field of special education, current research, programming innovations, curricular trends, and theoretical perspectives to be discussed.

SPE 641: Evaluation and Methods and Materials of Special Education (3)- This course is designed to present innovative positions regarding how children in special education may be aided in the learning process.

SPE 643: Curriculum Planning--K-6 (3)- This course focuses on the study of the philosophical and psychological foundations of special education and designing curriculum specific to addressing the needs of individuals with disabilities within an inclusive education setting in grades K-6.

SPE 644: Curriculum Planning --6-12 (3)- This course focuses on the study of the philosophical and psychological foundations of special education and designing curriculum specific to addressing the needs of individuals with disabilities within an inclusive education setting in grades 6-12.

SPE 660: Advanced Collaborative Consultation (3)- This course is designed to provide teachers with opportunities to successfully plan and facilitate intervention strategies to be implemented in a school-wide inclusion program. The focus is upon implementing strategies which garner teacher support for collaborative consultation while simultaneously meeting the needs of children with disabilities.

SPE 664: Supervising Collaborative Consultation Programs K-6 (3)- This course is designed to provide opportunities for teachers of young children with disabilities with practical experience in facilitating collaborative activities among special educators and general educators, families, and interagency personnel.

SPE 665: Supervising Collaborative Consultation Program 6-12 (3)- This course is designed to provide opportunities for teachers of adolescents with disabilities with practical experience in facilitating collaborative activities among special educators and general educators, families, and interagency personnel.

SPE 667: Professional Writing (3)- This course focuses upon professional writing strategies and processes for professional educators. The course emphasis is upon identifying funding sources, professional organizations, and refereed journals for which professional writing is appropriate.

Candidates will plan, draft, and finalize papers and proposals.

SCHOOL OF ENGINEERING AND TECHNOLOGY

V. Trent Montgomery, Ph.D., P.E.
Dean
Room 226 ETB

MISSION

The School of Engineering and Technology operates in the traditional land-grant concept with emphasis on instructional, research, and extension programs. The School strives to provide an integrated academic program for students who have aspirations for modern day careers in engineering, engineering technology, industrial technology, or related scientific disciplines. The mission is accomplished through the integration of general and professional studies in each engineering or technology discipline.

OBJECTIVES

- To provide course work that provides a bridge between mathematics, basic sciences, social sciences, and current practices in engineering, engineering technology, and industrial technology.

- To provide course work that provides a fundamental understanding of engineering, engineering technology, and industrial technology, and their impact on the individual, the society, and the environment.

- To provide course work that provides a mastery of technical knowledge, basic sciences, and social sciences, and their use in the solution of individual, societal, and environmental problems.

DEPARTMENT OF CIVIL ENGINEERING

Pabitra K. Saha, Ph.D., P.E., Chair
Room 305 ETB

DEPARTMENT OF ELECTRICAL ENGINEERING

Kaveh Heidary, Ph.D., Chair
Room 214 ETB

DEPARTMENT OF MECHANICAL ENGINEERING

Mohamed A. Seif, Ph.D., P.E., Acting Chair
Room 307 ETB

MASTER OF ENGINEERING in MATERIEL ENGINEERING

The Departments of Civil, Electrical, and Mechanical Engineering collectively offer a graduate program leading to the Master of Engineering (M.Eng) degree in Materiel Engineering. Materiel is defined as the equipment, apparatus, and supplies used by an organization. Materiel engineering involves the design, production, test and evaluation, distribution, operation and support, and ultimate disposition of man-made equipment, apparatus, and supplies, and, as such, is highly interdisciplinary.

OBJECTIVE

The general objective of this program from AAMU is to provide a curriculum of the highest quality for post-baccalaureate learning opportunities in this highly important area. Specific objectives are as follows:

- Provide students with a solid foundation in Materiel Engineering, as well advanced studies in areas of Civil, Electrical, or Mechanical Engineering
- Provide a continuum of study leading to a graduate degree for qualified students at AAMU completing a baccalaureate in engineering
- Provide a program of study that also accommodates the needs and limitations of mature adults engaged in full-time employment
- Accommodate the admission of persons holding bachelor's degrees in non-engineering areas, using selected background courses
- Respond to the anticipated requirement of making the master's degree, or the equivalent, as an entry-level qualification for attaining professional licensure.

ADMISSION REQUIREMENTS

This program is intended for individuals holding a bachelor's degree from a regionally accredited institution in any area of engineering or a closely related discipline. To formally pursue the Master of Engineering degree, the student must apply to the Graduate School of AAMU for Regular Admission, meeting the requirements for either Unconditional or Conditional Status. To take individual courses without seeking the graduate degree, persons may be admitted in a Non-Degree Graduate Status.

Regular Graduate Admission Applicants for admission to the Graduate School of AAMU must provide transcripts from each post-secondary school attended, as well as a transcript of the Graduate Record Examination (GRE). They must also provide two letters of recommendation and submit details of any professional work experience. Students from non-English speaking countries are required to have a minimum score of 500 on the Test of English as a Foreign Language (TOEFL).

Unconditional Admission. To be admitted with Regular Status to the Master of Engineering program, an applicant must have

- Earned a bachelor's degree in an engineering program that had ABET accreditation at the time of graduation,
- Earned an overall Grade Point Average (GPA) of at least 3.00 on a scale of 4.00, or have passed the National Council of Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering Examination, and

- Minimum GRE scores of 600 on the quantitative portion and 1000 on the combined verbal and quantitative portions.

Conditional Admission. Applicants who do not meet one, but no more, of the three above-listed requirements for unconditional admission may be admitted on a conditional basis under the following conditions:

- GPA or GRE Deficiency. Persons with a bachelor's degree in engineering may receive Conditional Admission provided their GPA is at least 2.5 on all undergraduate engineering courses attempted. This condition also holds for individuals with a GRE deficiency, including those who have not taken the GRE.
- Degrees in Other Fields. Individuals with a bachelor's degree in physics, mathematics, computer science, chemistry, or other fields closely related to engineering may receive Conditional Admission provided they have completed the following:
    - Mathematics through Differential Equations
    - Series in General Chemistry
    - Series in Calculus-based Physics
    - Introductory Computer Programming
    - Other courses prescribed by the advising engineering department, including specific topics stated as prerequisites for intended graduate courses.

Persons not meeting these minimum preparatory studies are advised to register as undergraduate students while completing this background.

Under Conditional Admission, a student may complete up to 15 semester hours credits recommended by the department advisor. A student in Conditional Admission is required to earn a minimum of 'B' grade in these courses to progress to Regular Admission; otherwise, the student will be dismissed from the School of Graduate Studies.

Non-Degree Graduate Status Professionals in the community may desire to take certain courses for graduate credit without the full formalities of applying for the graduate program. The AAMU School of Graduate Studies provides for the admission of such persons in a non-degree graduate status. To qualify for this admission, individuals must be a graduate of a regionally accredited institution in the United States with a 2.5 or higher undergraduate GPA. They must also have the prerequisites for any course pursued at AAMU.

To pursue graduate engineering courses using the non-degree graduate status, an application must first be submitted to the School of Engineering and Technology. This is to ensure that the applicant has the required background for the desired course(s). If approved, the application will then be passed on to the School of Graduate Studies for processing.

Up to nine semester hours of graduate credit may be earned while in the non-degree status. Later, if the individual applies for and receives regular admission to the program, applicable credits earned with a grade of 'B' or better may be applied to meeting the program requirements.

DEGREE COMPLETION REQUIREMENTS

Academic Credit: A minimum of 30 semester hours credit in graduate-level courses will be required. These are distributed as follows:

Core Courses	12 s.h.
Discipline Specialization Courses	9 s.h.
Approved Electives	6 s.h.
Master's Project	3 s.h.
Total Academic Credit	30 s.h

1. Core Courses:

GEN- 601 Life-Cycle Design Engineering	3 s.h.
GEN -602 Product Assurance Engineering	3 s.h.
GEN -603 Analysis and Simulation Methods	3 s.h.
GEN -604 Test and Evaluation Engineering	3 s.h.

2. Discipline Specialization Courses: The discipline specialization allows the student to further develop his/her ability in a narrow area of engineering. Each specialization must have a minimum of three courses. The primary specializations and the cognizant departments are as follows:

- Civil Engineering: Environmental Systems, Structural Systems, Transportation Systems
- Electrical Engineering: Control Systems, Electrical Power Systems, Micro/ Nanoelectronics, Sensor Systems, Software Engineering, Telecommunication Systems
- Mechanical Engineering: Aerospace Systems, Manufacturing Systems, Systems Engineering, Thermal Energy Systems

The student will select courses for his/her specialization from an approved list. Department Advisors may approve other specializations. GEN-590 and GEN-600 may be used as discipline specialization courses. Advisors may also approve appropriate courses from other AAMU departments or courses taken elsewhere.

3. Approved Elective Courses: To allow additional diversity, approved elective courses may be included to complete the course requirements, the number of such electives depending on the number of courses taken in the specialization. These electives may be drawn from other specialty areas or may include approved graduate courses from other AAMU departments or elsewhere as approved by the advisor. In certain cases and as appropriate, advanced courses needed as prerequisites to other program courses may be included.

4. Master's Project: The Master's Project is a significant completion requirement. For this, the student registers in GEN-690 Materiel Engineering Project.

The activity is initiated by a seminar covering the requirements, with an emphasis on reports typical in the engineering profession. The project subject, which must be approved by the student's department advisor, must relate one or more topics from core courses with a detailed topic from a specialty course, providing a state-of-the-art treatment based on available literature. The student then acts independently in developing the report.

