COLLEGE OF ARTS AND SCIENCES

The College of Arts and Sciences is, from both historical and functional points of view, the core of the modern university. The College of Arts and Sciences views creativity, inquiry and understanding as among the greatest values in human experience. Thus, it is dedicated to the questioning, creation and transmission of knowledge; to the provision of undergraduate and graduate educational programs that are responsive to the need for an enlightened and productive citizenry; and to the provision of programs and services that enhance the quality of life of the people it serves. These goals compel a commitment to creativity and inquiry free of bias and based upon the principles of objective scholarship. They require a responsibility to promote and convey those elements of the liberal arts and sciences that must be essential components of the educational goals of all units of the university. The college seeks richness through diversity of its programs and strength through erudition.

In addition to general studies courses, major courses and minor courses, sufficient free electives should be chosen to total at least 120 hours.

As part of ongoing planning and evaluation, the College of Arts and Sciences regularly evaluates student learning outcomes for each degree program.

AEROSPACE STUDIES MINOR (18 HOURS)

AS 3312	(3)	Air Force Leadership Studies I
AS 3313	(3)	Air Force Leadership Studies II
AS 4412	(3)	National Security Affairs/ Preparation for Active Duty I
AS 4413	(3)	National Security Affairs/ Preparation for Active Duty II

Select two three-hour courses from upper-level political science (POL) courses, or substitute upper-level courses from history (HIS), geography (GEO), or social science (SOC) courses with the approval of the Department of Aerospace Studies chair.

ANTHROPOLOGY MINOR (18 HOURS)

ANT 3310	(3)	Cultural Anthropology
ANT 3311	(3)	Physical Anthropology

Select at least 12 hours of additional 3000/4000-level anthropology courses as approved by your faculty adviser.

ARCHIVAL STUDIES MINOR (18 HOURS)

HIS 3360	(3)	Introduction to Archives: Theory and Issues
HIS 3362	(3)	Archival Methods and Practice
HIS 4472	(3)	Records Management
HIS 4473	(3)	Archives Practicum

Select two courses from the following, including at least one at the 4000 level:

GEO/HIS3316	(3)	History of Alabama
GEO/SOC4406	(3)	Urbanism
HIS 4405	(3)	Old South
HIS 4406	(3)	New South
HIS/POL 4441	(3)	American Constitutional Develop.
HIS 4470	(3)	Oral History
HIS 4471	(3)	Local History
MGT 4471	(3)	Organizational Development
MGT 4474	(3)	Business and Society
POL 4421	(3)	Introduction to Public Administration
SOC 4433	(3)	The Community
SOC 4435	(3)	The Sociology of Complex Societies

BIOLOGY EDUCATION

Students seeking Alabama teacher certification should select biology as a first major and education as a second major. Students should consult with their advisers concerning all certification requirements.

BIOLOGY MAJOR (43 HOURS)

Specialized General Studies Requirements

General studies requirements for the biology, environmental science, biomedical sciences, and marine biology programs and the biology major total 64 semester hours. See the General Studies section of this catalog for complete general studies information.

Area III

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
MTH 1125	(4)	Calculus I

Area V

BIO 1101	(3)	Organismal Biology
BIO L101	(1)	Organismal Biology Lab
CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab
IS 2241	(3)	Computer Concepts and Apps.
TROY 1101	(1)	University Orientation

Select one sequence:

PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab
or		
PHY 2262	(3)	Physics I with Calculus
PHY L262	(1)	Physics I with Calculus Lab
PHY 2263	(3)	Physics II with Calculus
PHY L263	(1)	Physics II with Calculus Lab

Major Requirements

BIO 2229	(3)	General Ecology
BIO L229	(1)	General Ecology Lab
BIO 3320	(3)	Genetics
BIO L320	(1)	Genetics Lab
BIO 3372	(3)	Microbiology
BIO L372	(1)	Microbiology Lab
CHM 3342	(3)	Organic Chemistry I
CHM L342	(1)	Organic Chemistry I Lab
CHM 3343	(3)	Organic Chemistry II
CHM L343	(1)	Organic Chemistry II Lab
MTH 2210	(3)	Applied Statistics

Select one botany course with its corresponding lab:

BIO 3325	(3)	Plant Form and Function
BIO L325	(1)	Plant Form and Function Lab
BIO 3326	(3)	Plant Diversity
BIO L326	(1)	Plant Diversity Lab
BIO 4402	(4)	Spring Flora
BIO 4425	(4)	Field Botany

Select one zoology course with its corresponding lab:

BIO 3307	(3)	Invertebrate Zoology
BIO L307	(1)	Invertebrate Zoology Lab
BIO 3308	(3)	Vertebrate Zoology
BIO L308	(1)	Vertebrate Zoology Lab
BIO 4405	(3)	Entomology
BIO L405	(1)	Entomology Lab
BIO 4410	(3)	Animal Behavior
BIO L410	(1)	Animal Behavior Lab
BIO 4420	(4)	Field Vertebrate Zoology
BIO 4432	(3)	Comparative Vertebrate Anatomy
BIO L432	(1)	Comparative Vertebrate Anatomy Lab
BIO 4445	(3)	Ichthyology
BIO L445	(1)	Ichthyology Lab
BIO 4446	(3)	Herpetology
BIO L446	(1)	Herpetology Lab
BIO 4447	(3)	Ornithology
BIO L447	(1)	Ornithology Lab
BIO 4448	(3)	Mammalogy
BIO L448	(1)	Mammalogy Lab
BIO 4471	(3)	Parasitology
BIO L471	(1)	Parasitology Lab

Select one ecology/environmental course with its corresponding lab:

BIO 2202	(3)	Principles of Environmental Science
BIO L202	(1)	Principles of Environmental Science Lab
BIO 4413	(3)	Limnology
BIO L413	(1)	Limnology Lab
BIO 4416	(3)	Microbial Ecology
BIO L416	(1)	Microbial Ecology Lab
BIO 4421	(3)	Population Ecology
BIO L421	(1)	Population Ecology Lab
BIO 4479	(3)	Environmental Assessment
BIO L479	(1)	Environmental Assessment Lab

Select one physiology/cell/molecular course with its corresponding lab:

BIO 3347	(3)	Human Anatomy and Physiology I
BIO L347	(1)	Human Anatomy and Physiology I Lab
BIO 3348	(3)	Human Anatomy and Physiology II
BIO L348	(1)	Human Anatomy and Physiology II Lab
BIO 3382	(3)	Immunology
BIO L382	(1)	Immunology Lab
BIO 3386	(3)	Hematology
BIO L386	(1)	Hematology Lab
BIO 4414	(3)	Food Microbiology
BIO L414	(1)	Food Microbiology Lab
BIO 4430	(3)	Applied Genetics
BIO L430	(1)	Applied Genetics Lab
BIO 4433	(3)	Embryology
BIO L433	(1)	Embryology Lab
BIO 4451	(3)	Toxicology
BIO L451	(1)	Toxicology Lab
BIO 4478	(3)	Cell Biology
BIO L478	(1)	Cell Biology Lab
BIO 4480	(3)	Histology
BIO L480	(1)	Histology Lab
BIO 4482	(3)	Molecular Biology
BIO L482	(1)	Molecular Biology Lab

Select one upper-level adviser-approved biology course and its corresponding lab.

BIOLOGY MINOR (18-20 HOURS)

Lectures and the corresponding labs must be taken together:

BIO 1101	(3)	Organismal Biology
BIO L101	(1)	Organismal Biology Lab
BIO 2229	(3)	General Ecology
BIO L229	(1)	General Ecology Lab
BIO 3320	(3)	Genetics
BIO L320	(1)	Genetics Lab
BIO 3372	(3)	Microbiology
BIO L372	(1)	Microbiology Lab

Select 2-4 additional semester hours of approved upper-level (3300 or above) biology courses with corresponding labs.

