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 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 Requirements

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 2220 (3)  Principles of Cell Biology
BIO L220 (1)  Principles of Cell Biology Lab
BIO 2229 (3)  General Ecology
BIO L229 (1)  General Ecology Lab
BIO 3320 (3)  Genetics
BIO L320 (1)  Genetics 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

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.
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 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

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

Select one course with its corresponding lab:
- BIO 2220 (3) Principles of Cell Biology
- BIO L220 (1) Principles of Cell Biology 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 Requirements*
- 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
- 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
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

Students in the general biology concentration, ecology and field biology concentration, or medical technology concentration select:

BIO 2220 (3) Principles of Cell Biology
BIO L220 (1) Principles of Cell Biology Lab

Students in the biomedical sciences concentration or food safety concentration, select:

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

Select one of the five concentrations shown below (biomedical sciences, food safety, 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 3372 (3) Microbiology
BIO L372 (1) Microbiology Lab
BIO 4482 (3) Molecular Biology
BIO L482 (1) Molecular Biology Lab

Select 16 hours (four lectures with labs) from the courses listed below. With the adviser’s approval, one upper level botany, ecology or zoology course with its corresponding laboratory course may be taken:

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

- Food Safety Concentration

BIO 3372 (3) Microbiology
BIO L372 (1) Microbiology Lab
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 7 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

- 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 3372 (3) Microbiology
BIO L372 (1) Microbiology Lab
BIO 3382 (3) Immunology
BIO L382 (1) Immunology Lab

Select one course with its corresponding 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)

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<tr>
<td>CHM 1142</td>
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<td>General Chemistry I</td>
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<tr>
<td>CHM L142</td>
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Area V Requirements (20 Hours)

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<td>CHM 1143</td>
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<tr>
<td>IS 2241</td>
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<td>TROY 1101</td>
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Select one sequence (physics sequence not required for medical technology concentration):

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<td>PHY 2253</td>
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<td>General Physics II</td>
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<td>PHY 2262</td>
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<td>PHY L252</td>
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<td>PHY 2263</td>
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Requirements for the major

Lectures and their corresponding labs must be taken together.

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<td>BIO 3320</td>
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Select 32 semester hours from the courses listed below:

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<td>BIO 3386</td>
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<td>BIO 4430</td>
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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

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Area V Requirements

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Select one series:

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<td>1</td>
<td>General Physics II Lab</td>
</tr>
<tr>
<td>PHY 2262</td>
<td>3</td>
<td>Physics I with Calculus</td>
</tr>
<tr>
<td>PHY L252</td>
<td>1</td>
<td>Physics I with Calculus Lab</td>
</tr>
<tr>
<td>PHY 2263</td>
<td>3</td>
<td>Physics II with Calculus</td>
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Chemistry Core (34 Hours)

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>CHM 1143</td>
<td>3</td>
<td>General Chemistry II</td>
</tr>
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</tr>
<tr>
<td>CHM 2242</td>
<td>3</td>
<td>Analytical Chemistry</td>
</tr>
<tr>
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<td>1</td>
<td>Analytical Chemistry Lab</td>
</tr>
<tr>
<td>CHM 3342</td>
<td>3</td>
<td>Organic Chemistry I</td>
</tr>
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</table>
CHEMISTRY PROGRAM (51 HOURS)

Specialized General Studies Requirements

**Area III**

<table>
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<tbody>
<tr>
<td>BIO 1100</td>
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</tr>
<tr>
<td>BIO L101</td>
<td>(1)</td>
</tr>
<tr>
<td>CHM 1142</td>
<td>(3)</td>
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<tr>
<td>CHM L142</td>
<td>(1)</td>
</tr>
<tr>
<td>MTH 1125</td>
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Chemistry, Mathematics, and Physics Core Courses