Information sources would include journals, trade publications, and government and industry reports. Other than the assessment of this existing information, no original research is required. Source information must be referenced in a professional style. The final report will be reviewed by the department advisor, with a Pass/Fail/Incomplete grade.

Transfer Credit. With the approval of the department advisor, graduate credit may be transferred into this program from study at AAMU and/or other colleges and universities. This would be limited to 12 semester hours if the credit has not been used in completing a graduate program, and 6 semester hours if previously used in completing a graduate degree. All such courses must have been completed with a grade of "B" or better and must have been taken while the student was in a graduate status.

COURSE DESCRIPTIONS

Materiel Engineering

GEN 590 Special Topics – 3 hrs. This course focuses on topics based on modern trends in materiel engineering. The specifics of each course will be identified prior to it being offered.

GEN 600 Special Topics – 3 hrs. This course focuses on topics based on modern trends in materiel engineering. The specifics of each course will be identified prior to it being offered..

GEN 601 Life-Cycle Design Engineering – 3 hrs. This course is intended to provide insight and experience in theory and in practice in dealing with product complexity associated with such design processes. Topics include contemporary techniques such as product realization process, robust design, design for six-sigma, and design for manufacturability. Also considered are systems architectural principles; system optimization; standardization; and case studies in real-life product design projects. **Prerequisite**: bachelor's degree in engineering or admission to Materiel Engineering graduate program.

GEN 602 Product Assurance Engineering – 3 hrs. This course involves techniques for establishing product specifications, process controls for quality assurance, compatibility analysis,

and product reliability and maintainability. Topics include system reliability; confidence intervals-limits; normal and exponential distribution; failure analysis; the Weibull model in life testing; quality control; aging and system reliability; and case studies. **Prerequisite**: bachelor's degree in engineering or admission to Materiel Engineering graduate program; basic knowledge of statistics.

GEN 603 Analysis and Simulation Methods – 3 hrs. The course centers on stochastic search methods for system optimization and the analysis and construction of Monte Carlo simulations. The focus is on issues in algorithm design and mathematical modeling, together with implications for practical implementation. Finite-element analysis is also given major consideration**.** **Prerequisite**: bachelor's degree in engineering or admission to Materiel Engineering graduate program; capability in computer programming.

GEN 604 Test and Evaluation Engineering – 3 hrs, lecture and laboratory. This course provides an intensive introduction to test methods and evaluation techniques; statistical considerations in measurement uncertainties; experiment planning, designing, debugging, and execution; instrumentation for data acquisition; signal processing; techniques for data analysis and evaluation; methods for hardware verification and validation. **Prerequisite**: bachelor's degree in engineering or admission to Materiel Engineering graduate program; basic knowledge of statistics and electronic instrumentation.

GEN 690 Materiel Engineering Project – 3 hrs. The activity is initiated by a seminar covering the requirements, with an emphasis on reports typical in the engineering profession. The project subject must relate one or more topics from core courses with a detailed topic from a specialty course, providing a state-of-the-art treatment based on available literature. **Prerequisite**: at least 18 graduate semester hours in materiel engineering program.

The following courses are offered by the three AAMU Engineering Departments for use in fulfilling the Discipline Specialization and/or Approved Elective requirements. Many of these courses are co-listed as undergraduate (400-level) and graduate (500-level). Graduate students taking co-listed courses will be required to complete additional assignments.

Co-listed courses may be used in a graduate program only if the student has not completed the same, or a highly similar, course at the undergraduate level within the past four years (the typical half-life of advanced engineering subjects). If a co-listed course is required in an AAMU undergraduate curriculum, except with approval by the cognizant Graduate Advisor the corresponding 500-level course cannot be used in a Discipline Specialization; these courses, however, may be used in the Approved Electives. Such courses are marked with an asterisk (*).

Civil Engineering

CE 501 Structural Steel Design - 3 hrs. Same as CE 401*. Introduction to the design of steel structures to include behavior of members and their connections. Theoretical and practical basis

for proportioning members are addressed. **Prerequisite**: undergraduate course in structural analysis

CE 502 Reinforced Concrete Design - 3 hrs. Same as CE 402*. A study of the theory and design of reinforced concrete members. Design considerations for concrete bridges and buildings are included. **Prerequisite:** undergraduate course in structural analysis

CE 504 Hydraulic Engineering and Design - 3 hrs. Same as CE 404*. A study of the similitude, and flow measurement; open channel flow, pipe flow and their applications; and design of various elements of hydraulic structures. Prerequisites: undergraduate course in fluid mechanics

CE 506 Computer Analysis of Structures - 3 hrs. Same as CE 406. Focus on flexibility and stiffness methods of analysis. Development of matrix methods for both trusses and rigid frames and use of the computer in structural analysis, including finite element method are included. **Prerequisites**: undergraduate course in structures; good knowledge of computer programming

CE 508 Foundation Design - 3 hrs. Same as CE 408*. The study of shallow and deep foundation elements, determination of bearing capacity of spread footings, mat and pile foundations. This course also includes instruction on drilled caissons and piers as well as lateral earth pressure and the design of retaining structures. **Prerequisite**: undergraduate course or experience in soil mechanics

CE 509 Public Health Engineering - 3 hrs. Same as CE 409. A study of the engineering aspects involved in the control of the environment for the protection of health and the promotion of the comfort of man. Discussion will include communicable disease control, air pollution, refuse disposal, industrial hygiene, and radiological health hazards. **Prerequisite**: undergraduate course or experience in environment analysis

CE 510 Transportation Engineering and Design - 3 hrs. Same as CE 410*. A study of engineering and design basics for highway transportation; elements of highway transportation and their characteristics; drivers; vehicles, volume, density, speed, and travel time; design for safety, service, and economy; highway alignment, cross section and geometric design elements. **Prerequisite:** undergraduate course or experience in transportation systems

CE 511 Urban Transportation Planning - 3 hrs. Same as CE 411. A study of functions and elements of urban transportation including modeling trip generation, trip attraction, modal split and network assignment; integrated models, and computer applications. **Prerequisites:** undergraduate course or experience in transportation systems

CE 512 Pavement Systems - 3 hrs. Same as CE 412. A study of the design of highway and airport pavement systems; subgrades, subbases and bases; flexible and rigid pavements; drainage

and earthwork; pavement evaluation and maintenance. **Prerequisites:** undergraduate course or experience in transportation systems

CE 513 Construction Management - 3 hrs. Same as CE 413 An introduction to construction project planning and scheduling by network diagrams. Estimating and project control fundamentals. Various equipment and productivity are included. **Prerequisite**: undergraduate studies or experience in construction

CE 514 Design of Timber Structures - 3 hrs. Same as CE 414. A study of wood as an engineering design material. Beams, columns, plywood design, and glued laminated structural members as used in actual design and construction are covered. **Prerequisite:** undergraduate course in structural analysis

CE 550 Hydraulics of Open Channel Flow - 3 hrs. Same as CE 450. A study of the mechanics of fluid flow in open channels, as an extension of basic engineering hydraulics and experimental concepts applied to the theory, design, and shape optimization of open channels. Classification of flow, channel cross section, hydraulic jump, stilling basins, specific energy, culvert hydraulics, and the use of design charts and tables are included. **Prerequisite**: undergraduate course in hydrogeology

CE 555 Wastewater Treatment - 3 hrs. Same as CE 455. An introduction to wastewater characteristics and treatment processes; biological mechanism, reactors, waste treatment, and kinetics. The engineering design of physical processes such as sedimentation, thickening, and filtration, as well as chemical processes, processing of sludge and advanced wastewater treatment processes are included. A field trip to wastewater treatment plant is required. **Prerequisites**: undergraduate course in hydrogeology

CE 556 Solid Waste Disposal - 3 hrs. Same as CE 456. An introduction to the problem of solid waste management, types and quantities of wastes, collection and transportation of wastes, composting, landfill and incineration, and recycling of wastes and resource recovery. **Prerequisite**: undergraduate course or experience in environmental analysis

CE 557 Hazardous Waste Management - 3 hrs. Same as CE 457. An introduction to the transportation, storage, and disposal of hazardous wastes. Legal aspects of hazardous materials, cleanup of hazardous material spills, and the impact of hazardous materials on the environment are all covered. **Prerequisite**: undergraduate course or experience in environmental analysis

Electrical Engineering

EE 502 Electrical Machines -3 hrs. Same as EE 402. A study of energy conversion; D.C. machines, motors, generators, principles of operation, characteristics, and applications; transformers and induction machines, principles of operation, characteristics, and applications;

and synchronous machines, alternators, synchronous motors, principles of operation, characteristics, and applications. **Prerequisite:** undergraduate course in electromagnetic theory

EE 503 Feedback System Analysis and Design - 3 hrs. Same as EE 403*. A study of open and closed loop systems; time domain analysis; transfer functions, poles, and zeros; frequency response, Bode plots; root locus methods; system stability, Routh-Hurwitz criterion, Nyquist criterion; system compensation and design; state space methods, state equations, state transition matrix, and system response. **Prerequisite**: undergraduate course in electrical signal analysis

EE 504 Communication Theory -3 hrs. Same as EE 404*. A study of communication signals and systems; AM and FM methods; pulse code modulation; multiplexing, and digital communications. Prerequisite: undergraduate course in electrical signal analysis

EE 510 Microwave Engineering - 3 hrs. Same as EE 410*. A review of electromagnetic theory, transmission lines and waveguides, circuit theory for waveguide systems, impedance matching and transformation, passive microwave devices, electromagnetic resonators, and periodic structures and filters. **Prerequisite**: undergraduate course in electromagnetic theory