BIOLOGY PROGRAM (55 HOURS)

Specialized General Studies Requirements

Area III

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
MTH 1125	(4)	Calculus I

Area V

IS 2241	(3)	Computer Concepts and Apps.
TROY 1101	(1)	University Orientation
BIO 1101	(3)	Organismal Biology
BIO L101	(1)	Organismal Biology Lab
CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab

Select one sequence (physics sequence not required for medical technology concentration):

PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab

or

PHY 2262	(3)	Physics I with Calculus
PHY L262	(1)	Physics I with Calculus Lab
PHY 2263	(3)	Physics II with Calculus
PHY L263	(1)	Physics II with Calculus Lab

Requirements

BIO 2229	(3)	General Ecology
BIO L229	(1)	General Ecology Lab
BIO 3320	(3)	Genetics
BIO L320	(1)	Genetics Lab
BIO 3372	(3)	Microbiology
BIO L372	(1)	Microbiology Lab
CHM 3342	(3)	Organic Chemistry I
CHM L342	(1)	Organic Chemistry I Lab
CHM 3343	(3)	Organic Chemistry II
CHM L343	(1)	Organic Chemistry II Lab
MTH 2210	(3)	Applied Statistics

Select one of the four concentrations shown below (biomedical sciences, general biology, ecology and field biology, or medical technology):

· Biomedical Sciences Concentration

BIO 3347	(3)	Human Anatomy and Physiology I
BIO L347	(1)	Human Anatomy and Physiology I Lab
BIO 3348	(3)	Human Anatomy and Physiology II
BIO L348	(1)	Human Anatomy and Physiology II Lab
BIO 4478	(3)	Cell Biology
BIO L478	(1)	Cell Biology Lab
BIO 4482	(3)	Molecular Biology
BIO L482	(1)	Molecular Biology Lab

Select 16 hours (four lectures with labs) from the courses listed below:

BIO 3382	(3)	Immunology
BIO L382	(1)	Immunology Lab
BIO 4416	(3)	Microbial Ecology
BIO L416	(1)	Microbial Ecology Lab
BIO 4430	(3)	Applied Genetics
BIO L430	(1)	Applied Genetics Lab
BIO 4451	(3)	Toxicology
BIO L451	(1)	Toxicology Lab
BIO 4471	(3)	Parasitology
BIO L471	(1)	Parasitology Lab
BIO 4480	(3)	Histology
BIO L480	(1)	Histology Lab
CHM 3352	(3)	Biochemistry
CHM L352	(1)	Biochemistry Lab

· Food Safety Concentration

BIO 4414	(3)	Food Microbiology
BIO L414	(1)	Food Microbiology Lab
BIO 4451	(3)	Toxicology
BIO L451	(1)	Toxicology Lab
BIO 4418	(3)	Food Laws and Regulations
CHM 3352	(3)	Biochemistry
CHM L352	(1)	Biochemistry Lab
MGT 4466	(3)	Restaurant Management
NSG 2211	(3)	Human Nutrition

Select 11 or more hours from the courses listed below. Lectures and their corresponding labs must be taken together.

BIO 3382	(3)	Immunology
BIO L382	(1)	Immunology Lab
BIO 4416	(3)	Microbial Ecology
BIO L416	(1)	Microbial Ecology Lab
BIO 4471	(3)	Parasitology
BIO L471	(1)	Parasitology Lab
BIO 4478	(3)	Cell Biology
BIO L478	(1)	Cell Biology Lab
BIO 4482	(3)	Molecular Biology
BIO L482	(1)	Molecular Biology Lab
BIO 4488/4489/4490	(1-8)	Internship in the Biological or Environmental Sciences
CHM 4455	(3)	Instrumental Analysis
CHM L455	(1)	Instrumental Analysis Lab
MGT 3372	(3)	Hospitality Management
MGT 4465	(3)	Food and Beverage Service

· General Biology Concentration

Select one botany course with its corresponding lab:

BIO 3325	(3)	Plant Form and Function
BIO L325	(1)	Plant Form and Function Lab
BIO 3326	(3)	Plant Diversity
BIO L326	(1)	Plant Diversity Lab
BIO 4402	(4)	Spring Flora
BIO 4425	(4)	Field Botany

Select one zoology course with its corresponding lab:

BIO 3307	(3)	Invertebrate Zoology
BIO L307	(1)	Invertebrate Zoology Lab
BIO 3308	(3)	Vertebrate Zoology
BIO L308	(1)	Vertebrate Zoology Lab
BIO 4405	(3)	Entomology
BIO L405	(1)	Entomology Lab
BIO 4410	(3)	Animal Behavior
BIO L410	(1)	Animal Behavior Lab
BIO 4420	(4)	Field Vertebrate Zoology
BIO 4432	(3)	Comparative Vertebrate Anatomy
BIO L432	(1)	Comparative Vertebrate Anatomy Lab
BIO 4445	(3)	Ichthyology
BIO L445	(1)	Ichthyology Lab
BIO 4446	(3)	Herpetology
BIO L446	(1)	Herpetology Lab
BIO 4447	(3)	Ornithology
BIO L447	(1)	Ornithology Lab
BIO 4448	(3)	Mammalogy
BIO L448	(1)	Mammalogy Lab
BIO 4471	(3)	Parasitology
BIO L471	(1)	Parasitology Lab

Select one ecology/environmental course with its corresponding lab:

BIO 4413	(3)	Limnology
BIO L413	(1)	Limnology Lab
BIO 4416	(3)	Microbial Ecology
BIO L416	(1)	Microbial Ecology Lab
BIO 4421	(3)	Population Ecology
BIO L421	(1)	Population Ecology Lab

BIO 4479	(3)	Environmental Assessment
BIO L479	(1)	Environmental Assessment Lab

Select one physiology/cell/molecular course with its corresponding lab:

BIO 3347	(3)	Human Anatomy and Physiology I
BIO L347	(1)	Human Anatomy and Physiology I Lab
BIO 3348	(3)	Human Anatomy and Physiology II
BIO L348	(1)	Human Anatomy and Physiology II Lab
BIO 3382	(3)	Immunology
BIO L382	(1)	Immunology Lab
BIO 3386	(3)	Hematology
BIO L386	(1)	Hematology Lab
BIO 4414	(3)	Food Microbiology
BIO L414	(1)	Food Microbiology Lab
BIO 4430	(3)	Applied Genetics
BIO L430	(1)	Applied Genetics Lab
BIO 4433	(3)	Embryology
BIO L433	(1)	Embryology Lab
BIO 4451	(3)	Toxicology
BIO L451	(1)	Toxicology Lab
BIO 4478	(3)	Cell Biology
BIO L478	(1)	Cell Biology Lab
BIO 4480	(3)	Histology
BIO L480	(1)	Histology Lab
BIO 4482	(3)	Molecular Biology
BIO L482	(1)	Molecular Biology Lab

Select 16 additional semester hours (four courses with labs) from the four above categories (botany, zoology, ecology/ environmental, and physiology/cell/molecular). Guided Independent Research (BIO 4491/4492) or Guided Independent Study (BIO 4493/4494) may be taken for up to six of these credits. BIO 4491 and 4493 may be mixed and taken in any sequence for up to six credits. However, the two course sequences of BIO 4491/4492 and BIO 4493/4494 may not be taken for more than six credits regardless of the mix. The 16 hours chosen should be based on the student's future plans (employment, graduate school, or professional school).

· Ecology and Field Biology Concentration

BIO	4420	(4)	Field Vertebrate Zoology
BIO	4421	(3)	Population Ecology
BIO	L421	(1)	Population Ecology Lab
BIO	4425	(4)	Field Botany

Select 12 hours (three courses with labs) from the three categories below. At least one course must be taken from each of the three categories.

Zoology

BIO 3307	(3)	Invertebrate Zoology
BIO L307	(1)	Invertebrate Zoology Lab
BIO 4405	(2)	Entomology
BIO L405	(2)	Entomology Lab

Botany

BIO 3325	(3)	Plant Form and Function
BIO L325	(1)	Plant Form and Function Lab
BIO 3326	(3)	Plant Diversity
BIO L326	(1)	Plant Diversity Lab

Ecology

BIO 4413	(3)	Limnology
BIO L413	(1)	Limnology Lab
BIO 4479	(3)	Environmental Assessment
BIO L479	(1)	Environmental Assessment Lab
MB 4406	(4)	Marsh Ecology

Select an additional eight hours of adviser-approved BIO or MB courses.

· Medical Technology Concentration

Students must complete 29 semester hours on the Troy campus prior to applying for an internship.

Lectures and their corresponding labs must be taken together.

BIO 3347	(3)	Human Anatomy and Physiology I
BIO L347	(1)	Human Anatomy and Physiology I Lab
BIO 3348	(3)	Human Anatomy and Physiology II
BIO L348	(1)	Human Anatomy and Physiology II Lab
BIO 3382	(3)	Immunology
BIO L382	(1)	Immunology Lab
BIO 3386	(3)	Hematology
BIO L386	(1)	Hematology Lab
BIO 4471	(3)	Parasitology
BIO L471	(1)	Parasitology Lab

In addition to the above courses, including core courses, students must complete 33 semester hours of hospital internship MT 4400-4413 courses.

BIOLOGY, PREPROFESSIONAL MAJOR (55 HOURS)

Specialized General Studies Requirements

Area III (12 Hours)

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
MTH 1125	(4)	Calculus I

Area V (20 Hours)

BIO 1101	(3)	Organismal Biology
BIO L101	(1)	Organismal Biology Lab
CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab
IS 2241	(3)	Computer Concepts and Applications
TROY 1101	(1)	University Orientation

Select one sequence (physics sequence not required for medical technology concentration):

PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab

or

PHY 2262	(3)	Physics I with Calculus
PHY L262	(1)	Physics I with Calculus Lab
PHY 2263	(3)	Physics II with Calculus
PHY L263	(1)	Physics II with Calculus Lab

Requirements for the major

Lectures and their corresponding labs must be taken together.

