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:	s jrom m	e Jouowing, including at least one at the
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 Organizations

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 Require	ements	
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 sequ	ence:	
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 Principles of Cell Biology (3) **BIO L220** (1)Principles of Cell Biology Lab **BIO 2229** (3) General Ecology **BIO L229** General Ecology Lab (1) BIO 3320 Genetics (3) **BIO L320** Genetics Lab (1) CHM 3342 (3) Organic Chemistry I **CHM L342** Organic Chemistry I Lab (1) CHM 3343 (3) Organic Chemistry II **CHM L343** Organic Chemistry II Lab (1)

(3)

Applied Statistics

MTH 2210

Select one bota	nv course w	vith its corresponding lab:	BIO 4430	(3)	Applied Genetics
BIO 3325	(3)	Plant Form and Function	BIO L430	(1)	Applied Genetics Lab
BIO L325	(1)	Plant Form and Function Lab	BIO 4433	(3)	Embryology
BIO 3326	(3)	Plant Diversity	BIO L433	(1)	Embryology Lab
BIO L326	(1)	Plant Diversity Lab	BIO 4451	(3)	Toxicology
BIO 4402	(4)	Spring Flora	BIO L451	(1)	Toxicology Lab
BIO 4425	(4)	Field Botany	BIO 4478	(3)	Cell Biology
21020	(.)	1 Total Dominy	BIO L478	(1)	Cell Biology Lab
Select one zool	nov course	with its corresponding lab:	BIO 4480	(3)	Histology
BIO 3307	(3)	Invertebrate Zoology	BIO L480	(1)	Histology Histology Lab
BIO 1307	(1)	Invertebrate Zoology Lab	BIO 4482	(3)	Molecular Biology
BIO 3308	(3)	Vertebrate Zoology	BIO L482	(1)	Molecular Biology Molecular Biology Lab
BIO 1308	(1)	Vertebrate Zoology Vertebrate Zoology Lab	DIO L-102	(1)	Wolcedia Blology Lab
BIO 4405	(3)	Entomology	Salact one uppe	r lovel adv	iser-approved biology course and its
BIO L405	(1)	Entomology Entomology Lab	corresponding l		iser-approved viology course and its
BIO 4410		Animal Behavior	corresponding r		
	(3)	Animal Behavior Lab		DIOI OC	V MINOD (19 20 HOUDS)
BIO L410	(1)				Y MINOR (18-20 HOURS)
BIO 4420	(4)	Field Vertebrate Zoology		-	nding labs must be taken together:
BIO 4432	(3)	Comparative Vertebrate Anatomy	BIO 1101	(3)	Organismal Biology
BIO L432	(1)	Comparative Vertebrate Anatomy Lab	BIO L101	(1)	Organismal Biology Lab
DIO 4445	(2)		BIO 2229	(3)	General Ecology
BIO 4445	(3)	Ichthyology	BIO L229	(1)	General Ecology Lab
BIO 1445	(1)	Ichthyology Lab	BIO 3320	(3)	Genetics
BIO 4446	(3)	Herpetology	BIO L320	(1)	Genetics Lab
BIO L446	(1)	Herpetology Lab			
BIO 4447	(3)	Ornithology	Select one cours	se with its o	corresponding lab:
BIO L447	(1)	Ornithology Lab	BIO 2220	(3)	Principles of Cell Biology
BIO 4448	(3)	Mammalogy	BIO L220	(1)	Principles of Cell Biology Lab
BIO L448	(1)	Mammalogy Lab	BIO 3372	(3)	Microbiology
BIO 4471	(3)	Parasitology	BIO L372	(1)	Microbiology Lab
BIO L471	(1)	Parasitology Lab			
Select one eco	logy/enviro	nmental course with its corresponding			al semester hours of approved upper- ogy courses with corresponding labs.
	ology/enviro	nmental course with its corresponding Principles of Environmental Science	level (3300 or a	bove) biolo	ogy courses with corresponding labs.
lab:	-	Principles of Environmental Science Principles of Environmental Science	level (3300 or a	bove) biolo	ogy courses with corresponding labs. Y PROGRAM (55 HOURS)
<i>lab:</i> BIO 2202 BIO L202	(3) (1)	Principles of Environmental Science Principles of Environmental Science Lab	Specialized Ge	bove) biolo	ogy courses with corresponding labs.
<i>lab:</i> BIO 2202	(3) (1) (3)	Principles of Environmental Science Principles of Environmental Science Lab Limnology	level (3300 or a	BIOLOGY	Y PROGRAM (55 HOURS) ies Requirements
<i>lab:</i> BIO 2202 BIO L202	(3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab	Specialized Ge Area III BIO 1100	BIOLOGY neral Stud	Principles of Biology
lab: BIO 2202 BIO L202 BIO 4413	(3) (1) (3)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology	Specialized Ge	BIOLOGY	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab
lab: BIO 2202 BIO L202 BIO 4413 BIO L413	(3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab	Specialized Ge Area III BIO 1100	BIOLOGY neral Stud	Principles of Biology
lab: BIO 2202 BIO L202 BIO 4413 BIO L413 BIO 4416	(3) (1) (3) (1) (3)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology	Specialized Ge Area III BIO 1100 BIO L100	BIOLOGY neral Stud (3) (1)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab
lab: BIO 2202 BIO L202 BIO 4413 BIO L413 BIO 4416 BIO L416	(3) (1) (3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab	Specialized Ge Area III BIO 1100 BIO L100 CHM 1142	BIOLOGY neral Stud (3) (1) (3)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I
lab: BIO 2202 BIO L202 BIO 4413 BIO 4416 BIO L416 BIO 4421	(3) (1) (3) (1) (3) (1) (3)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology	Specialized Ge Area III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125	BIOLOGY neral Stud (3) (1) (3) (1) (4)	Principles of Biology Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab
lab: BIO 2202 BIO L202 BIO 4413 BIO L413 BIO 4416 BIO L416 BIO 4421 BIO L421	(3) (1) (3) (1) (3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require	BIOLOGY neral Stud (3) (1) (3) (1) (4)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I
lab: BIO 2202 BIO L202 BIO L413 BIO L413 BIO L416 BIO L416 BIO 4421 BIO L421 BIO L421	(3) (1) (3) (1) (3) (1) (3) (1) (3)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241	BIOLOGY neral Stud (3) (1) (3) (1) (4) ements (3)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps.
lab: BIO 2202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L416 BIO 4421 BIO L421 BIO L421 BIO L479	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Environmental Assessment Environmental Assessment Lab	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101	(3) (1) (3) (1) (4) (2ments (3) (1)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation
lab: BIO 2202 BIO L202 BIO L413 BIO L413 BIO L416 BIO L416 BIO L421 BIO L421 BIO L479 BIO L479	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO 1101	(3) (1) (3) (1) (4) ements (3) (1) (4)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology
lab: BIO 2202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L416 BIO L421 BIO L421 BIO L427 BIO L479 Select one corresponding	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) <i>physiolog</i> , <i>lab</i> :	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Lab	Specialized Geometria III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO 1101 BIO L101	(3) (1) (3) (1) (4) ements (3) (1) (4)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Lab
lab: BIO 2202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L421 BIO L421 BIO L429 BIO L479 Select one corresponding BIO 3347	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) <i>physiolog.lab:</i> (3)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I	Specialized Geometria III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO 1101 BIO L101 CHM 1143	(3) (1) (3) (1) (4) ements (3) (1) (3) (1) (4) (3) (1) (3) (1) (3)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Lab General Chemistry II
lab: BIO 2202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L416 BIO L421 BIO L421 BIO L427 BIO L479 Select one corresponding	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) <i>physiolog</i> , <i>lab</i> :	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Lab	Specialized Geometria III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO 1101 BIO L101	(3) (1) (3) (1) (4) ements (3) (1) (4)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Lab
lab: BIO 2202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L421 BIO L421 BIO L429 BIO L479 Select one corresponding BIO 3347	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Lab	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO 1101 BIO L101 CHM 1143 CHM L143	(3) (1) (3) (1) (4) ements (3) (1) (3) (1) (4)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Lab General Chemistry II General Chemistry II General Chemistry II
lab: BIO 2202 BIO L202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L421 BIO L421 BIO L427 BIO L479 Select one corresponding BIO 3347 BIO L347 BIO 3348	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) physiolog. (3) (1) (3)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Lab Human Anatomy and Physiology II	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO L101 CHM 1143 CHM L143 Select one sequence	(3) (1) (3) (1) (4) ements (3) (1) (3) (1) (4) ements (3) (1) (3) (1) (3) (1) (3) (1)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology General Chemistry II General Chemistry II General Chemistry II General Chemistry II Sics sequence not required for medical
lab: BIO 2202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L421 BIO L421 BIO L427 BIO L479 Select one corresponding BIO 3347 BIO L347	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Lab	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO L101 CHM 1143 CHM L143 Select one sequence of the control of the	(3) (1) (3) (1) (4) ements (3) (1) (3) (1) (4) ements (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology General Chemistry II General Chemistry II General Chemistry II General Chemistry II Sics sequence not required for medical
lab: BIO 2202 BIO L202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L421 BIO L421 BIO L427 BIO L479 Select one corresponding BIO 3347 BIO L347 BIO 3348	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) physiolog. (3) (1) (3)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Lab Human Anatomy and Physiology II Human Anatomy and Physiology II	Specialized General Helps Specialized General Helps Special Helps Specia	(3) (1) (3) (1) (4) ements (3) (1) (3) (3) (1) (3) (3) (1) (3) (3) (1) (3) (3) (1) (3) (3) (3) (3) (3) (3)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Organismal Biology Lab General Chemistry II General Chemistry II General Chemistry II Lab