<table>
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<tr>
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<th>Credits</th>
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<tbody>
<tr>
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<td>(3)</td>
</tr>
<tr>
<td>CHM L143</td>
<td>(1)</td>
</tr>
<tr>
<td>CHM 2242</td>
<td>(3)</td>
</tr>
<tr>
<td>CHM L242</td>
<td>(1)</td>
</tr>
<tr>
<td>CHM 3342</td>
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<td>CHM L342</td>
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<td>CHM 3343</td>
<td>(3)</td>
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Select one series:

<table>
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<tbody>
<tr>
<td>PHY 2252</td>
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<tr>
<td>PHY L252</td>
<td>(1)</td>
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<tr>
<td>PHY 2253</td>
<td>(3)</td>
</tr>
<tr>
<td>or PHY 2262</td>
<td>(3)</td>
</tr>
<tr>
<td>PHY L262</td>
<td>(1)</td>
</tr>
<tr>
<td>PHY 2263</td>
<td>(3)</td>
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</tbody>
</table>

Select five hours of chemistry electives:

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<th>Credits</th>
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</thead>
<tbody>
<tr>
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<td>(3)</td>
</tr>
<tr>
<td>CHM L352</td>
<td>(1)</td>
</tr>
<tr>
<td>CHM 4400</td>
<td>(3)</td>
</tr>
<tr>
<td>CHM 4403</td>
<td>(3)</td>
</tr>
<tr>
<td>CHM L444</td>
<td>(1)</td>
</tr>
<tr>
<td>CHM 4493/4</td>
<td>(1-3)</td>
</tr>
<tr>
<td>CHM 4499</td>
<td>(1)</td>
</tr>
</tbody>
</table>

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.

COMPREHENSIVE GENERAL SCIENCE PROGRAM (46 HOURS)

Specialized General Studies Requirements

**Area III**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
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<td>CHM 1142</td>
<td>(3)</td>
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<tr>
<td>CHM L142</td>
<td>(1)</td>
</tr>
<tr>
<td>MTH 1125</td>
<td>(4)</td>
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</table>

Area V Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>BIO 1101</td>
<td>(3)</td>
</tr>
<tr>
<td>BIO L101</td>
<td>(1)</td>
</tr>
<tr>
<td>CHM 1143</td>
<td>(3)</td>
</tr>
<tr>
<td>CHM L143</td>
<td>(1)</td>
</tr>
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<td>IS 2241</td>
<td>(3)</td>
</tr>
<tr>
<td>TROY 1101</td>
<td>(1)</td>
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Select one series:

<table>
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<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHY 2252</td>
<td>(3)</td>
</tr>
<tr>
<td>PHY L252</td>
<td>(1)</td>
</tr>
<tr>
<td>PHY 2253</td>
<td>(3)</td>
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</table>

or

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY L252</td>
<td>(1)</td>
</tr>
<tr>
<td>or PHY 2262</td>
<td>(3)</td>
</tr>
<tr>
<td>or PHY L262</td>
<td>(1)</td>
</tr>
</tbody>
</table>
Required Courses

<table>
<thead>
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<th>Credits</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>PHY 2262</td>
<td>3</td>
<td>Physics I with Calculus</td>
</tr>
<tr>
<td>PHY L262</td>
<td>1</td>
<td>Physics I with Calculus Lab</td>
</tr>
<tr>
<td>PHY 2263</td>
<td>3</td>
<td>Physics II with Calculus</td>
</tr>
<tr>
<td>PHY L263</td>
<td>1</td>
<td>Physics II with Calculus Lab</td>
</tr>
</tbody>
</table>