BIO 2229	(3)	General Ecology
BIO L229	(1)	General Ecology Lab
BIO 3320	(3)	Genetics
BIO L320	(1)	Genetics Lab
BIO 3372	(3)	Microbiology
BIO L372	(1)	Microbiology Lab
CHM 3342	(3)	Organic Chemistry I
CHM L342	(1)	Organic Chemistry I Lab
CHM 3343	(3)	Organic Chemistry II
CHM L343	(1)	Organic Chemistry II Lab
MTH 2210	(3)	Applied Statistics

Select 32 semester hours from the courses listed below:

BIO 3347	(3)	Human Anatomy and Physiology I
BIO L347	(1)	Human Anatomy and Physiology I Lab
BIO 3348	(3)	Human Anatomy and Physiology II
BIO L348	(1)	Human Anatomy and Physiology II Lab
BIO 3382	(3)	Immunology
BIO L382	(1)	Immunology Lab
BIO 3386	(3)	Hematology
BIO L386	(1)	Hematology Lab
BIO 4414	(3)	Food Microbiology
BIO L414	(1)	Food Microbiology Lab
BIO 4416	(3)	Environmental Microbiology.
BIO L416	(1)	Environmental Microbiology Lab
BIO 4430	(3)	Applied Genetics
BIO L430	(1)	Applied Genetics Lab
BIO 4432	(3)	Comparative Vertebrate Anatomy
BIO L432	(1)	Comparative Vertebrate Anatomy Lab
BIO 4433	(3)	Embryology
BIO L433	(1)	Embryology Lab
BIO 4451	(3)	Toxicology
BIO L451	(1)	Toxicology Lab
BIO 4471	(3)	Parasitology
BIO L471	(1)	Parasitology Lab
BIO 4478	(3)	Cell Biology
BIO L478	(1)	Cell Biology Lab
BIO 4480	(3)	Histology
BIO L480	(1)	Histology Lab
BIO 4482	(3)	Molecular Biology
BIO L482	(1)	Molecular Biology Lab
CHM 3352	(3)	Biochemistry
CHM L3352	(1)	Biochemistry Lab

CHEMISTRY EDUCATION

Students seeking Alabama teacher certification should select chemistry as a first major and education as a second major. Students should consult with their advisers concerning all certification requirements. CHM 3352 is required for Alabama teacher certification.

CHEMISTRY MAJOR (37 HOURS)

Specialized General Studies Requirements

Area III

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
MTH 1125	(4)	Calculus I

Area V

IS 2241	(3)	Computer Concepts and Applications
TROY 1101	(1)	University Orientation

Select one series:

PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab
or		
PHY 2262	(3)	Physics with Calculus I
PHY L262	(1)	Physics with Calculus I Lab
PHY 2263	(3)	Physics with Calculus II
PHY L263	(1)	Physics with Calculus II Lab

Chemistry Core (34 Hours)

CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab
CHM 2242	(3)	Analytical Chemistry
CHM L242	(1)	Analytical Chemistry Lab
CHM 3342	(3)	Organic Chemistry I
CHM L342	(1)	Organic Chemistry I Lab
CHM 3343	(3)	Organic Chemistry II
CHM L343	(1)	Organic Chemistry II Lab
CHM 3381	(3)	Physical Chemistry I
CHM L381	(1)	Physical Chemistry I Lab
CHM 3382	(3)	Physical Chemistry II
CHM 4444	(3)	Advanced Inorganic Chemistry
CHM 4445	(3)	Instrumental Analysis
CHM L445	(1)	Instrumental Analysis Lab
MTH 1126	(4)	Calculus II

Select 3 hours of chemistry electives:

CHM 3352	(3)	Biochemistry
CHM L352	(1)	Biochemistry Lab
CHM L382	(1)	Physical Chemistry II Lab
CHM 4400	(3)	Special Topics
CHM 4403	(3)	Advanced Organic Chemistry
CHM L444	(1)	Advanced Inorganic Chemistry Lab
CHM 4491/2	(1-3)	Guided Independent Research
CHM 4493/4	(1-3)	Guided Independent Study
CHM 4499	(1)	Senior Research Seminar

CHEMISTRY MINOR (20 HOURS)

CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab
CHM 3342	(3)	Organic Chemistry I
CHM L342	(1)	Organic Chemistry I Lab
CHM 3343	(3)	Organic Chemistry II
CHM L343	(1)	Organic Chemistry II Lab

Select four additional hours of advanced chemistry courses, such as

CHM 2242/L242	Analytical Chemistry and lab
CHM 3352 / L352	Biochemistry and Lab

Note: The chemistry minor requires 20 hours in addition to the hours required for a major in another discipline. For example, the biology major requires Organic Chemistry II and lab, so a student majoring in biology would need to select eight, not four, additional hours of advanced chemistry courses.

CHEMISTRY PROGRAM (51 HOURS)

Specialized General Studies Requirements

Area III

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
MTH 1125	(4)	Calculus I

Chemistry, Mathematics, and Physics Core Courses

CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab
CHM 2242	(3)	Analytical Chemistry
CHM L242	(1)	Analytical Chemistry Lab
CHM 3342	(3)	Organic Chemistry I
CHM L342	(1)	Organic Chemistry I Lab
CHM 3343	(3)	Organic Chemistry II
CHM L343	(1)	Organic Chemistry II Lab
CHM 3381	(3)	Physical Chemistry I
CHM L381	(1)	Physical Chemistry I Lab
CHM 3382	(3)	Physical Chemistry II
CHM 4444	(3)	Advanced Inorganic Chemistry
CHM 4445	(3)	Instrumental Analysis
CHM L445	(1)	Instrumental Analysis Lab
MTH 1126	(4)	Calculus II

Select one series:

PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab
or		
PHY 2262	(3)	Physics with Calculus I
PHY L262	(1)	Physics with Calculus I Lab
PHY 2263	(3)	Physics with Calculus II
PHY L263	(1)	Physics with Calculus II Lab

Select five hours of chemistry electives:

CHM 3352	(3)	Biochemistry
CHM L352	(1)	Biochemistry Lab
CHM L382	(1)	Physical Chemistry II Lab
CHM 4400	(3)	Special Topics
CHM 4403	(3)	Advanced Organic Chemistry
CHM L444	(1)	Advanced Inorganic Chemistry Lab
CHM 4491/2	(1-3)	Guided Independent Research
CHM 4493/4	(1-3)	Guided Independent Study
CHM 4499	(1)	Senior Research Seminar

COMPREHENSIVE GENERAL SCIENCE PROGRAM (46 HOURS)

Specialized General Studies Requirements

Area III

BIO 1101	(3)	Principles of Biology
BIO L101	(1)	Principles of Biology Lab
CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
MTH 1125	(4)	Calculus I

Area V

BIO 1101	(3)	Organismal Biology
BIO L101	(1)	Organismal Biology Lab
CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab
TROY 1101	(1)	University Orientation

Select one series:

PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab
or		
PHY 2262	(3)	Physics I with Calculus
PHY L262	(1)	Physics I with Calculus Lab
PHY 2263	(3)	Physics II with Calculus
PHY L263	(1)	Physics II with Calculus Lab

Required Courses

BIO 3320	(3)	Genetics
BIO L320	(1)	Genetics Lab
CHM 3342	(3)	Organic Chemistry I
CHM L342	(1)	Organic Chemistry I Lab
MTH 2210	(3)	Applied Statistics
PHY 4410	(3)	Modern Physics
PHY L410	(1)	Modern Physics Lab
SCI 3335	(3)	Physical Geology
SCI L335	(1)	Physical Geology Lab
SCI 3336	(3)	Principles of Astronomy

Select one of the following concentrations:

- **Biology Concentration**

BIO 2229	(3)	General Ecology
BIO L229	(1)	General Ecology Lab
BIO 3347	(3)	Anatomy & Physiology I
BIO L347	(1)	Anatomy & Physiology I Lab
BIO 3348	(3)	Anatomy & Physiology II
BIO L348	(1)	Anatomy & Physiology II Lab

BIO 3372	(3)	Microbiology
BIO L372	(1)	Microbiology Lab

Select 1 botany course with corresponding lab (four hours).

Select 1 zoology course with corresponding lab(four hours).