EE 520 Power Systems I - 3 hrs. Same as EE 420. Fundamental concepts of power system analysis, transmission line parameters, basic system models, steady state performance, network calculations, power flow solutions, symmetrical components, fault studies, operating strategies and control. **Prerequisite:** undergraduate course or experience in energy conversion

EE 521 Power Systems II - 3 hrs. Same as EE 421. Generating station characteristics, transmission line calculations, load studies and economic operations, and stability. Prerequisite: EE 520 or extensive experience in power systems

EE 524 Advanced Digital Systems - 3 hrs. Same as EE 424. A course designed to provide digital system design experience using the Verilog hardware description language (Verilog HDL). The history of descriptive hardware design and features of hardware description languages are explained along with design and simulation examples. With the use of the industry standard simulation and synthesis tools, designs will be constructed, synthesized, and configured in Field Programmable Gate Arrays (FPGA) or other Programmable Logic Devices. **Prerequisite:** undergraduate course or experience with microprocessors

EE 531 Advanced Semiconductor Engineering – 3 hrs. Same as EE 431*. Principles of device electronics, physics of band models, Schottky barriers, bipolar and unipolar devices, conduction phenomena, SRH generation-recombination statistics, role of defects and noise. The course provides an introduction to wide-bandgap semiconductors and devices. **Prerequisite**: undergraduate course or experience in semiconductor engineering

EE 541 Digital Signal Processing - 3 hrs. Same as EE 441. A review of discrete time signals and systems; sampling of continuous time signals, sampling theorem; discrete time Fourier

transforms; Z-transforms; region of convergence; applications; discrete Fourier transforms; fast Fourier transforms; design of digital filters, IIR filters, FIR filters, and computer-aided design**.** **Prerequisite**: undergraduate course or experience in signal processing

EE 545 Advanced Electromagnetic Theory - 3 hrs. Same as EE 445. Solution of Laplace's equation in two dimensions, circular harmonics, cylindrical harmonics, method of finite differences; wave propagation, perfect dielectrics, conductors, lossy dielectrics, transmission line analogy, Smith chart solutions; and computer applications. **Prerequisite**: undergraduate course in electromagnetic theory

EE 551 Integrated Circuit Fabrication - 3 hrs. Same as EE 451*. Introduction to principles of monolithic IC fabrication including bipolar and MOS transistor processing. The course includes active and passive device and process design, simulation, cleanroom procedures, in-process and final test and evaluation techniques, yield, chip assembly and packaging. **Prerequisite**: undergraduate course or experience in semiconductor devices

EE 552 Semiconductor Instrumentation - 3 hrs. Same as EE 452*. Basic principles of semiconductor testing and evaluation. Various tools and techniques will be introduced for test and evaluation of semiconductor materials, devices and integrated circuits. **Prerequisite**: undergraduate course or experience in semiconductor devices

EE 555 Optimal Control Theory - 3 hrs. Same as EE 455. A review of state space methods; optimal control problems, performance criterion, minimum time problems, minimum energy problems, and minimum fuel problems; optimization, using calculus of variations, Lagrange, Meyer, and Bolza problems, Lagrange equations, solution, applications; Pontryagin's maximum principle, formulation, co-state variables, solution; dynamic programming, principle of optimality, discrete control processes; Hamilton-Jacobi approach, closed loop control law, matrix Riccati equation, applications; and stability in the sense of Lyapunov. **Prerequisite:** undergraduate course in control theory

EE 556 Nonlinear Control Systems - 3 hrs. Same as EE 456. A study of nonlinearities, classification, saturation, dead zone, hysteresis; phase plane formulation, phase portraits; description of function approach, limit cycles, and relay servomechanisms. **Prerequisite**: undergraduate course in control theory

Mechanical Engineering

ME 511 Power Plant Performance - 3 hrs. Same as ME 411*. A study of the fundamentals of aerothermodynamics of propulsion systems, cycle analysis, ideal Bryton air cycle, and real turbojet and turbofan performance. Basic sizing techniques, economy parameters, performance simulation, and prediction will be covered. Introduction to power plant/airframe integration will be introduced. **Prerequisites**: undergraduate course in thermodynamics and power generation

ME 512 Analysis and Synthesis of Gas Turbines and Components - 3 hrs. Same as ME 412*. A review of aerothermodynamics of propulsion systems, characterization of power plant utilization, and operation cycle analysis. On-off design performance, component characterization, component design, component matching, optimization, and introduction to power plant integration systems in a fixed or moving architecture are also covered. **Prerequisite**: ME 511 or the equivalent

ME 513 Rocket Propulsion - 3 hrs. Same as ME 413*. A study of propulsion system requirements for terrestrial and interplanetary flight. Basic principles and performance of both solid and liquid chemical rocket propulsion systems, elements of nuclear rockets, nuclear-electrical power systems, and electrical propulsion systems are addressed. **Prerequisites**: undergraduate courses in thermodynamics and fluid mechanics

ME 514 Gas Turbine Engine Design and Manufacture - 3 hrs. Same as ME 414 A study of synthesis of gas turbine design under the constraints of power plant system integration or airframe integration. Definitions of system requirements, preliminary configuration analysis and engine sizing; inlet preliminary design; compressor, combustor, turbine and nozzle design; co-generation and heat recovery considered for stationary power plants.; engine on and off design performance simulation; installed thrust and system interference effects; noise sources and noise control are covered. **Prerequisites**: undergraduate courses in heat and mass transfer and machine dynamics

ME 515 Heating, Ventilating, Air Conditioning, Refrigeration - 3 hrs. Same as ME 415. A study of refrigeration cycles, psychrometrics, thermal comfort, ventilation, duct design, equipment sizing, energy recovery, and solar design concepts. **Prerequisites**: undergraduate courses in thermodynamics and heat and mass transfer

ME 516 Gas Dynamics - 3 hrs. Same as ME 416*. A study of the fundamental theory of one-dimensional gas dynamics: Isentropic flow, flow in converging-diverging nozzles, shock propagation, normal and oblique shock theory, Prandtl-Meyer expansions, Fanno line flow, and measurement methods. **Prerequisites**: undergraduate courses in thermodynamics and fluid mechanics

ME 532 Design for Manufacture and Reliability - 3 hrs. Same as ME 432*. A study of the design synthesis and methods; strength design of mechanical structures and components; optimization and reliability principles; and computer-aided design techniques. Emphasis is on modeling synergistic processes for manufacture. **Prerequisites**: undergraduate course in machine dynamics or consent of instructor.

ME 571 Systems Engineering - 3 hrs. Same as ME 471. The systems engineering process is defined and investigated in this course. Among the topics introduced and studied are conceptual, preliminary, and detail design concepts using modern tools such as CAD, optimization, and

systems test and evaluation in completing designs built for increased reliability, maintainability, and supportability. Environmental and social impact and life-cycle costs are also introduced. **Prerequisites**: undergraduate courses in advanced engineering mathematics.

ME 572 Economic Evaluation of Design - 3 hrs. Same as ME 472*. The concepts of life-cycle costs and optimization of alternatives are investigated. The formal study of decision-making and economic theory are applied to engineering projects. Case studies are used. **Prerequisites:** undergraduate course in machine dynamics or consent of instructor

ME 573 Logistics - 3 hrs. A study of the initial distribution and the subsequent sustaining life-cycle maintenance and support of a system of products throughout the consumer use phase. Systems design will be re-evaluated with emphasis placed on maintenance and support, taking into consideration reliability, maintainability, human factors, and life-cycle cost factors. **Prerequisite**: undergraduate course or experience in system design

ME 581 Quality and Reliability Assurance - 3 hrs. Same as ME 481*. An introduction to probability and statistics. Quantitative techniques for establishing product specifications and process controls for quality assurance, ISO 9000; the role of reliability in manufacturing operations; and so forth, are covered. **Prerequisite**: undergraduate course or experience in system design

ME 582 Operations Planning and Scheduling - 3 hrs. Same as ME 482*. Analysis and design of production and control systems for both intermittent and continuous manufacturing, inventory effects on production, and production control techniques review of Just In Time manufacturing. Emphasis is given to extending concurrent engineering techniques and methods for manufacturing and product development. **Prerequisite:** undergraduate course or experience in concurrent engineering

DEPARTMENT OF TECHNOLOGY

MASTER OF SCIENCE IN INDUSTRIAL TECHNOLOGY

The objective of the graduate program in Industrial Technology is to provide students with advanced technical-management and leadership competencies needed to broaden their career potential for positions in business, industry, education, and government. This objective is achieved through a curriculum that emphasizes:

1. Project planning and implementation.

2. Tools and strategies for process improvement.

3. The safe, effective, efficient, and creative use of technological resources and materials in performing technological processes.

4. The application of mathematics, natural/physical sciences, social sciences and technological concepts in solving practical technology problems and extending human capabilities.

5. Principles, practices, and standards used in performing tasks associated with technology-based systems.

6. Supervision of personnel and the management of technology systems in the production of consumer goods and services.

7. Design and delivery of instruction in a career/technical education program at the secondary and

post-secondary levels.

MASTER OF SCIENCE IN INDUSTRIAL TECHNOLOGY

The Master of Science Degree Program in Industrial Technology is designed to provide students with the skills required for applying technical innovations in the analysis of technical systems and enhancement of productivity. The program is designed with flexibility to prepare students for managerial and leadership positions in business, industry, education, and government.