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>BIO 3320</td>
<td>3</td>
<td>Genetics</td>
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<td>BIO L320</td>
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<td>Genetics Lab</td>
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<tr>
<td>CHM 3342</td>
<td>3</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>CHM L342</td>
<td>1</td>
<td>Organic Chemistry I Lab</td>
</tr>
<tr>
<td>MTH 2210</td>
<td>3</td>
<td>Applied Statistics</td>
</tr>
<tr>
<td>PHY 4410</td>
<td>3</td>
<td>Modern Physics</td>
</tr>
<tr>
<td>PHY L410</td>
<td>1</td>
<td>Modern Physics Lab</td>
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<tr>
<td>SCI 3335</td>
<td>3</td>
<td>Physical Geology</td>
</tr>
<tr>
<td>SCI L335</td>
<td>1</td>
<td>Physical Geology Lab</td>
</tr>
<tr>
<td>SCI 3336</td>
<td>3</td>
<td>Principles of Astronomy</td>
</tr>
</tbody>
</table>

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)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Name</th>
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<tr>
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<td>3</td>
<td>Computer Science I</td>
</tr>
<tr>
<td>CS 2255</td>
<td>3</td>
<td>Computer Science II</td>
</tr>
</tbody>
</table>

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

**COMPUTER SCIENCE PROGRAM (48 HOURS)**

Specialized General Studies Requirements

**Area III**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Name</th>
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</thead>
<tbody>
<tr>
<td>MTH 1125</td>
<td>4</td>
<td>Calculus I, in lieu of MTH 1110</td>
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</tbody>
</table>

Select a four hour course/lab combination from the following:
(Students must complete an 8 hour sequence in chemistry or physics. Also see Area V Requirements.)

- 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

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

**Area V Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 2250</td>
<td>3</td>
<td>Computer Science I</td>
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<tr>
<td>MTH 1126</td>
<td>4</td>
<td>Calculus II</td>
</tr>
<tr>
<td>TROY 1101</td>
<td>1</td>
<td>University Orientation</td>
</tr>
</tbody>
</table>

Select a four hour course/lab combination from the following:
(Students must complete an 8 hour sequence in chemistry or physics. Also see Area III.)

- CHM 1143 (3) General Chemistry II
- CHM L143 (1) General Chemistry II Lab
- PHY 2253 (3) General Physics II
- PHY L253 (1) General Physics II Lab

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Name</th>
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<tr>
<td>CS 2255</td>
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<td>Computer Science II</td>
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<tr>
<td>CS 3310</td>
<td>3</td>
<td>Foundations of Computer Science</td>
</tr>
<tr>
<td>CS 3323</td>
<td>3</td>
<td>Data Structures</td>
</tr>
<tr>
<td>CS 3329</td>
<td>3</td>
<td>Analysis of Algorithms</td>
</tr>
<tr>
<td>CS 3332</td>
<td>3</td>
<td>Software Engineering I</td>
</tr>
<tr>
<td>CS 3360</td>
<td>3</td>
<td>Concepts of Object-Oriented</td>
</tr>
<tr>
<td>CS 3365</td>
<td>3</td>
<td>Programming I</td>
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<tr>
<td>CS 3370</td>
<td>3</td>
<td>Introduction to Computer</td>
</tr>
<tr>
<td>CS 3372</td>
<td>3</td>
<td>Organization and Architectures</td>
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<tr>
<td>CS 3377</td>
<td>3</td>
<td>Nature of Programming Languages</td>
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<tr>
<td>CS 3378</td>
<td>3</td>
<td>Formal Languages and the Theory</td>
</tr>
<tr>
<td>CS 3379</td>
<td>3</td>
<td>of Computation</td>
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<tr>
<td>CS 4420</td>
<td>3</td>
<td>Introduction to Database Systems</td>
</tr>
<tr>
<td>CS 4445</td>
<td>3</td>
<td>Data Communication and Networking</td>
</tr>
<tr>
<td>CS 4448</td>
<td>3</td>
<td>Operating Systems</td>
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<tr>
<td>MTH 2210</td>
<td>3</td>
<td>Applied Statistics</td>
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<td>MTH 2215</td>
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<tbody>
<tr>
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<tr>
<td>CS 3325</td>
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<td>Operations Research</td>
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<tr>
<td>CS 3331</td>
<td>3</td>
<td>Fundamentals of Artificial Intelligence</td>
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<tr>
<td>CS 3361</td>
<td>3</td>
<td>Concepts of Object Oriented Programming II</td>
</tr>
<tr>
<td>CS 4401</td>
<td>3</td>
<td>Advanced Artificial Intelligence</td>
</tr>
<tr>
<td>CS 4443</td>
<td>3</td>
<td>Web Based Software Development</td>
</tr>
<tr>
<td>CS 4447</td>
<td>3</td>
<td>Systems Analysis and Design</td>
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<tr>
<td>CS 4451</td>
<td>3</td>
<td>Computer Security and Reliability</td>
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<tr>
<td>CS 4461</td>
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<td>Software Engineering II</td>
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<tr>
<td>CS 4462</td>
<td>3</td>
<td>Special Topics in Object-Oriented Technology</td>
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<td>CS 4495</td>
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<td>Special Topics in Computer Science</td>
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**COMPUTER SCIENCE, APPLIED MAJOR (36 HOURS)**