- **Chemistry Concentration**

CHM 2242	(3)	Analytical Chemistry
CHM L242	(1)	Analytical Chemistry Lab
CHM 3343	(3)	Organic Chemistry II
CHM L343	(1)	Organic Chemistry II Lab
CHM 3352	(3)	Biochemistry
CHM L352	(1)	Biochemistry Lab
CHM 3381	(3)	Physical Chemistry I
CHM L381	(1)	Physical Chemistry I Lab

Select a minimum of 8 semester hours of coursework from the following:

CHM 3382	(3)	Physical Chemistry II
CHM L382	(1)	Physical Chemistry II Lab
CHM 4403	(3)	Advanced Organic Chemistry
CHM 4444	(3)	Advanced Inorganic Chemistry
CHM L444	(1)	Advanced Inorganic Chemistry Lab
CHM 4445	(3)	Instrumental Analysis
CHM L445	(1)	Instrumental Analysis Lab

- **Physics Concentration**

PHY 4411	(3)	Advanced Modern Physics
PHY 4459	(3)	Optics
PHY L459	(1)	Optics lab
PHY 4420	(3)	Mechanics
PHY 4430	(3)	Electromagnetic Fields
PHY 4495	(3)	Topics in Physics

Select 8 hours of upper level physics or chemistry courses approved by the academic adviser.

COMPUTER SCIENCE MINOR (18 HOURS)

CS 2244	(3)	Computer Programming I
CS 2260	(3)	Computer Programming II

Select 12 semester hours of computer science courses with at least one course being at the 4000 level.

COMPUTER SCIENCE PROGRAM (49 HOURS)

General Studies Requirements

Area III

MTH 1125	(4)	Calculus I, in lieu of MTH 1110

Select remaining Area III courses as shown in the General Studies section of this catalog.

Area V

CS 2244	(3)	Computer Programming I
TROY 1101	(1)	University Orientation

Required Courses:

MTH 1126	(4)	Calculus II
MTH 2215	(3)	Applied Discrete Mathematics
CS 2260	(3)	Computer Programming II
CS 2261	(3)	Foundations of Computer Science
CS 3323	(3)	Data Structures
CS 3329	(3)	Analysis of Algorithms
CS 3332	(3)	Software Engineering I
CS 3372	(3)	Formal Languages and the Theory of Computation
CS 3357	(3)	Logical Structures of Computer Design
CS 3365	(3)	Intro to Computer Organization and Architectures
CS 3370	(3)	Nature of Programming Languages
CS 4420	(3)	Introduction to Database Systems
CS 4445	(3)	Data Communication and Networking
CS 4448	(3)	Operating Systems

Select two of the following:

MTH 2210	(3)	Applied Statistics
CS 3325	(3)	Operations Research
CS 3331	(3)	Fundamentals of Artificial Intelligence
CS 3339	(3)	Fundamentals of Object-Oriented Programming
CS 4401	(3)	Special Topics in AI
CS 4443	(3)	Web Based Software Development
CS 4447	(3)	Systems Analysis and Design
CS 4451	(3)	Computer Security and Reliability
CS 4461	(3)	Software Engineering II
CS 4462	(3)	Special Topics in Object-Oriented Technology

COMPUTER SCIENCE, APPLIED MAJOR (36 HOURS)

Specialized General Studies Requirements

Area III

MTH 2201	(3)	Business Calculus

Select additional Area III requirements as shown in the General Studies section of this catalog.

Area V

IS 2241	(3)	Computer Concepts and Applications
MTH 2215	(3)	Applied Discrete Mathematics
TROY 1101	(1)	University Orientation

Major Requirements

CS 2244	(3)	Computer Programming I
CS 2260	(3)	Computer Programming II
CS 2265	(3)	Advanced Programming I
CS 3330	(3)	Data Structures and Algorithms
CS 4420	(3)	Introduction to Database Systems
CS 4443	(3)	Web-Based Software Development
CS 4445	(3)	Data Communications and Networking
CS 4447	(3)	Systems Analysis and Design
CS 4448	(3)	Operating Systems

Select three of the following:

CS 2262	(3)	Business Systems Programming
CS 3332	(3)	Software Engineering I
CS 3347	(3)	Advanced Programming II

CS 4449	(3)	Applied Networking
CS 4451	(3)	Computer Security
CS 4495	(3)	Special Topics in Computer Science

COMPUTER SCIENCE A.S. DEGREE (60 HOURS)

Associate of Science Degree

See the academic regulations section of this bulletin for additional information regarding associate degrees.

General Studies Requirements

Area I

ENG 1101	(3)	Composition and Modern English I
ENG 1102	(3)	Composition and Modern English II

Area II

Select one:

ENG 2205	(3)	World Literature before 1660
ENG 2206	(3)	World Literature after 1660
ENG 2211	(3)	American Literature before 1875
ENG 2212	(3)	American Literature after 1875
ENG 2244	(3)	British Literature before 1785
ENG 2245	(3)	British Literature after 1785

Select one:

ART 1133	(2)	Visual Arts
DRA 2200	(2)	Introduction to Drama
MUS 1131	(2)	Music Appreciation

Area III

MTH 1125	(3)	Calculus I

Select one science course and corresponding lab:

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
SCI 2233	(3)	Physical Science
SCI L233	(1)	Physical Science Lab
SCI 2234	(3)	Earth and Space Science
SCI L234	(1)	Earth and Space Science Lab

Area IV

Select one:

HIS 1101	(3)	Western Civilization I
HIS 1102	(3)	Western Civilization II
HIS 1111	(3)	U.S. to 1877
HIS 1112	(3)	U.S. since 1877
HIS 1122	(3)	World History to 1500
HIS 1123	(3)	World History from 1500

Area V

COM 1110	(3)	Effective Communication *(Montgomery campus only)*
IS 2241	(3)	Computer Concepts and Applications
TROY 1101	(1)	University Orientation

Additional requirements

CS 2244	(3)	Computer Programming I
CS 2260	(3)	Computer Programming II
CS 2261	(3)	Foundations of Computer Science Concepts
CS 3323	(3)	Data Structures
CS 3329	(3)	Analysis of Algorithms
CS 3332	(3)	Software Engineering I
CS 3357	(3)	Logical Structures
MTH 2215	(3)	Applied Discrete Mathematics

Select 7-10 hours of free electives.

CRIMINAL JUSTICE MAJOR (36 HOURS)

Criminal justice majors are encouraged to take two semesters of Spanish or another foreign language as part of their general studies requirements.

CJ 1101	(3)	Introduction to Criminal Justice
CJ 2221	(3)	Survey of Law Enforcement
CJ 2231	(3)	Survey of Corrections
CJ 2241	(3)	Survey of Law and Criminal Procedure
CJ 3345	(3)	Criminology
CJ 3352	(3)	Constitutional Law
CJ 3375	(3)	Introduction to Social Scientific Inquiry
CJ 4499	(3)	Senior Seminar

Select A or B below:

A. 12 additional hours of advanced or upper-level criminal justice courses, as approved by the adviser,

or

B. Homeland Security Concentration. Select 12 additional hours from the following as approved by the adviser:

CJ 3335	(3)	Private and Public Security Administration
CJ 4435	(3)	Grant Writing
CJ 4440	(3)	Terrorism
CJ 4470	(3)	Criminal Justice Issues in Homeland Security
CJ 4472	(3)	Cyber Crime
CJ 4488	(3)	Internship (limit 1)
POL 3364	(3)	State and Local Politics
POL 4422	(3)	Public Policy Making

CRIMINAL JUSTICE MINOR (18 HOURS)

CJ 1101	(3)	Introduction to Criminal Justice

Select 15 additional hours of upper-level criminal justice courses as approved by the adviser.

EARTH AND SPACE STUDIES MINOR (18 HOURS)

SCI 3335	(3)	Physical Geology
SCI L335	(1)	Physical Geology Lab
SCI 3336	(3)	Astronomy
SCI 3340	(3)	Marine Science
SCI L340	(1)	Marine Science Lab
SCI 3350	(3)	Weather and Climate

SCI L350	(1)	Weather and Science Lab
SCI 4403	(3)	Conservation

ENGLISH MAJOR (36 HOURS)

Specialized General Studies Requirements

Area V

ENG 2211	(3)	American Literature before 1875
ENG 2212	(3)	American Literature after 1875
ENG 2244	(3)	British Literature before 1785
ENG 2245	(3)	British Literature after 1785
IS 2241	(3)	Computer Concepts and Applications
TROY 1101	(1)	University Orientation

Major Requirements

ENG 3341	(3)	Advanced Grammar

Select an additional 33 hours of upper division courses, at least nine of which are at the 4000 level or above.