ADMISSION REQUIREMENTS

This specialization is available to all students who have completed: (1) Bachelor of Science Degree in Industrial Technology or Industrial Technology related discipline; (2) Bachelor of Science Degree in any field and a minimum of 24-semester hours of course work in Industrial Technology or Industrial Technology related discipline; or (3) A bachelor's degree in any academic discipline and a minimum of three (3) years work experience in industry.

The graduate faculty considers the following factors to decide whether or not to recommend an applicant for admission:

1. Entrance Examination: GRE – 800 (verbal & quantitative combined with a minimum score of 400 on each).
2. A minimum grade point average of 2.50 in the undergraduate major. An applicant must have a minimum of 6 semester hours of mathematics (Pre-Calculus Algebra and Pre-Calculus Trigonometry), and 6 semester hours of physics and/or chemistry.

PROGRAM OF STUDY

Thesis Option

The thesis option requires a minimum of 24 semester hours of course work and a thesis. This option includes twelve (12) semester hours of core, twelve (12) semester-hours of electives in the area of study, and six (6) semester-hours of thesis. The electives should be chosen in any area that strengthens a student's goal, and as approved by the advisor.

Non-Thesis Option

Students electing the non-thesis option must complete twelve (12) semester-hours of core, twelve (12) semester-hours of courses in the area of concentration, and nine (9) semester-hours of electives in a minor area. The electives should be chosen in any area that strengthens the student's goal, and as approved by the student advisor. Students who choose the non-thesis option must take three (3) semester-hours of INT 550 or TTE 550 (Individual Research Problems). Electives may be selected from business, mathematics, engineering/technology, computer science, or any other area approved by the advisor.

All candidates for the Master of Science degree in Industrial Technology Management must pass a comprehensive examination administered by the Department.

GRADUATE CURRICULUM IN INDUSTRIAL TECHNOLOGY

Industrial Technology Core (12-semester hours required)

Course Number	Course Name	Semester Hours
INT 523	Applications of Statistical Methods	3
INT 525	Management of Technology & Operations	3
INT 560	Project Management	3
INT 575	Engineering Cost Analysis*	3

Technical Concentration

Specializations are available in Industrial Management and Manufacturing Systems management. However, students may choose a combination of courses that meet their individual career goals.

Concentration in Industrial Management

Course Number	Course Name	Semester Hours
INT 530	Industrial Systems Management	3
INT 534	Quality Management	3
INT 535	Organizational Leadership and Supervision	3
INT 538	Facilities Planning	3

Concentration in Manufacturing Systems Management

Course Number	Course Name	Semester Hours
INT 510	Computer-Integrated Manufacturing	3
INT 515	Statistical Quality Control	3
INT 539	Lean Manufacturing	3
INT 540	Manufacturing Systems Analysis	3

Technical Electives

Students who select the non-thesis option must complete INT 550 or TTE 550 (Individual Research Problems) and nine (9) semester hours of technical electives that further strengthen their career objectives. A minimum of three (3) semester hours must be selected from the list below. These electives may be supplemented with other graduate-level courses not listed below upon the approval of the student's faculty advisor.

Course Number	Course Name	Semester Hours
EET 501	Telecommunications and Network Technology	3
EET 505	Computer Telephony Integration	3
EET 516	Automatic Control Systems I	3
EET 517	Automatic Control Systems II	3
EET 518	Robotics	3
INT 500	Manufacturing and Design Problems	3
INT 515	Statistical Quality Control	3
INT 534	Quality Management	3
INT 535	Organizational Leadership and Supervision	3
INT 540	Manufacturing Systems Analysis	3
INT 541	Design and Analysis of Experiments	3
INT 602	Industrial Psychology	3
LSM 536	Logistics & supply Chain Management	3
LSM 572	Logistics & Supply Chain Risk Management	3
MGT 554	Training & Development	3
MGT 508	Legal Environment and Ethics	3
MKT 510	Operations Management	3

A maximum of twelve semester hours of approved graduate credits may be transferred from an accredited institution.

POST-SECONDARY TECHNICAL INSTRUCTOR DEVELOPMENT
(formerly Postsecondary Industrial Technology Education)

This master's degree program concentration is intended for those professionals who are teach in a career/technical education program at the postsecondary level and are interested in obtaining an advanced degree at the master's level advance in their career profession. Each applicant must hold a bachelor's degree in a career/technical program area; and the minimum required work wage earning work experience to be admitted to the program concentration. This master's degree concentration does not lead to a Class A Secondary Professional Educator Certificate Endorsed in Technical Education.

Technical Instruction Development (24-semester hours required)

Course Number	Course Title	Semester Hours
TED502	Instructional Strategies, Materials Development, and Technology in Career/Technical Education	3
TED503	Career Information and Guidance	3
TED506	Principles of Teaching Technical Subjects in Career/Technical Education	3
TED509	Special Needs in Career/Technical Education	3
TED510	Foundations in Career and Technical Education	3
TED512	Curriculum Development Systems in Career/Technical Education	3
TED521	Evaluating Student Achievement in Career/Technical Education	3
TED525	Instructional Development Systems in Industry	3
	Total	**24**

Elective Courses (6:12-semester hours required). Thesis Option only requires TED599

INT510	Principles of Industrial Management	3
INT535	Industrial Supervision	3
INT602	Industrial Psychology	3
TED504	Classroom/Laboratory Management in Career/Technical Education	3
TED509	Special Needs in Career/Technical Education	3
TED540	Supervised Occupational Development	3
TED550	Practicum	3
TED599	Thesis Research (Thesis Option only)	3
	Total	**6:12**

SPECIALIST DEGREE IN GENERAL EDUCATION
Postsecondary Career and Technical Education
36-Semester Hours

This specialist degree program area is intended for those professionals who are teaching in a career/technical education program at the postsecondary level and are interested in obtaining advanced degree at the specialist level to advance in their career profession. Each applicant must hold a master's degree in an area of Career/Technical Education to be admitted to this specialist degree program; and all admission requirements of the Schools of Graduate Studies and Education.

Core Foundation Courses (15-semester hours required)

FED600 Advanced Curriculum Development	3
FED605 Qualitative Methods in Educational Research	3
FED604 Advanced Evaluation of Teaching and Learning	3
FED603 Advanced Educational Research	3
SPE501 Introduction to the Study of Exceptional Children **or**	3
TED509 Special Needs In Career/Technical Education	(3)

Required Technical Education Courses (15-semester hours required)

TED600 Contemporary Issues and Philosophy of Career and Technical Education	3
TED610 Research and Evaluation in Career and Technical Education	3
TED618 Administration, Leadership, and Legislation in Career and Technical Education	3
TED630 Career Education and Workforce Development	3

(Choose one course from the following):

TED521 Evaluating Student Achievement in Career and Technical Education	(3)
TED617 Postsecondary Career and Technical Education Programs	(3)
TED621 Teaching in Career and Technical Education	(3)
TED640 Supervised Occupational Development	(3)
INT602 Industrial Psychology	(3)

Thesis (6-semester hours required)

TED699 Thesis Research	6
Total	36

SECONDARY TECHNICAL EDUCATION TEACHING FIELD

This graduate secondary teaching field program is designed to provide advanced coursework in Technical Education at the graduate level. In addition to the admission requirements of the Schools of Graduate Studies and Education each applicant must meet the specific requirements listed below to be admitted to this secondary teaching field program.

1. Class A Program (Master of Education Degree in Secondary Education). Class B Secondary Professional Education Certificate Endorsed in Technical Education is required.

2. Alternative-A Program (Master of Education Degree in Secondary Education). Level 3 or Level 4 Career/Technical Certificate Endorsed in Technical Education is required. Health Education teachers who desire to complete the master's degree must have a Level 4 Career/Technical Certificate Endorsed in Health Education.

3. Class AA Program (Educational Specialist Degree in Secondary Education). Class A Secondary Professional Education Certificate Endorsed in Technical Education is required.

MASTER OF EDUCATION IN SECONDARY EDUCATION
Technical Education
Class A Program
33:36 Semester Hours Required

Technical Education coursework (12-semester hours required)

TED501 Teaching Curriculum Core Subjects in Career/Technical Education	3
TED502 Instructional Strategies, Materials Development and Technology in Career/Technical Education	3
TED512 Curriculum Development Systems	3

Complete one of the following courses:

TED503 Career Information and Guidance (required, if not previously taken) **or**	(3)
TED510 Foundations in Career and Technical Education	(3)
TED521 Evaluating Student Achievement in Career and Technical Education	(3)
TED540 Supervised Occupational Development	(3)
Total	12

Secondary Education coursework (21:24-semester hours required)

FED500 Professional Seminar	3
FED503 Introduction to Education Required	3
FED504 Evaluation of Teaching and Learning	3
FED529 Computer-Based Instructional Technology	3
FED501 Foundations in Education **or**	3
FED521 Multicultural Education	(3)
SED527 Guiding Learning in Secondary Schools **or**	3
FED531 Current & Emerging Instructional Technologies	(3)
SED530 The Secondary School Curriculum **or**	3
FED532 Curriculum Integration of Technology	(3)
SPE501 Introduction to the Study of Exceptional Learner (required, if not previously taken)	0 or 3
Total	21:24

MASTER OF EDUCATION IN SECONDARY EDUCATION
Technical Education (TED)
Alternative-A Program
42:45-Semester Hours Required

Technical Education coursework (15-semester hours required)

TED501 Teaching Curriculum Core Subjects in Career/Technical Education	3
TED502 Instructional Strategies, Materials Development and Technology in Career and Technical Education	3
TED510 Foundations in Career and Technical Education	3
TED512 Curriculum Development Systems in Career and Technical Education	3

Complete one of the following courses:

TED503 Career Information and Guidance (required, if not previously taken) **or**	3
TED521 Evaluating Student Achievement in Career and Technical Education	(3)
TED540 Supervised Occupational Development	(3)
TED550 Practicum in Technical Education	(3)
INT510 Principles of Industrial Management	(3)

Secondary Education coursework (27:30-semester hours required)

FED500 Professional Seminar	3
FED503 Introduction to Educational Research	3
FED504 Evaluation of Teaching and Learning	3
FED529 Computer-Based Instructional Technology	3
FED501 Foundations of Education **or**	3
SED515 Reading in Content Areas	3
TED595 Internship in Technical Education	3
FED521 Multicultural Education	(3)
FED501 Foundations of Education **or**	3
FED521 Multicultural Education	(3)
SPE501 Introduction to Study of Exceptional Learners **(required, if not previously taken)**	0 or 3
SED515 Reading in Content Areas	3
TED505 Coordination of Cooperative Career and Technical Education(required, if not previously completed) **or**	3
Elective course: TED521, TED540, TED550, of INT510	(3)
Total	42:45

EDUCATIONAL SPECIALIST IN SECONDARY EDUCATION
Technical Education (TED)
Class AA Program
36:39-Semester Hours Required

Technical Education coursework (12-semester hours required)

TED600 Contemporary Issues and Philosophy of Career and Technical Education	3
TED610 Research and Evaluation in Career and Technical Education	3
TED621 Teaching in Career and Technical Education	3

Complete one of the following courses:

TED617 Postsecondary Career and Technical Education Programs	(3)
TED618 Administration, Leadership, and Legislation in Career and Technical Education	(3)
TED625 Instructional Supervision	(3)
TED630 Career Education and Workforce Development	(3)
TED640 Supervised Occupational Development	(3)

Thesis (6-semester hours required)

TED699 Thesis Research	6

Secondary Education (18:21-semester hours required)

EAS 563 Instructional Supervision and Curriculum Development	3
FED600 Advanced Curriculum Development	3
FED601 Advanced Philosophy of Education	3
FED603 Advanced Educational Research	3
FED604 Advanced Evaluation of Teaching and Learning	3
FED602 Quantitative Methods of Educational Research **or**	3
FED605 Qualitative Methods of Educational Research	(3)
SPE501 Introduction to study of Exceptional Children	0-3

Secondary Career Technologies Education Teaching Field (CTE)

(Nationally known as Technology Education)

Career Technologies Education, a Secondary Education teaching program in the School of Graduate Studies, offers curriculum leading to the Master's and Education Specialist degrees in secondary education. With the growing importance of technology to society, it is vital that students receive an education that emphasizes technological literacy (ITEA, 2000). Students need to understand technology so they can make appropriate career choices regarding the field. The program is designed to assist candidates accomplish the following:

- Achieve broader foundational knowledge and understanding in the field of education.
- Develop competency in the use of educational tools to improve learning in technology.
- Increase proficiency across the broad spectrum of teacher knowledge in relation to current thinking in Career Technologies Education.

Career Technologies Education (CTE)
Alternative Masters Program (Class A)
Master of Education Degree in Secondary Education

Foundation of Professional Studies (3-sh required)

FED 501	Foundations of Education **or**	3
FED 521	Multicultural Education	3

Special Education Coursework (Required if not previously completed 3-sh):

SPE 501	Intro. Study of Excep. Children	0-3

Technology (3-sh):

FED 529	Computer-Based Instructional Technology	3

Evaluation of Teaching and Learning (3-sh):

FED 504	Eval. of Teaching & Learning	3

Reading (3-sh):

SED 515	Reading in the Content Area	3

Internship (6-sh):

CTE 595	Internship	6

Teaching Field (15-sh):

CTE 501	Curriculum Development in CTE	3
CTE 502	Principles of Teaching in Career Technologies Edu.	3
CTE 503	Career Information and Guidance	3
CTE 504	Foundation & Leadership in CTE	3

CTE 510	History, Objectives, Philosophy, and Principles of CTE **or**	3
CTE 513	Managing Technology Education Lab **or**	3
CTE 521	Evaluating Student Achievement in CTE **or**	3
CTE 560	CTE Student Organizations **or**	3
CTE 615	Imp M & M in Manufacturing Technology **or**	3
CTE 617	Imp M & M in Construction Technology **or**	3
CTE 618	Imp M & M in Power & Energy Technology **or**	3
CTE 619	Imp M & M in Transportation Technology	3
CTE 620	Imp M & M in Bio-Technologies	3
Additional Requirements/Electives (9-sh required)		
EDU 501	Professional Seminar	3
SED 515	Reading in Content Areas	3
INT 610	Seminar	3
CTE 615, CTE 617, CTE 618, CTE 619, or CTE 620		3

Total Masters of Education Degree 42-45

Career Technologies Education (CTE)
Class A Program
Master of Education Degree in Secondary Education

Foundation of Professional Studies (3-sh required)		
FED 501	Foundations of Education **or**	3
FED 521	Multicultural Education	3
Special Education Coursework (Required if not previously completed 3-sh):		
SPE 501	Intro. Study of Excep. Children	0-3
Technology (3-sh):		
FED 529	Computer-Based Instructional Technology	3
Evaluation of Teaching and Learning (3-sh):		
FED 504	Eval. of Teaching & Learning	0-3
Educational Research (3-sh):		
FED 503	Introduction to Educational Research	3
Teaching Field (12-sh):		
CTE 501	Curriculum Development in CTE	3
CTE 502	Principles of Teaching in Career Technologies Edu.	3
CTE 503	Career Information and Guidance	3
CTE 504	Foundation & Leadership in CTE **or**	3
CTE 510	History, Objectives, Philosophy, and Principles of CTE **or**	3
CTE 513	Managing Technology Education Lab **or**	3
CTE 521	Evaluating Student Achievement in CTE **or**	3

CTE 560	CTE Student Organizations **or**	3
CTE 615	Imp M & M in Manufacturing Technology **or**	3
CTE 617	Imp M & M in Construction Technology **or**	3
CTE 618	Imp M & M in Power & Energy Technology **or**	3
CTE 619	Imp M & M in Transportation Technology	3
CTE 620	Imp M & M in Bio-Technologies	3

Additional Requirements/Electives (9-sh required) ***For students in TSPAT program FED 531 and FED 532 should be taken***

SED 527	Guiding Learning in Secondary Schools **or**	3
FED 531	Current & Emerging Instructional Technologies	3
SED 530	The Secondary School Curriculum **or**	3
FED 532	Curriculum Integration of Technology	3
EDU 500	Professional Seminar	3

Total Masters of Education Degree 36

Career Technologies Education (CTE)
Class AA Program
Educational Specialist Degree in Secondary Education

This program applies to students who have completed an approved teacher education program in Career Technologies Education or Technology Education at the Master's Degree level with an Class A Certification endorsed in Career Technologies Education or Technology Education.

Foundation of Professional Studies (3-sh required)

FED600	Advanced Curriculum Development	3

Special Education Coursework (Required if not previously completed 3-sh):

SPE 501	Intro. Study of Excep. Children	0-3

Evaluation (3-sh):

FED 604	Advanced Evaluation of Teaching and Learning	3

Educational Research (6-sh):

FED 602	Quantitative Methods of Educational Research **or**	3
FED 605	Qualitative Methods of Educational Research	3
FED 603	Advanced Educational Research	3

Thesis (6-sh required)

CTE 699	Thesis Research	6

Teaching Field (12-sh):

CTE 601 Appropriate Technology	3
CTE 602 Technology Education in the 21st Century	3
CTE 603 W'shop in Teaching Lab in Career Tech Bio-Technologies	3

CTE 604 W'shop in Teaching Lab in Career Tech Manufacturing Technology **or**	3
CTE 605 W'shop in Teaching Lab in Career Tech Construction Technology **or**	3
CTE 606 W'shop in Teaching Lab in Career Tech Communication Technology **or**	3
CTE 621 Seminar in Administration and Leadership in CTE **or**	3

Additional Requirements/Electives (9-sh):

EAS 563	Instructional Supervision & Curriculum Dev	3
FED 601	Advanced Philosophy of Education	3

Total Educational Specialist Degree 36-39

DESCRIPTION OF CAREER TECHNOLOGIES COURSES (CTE)

CTE 501 Curriculum Development in CTE – 3 semester hours**.** Course emphasizes the analysis of appropriate materials and methods used in teaching and evaluating the most current strategies in Career Technologies Education.

CTE 502 Principles of Teaching in Career Technologies Education – 3 semester hours**.** The meaning and importance of statistics as a scientific tool in educational investigation' measures of central tendency, variability, and relation as descriptive devices; the computation of descriptive measures, and the presentation of data in graphical and tabular forms. Cross-listed with EDU 502.

CTE 503 Career Information, and Guidance – 3 semester hours**.** Research and development in theories of technology education and occupational choice; and models of CTE programs.

CTE 504 Foundation & Leadership in Career Technologies Education – 3 semester hours**.**
An investigation in the development, management and implementation of CTE programs to include social capital strategies for partnership linkages.

CTE 505 Individual Studies in CTE – 3 semester hours**.** Independent research and discovery in CTE subjects. Designed to provide an in-depth exploration of current CTE areas under discussion.

CTE 510 History, Objectives, Philosophy, and Principles of CTE – 3 semester hours**.** An investigation of the origin and development of Career Technologies Education through significant periods; applicable federal and state public impacting career technologies education; and foundations, purposes, and objectives of career technologies education.