**Specialized General Studies Requirements**

**Area III**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTH 2201</td>
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<td>Business Calculus</td>
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</table>

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

**Area V Requirements**

<table>
<thead>
<tr>
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<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 2241</td>
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<td>Computer Concepts and Applications</td>
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<tr>
<td>MTH 2215</td>
<td>3</td>
<td>Applied Discrete Mathematics</td>
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<td>University Orientation</td>
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**Major Requirements**

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<tr>
<td>CS 2250</td>
<td>3</td>
<td>Computer Science I</td>
</tr>
<tr>
<td>CS 2265</td>
<td>3</td>
<td>Advanced Programming I</td>
</tr>
<tr>
<td>CS 3330</td>
<td>3</td>
<td>Data Structures and Algorithms</td>
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<tr>
<td>CS 4420</td>
<td>3</td>
<td>Introduction to Database Systems</td>
</tr>
<tr>
<td>CS 4443</td>
<td>3</td>
<td>Web-Based Software Development</td>
</tr>
<tr>
<td>CS 4445</td>
<td>3</td>
<td>Data Communications and Networking</td>
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<tr>
<td>CS 4447</td>
<td>3</td>
<td>Systems Analysis and Design</td>
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<tr>
<td>CS 4448</td>
<td>3</td>
<td>Operating Systems</td>
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Select three of the following:

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<th>Credits</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CS 3320</td>
<td>3</td>
<td>Business Systems Programming</td>
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<tr>
<td>CS 3332</td>
<td>3</td>
<td>Software Engineering I</td>
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<tr>
<td>CS 3347</td>
<td>3</td>
<td>Advanced Programming II</td>
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<tr>
<td>CS 4449</td>
<td>3</td>
<td>Applied Networking</td>
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<tr>
<td>CS 4451</td>
<td>3</td>
<td>Computer Security</td>
</tr>
<tr>
<td>CS 4495</td>
<td>3</td>
<td>Special Topics in Computer Science</td>
</tr>
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</table>

**COMPUTER SCIENCE A.S. DEGREE (60 HOURS)**

**Associate of Science Degree**

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

**General Studies Requirements**

**Area I**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 1101</td>
<td>3</td>
<td>Composition and Modern English I</td>
</tr>
</tbody>
</table>
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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Title</th>
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<tbody>
<tr>
<td>CJ 3335</td>
<td>3</td>
<td>Private and Public Security Administration</td>
</tr>
<tr>
<td>CJ 4435</td>
<td>3</td>
<td>Grant Writing</td>
</tr>
<tr>
<td>CJ 4440</td>
<td>3</td>
<td>Terrorism</td>
</tr>
<tr>
<td>CJ 4470</td>
<td>3</td>
<td>Criminal Justice Issues in Homeland Security</td>
</tr>
<tr>
<td>CJ 4472</td>
<td>3</td>
<td>Cyber Crime</td>
</tr>
<tr>
<td>CJ 4488</td>
<td>3</td>
<td>Internship (limit 1)</td>
</tr>
<tr>
<td>POL 3364</td>
<td>3</td>
<td>State and Local Politics</td>
</tr>
<tr>
<td>POL 4422</td>
<td>3</td>
<td>Public Policy Making</td>
</tr>
</tbody>
</table>