· Professional Writing Emphasis

Students at the Montgomery campus may select the Professional Writing Emphasis. In addition to ENG 3341, the following courses are required:

ENG 2260	(3)	Introduction to Technical and Professional Writing
ENG 3345	(3)	Technical and Professional Editing
ENG 3365	(3)	Advanced Technical and Professional Writing
ENG 3366	(3)	Professional Document Design
ENG 4488	(3)	Seminar in Professional Writing Portfolio Design
ENG 4490	(3)	Professional Writing Internship

Select an additional four courses:

ENG 3320	(3)	Introduction to Linguistics
ENG 3351	(3)	Creative Writing I
ENG 3352	(3)	Creative Writing II
ENG 4400	(3)	Selected Topics
ENG 4405	(3)	History of the English Language
ENG 4419	(3)	Advanced Writing

ENGLISH MINOR (18 HOURS)

ENG 3341	(3)	Advanced Grammar

Select one sequence:

ENG 2211	(3)	American Literature before 1875
ENG 2212	(3)	American Literature after 1875
or		
ENG 2244	(3)	British Literature before 1785
ENG 2245	(3)	British Literature after 1785

Select an additional nine hours of upper division English courses.

ENGLISH MINOR, CREATIVE WRITING (18 HOURS)

ENG 3351	(3)	Introduction to Creative Writing

Select an additional 15 hours from the following:

ENG 3352	(3)	Advanced Creative Writing I
ENG 3353	(3)	Advanced Creative Writing II
ENG 3354	(3)	Advanced Nonfiction Writing
ENG 3355	(3)	Verse Writing
ENG 3356	(3)	Forms and Theory of Fiction
ENG 4427	(3)	Contemporary American Literature
ENG 4489	(3)	Internship

ENGLISH MINOR, PROFESSIONAL WRITING EMPHASIS (18 HOURS)

ENG 2260	(3)	Introduction to Technical and Professional Writing
ENG 3345	(3)	Technical and Professional Editing
ENG 3365	(3)	Advanced Technical and Professional Writing
ENG 3366	(3)	Professional Document Design

Select an additional six hours from the following:

ENG 3320	(3)	Introduction to Linguistics
ENG 3351	(3)	Creative Writing I
ENG 3352	(3)	Creative Writing II
ENG 4400	(3)	Selected Topics
ENG 4405	(3)	History of the English Language
ENG 4419	(3)	Advanced Writing
ENG 4488	(3)	Seminar in Professional Writing Portfolio Design
ENG 4490	(3)	Professional Writing Internship

ENGLISH—LANGUAGE ARTS PROGRAM (139 HOURS)

Students seeking Alabama teacher certification should complete the English major and the required courses for language arts, in addition to selecting education as a second major. Students should consult their advisers concerning all certification requirements.

Specialized General Studies Requirements

See the general studies section of this catalog for additional information.

Area II

COM 2241	(3)	Fundamentals of Speech
DRA 2200	(2)	Introduction to Drama
ENG 2205	(3)	World Literature before 1660
ENG 2206	(3)	World Literature after 1660

Select one of the following:

ART 1133	(2)	Visual Arts
MUS 1131	(2)	Music Appreciation

Area V

ENG 2211	(3)	American Literature before 1875
ENG 2212	(3)	American Literature after 1875
ENG 2244	(3)	British Literature before 1785
ENG 2245	(3)	British Literature after 1785
IS 2241	(3)	Computer Concepts and Apps.
JRN 1101	(3)	Intro. to Mass Communications
TROY 1101	(1)	University Orientation

Required Courses for Language Arts

COM 3342	(3)	Argumentation and Debate
COM 4441	(2)	Oral Interpretation
DRA 2211	(1)	Theatre for Youth
DRA 2245	(1)	Stagecraft Lab
DRA 3301	(2)	Acting I
DRA 4451	(3)	Directing I
ENG 3341	(3)	Advanced Grammar

ENG 3371	(3)	Literature for Young Adults
ENG 4405	(3)	History of the English Language
ENG 4478	(3)	Theory and Practice of Composition: Writing and Learning Across the Curriculum
JRN 3326	(3)	Advising Student Publications

Select twelve hours of upper division English electives, six of which must be at the 4000 level, three of which may be upper-level creative writing

ENVIRONMENTAL SCIENCE MINOR (18-20 SEMESTER HOURS)

BIO 2202	(3)	Principles of Environmental Science
BIO L202	(1)	Principles of Environmental Science Lab
BIO 4428	(3)	Environmental Pollution and Control
BIO L428	(1)	Environmental Pollution and Control Lab

Select 12 hours from the following:

BIO 4451	(3)	Toxicology
BIO L451	(1)	Toxicology Lab
BIO 4452	(3)	Industrial Hygiene
BIO L452	(1)	Industrial Hygiene Lab
BIO 4479	(3)	Environmental Assessment
BIO L479	(1)	Environmental Assessment Lab
BIO 4420	(4)	Field Vertebrate Zoology (combined lecture and lab)
BIO 4425	(4)	Field Botany or BIO 4402 (combined lecture and lab)
BIO 4476	(1-4)	Special Topics (combined lecture and lab)
BIO 4491	(1-4)	Guided Independent Research (combined lecture and lab)
CHM 3350	(3)	Principles of Physical Chemistry
CHM L350	(1)	Principles of Physical Chemistry Lab
CHM 3352	(3)	Biochemistry
CHM L352	(1)	Biochemistry Lab
CHM 4445	(3)	Instrumental Analysis
CHM L445	(1)	Instrumental Analysis Lab

ENVIRONMENTAL SCIENCE PROGRAM (55 HOURS)

Specialized General Studies Requirements

Area III

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
MTH 1125	(4)	Calculus I

Area V

IS 2241	(3)	Computer Concepts and Apps.
TROY 1101	(1)	University Orientation
BIO 1101	(3)	Organismal Biology
BIO L101	(1)	Organismal Biology Lab
CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab

Select one sequence (physics sequence not required for medical technology concentration):

PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab
or		
PHY 2262	(3)	Physics I with Calculus
PHY L262	(1)	Physics I with Calculus Lab
PHY 2263	(3)	Physics II with Calculus
PHY L263	(1)	Physics II with Calculus Lab

Program Requirements

BIO 2229	(3)	General Ecology
BIO L229	(1)	General Ecology Lab
BIO 3320	(3)	Genetics
BIO L320	(1)	Genetics Lab
BIO 3372	(3)	Microbiology
BIO L372	(1)	Microbiology Lab
CHM 3342	(3)	Organic Chemistry I
CHM L342	(1)	Organic Chemistry I Lab
CHM 3343	(3)	Organic Chemistry II
CHM L343	(1)	Organic Chemistry II Lab
MTH 2210	(3)	Applied Statistics

Environmental Science Core (32 semester hours):

BIO 2202	(3)	Principles of Environmental Science
BIO L202	(1)	Principles of Environmental Science Lab
BIO 4428	(3)	Environmental Pollution and Control
BIO L428	(1)	Environmental Pollution and Control Lab
BIO 4413	(3)	Limnology
BIO L413	(1)	Limnology Lab
BIO 4451	(3)	Toxicology
BIO L451	(1)	Toxicology Lab
BIO 4452	(3)	Industrial Hygiene
BIO L452	(1)	Industrial Hygiene Lab
BIO 4479	(3)	Environmental Assessment
BIO L479	(1)	Environmental Assessment Lab

Select eight hours of adviser-approved upper-level courses in biology, chemistry or mathematics.

BIO 4488/4489/4490	(1-8)	Internship in Environmental Science

GENERAL EDUCATION A.A. DEGREE (60 HOURS)

Associate of Arts Degree

See the academic regulations section of this bulletin for additional information regarding associate degrees.

General Studies Requirements

Area I

ENG 1101	(3)	Composition and Modern English I
ENG 1102	(3)	Composition and Modern English II

Area II

Select one:

ART 1133	(2)	Visual Arts
DRA 2200	(2)	Introduction to Drama
MUS 1131	(2)	Music Appreciation

Select one:

ENG 2205	(3)	World Literature before 1660
ENG 2206	(3)	World Literature after 1660
ENG 2211	(3)	American Literature before 1875
ENG 2212	(3)	American Literature after 1875
ENG 2244	(3)	British Literature before 1785
ENG 2245	(3)	British Literature after 1785

Select six hours of one foreign language.

Area III

Select one:

MTH 1110	(3)	Finite Mathematics
MTH 1112	(3)	Pre-calculus Algebra

Select one science course and corresponding lab:

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
SCI 2233	(3)	Physical Science
SCI L233	(1)	Physical Science Lab
SCI 2234	(3)	Earth and Space Science
SCI L234	(1)	Earth and Space Science Lab

Area IV

Select one:

HIS 1101	(3)	Western Civilization I
HIS 1102	(3)	Western Civilization II
HIS 1111	(3)	U.S. to 1877
HIS 1112	(3)	U.S. since 1877
HIS 1122	(3)	World History to 1500
HIS 1123	(3)	World History from 1500

Area V

COM 1110	(3)	Effective Communication *(Montgomery campus only)*
IS 2241	(3)	Computer Concepts and Applications
TROY 1101	(1)	University Orientation

Additional requirements

Select any minor or area of concentration.