CTE 512 Curriculum Development and Evaluation in CTE – 3 semester hours**.** An analysis of methods and procedures used in analyzing occupations for teaching content; organization and sequence of instruction; development of learning objectives and outcomes.

CTE 513 Managing Technology Education Lab – 3 semester hours**.** Physical aspects of facilities and laboratories. Purchase and inventory of supplies, materials, and equipment; selection, acquisition and installation of equipment; equipment agreements and maintenance; development of desirable lab layout. The basic philosophy of exploratory and discovery of technology, use of instructional technology and development of programs for special groups.

CTE 521 Evaluating Student Achievement in CTE – 3 semester hours**.** Methods and procedures for developing and administering achievement assessments in CTE.

CTE 601 Appropriate Technology – 3 semester hours**.** Examination and selected readings from CTTE Yearbooks.

CTE 602 Technology Education in the 21st Century – 3 semester hours**.** Examination and selected readings from CTTE Yearbooks.

CTE 610 Research and Evaluation in CTE – 3 semester hours**.** Research methodology and techniques of analyzing education data with special focus on career technologies education programs.

CTE 615 Improved Methods & Materials in Manufacturing Technology – 3 semester hours**.** Advanced study of recent developments in manufacturing technology, including procedures and problems in the context technology learning and careers.

CTE 617 Improved Methods & Materials in Construction Technology – 3 semester hours**.** Advanced study of the recent developments in construction technology, including the examination of the role of the construction project manager in the context of technology learning and careers.

CTE 618 Improved Methods & Materials in Power & Energy Technology – 3 semester hours**.** Advanced study of the recent developments in power and energy technology, including the examination of research trends in new discoveries in the context of technology learning and careers.

CTE 619 Improved Methods & Materials in Transportation Technology – 3 semester hours**.** Advanced study of the recent developments in transportation technology, including the examination of issues and research trends in new discoveries in the context of technology learning and careers.

CTE 620 Improved Methods & Materials in Bio-Technologies – 3 semester hours**.** Advanced study of the recent developments in bio-technologies technology, including the examination of issues and research trends in new discoveries in the context of technology learning and careers.

DESCRIPTIONS OF INDUSTRIAL TECHNOLOGY MANAGEMENT COURSES (INT)

EET 501 Computer Telephony Integration – 3 semester hours.

Introduction to modern telecommunication and networking technologies. Including data traffic, queuing models, multi-access channels, switching and routing. Covers X.25, ISDN, Frame Relay, Asynchronous transfer mode, SONET, and wireless networks. Prerequisite: graduate standing. Course scheduling: offered as needed.

EET 505 Computer Telephony Integration – 3 semester hours.

Introduces Enterprise computer telephony integration (ECTI) applications and advanced intelligent network (AIN) services. Covers examples of advanced carrier delivered services including; Virtual call centers, applications for effective customer interactions, productivity applications for Centrex users, blending of formal and informal call centers, and extending the resource pool of call centers to professionals working at home. Also provides an introduction to Network Computer-Telephony Integration (NCTI). Prerequisite: EET 501. Course scheduling: offered as needed.

EET 516 Automatic Control Systems I – 3 semester hours.

Methods and principles of automatic control. Pneumatic, hydraulic, and electrical systems. Representative applications of automatic control systems. Modeling and simulation of mechanical systems. Development of equation of motion and dynamic response characteristics. Fundamentals of classical control applications, including mathematical analysis and design of closed loop control systems. Introduction to computer interfacing for data acquisition and control. Prerequisite: graduate standing. Course scheduling: offered as needed.

EET 517 Automatic Control Systems II– 3 semester hours.

A continuation of EET 516 Automatic Controls I. This course studies the application of modern control design methods including optimal control, stochastic control and digital control. Includes Electrical and Mechanical design projects with electrical motors, hydraulics and pneumatics. Prerequisite: EET 516. Course scheduling: offered as needed.

EET 518 Robotics – Three Semester Hours.

Covers components of a Robot System, types, electronic system components, analog-digital conversion and error analysis. Also covers three-dimensional kinematics, dynamics and control of robot manipulators, hardware elements and sensors. Students will learn to analyze and design robot manipulators. Students will work in teams to develop a graphical simulation of a robotic system using a high-level language and graphics package. Prerequisite: graduate standing. Course scheduling: offered as needed.

EET 612 Special Problems - Three Semester Hours.

Individualized research and investigation into areas not covered in other classes.

INT 500 Manufacturing and Design Problems – Three Semester Hours.

Advanced study of recent developments in manufacturing, including mechanical design procedures and problems of manufacturing. Critical path scheduling and machine relations are also covered.

INT 510 Computer-Integrated Manufacturing – Three Semester Hours.

A laboratory-based course designed to Integrate the total manufacturing system. Topics include flow line production, materials handling, group technology, and flexible and computer integrated manufacturing. Prerequisite: INT 540

INT 515 Statistical Quality Control – Three Semester Hours.

Statistical theory and techniques for achieving product quality and process improvement.

INT 520 Occupational Safety and Health – Three Semester Hours.

Course cover workplace accidents and their effects; theories of accident causation; OSHA Act, standards, workplace hazardous; human factors and accidents; safety promotion and education; and accident investigation and reporting.

INT 523 Applications of Statistical Methods – Three Semester Hours.

Course is designed to acquaint students with basic research methodology as it applies to technology. Students develop competencies in basic research design, statistical analysis, and interpretation of research data.

INT 525 Management of Technology and Operations – Three Semester Hours.

Principles of operations and managements as related to technical resources.

INT 530 Industrial Systems Management – Three Semester Hours.

Principles and practices in managing a business or industrial enterprise; organization and management structure; procurement; quality and quantity control; research and development; management science; personnel management; labor-employee relations; and marketing in industrial and manufacturing plants.

INT 534 Quality Management – Three Semester Hours.

Fundamentals of statistical process controls, capability analysis, development and interpretation of control charts for variable and attribute data; sampling and probability in quality controls and reliability in quality controls.

INT 535 Organizational Leadership and Supervision – Three Semester Hours.

An analysis of supervisors' job with respect to their roles and responsibilities for supervising the work of subordinates and employing technology systems in the production of consumer goods and services.

INT 537 Safety Standards of Industry – Three Semester Hours.

A study of specific federal and state safety and health standards as applied to building and facilities, materials and handling and storage, machines and machine guarding., welding, electrical hazards, construction, and transportation in factors and plants.

INT 538 Facilities Planning – Three Semester Hours.

Survey and application of principles and methods used for solving plant layout and materials handling problems in industry.

INT 539 Production and Inventory Control Systems – Three Semester Hours.

Principles and techniques of minimizing cost of ordering, receiving, storing, issuing, scheduling, routing, dispatching, expediting, and controlling materials, parts, subassemblies, and final assembles of a manufacturing system.

INT 540 Manufacturing Management – Three Semester Hours.

Principles and practices of automating manufacturing operations and processes.

INT 541 Design and Analysis of Experiments – Three Semester Hours.

Principles and procedures for using statistically designed experiments for product and process improvement as well as their applications for improving quality and efficiency in systems. (Prerequisites: INT 523)

INT 550 Individual Research Problems – Three Semester Hours

Individual technology-related project to demonstrate students' ability to apply the knowledge, skills, and interest developed during their course of study. To be completed at the culmination of the program.

INT 554 Industrial Ergonomics – Three Semester Hours

Methods for designing tools, machines, tasks, and work procedures to meet physical (anthropometric and biomechanical) and mental requirements of human beings in working safely and efficiently.

INT 560 Project Management – Three Semester Hours

Theory and practice of managing projects including the application of modern project management software.

INT 570 Co-operative Education

Supervised industrial experience for students to participate in industrial activities. A minimum of 45 hours of employment is required during the semester in which the student is enrolled.

INT 575 Engineering Cost Analysis – Three Semester hours.

Practical approach for financial and technical decision making in evaluating the economic feasibility of engineering systems and projects. Applied engineering economy techniques for cost reduction, continuous profit improvement, and financial management of contemporary organizations.

INT 576 Time and Motion Studies – Three Semester Hours.

A study of advanced engineering methods in industry to include research studies in work measurements.

INT 602 Industrial Psychology – Three Semester Hours.

Psychological principles necessary to enhance the satisfaction and productivity of people at work. Psychology as a functioning instrument in ascertaining work attitudes, motivations, job satisfaction, morale, production, potential, fitting the workers to the job, and establishing worker-employer rapport **(same as PSY 602).**

INT 608 Materials Technology – Three Semester Hours.

Characteristics and applications of newer materials of industry. Materials research techniques and materials-oriented product.

INT 610 Seminar – Three Semester Hours.

Students research latest developments in technology that were not covered in other courses and make presentations in a classroom seminar arrangement.

INT 612 Special Problems – Three Semester Hours.

Individualized research and investigation into areas not covered in other classes.

DESCRIPTION OF TECHNICAL EDUCATION COURSES (TED)

TED 501 Teaching Curriculum Core Subjects in Career/Technical Education – Three Semester Hours. This course focuses on analyzing, selecting, and sequencing subjects to be taught in the curriculum core course in career/technical education at the secondary level. The candidate master teacher will develop a course of study, units of instruction and lesson plans to be used in teaching and evaluating student performance in the career/technical education curriculum core course. **Prerequisites**: Admission to the Teacher Education program in Technical Education; and completion of TED302, TED305, TED404, TED406, and TED409.