CRIMINAL JUSTICE MAJOR (36 HOURS)

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:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Title</th>
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<tbody>
<tr>
<td>ENG 2260</td>
<td>3</td>
<td>Introduction to Technical and Professional Writing</td>
</tr>
<tr>
<td>ENG 3345</td>
<td>3</td>
<td>Technical and Professional Editing</td>
</tr>
<tr>
<td>ENG 3365</td>
<td>3</td>
<td>Advanced Technical and Professional Writing</td>
</tr>
<tr>
<td>ENG 3366</td>
<td>3</td>
<td>Professional Document Design</td>
</tr>
<tr>
<td>ENG 4488</td>
<td>3</td>
<td>Seminar in Professional Writing Portfolio Design</td>
</tr>
<tr>
<td>ENG 4490</td>
<td>3</td>
<td>Professional Writing Internship</td>
</tr>
</tbody>
</table>

ENGLISH MAJOR (36 HOURS)

Area V Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENG 2211</td>
<td>3</td>
<td>American Literature before 1875</td>
</tr>
<tr>
<td>ENG 2212</td>
<td>3</td>
<td>American Literature after 1875</td>
</tr>
<tr>
<td>ENG 2244</td>
<td>3</td>
<td>British Literature before 1785</td>
</tr>
<tr>
<td>ENG 2245</td>
<td>3</td>
<td>British Literature after 1785</td>
</tr>
<tr>
<td>IS 2241</td>
<td>3</td>
<td>Computer Concepts and Applications</td>
</tr>
<tr>
<td>TROY 1101</td>
<td>1</td>
<td>University Orientation</td>
</tr>
</tbody>
</table>

ENGLISH MINOR (18 HOURS)

ENG 3341  (3)  Advanced Grammar

Select one sequence:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 2211</td>
<td>3</td>
<td>American Literature before 1875</td>
</tr>
<tr>
<td>ENG 2212</td>
<td>3</td>
<td>American Literature after 1875</td>
</tr>
<tr>
<td>ENG 2244</td>
<td>3</td>
<td>British Literature before 1785</td>
</tr>
<tr>
<td>ENG 2245</td>
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<td>British Literature after 1785</td>
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ENGLISH MINOR, CREATIVE WRITING (18 HOURS)

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>ENG 3351</td>
<td>3</td>
<td>Introduction to Creative Writing</td>
</tr>
<tr>
<td>ENG 3352</td>
<td>3</td>
<td>Advanced Creative Writing I</td>
</tr>
<tr>
<td>ENG 3353</td>
<td>3</td>
<td>Advanced Creative Writing II</td>
</tr>
<tr>
<td>ENG 3354</td>
<td>3</td>
<td>Advanced Nonfiction Writing</td>
</tr>
<tr>
<td>ENG 3355</td>
<td>3</td>
<td>Verse Writing</td>
</tr>
<tr>
<td>ENG 3356</td>
<td>3</td>
<td>Forms and Theory of Fiction</td>
</tr>
<tr>
<td>ENG 4420</td>
<td>3</td>
<td>Selected Topics in Creative Writing</td>
</tr>
<tr>
<td>ENG 4427</td>
<td>3</td>
<td>Contemporary American Literature</td>
</tr>
<tr>
<td>ENG 4489</td>
<td>3</td>
<td>Internship</td>
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ENGLISH MINOR, PROFESSIONAL WRITING EMPHASIS (18 HOURS)