Select additional free electives to complete a total of 60 hours.

GENERAL EDUCATION A.S. DEGREE (60 HOURS)

Associate of Science Degree

See the academic regulations section of this bulletin for additional information regarding associate degrees.

Note: Students who pursue a baccalaureate degree with Troy University following the completion of the Associate of Science in General Education must meet the minimum grade requirements in mathematics.

General Studies Requirements

Area I

ENG 1101	(3)	Composition and Modern English I
ENG 1102	(3)	Composition and Modern English II

Area II

Select one:

ART 1133	(2)	Visual Arts
DRA 2200	(2)	Introduction to Drama
MUS 1131	(2)	Music Appreciation

Select one:

ENG 2205	(3)	World Literature before 1660
ENG 2206	(3)	World Literature after 1660
ENG 2211	(3)	American Literature before 1875
ENG 2212	(3)	American Literature after 1875
ENG 2244	(3)	British Literature before 1785
ENG 2245	(3)	British Literature after 1785

Area III

Select one:

MTH 1110	(3)	Finite Mathematics
MTH 1112	(3)	Pre-calculus Algebra

Select one science course and corresponding lab:

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
SCI 2233	(3)	Physical Science
SCI L233	(1)	Physical Science Lab
SCI 2234	(3)	Earth and Space Science
SCI L234	(1)	Earth and Space Science Lab

Area IV

Select one:

HIS 1101	(3)	Western Civilization I
HIS 1102	(3)	Western Civilization II
HIS 1111	(3)	U.S. to 1877
HIS 1112	(3)	U.S. since 1877
HIS 1122	(3)	World History to 1500
HIS 1123	(3)	World History from 1500

Area V

COM 1110	(3)	Effective Communication *(Montgomery campus only)*
IS 2241	(3)	Computer Concepts and Applications
TROY 1101	(1)	University Orientation

Additional requirements

Select any minor or area of concentration.

Select additional free electives to complete a total of 60 hours.

GEOGRAPHIC INFORMATION SYSTEMS (GIS) MINOR (18 HOURS)

GEM 3390	(3)	Introduction to GIS
GEM L390	(1)	Introduction to GIS Lab
GEM 3391	(3)	Applications of GIS
GEM L391	(1)	Applications of GIS Lab
GEM 4499	(2)	Geomatics/GIS Projects

With adviser approval, select a minimum of eight credit hours from one of the four bundles:

• Data Collection/Analysis

GEM 2200	(3)	Basics of Cartography and Surveying
GEM L220	(1)	Basics of Cartography and Surveying Lab
GEM 3330	(3)	Advanced Measurement Analysis
GEM L330	(1)	Advanced Measurement Analysis Lab
GEM L371	(1)	Measurement for GIS Lab

• Image Processing

GEM 1100	(1)	Computer-Aided Drafting
GEM L110	(2)	Computer-Aided Drafting Lab
GEM 3366	(3)	Photogrammetry and Remote Sensing
GEM L366	(1)	Photogrammetry and Remote Sensing Lab
GEM L367	(1)	Digital Images in GIS Lab

• Customizing the ArcView GIS Interface

CS 2260	(3)	Computer Programming II
CS 3330	(3)	Data Structures and Algorithms
CS 3339	(3)	Fundamentals of Object-Oriented Programming

• GIS Database Development

CS 2260	(3)	Computer Programming II
CS 3323	(3)	Data Structures
CS 4420	(3)	Introduction to Database Systems

GEOGRAPHY MINOR (18 HOURS)

GEO 3300	(3)	Principles of Physical Geography
GEO 3301	(3)	Principles of Cultural Geography

Select an additional 12 hours of approved, upper-level geography courses. GEO 2210 may not be counted toward both general studies and the geography minor.

GEOMATICS MAJOR (47 HOURS)

Specialized General Studies Requirements

Area II

Select the following in lieu of ART 1133:

ART 2201	(3)	Introductory Drawing

Select remaining Area II courses as specified in the General Studies section of this catalog.

Area III

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
MTH 1125	(4)	Calculus I

Area IV

ECO 2251	(3)	Principles of Macroeconomics
ECO 2252	(3)	Principles of Microeconomics

Select one history sequence as specified in the General Studies section of this catalog.

Area V

IS 2241	(3)	Computer Concepts and Apps.
TROY 1101	(1)	University Orientation
CS 2244	(3)	Computer Programming I
MTH 2210	(3)	Applied Statistics
MTH 1126	(4)	Calculus II
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab

Major Requirements

GEM 2200	(3)	Basics of Cartography and Surveying
GEM L220	(1)	Basics of Cartography and Surveying Lab
GEM 3309	(3)	Land Parcel Administration and Law
GEM L309	(1)	Land Parcel Administration and Law Lab
GEM 3310	(3)	Land Surveying Practice
GEM L310	(1)	Boundary Retracement Lab
GEM 3330	(3)	Advanced Measurement Analysis
GEM L330	(1)	Advanced Measurement Analysis Lab
GEM 3366	(3)	Photogrammetry and Remote Sensing
GEM L366	(1)	Photogrammetry and Remote Sensing Lab
GEM 3370	(3)	Geodesy and Geodesics
GEM L370	(1)	Geodesy and Geodesics Lab
GEM 3379	(3)	Introduction to Least Squares Adjustment
GEM L379	(1)	Introduction to Least Squares Adjustment Lab
GEM 3390	(3)	Intro to GIS
GEM L390	(1)	Intro to GIS Lab
GEM 3391	(3)	Applications of GIS
GEM L391	(1)	Applications of GIS Lab
GEM 4405	(2)	Route and Construction Survey
GEM L405	(1)	Route and Construction Survey Lab
GEM 4407	(1)	Land Development
GEM L407	(1)	Subdivision Design Practice
GEM 4409	(3)	Hydrology
GEM L409	(1)	Hydrology Lab
GEM 4499	(2)	Geomatics/GIS Projects

NOTE: It is strongly recommended that each student gain work experience with a professional surveyor or geomatics firm after completion of the sophomore year.

HISTORY EDUCATION (36 HOURS)

Students seeking Alabama teacher certification should select history as a first major and education as a second major. Students should consult with their advisers concerning all certification requirements.

Specialized General Studies Requirements

Area IV

POL	2241	(3)	American National Government
SOC	2275	(3)	Introduction to Sociology

Select one six-hour sequence:

HIS	1101	(3)	Western Civilization I, or placement
HIS	1102	(3)	Western Civilization II, or placement
Or			
HIS	1122	(3)	World History to 1500
HIS	1123	(3)	World History from 1500

Area V

GEO	2210	(3)	World Regional Geography
HIS	1111	(3)	U.S. to 1877, or placement
HIS	1112	(3)	U.S. since 1877, or placement
IS	2241	(3)	Computer Concepts and Apps.
TROY	1101	(1)	University Orientation

Requirements for the Major

HIS 3375	(3)	Research and Methodology
HIS 4490	(3)	Senior Seminar

Select one emphasis:

• American/Latin American History Emphasis

Select 15 hours of upper-level American/Latin American courses in addition to either HIS 3316 or 4406.

Select an additional 9 hours of upper-level European/Asian/African courses in addition to HIS 4451.

• European/Asian/African History Emphasis

Select 15 hours of upper-level European/Asian/African courses in addition to HIS 4451.

Select an additional 9 hours of upper-level American/Latin American courses in addition to either HIS 3316 or 4406.

NOTE: Students majoring in History Education may not select the Civil Rights emphasis in history.

HISTORY MAJOR (36 HOURS)

Select one emphasis below.

• AMERICAN/LATIN AMERICAN EMPHASIS

Specialized General Studies Requirements

Area IV

Select a six hour sequence in western civilization or world history.

Select additional Area IV courses as specified in the General Studies section of this catalog.

Area V

GEO 2210	(3)	World Regional Geography
HIS 1111	(3)	U.S. to 1877, or placement
HIS 1112	(3)	U.S. since 1877, or placement
IS 2241	(3)	Computer Concepts and Apps.
TROY 1101	(3)	University Orientation

Requirements for the Major

HIS 3375	(3)	Research and Methodology
HIS 4490	(3)	Senior Seminar

Select 18 hours of approved upper-level American/Latin American courses.

Select 12 hours of approved upper-level European/Asian/African courses.

• CIVIL RIGHTS EMPHASIS

Specialized General Studies Requirements

Area IV

Select a six hour sequence in western civilization or world history.