TED 502 Instructional Strategies, Materials Development, and Technology in Career/Technical Education – Three Semester Hours. This course focuses on developing and selecting instructional materials and strategies to be used in teaching technical subjects in career/technical education programs at the secondary or postsecondary level; and the use of the computer as a teaching tool in the classroom. The candidate teacher is required to develop units of instruction and lesson plans that incorporate instructional materials and strategies to be used in teaching and evaluating students' performance in the classroom, shop, and laboratory. **Pre-requisites:** Admission to the graduate school..

TED 503 Career Information and Guidance – Three Semester Hours. Course provides instruction on the foundations of career development; career counseling, appraisal, and students with special needs; career development practices; organizing career development programs; understanding the world of work; providing career guidance information; and special setting future possibilities. The use of a variety of computer assisted guidance systems to research career information is required in this course. This course is not opened to students who have completed TED403 or similar course at another institution.

TED 504 Classroom/Laboratory Management in Career and Technical Education – Three Semester Hours. This course includes instruction on excepted processes and practices of managing activities in the career/technical education laboratories and shops. Emphasis is placed on equipment and supply selection; facilities planning; materials control; maintenance and records; safety; organizing personnel; budget preparation; orienting students to laboratory and shop activities; students with special needs/special populations; adult students in career and technical education programs; and incorporating basic skills in career and technical education laboratory and shop activities. This course is not opened to students who have completed TED404 or a similar course at another institution.

TED 505 Coordination of Cooperative Career/Technical Education – Three Semester Hours. This course covers the responsibilities and roles of the teacher-coordinator in a cooperative career/technical education program. It includes instruction on establishing guidelines, policies, and procedures for the program; managing the attendance, transfers, and termination of Co-op students; cooperating with administrators, faculty, and counselors in selecting students for participation in the Co-op program; securing training stations, developing training plans, and training agreements; coordinating on-the-job instruction, providing student general related instruction in the classroom, and working with other career/technical education instructors in providing technical related instruction; evaluating students on-the-job performance; supervise an employer-employee appreciation event; and maintain an office in accordance with established local and state rules and policies. This course is not opened to students who have completed TED405 or similar course at another institution.

TED 506 Principles of Teaching Technical Subjects in Career and Technical Education – Three Semester Hours. The course is designed to provide the career and technical education teacher with the required knowledge and understanding to design and present technical instruction in a career/technical education program at the secondary and post-secondary levels. This course is not open to students who have completed TED406 or a similar course at another other institution. **Pre-requisites:** Admission to master's degree program in Technical Instructor Development.

TED 507 Career/Technical Student Organizations – Three Semester Hours. The duties and responsibilities of the career/technical education teacher in advising students in a career/technical student organization. This course is not available to students who have completed TED407 or similar course at another institution. **Prerequisites:** Admission to the graduate program in Technical Education.

TED 509 Special Needs in Career/Technical Education – Three Semester Hours. Course covers special populations in the workforce; learners with disabilities; characteristics of other special populations including educationally and economically disadvantages, single parents, individuals in correctional institutions; vocational assessment; individualized education programs; curriculum modification; instructional strategies; evaluation strategies; career and technical student organizations; coordinated student services; and transition process. This course is not opened to students who have completed TED409 or similar course at another institution.

TED 510 Foundations in Career/Technical Education – Three Semester Hours. This course covers the economical, educational, historical, philosophical, and psychological foundations of career and technical education and their impact on curriculum and instruction in career and technical education. **Pre-requisites:** Admission to Graduate School.

TED 512 Curriculum Development Systems in Career/Technical Education – Three Semester Hours. The course covers the systems approach to developing the curriculum for a career/technical education program at the secondary or postsecondary level. The student is required to employ the curriculum development system to develop a course of study for his/her specialty area in career/technical education. **Pre-requisites:** Admission to graduate program in Career and Technical Education.

TED 514 Individual Studies in Career/Technical Education - Three Semester Hours. Course provides an opportunity for career/technical education students to develop additional knowledge and understanding of specific program areas in career/technical education. **Pre-requisites:** Instructor's permission required to enroll in this course.

TED 521 Evaluating Students Achievement in Career/Technical Education – Three Semester Hours. Methods and procedures for developing instruments to be used in evaluating student's knowledge and understanding in a career/technical education program setting. Candidate teachers will be required to develop master test plans based on established course and program learning outcomes; knowledge and skills tests; procedures and standards for evaluating student performance in career/technical student organization contests; and follow-up studies of program graduates.

TED 525 Instructional Development Systems in Industry – Three Semester Hours. This course focuses on the system approach to developing courses for the development, training, and utilization of

technical employees in the workforce. Students are required to employ the instructional system approach in developing a technical course for use in industry. **Pre-requisites:** Admission to Graduate School.

TED 540 Supervised Occupational Development – Three Semester Hours. The career/technical education teacher participates in technical workshops and seminars conducted by professional organizations and society, and work experience programs directly related to their career/technical program area. This experience is designed to aid the career/technical education teacher in maintaining existing knowledge and skills; improving existing knowledge and skills; or developing new knowledge and skills. Instructor approved required prior to enrolling this course.

TED 550 Practicum in Technical Education – Three Semester Hours. Practical experience gained in a career and technical education in a classroom setting at the secondary or post-secondary level. Advisor's approval is required to participate in this course.

TED 599 Thesis Research – 6 semester hours. Enrollment in Thesis Research is limited to graduate students who have chosen the Thesis Option. Students must enroll in a minimum of two (2) semesters to complete the thesis. Students complete the thesis proposal during the first semester, and conduct the research and write the thesis during the second semester. This study is done under the supervision of the thesis advisor and committee, with the approval of the department head, school dean, and dean of graduate studies. **Pre-requisites:** Completion of 24 semester hours of graduate coursework and the comprehensive examination.

TED 600 Contemporary Issues and Philosophy in Career/Technical Education – Three Semester Hours. The course focuses on selected readings in the profession with emphasis on current issues in career/technical education; and significant philosophies that shape developments and future directions in career/technical education.

TED 610 Research and Evaluation in Career/Technical Education – Three Semester Hours. An analysis of research and evaluation studies on career/technical education; and recommendations for program improvements in curriculum and instruction; administration and supervision; and other program areas.

TED 614 Individual Studies in Career/Technical Education – Three Semester Hours. Course provides an opportunity for career/technical education students to develop additional knowledge and understanding of specific program areas in career/technical education. **Pre-requisites:** Instructor's permission required to enroll in this course.

TED 617 Postsecondary Career/Technical Education Programs – Three Semester Hours. An analysis of the contributions of postsecondary institutions to meet the career development needs of the adult population, developments in various program areas including curriculum, instruction, finance, administration, facilities, and evaluation. Future directions in postsecondary career/technical education programs are also considered.

TED 618 Administration, Leadership, and Legislation – Three Semester Hours. In this course the student will an analysis of public laws and policies at the federal and state levels; and their impact on career/technical education programs at the secondary and postsecondary levels.

TED 621 Teaching Career/Technical Education – Three Semester Hours. This course is designed for career/technical education teachers who are interested in improving the instructional process based on the results of recent research studies and practices in the following instructional area: planning, execution, evaluation, and management.

TED 625 Instructional Supervision – Three Semester Hours. The professional role and responsibility of school personnel in planning the student teaching experience and supervising student teachers during their internship; and newly employed teacher.

TED 630 Career Education and Workforce Development – Three Semester Hours. This course focuses on trends and issues in the training, development, and utilization of a contemporary workforce.

TED 640 Supervised Occupational Development – Three Semester Hours. – The career/technical education teacher participates in technical workshops and seminars conducted by professional organizations and society, and work experience programs directly related to their career/technical program area. This experience is designed to aid the career/technical education teacher in maintaining existing knowledge and skills; improving existing knowledge and skills; or developing new knowledge and skills. Instructor approved required prior to enrolling this course.

TED650 Practicum in Technical Education – Three Semester Hours. Practical experience gained in a career and technical education in a classroom setting at the secondary or post-secondary level. Advisor's approval is required to participate in this course. **Pre-requisites**

TED 699 Thesis Research – Six Semester Hours. This is a requirement for graduate students in the specialist degree program. Students must enroll in a minimum of two (2) semesters to complete the thesis. Students complete the thesis proposal during the first semester, and conduct the research and write the thesis during the second semester. This study is done under the supervision of the thesis advisor and committee, with the approval of the department head, school dean, and dean of graduate studies. **Pre-requisites:** Completion of 24 semester hours of graduate coursework in the specialist degree program and the comprehensive examination.

DEPARTMENT OF COMPUTER SCIENCE

Dr. Venkata Atluri, Interim Chairperson
Room 302 ETB

MISSION

The graduate program in Computer Science is consistent with the mission of the University and prepares students for careers at the forefront of computer research, teaching and industry. Computer Science is characteristically dynamic and fast changing discipline and students at Alabama A&M University are prepared to work at the cutting edge of this important and exciting field.

The computer science graduate faculty is composed of researchers in many vital areas of computer science. Areas of current faculty interests include database and knowledge-base systems, software engineering, object-oriented analysis, design and programming, pattern recognition, soft computing, image processing, computer vision, computer based simulation, artificial intelligence and expert systems, fuzzy and neural network system, operations research, bioinformatics, algorithms and complexity of programming languages, computer networks, computer security, and computer architecture.

Graduate students often work closely with computer science faculty on research and applied projects. The department maintains a wide range of laboratories with state-of-the-art computing equipment. These include work-stations running latest versions of Unix, Linux, and Windows. Graduate students in computer science can also have access to the Alabama State Super Computer and certain mainframe computers.

OBJECTIVES

The graduate program is designed to equip students with advanced knowledge, in both computer science theory and application. , This includes opportunities through funded research, seminars, lab-work, and field trips to acquire hands-on experience on a wide variety of state-of-the-art computer hardware and software systems.