<table>
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<tr>
<td>ENG 2260</td>
<td>3</td>
<td>Introduction to Technical and Professional Writing</td>
</tr>
<tr>
<td>ENG 3345</td>
<td>3</td>
<td>Technical and Professional Editing</td>
</tr>
<tr>
<td>ENG 3365</td>
<td>3</td>
<td>Advanced Technical and Professional Writing</td>
</tr>
<tr>
<td>ENG 3366</td>
<td>3</td>
<td>Professional Document Design</td>
</tr>
</tbody>
</table>
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 Requirements**

- 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 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 Requirements**

- 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 2220 (3) Principles of Cell Biology  
BIO L220 (1) Principles of Cell Biology Lab  
BIO 2229 (3) General Ecology  
BIO L229 (1) General Ecology Lab  
BIO 3320 (3) Genetics  
BIO L320 (1) Genetics 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

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
Select one:
- 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.A. DEGREE (60 HOURS)
Associate of Arts Degree
See the academic regulations section of this catalog 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

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
Select one:
- 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 catalog 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.
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.

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 2255 (3) Computer Science II
  CS 3330 (3) Data Structures and Algorithms
  CS 3360 (3) Concepts of Object Oriented Programming I

- **GIS Database Development**
  CS 2255 (3) Computer Science 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.

**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 Requirements
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 Requirements
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 15 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 18 hours of approved upper-level American/Latin American courses.
Select 12 hours of approved upper-level European/Asian/African courses.

**HISTORY MINOR (18 HOURS)**

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 4435  (3) Private and Public Security Administration
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 Requirements**

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 2220  (3) Principles of Cell Biology
BIO L220  (1) Principles of Cell Biology Lab
BIO 2229  (3) General Ecology
BIO L229  (1) General Ecology Lab
BIO 3320  (3) Genetics
BIO L320  (1) Genetics 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

<table>
<thead>
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<td>Principles of Biology</td>
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<td>Principles of Biology Lab</td>
</tr>
<tr>
<td>MTH 1125</td>
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<td>Calculus I</td>
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Select a four hour course/lab combination from the following:

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<th>Hours</th>
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<tbody>
<tr>
<td>CHM 1142</td>
<td>3</td>
<td>General Chemistry I</td>
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<tr>
<td>CHM L142</td>
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<td>General Chemistry I Lab</td>
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<tr>
<td>PHY 2252</td>
<td>3</td>
<td>General Physics I</td>
</tr>
<tr>
<td>PHY L252</td>
<td>1</td>
<td>General Physics I Lab</td>
</tr>
<tr>
<td>SCI 2233</td>
<td>3</td>
<td>Physical Science</td>
</tr>
<tr>
<td>SCI L233</td>
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<td>Physical Science Lab</td>
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<tr>
<td>SCI 2234</td>
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<td>Earth and Space Science</td>
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<tr>
<td>SCI L234</td>
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Area V Requirements

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<tr>
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<td>University Orientation</td>
</tr>
<tr>
<td>MTH 2220</td>
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<td>Computer Programming for Mathematics</td>
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Requirements for the Major

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<th>Hours</th>
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<tr>
<td>MTH 1126</td>
<td>4</td>
<td>Calculus II</td>
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<tr>
<td>MTH 2227</td>
<td>4</td>
<td>Calculus III</td>
</tr>
<tr>
<td>MTH 3311</td>
<td>3</td>
<td>Differential Equations</td>
</tr>
<tr>
<td>MTH 3318</td>
<td>3</td>
<td>Introduction to Advanced Mathematics</td>
</tr>
<tr>
<td>MTH 3331</td>
<td>3</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>MTH 4424</td>
<td>3</td>
<td>Real Analysis I</td>
</tr>
<tr>
<td>MTH 4441</td>
<td>3</td>
<td>Abstract Algebra I</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Title</th>
</tr>
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<tbody>
<tr>
<td>MTH 1125</td>
<td>4</td>
<td>Calculus I</td>
</tr>
<tr>
<td>MTH 1126</td>
<td>4</td>
<td>Calculus II</td>
</tr>
<tr>
<td>MTH 2227</td>
<td>4</td>
<td>Calculus III</td>
</tr>
<tr>
<td>MTH 3331</td>
<td>3</td>
<td>Linear Algebra</td>
</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Title</th>
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<tbody>
<tr>
<td>MSL 3301</td>
<td>3</td>
<td>Leadership and Problem Solving</td>
</tr>
<tr>
<td>MSL 3302</td>
<td>3</td>
<td>Leadership and Ethics</td>
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<tr>
<td>MSL 3304a</td>
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<td>Leadership Lab</td>
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<tr>
<td>MSL 3304b</td>
<td>1</td>
<td>Leadership Lab</td>
</tr>
<tr>
<td>MSL 4401</td>
<td>3</td>
<td>Leadership and Management</td>
</tr>
<tr>
<td>MSL 4402</td>
<td>3</td>
<td>Officership</td>
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<tr>
<td>MSL 4404a</td>
<td>1</td>
<td>Leadership Lab</td>
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<tr>
<td>MSL 4404b</td>
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<td>Leadership Lab</td>
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</table>