Select six additional Area IV courses as specified in the General Studies section of this catalog.

Area V

IS 2241	(3)	Computer Concepts and Apps.
TROY 1101	(1)	University Orientation
HIS 1111	(3)	U.S. to 1877, or placement
HIS 1112	(3)	U.S. since 1877, or placement
GEO 2210	(3)	World Regional Geography

Requirements for the major

HIS 3375	(3)	Research and Methodology
HIS 4490	(3)	Senior Seminar
HIS 4430	(3)	Civil Rights Movement
HIS 4494	(3)	Guided Independent Study in Civil Rights
SOC 3310	(3)	Minorities in the U.S. Social Structure
ENG 4465	(3)	African-American Literature

Select nine hours of approved upper-level American/Latin American courses

Select nine hours of approved upper-level European/Asian/African courses.

• EUROPEAN/ASIAN/AFRICAN EMPHASIS

Specialized General Studies Requirements

Area IV

Select a six hour sequence in western civilization or world history.

Select six hours of additional Area IV courses as specified in the General Studies section of this catalog.

Area V

IS 2241	(3)	Computer Concepts and Apps.
TROY 1101	(1)	University Orientation
HIS 1111	(3)	U.S. to 1877, or placement
HIS 1112	(3)	U.S. since 1877, or placement
GEO 2210	(3)	World Regional Geography

Requirements for the Major

HIS 3375	(3)	Research and Methodology
HIS 4490	(3)	Senior Seminar

Select 18 hours of approved, upper-level European/Asian/African courses.

Select 12 hours of approved, upper-level American/Latin American courses.

HISTORY MINOR (18 HOURS)

HIS 3375	(3)	Research and Methodology

Select 15 hours of upper-level history courses.

Note: HIS 1111 and HIS 1112 are prerequisites for upper-level American history courses and must be taken if they have not been taken for general studies.

Note: HIS 1101 and HIS 1102 are prerequisites for upper-level European history courses and must be taken if they have not been taken for general studies.

HOMELAND SECURITY MINOR (18 HOURS)

CJ 1101	(3)	Introduction to Criminal Justice

Select 15 additional hours from the following as approved by the adviser:

CJ 3335	(3)	Private and Public Security Administration
CJ 4435	(3)	Grant Writing
CJ 4440	(3)	Terrorism
CJ 4470	(3)	Criminal Justice Issues in Homeland Security
CJ 4472	(3)	Cyber Crime
CJ 4488	(3)	Internship (limit one)
POL 3364	(3)	State and Local Politics
POL 4422	(3)	Public Policy Making

Note: This minor is not available to criminal justice majors.

HUMANITIES MINOR (18 HOURS)

ART 3302	(3)	History of the Arts
CLA 2260	(3)	Classical Mythology
CLA 2290	(3)	Classical Literature in English Translation
PHI 2203	(3)	Introduction to Philosophy
PHI 3301	(3)	Western Philosophy
REL 2280	(3)	World Religions

LEADERSHIP STUDIES MINOR (18 HOURS)

LDR 1100	(3)	Introduction to Leadership
LDR 2200	(3)	Tools for Leaders
LDR 3300	(3)	Leadership Theory
LDR 4400	(3)	Leadership Seminar

Select at least an additional six hours from the following:

AS 3312	(3)	Air Force Leadership Studies I
AS 3313	(3)	Air Force Leadership Studies II
COM 3326	(3)	Conflict Management
COM 3345	(3)	Group Discussion and Leadership
COM 4426	(3)	Organizational Communication
SED 4400	(3)	Secondary Classroom Management
HIS 3304	(3)	Military History of the United States
HIS 3315	(3)	Vietnam War
HIS 3318	(3)	History of American Women
IDS 2200	(3)	Interdisciplinary Studies
LDR 4402	(2)	Leadership Field Experiences
LDR 4493-94	(1-3)	Guided Independent Study
MGT 3371	(3)	Principles of Management and Organizational Behavior
MGT 3375	(3)	Human Resources Management
MGT 4472	(3)	Organizational Behavior
MSL 2201	(2)	Individual Leadership Studies
MSL 2202	(2)	Leadership and Teamwork
MSL 2204	(2)	Leadership Lab
PHI 2204	(3)	Ethics and the Modern World
POL 3340	(3)	U.S. Government – Executive Branch
POL 3364	(3)	State and Local Politics
POL 4421	(3)	Introduction to Public Administration
PSY 4410	(3)	Business and Industrial Psychology
SOC 3301	(3)	Social Change in the Information Age
SOC 3310	(3)	Minorities in U.S. Social Structure
SS 4498	(3)	Social Science Theory

MARINE BIOLOGY PROGRAM (55 HOURS)

Students must take courses at both Troy University and Dauphin Island Sea Lab.

Specialized General Studies Requirements

Area III

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
MTH 1125	(4)	Calculus I

Area V

IS 2241	(3)	Computer Concepts and Apps.
TROY 1101	(1)	University Orientation
BIO 1101	(3)	Organismal Biology
BIO L101	(1)	Organismal Biology Lab
CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab

Select one sequence (physics sequence not required for medical technology concentration):

PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab
or		
PHY 2262	(3)	Physics I with Calculus
PHY L262	(1)	Physics I with Calculus Lab
PHY 2263	(3)	Physics II with Calculus
PHY L263	(1)	Physics II with Calculus Lab

Requirements for the Program

Lectures and the corresponding labs must be taken together.

BIO 2229	(3)	General Ecology
BIO L229	(1)	General Ecology Lab
BIO 3320	(3)	Genetics
BIO L320	(1)	Genetics Lab
BIO 3372	(3)	Microbiology
BIO L372	(1)	Microbiology Lab
CHM 3342	(3)	Organic Chemistry I
CHM L342	(1)	Organic Chemistry I Lab
CHM 3343	(3)	Organic Chemistry II
CHM L343	(1)	Organic Chemistry II Lab
MTH 2210	(3)	Applied Statistics

Troy University Courses:

BIO 3307	(3)	Invertebrate Zoology
BIO L307	(1)	Invertebrate Zoology Lab

Select three additional upper-level adviser-approved biology courses (12 SH). Lectures and their corresponding labs must be taken together.

Dauphin Island Sea Lab (DISL) Courses (16 semester hours).

DISL courses are offered during the summer term. Students are required to take the following prerequisites before attending DISL: CHM 1143, L143, BIO 1101, L101, BIO 2229, L229. Students must also comply with all DISL catalog prerequisites for individual courses.

Select three courses:

MB 4403	(4)	Marine Vertebrate Zoology
MB 4404	(4)	Marine Botany
MB 4410	(4)	Introduction to Oceanography
MB 4406	(4)	Marsh Ecology, *or*
MB 4418	(4)	Marine Behavioral Ecology, *or*
MB 4423	(4)	Marine Ecology

Select four semester hours of marine biology elective(s).

MATHEMATICS EDUCATION

Students seeking Alabama teacher certification should select mathematics as a first major and education as a second major. Students should consult with their advisers concerning all certification requirements.

MATHEMATICS MAJOR (38 HOURS)

Specialized General Studies Requirements

Area III

BIO 1100	(3)	Principles of Biology
BIO L100	(1)	Principles of Biology Lab
MTH 1125	(4)	Calculus I

Select a four hour course/lab combination from the following:

CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
SCI 2233	(3)	Physical Science
SCI L233	(1)	Physical Science Lab
SCI 2234	(3)	Earth and Space Science
SCI L234	(1)	Earth and Space Science Lab

Area V

TROY 1101	(1)	University Orientation
MTH 2220	(3)	Computer Programming for Mathematics

Requirements for the Major

MTH 1126	(4)	Calculus II
MTH 2227	(4)	Calculus III
MTH 3311	(3)	Differential Equations
MTH 3318	(3)	Introduction to Advanced Mathematics
MTH 3331	(3)	Linear Algebra
MTH 4424	(3)	Real Analysis I
MTH 4441	(3)	Abstract Algebra I

Select one of the following:

MTH 4425	(3)	Real Analysis II
MTH 4442	(3)	Abstract Algebra II

Or both of the following:

MTH 4451	(3)	Mathematical Statistics I
MTH 4452	(3)	Mathematical Statistics II

Students selecting MTH 4451 and MTH 4452: select 9 more hours of mathematics courses at the 3000 level and above (excluding MTH 4481).

Students selecting MTH 4425 or MTH 4442: select 12 hours of mathematics courses at the 3000 level and above (excluding MTH 4481).

Students seeking Alabama teacher certification must select MTH 3325 and MTH 4451.

MATHEMATICS MINOR (18 HOURS)

MTH 1125	(4)	Calculus I
MTH 1126	(4)	Calculus II
MTH 2227	(4)	Calculus III
MTH 3331	(3)	Linear Algebra

Select an additional three hours of math courses at the 3000 level and above, other than those courses whose catalog description declares that they do not count toward the major or minor.