The department offers a rigorous Master of Science degree in Computer Science, providing basic competence in the principal areas of Computer Science. On this foundation, the student has the opportunity to build expertise in one of a number of practical and theoretical subjects, working toward a deeper understanding under the guidance of a faculty member.

ADMISSION REQUIREMENTS

Admission to the Graduate Program in Computer Science must follow criteria set forth by the School of Graduate Studies. Prospective students should have a substantial background in computing, mathematics and science. The required computing background typically includes: competence in programming using C/C++/Java, discrete structures, data structures and algorithms, computer organization and architecture, programming language theory and operating systems. The required mathematics and science background includes two courses in college calculus, a linear algebra course, and exposure to mathematical logic. A student must have a GPA of 3.00 in these, as well as an overall undergraduate GPA of 3.00; otherwise the student must take required undergraduate background courses as specified by the graduate advisory committee at the time of admission.

To be admitted to the Master's program, the applicant must have approximately the equivalent of an undergraduate degree in Computer Science from a program comparable to the one at Alabama A&M University. In addition the candidate must have obtained a minimum score of 500 on the quantitative portion of the GRE.

GENERAL REQUIREMENTS

The background courses that are specified at the time of admission will not be waived under any circumstance. It is the responsibility of the student to finish all the background courses, if any, before taking higher level courses.

The Program provides for thesis and non-thesis options:

Master's degree with Non-Thesis Option: The master's student who chooses to take the non-thesis option must complete 36 hours of course work. The coursework must consist of 18 hours of core courses and 18 hours of computer science (CMP) electives. With this option, the student must take a comprehensive examination and pass it within three attempts. A student must complete all core courses prior to taking the comprehensive examination. The comprehensive examination will consist of questions from the knowledge units from each of the six core courses. A score of 75 or better is required to pass the comprehensive examination.

Master's Degree with Thesis Option: The master's student who chooses to take the thesis option must complete 30 semester hours of course work plus 6 hours of thesis. The course work consists of 18 hours of core courses and 12 hours of computer science (CMP) electives. The Master's research and thesis must be an original work that (l) offers a theoretical contribution to the field or (2) provides a new methodology or techniques for solving practical problems in the area of computer science.

STRUCTURE OF THE COURSES

Core Courses: The following graduate courses are offered as the core curriculum and every student must take all of these core courses to fulfill the breadth-first requirement. A minimum GPA of 3.00 must be earned in the core courses, with a grade of C in no more than one of the courses.

Elective Courses: A number of elective courses are provided for the student to master in interested field(s) of specialization, and they are listed course descriptions section.

COURSE DESCRIPTIONS

Core Courses:

CMP 511 Design and Analysis of Algorithms - Three semester hours. Introduces and illustrates basic techniques for designing efficient algorithms and analyzing algorithm complexity. Topics will be chosen from graph algorithms, sorting and searching, NP-complete problems, pattern matching, parallel algorithms, and dynamic programming.
(Prerequisite: CMP 215)

CMP 521 Object Oriented Programming and Design - Three semester hours**.** Object modeling, dynamic modeling, functional modeling, analysis, system design, and object design methodologies. Introduction to various object-oriented design methodologies, including the Unified Modeling Language. (Prerequisites: CMP 215, CMP 440)

CMP 531 Computer Architecture - Three semester hours. Introduces computer architecture and system organization including virtual memory supports, cache, pipeline, vector processing, multiprocessor, and RISC architecture. Study and compare typical architectures to the extent that time permits. (Prerequisites: CMP 380)

CMP 541 Operating System Principles - Three semester hours. Examines process synchronization, I/O techniques, buffering, file systems, processor scheduling, deadlocks, memory management, virtual memory, job scheduling, resource allocation, system modeling, operating system security, performance measurement and evaluation.
(Prerequisites: CMP 215, CMP 380)

CMP 551 Database Management Systems - Three semester hours**.** Provides a conceptual understanding of database management systems in terms of the hierarchical, network, and relational models. Data modeling, database design and administration. Includes a review of file structures and a discussion of database implementation techniques. (Prerequisite: CMP 103)

CMP 561 Software Engineering Methodology - Three semester hours**.** Explores the traditional approach to software construction, software crisis, and software characteristics. Covers various

software engineering paradigms, and the fundamental concepts of analysis, design, coding, testing and maintenance. Introduces various CASE tools. (Prerequisite: CMP 215)

Elective Courses:

CMP 513 Management Information Systems - Three semester hours**.** Analysis of information requirements, Design approaches, processing methods, data management, and the role of computers in management information systems. Topics include models of an integrated system, and organization and social implications of information technology. (Prerequisite: Consent of Instructor)

CMP 515 Numerical Analysis - Three semester hours**.** Presents mathematical approach and computer solution to a wide variety of numerical problems. Topics include interpolation and approximation of data, solution of differential equations, summation series, numerical integration, solution of linear and non-linear systems of equations, and study of errors. (Prerequisite: CMP 109 or CMP 204)

CMP 517 Applications of Statistical Methods - Three semester hours**.** Treats data, probability distributions, sampling techniques, normal distribution, hypothesis testing, linear and multiple regression, correlation, analysis of variance, time series, index numbers, and parametric tests. (Prerequisite: MTH 237)

CMP 523 Compiler Design - Three semester hours. Basic mathematical theory underlying the design of compilers and other language processors and provides instruction on how to use that theory in practical design situations. Topics include: lexical analysis, parsing, syntax-directed translation, code optimization, and code generation. (Prerequisite: CMP 215)

CMP 525 Advanced Data Structures - Three semester hours**.** Development of the efficient data structures used to produce more efficient solutions to classical problems, such as those based on the graph theoretical model, as well as to problems that arise in application areas of contemporary interest. (Prerequisite: CMP 215)

CMP 535 Introduction to Bioinformatics - Four semester hours. An interdisciplinary course melding information from computer/information sciences and molecular biology. Retrieval and interpretation of biomedical information, algorithms and software use for sequence alignment, similarity searching of macromolecular sequence databases, and exposure to Java or Perl. (Prerequisite: Consent of Instructor)

CMP 543 Computer Communications - Three semester hours**.** Analysis of computer network architecture including topologies, media, switching, routing, congestion, control, protocols, and specific case problems. Addresses hardware interfaces and carriers, network security, and performance evaluation. (Prerequisites: Consent of Instructor)

CMP 550 Artificial Intelligence - Three semester hours**.** Formal concepts of artificial intelligence. Heuristic versus algorithmic methods, cognitive processes and simulation, artificial application programming techniques, and surveying the areas of game playing, vision, learning and natural language understanding. Students are provided direction for research using Internet and open literature resources. (Prerequisites: CMP 103, CMP 109 or CMP 204)

CMP 554 Neural Networks - Three semester hours**.** Introduction to natural networks, supervised and unsupervised learning, neural network architectures, training algorithms, black board architecture, and other general concepts. (Prerequisite: CMP 109 or CMP 204)

CMP 555 Advanced Database Systems - Three semester hours**.** Advanced database systems, including the areas of distributed and object-oriented database design, resource allocation, access plan selection, security measures, transition management, and query optimization. (Prerequisites: CMP 488)

CMP 562 Multimedia Systems and Applications - Three semester hours**.** Design and implementation of the technologies used to implement computer-based multimedia applications such as streaming video playback, video conferencing, interactive television, video editing, and hypermedia authoring. It acquaints the student with disciplines associated with multimedia, such as presentation software, the World Wide Web, HTML code, presentation design, and production. Other subjects that may be addressed as required for projects adopted for student productions: bitmap graphics, vector graphics, text design, digital photography, audio and sound design, and navigational element design. (Prerequisite: Consent of Instructor)

CMP 570 Computer Graphics and Animation - Three semester hours**.** Introduction to the basic concepts of computer science. Topics include: display device characteristics, system considerations, raster vs. vector technology, line patterns, line drawing algorithms, image rendering, 2-D and 3-D modeling, and symmetry groups. (Prerequisites: CMP 103, CMP 109 or CMP 204)

CMP 577 Fuzzy and Expert Systems - Three semester hours**.** Theoretical and applications of fuzzy systems. Topics may include: fuzzy set theory, approximate theory, fuzzy control, decision making under fuzzy environment, fuzzy operations research.
Prerequisite: CMP 103, CMP 109 or CMP 204)

CMP 591 Cooperative Educational Work Experience - Three semester hours**.** Provides students with applied, hands-on experience in an industry (computer-related) environment. The student should have the advisor's approval prior to taking this course and should submit a report and defend before a departmental committee. Submission of a copy of the three-credit-hour equivalent certificate to the graduate office upon completion of the course is required. (Prerequisite: Completion of all the core courses.)

CMP 593 Advanced Topics in Computer Science - Three semester hours**.** This course is based upon the topic to be addressed and the consent of instructor. Topics will be those of mutual interest to faculty and students and not currently available in the graduate program. (Prerequisites: Graduate standing and Consent of Instructor.)

CMP 597 Independent Study - Three semester hours. Provides opportunity for the students to participate in the ongoing research in the department. The student will work in close interaction with the professor of mutual research interest. The student is required to present at least one research paper at a reputable conference and should be evaluated by a departmental committee of three members formed by the chairperson. (Prerequisites: Completion of a minimum of 12 semester hours of graduate course work)

CMP 599 Graduate Thesis - One, two , or three semester hours**.** This course consists of individual research towards completing the thesis requirement for M.S. degree in Computer Science. (Prerequisite: School of Graduate Studies requirements.)

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