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

PHYSICAL SCIENCE MINOR (19-20 HOURS)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Title</th>
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<tbody>
<tr>
<td>CHM 1142</td>
<td>3</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>CHM L142</td>
<td>1</td>
<td>General Chemistry I Lab</td>
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<tr>
<td>CHM 1143</td>
<td>3</td>
<td>General Chemistry II</td>
</tr>
<tr>
<td>CHM L143</td>
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<td>General Chemistry II Lab</td>
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</table>

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

**PHYSICS MINOR (19 HOURS)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>PHY 4410</td>
<td>Modern Physics</td>
<td>3</td>
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<tr>
<td>PHY L410</td>
<td>Modern Physics Lab</td>
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<tr>
<td>PHY 4420</td>
<td>Mechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

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)**

**Area V Requirements**

- **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**

Select six hours from the following:

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

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

**SOCIAL 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 MAJOR (36 HOURS)**

**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 Organizational 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 Relations
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, social science, or sociology. At least 12 hours must be 3000/4000 level.

SOCIOMETRY MAJOR (36 HOURS)

Area V Requirements
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.

SOCIETY 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.

SURVEYING AND GEOMATICS SCIENCES 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 Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Title</th>
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<tbody>
<tr>
<td>IS 2241</td>
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<td>Computer Concepts and Apps.</td>
</tr>
<tr>
<td>TROY 1101</td>
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<td>University Orientation</td>
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<tr>
<td>CS 2250</td>
<td>3</td>
<td>Computer Science I</td>
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<tr>
<td>MTH 2210</td>
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<td>Applied Statistics</td>
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<tr>
<td>MTH 1126</td>
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<td>PHY 2253</td>
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<td>General Physics II</td>
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### Major Requirements

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<tbody>
<tr>
<td>GEM 2200</td>
<td>3</td>
<td>Basics of Cartography and Surveying</td>
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<tr>
<td>GEM 3309</td>
<td>3</td>
<td>Land Parcel Administration and Law</td>
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<tr>
<td>GEM 3310</td>
<td>3</td>
<td>Land Surveying Practice</td>
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<td>GEM L310</td>
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<td>GEM 3330</td>
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<td>Advanced Measurement Analysis</td>
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<td>GEM 3366</td>
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<td>Photogrammetry and Remote Sensing</td>
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<td>GEM 3370</td>
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<td>Geodesy and Geodesics</td>
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<td>GEM 3379</td>
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<td>Introduction to Least Squares Adjustment</td>
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<td>GEM 3390</td>
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<td>Intro to GIS</td>
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<td>GEM 3391</td>
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<td>GEM 4405</td>
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<td>Route and Construction Survey</td>
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<td>Hydrology</td>
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<tr>
<td>GEM 4499</td>
<td>2</td>
<td>Geomatics/GIS Projects</td>
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**NOTE:** It is strongly recommended that each student gain work experience with a professional surveyor or geomatics firm after completion of the sophomore year.