MILITARY OPERATIONS MINOR (18 HOURS)

Military electives may be taken from credit earned through the American Council on Education (ACE) recommendations, Community College of the Air Force (CCAF) or military credit from regionally accredited institutions. This minor is applicable only to Bachelor of Science programs. Military science as a specialization is applicable to the resources management program.

MILITARY SCIENCE MINOR (19 HOURS)

MSL 3301	(3)	Leadership and Problem Solving
MSL 3302	(3)	Leadership and Ethics
MSL 3304a	(1)	Leadership Lab
MSL 3304b	(1)	Leadership Lab
MSL 4401	(3)	Leadership and Management
MSL 4402	(3)	Officership

MSL 4404a	(1)	Leadership Lab
MSL 4404b	(1)	Leadership Lab

Select a three-hour military history course approved by the professor of military science.

PHYSICAL SCIENCE MINOR (19-20 HOURS)

CHM 1142	(3)	General Chemistry I
CHM L142	(1)	General Chemistry I Lab
CHM 1143	(3)	General Chemistry II
CHM L143	(1)	General Chemistry II Lab

Select one series:

PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Lab
PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Lab
or		
PHY 2262	(3)	Physics I with Calculus
PHY L262	(1)	Physics I with Calculus Lab
PHY 2263	(3)	Physics II with Calculus
PHY L263	(1)	Physics II with Calculus

Select an upper-level course in chemistry or physics (3-4 SH).

PHYSICS MINOR (19 HOURS)

PHY 4410	(3)	Modern Physics
PHY L410	(1)	Modern Physics Lab
PHY 4420	(3)	Mechanics

Select one series:

PHY 2252	(3)	Gen. Physics I
PHY L252	(1)	Gen. Physics Lab I
PHY 2253	(3)	Gen. Physics II
PHY L253	(1)	Gen. Physics Lab II
or		
PHY 2262	(3)	Physics I Calculus
PHY L262	(1)	Physics I with Calculus Lab
PHY 2263	(3)	Physics II with Calculus
PHY L263	(1)	Physics II with Calculus Lab

Select an additional four hours of adviser-approved, upper-level physics courses.

POLITICAL SCIENCE MAJOR (36 HOURS)

Specialized General Studies Requirements

Area V

IS 2241	(3)	Computer Concepts and Applications
TROY 1101	(1)	University Orientation
POL 2241	(3)	American National Government or placement in POL 2240
POL 2260	(3)	World Politics

Major Requirements

POL 3300	(3)	Foundations of Political Science
POL 3330	(3)	Political Theory

Select one of the following concentrations:

· American Politics Concentration

Select 15 hours from the following:

POL 3340	(3)	U.S. Government – Executive Branch
POL 3341	(3)	U.S. Government – Legislative Branch
POL 3342	(3)	U.S. Government – Judicial Branch
POL 3343	(3)	American Political Processes
POL 3364	(3)	State and Local Politics
POL 4422	(3)	Public Policy Making
POL 4423	(3)	American Foreign Policy to 1920
POL 4424	(3)	Contemporary American Foreign Policy
POL 4420	(3)	Constitutional Law
POL 4471	(3)	Intergovernmental Relations

Select an additional 15 hours of upper-level (3000-4000) political science courses, as approved by your academic adviser.

· International Politics Concentration

POL 3351	(3)	International Relations
POL 4410	(3)	International Political Economy
POL 4433	(3)	Comparative Government

Select six hours from the following:

POL 4415	(3)	International Conflict
POL 4423	(3)	American Foreign Policy to 1920
POL 4424	(3)	Contemporary American Foreign Policy
POL 4432	(3)	Comparative Public Policy
POL 4445	(3)	Inter-American Relations
POL 4450	(3)	Latin American Politics
POL 4452	(3)	International Law
POL 4460	(3)	Intercultural Relations
POL 4465	(3)	Politics of the Developing World
POL 4466	(3)	Middle Eastern Politics
POL 4470	(3)	European Politics
POL 4474	(3)	Terrorism and Political Violence
POL 4476	(3)	Politics of Southeast Asia

Select an additional 15 hours of upper-level (3000-4000) political science courses, as approved by your acdemic adviser.

· Public Administration Concentration

Select 15 hours from the following:

POL 3364	(3)	State and Local Politics
POL 4421	(3)	Introduction to Public Administration
POL 4422	(3)	Public Policy Making
POL 4451	(3)	Public Personnel Administration
POL 4432	(3)	Comparative Public Policy
POL 4453	(3)	Bureaucratic Politics
POL 4471	(3)	Intergovernmental Relations
POL 4472	(3)	Administrative Law

Select an additional 15 hours of upper-level political science courses, as approved by your academic adviser.

POLITICAL SCIENCE MINOR (18 HOURS)

POL 3300	(3)	Foundations of Political Science
POL 3330	(3)	Introduction to Political Theory

Select an additional 12 hours of upper level courses, as approved by your academic adviser.

SOCIAL SCIENCE EDUCATION

Students seeking Alabama teacher certification should complete the social science major with a general social science concentration and select education as a second major. Students should consult their education advisers concerning all certification requirements and with their academic discipline adviser for requirements in the major.

SOCIAL SCIENCE MAJOR (36 HOURS)

Specialized General Studies Requirements

AREA IV (12 SH)

NOTE: Social Science majors with concentrations in anthropology, geography, or sociology should take Area IV electives appropriate for their concentration.

Requirements for the Major

SS 3375	(3)	Introduction to Social Scientific Inquiry
SS 3376	(3)	Application of Social Scientific Inquiry
SS 4498	(3)	Social Science Theory
SS 4499	(3)	Senior Seminar

Select one concentration:

· Concentration 1: Anthropology

ANT 3310	(3)	Cultural Anthropology
ANT 3311	(3)	Physical Anthropology

Select at least 18 hours of additional 3000/4000-level anthropology courses as approved by your faculty adviser.

· Concentration 2: General Social Science

Select at least 24 hours of additional 3000/4000-level courses from anthropology, economics, geography, history, political science, psychology or sociology (six hours may be used from ECO 2251, ECO 2252, GEO 2210, ANT 2200, POL 2260 [World Politics], or SOC 2230) in at least three disciplines.

· Concentration 3: Geography

GEO 3300	(3)	Principles of Physical Geography
GEO 3301	(3)	Principles of Cultural Geography

Select at least 18 hours of additional 3000/4000-level courses as approved by your faculty adviser:

· Concentration 4: Leadership

LDR 1100	(3)	Introduction to Leadership
LDR 4400	(3)	Leadership Seminar*

*Requires approval of the Director of the Institute of Leadership Development

Select an additional 18 hours from the following:

AS 3312	(3)	Air Force Leadership Studies I
AS 3313	(3)	Air Force Leadership Studies II
COM 3345	(3)	Group Discussion and Leadership
HIS 4415	(3)	Contemporary America
MGT 3371	(3)	Principles of Management and Or ganizational Behavior
MGT 3375	(3)	Human Resources Management
MSL 2202	(2)	Leadership and Teamwork
MSL 2204	(1)	Leadership Lab
POL 4422	(3)	Public Policy Making
POL 3351	(3)	Foundations of International Rela tions
POL 4421	(3)	Introduction to Public Administration
PSY 4410	(3)	Business and Industrial Psychology
SOC 3301	(3)	Social Change in the Information Age
SOC 3302	(3)	Sociology of Small Groups

· Concentration 5: Sociology

Select at least 24 hours of additional 3000/4000-level sociology courses as approved by your faculty adviser.

SOCIAL SCIENCE MINOR: GENERAL SOCIAL SCIENCE (18 HOURS)

SS 4498	(3)	Social Science Theory

Select an additional 15 hours from at least three of the following: anthropology, economics, geography, history, political science, psychology or sociology. At least 12 hours must be 3000/4000 level.

SOCIOLOGY MAJOR (36 HOURS)

Specialized General Studies Requirements

Area V

IS 2241	(3)	Computer Concepts and Applications
TROY 1101	(1)	University Orientation
ANT 2200	(3)	Anthropology
SOC 2230	(3)	Social Problems in Contemporary Society
SOC 2275	(3)	Introduction to Sociology

Requirements for the Major

SOC 3300	(3)	Social Institutions
SOC 4420	(3)	Sociological Theory
SS 3376	(3)	Application of Social Scientific Inquiry

Select an additional 27 hours of approved upper-level sociology courses.

SOCIOLOGY MINOR (18 HOURS)

ANT 2200	(3)	Anthropology
SOC 2230	(3)	Social Problems in Contemporary Society

Select an additional 12 hours of approved, upper-level sociology courses.