lab: BIO 2202 BIO L202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L421 BIO L421 BIO L427 BIO L479 Select one corresponding BIO 3347 BIO L347 BIO L348	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Human Anatomy and Physiology II Human Anatomy and Physiology II Human Anatomy and Physiology II Lab	Specialized General Helps Specialized General Helps Special Helps Special Helps Special Specia	(3) (1) (3) (1) (4) **ments* (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Organismal Biology Lab General Chemistry II General Chemistry II General Chemistry II Lab
lab: BIO 2202 BIO L202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO L416 BIO L421 BIO L421 BIO L427 BIO L479 Select one corresponding BIO 3347 BIO L347 BIO L347 BIO 3348 BIO L348	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (4) (5) (1) (7) (8) (1) (1) (1) (3) (1) (4) (4) (4) (5) (5) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Lab Human Anatomy and Physiology II Human Anatomy and Physiology II Lab Immunology	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO 1101 BIO L101 CHM 1143 CHM L143 Select one sequence of the control of the contro	(3) (1) (3) (1) (4) **ments* (3) (1) (3)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Organismal Biology Lab General Chemistry II General Chemistry II General Chemistry II Lab Sics sequence not required for medical General Physics I General Physics I General Physics II
lab: BIO 2202 BIO L202 BIO L202 BIO L413 BIO L413 BIO L416 BIO L416 BIO L421 BIO L421 BIO L429 BIO L479 Select one corresponding BIO 3347 BIO L347 BIO L348 BIO L348 BIO L382 BIO L382 BIO 3386	(3) (1) (3) (4) (4) (4) (4) (5) (4) (5) (5) (5) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Lab Human Anatomy and Physiology II Lab Immunology	Specialized General Helps Specialized General Helps Special Helps Special Helps Special Specia	(3) (1) (3) (1) (4) **ments* (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Organismal Biology Lab General Chemistry II General Chemistry II General Chemistry II Lab
lab: BIO 2202 BIO L202 BIO L202 BIO L413 BIO L413 BIO 4416 BIO 4416 BIO L416 BIO 4421 BIO L421 BIO L479 BIO L479 Select one corresponding BIO 3347 BIO L347 BIO 3348 BIO L348 BIO L348	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) physiology lab: (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Lab Human Anatomy and Physiology II Lab Immunology Immunology Immunology Immunology Hematology Hematology Lab	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO 1101 BIO L101 CHM 1143 CHM L143 Select one sequence of technology contour phy 2252 PHY L252 PHY L253 PHY L253 or	(3) (1) (3) (1) (4) ements (3) (1)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Organismal Biology Lab General Chemistry II General Chemistry II General Chemistry II Lab sics sequence not required for medical General Physics I General Physics I Lab General Physics II General Physics II Lab
lab: BIO 2202 BIO L202 BIO L202 BIO L413 BIO L413 BIO L416 BIO L416 BIO L421 BIO L421 BIO L479 BIO L479 Select one corresponding BIO 3347 BIO L347 BIO 3348 BIO L348 BIO L348 BIO 3382 BIO L382 BIO L386	(3) (1) (3) (4) (4) (4) (4) (5) (5) (5) (5) (6) (6) (6) (6) (6) (6) (6) (6) (6) (6	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Lab Human Anatomy and Physiology II Human Anatomy and Physiology II Lab Immunology Immunology Immunology Immunology Hematology Hematology Hematology Lab Food Microbiology	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO L101 CHM 1143 CHM L143 Select one sequence of the chology concentrate of the concentrate of the concentration of	(3) (1) (3) (1) (4) ements (3) (1) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Organismal Biology Lab General Chemistry II General Chemistry II General Chemistry II Lab sics sequence not required for medical General Physics I General Physics I Lab General Physics II Lab Physics I with Calculus
lab: BIO 2202 BIO L202 BIO L202 BIO L413 BIO L413 BIO L416 BIO L416 BIO L421 BIO L421 BIO L427 BIO L479 Select one corresponding BIO 3347 BIO L347 BIO 3348 BIO L348 BIO 3382 BIO L386 BIO L386 BIO L386 BIO L414	(3) (1) (3) (1) (3) (1) (3) (1) (3) (1) physiology lab: (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1) (3) (1)	Principles of Environmental Science Principles of Environmental Science Lab Limnology Limnology Lab Microbial Ecology Microbial Ecology Lab Population Ecology Population Ecology Lab Environmental Assessment Environmental Assessment Environmental Assessment Lab W/cell/molecular course with its Human Anatomy and Physiology I Human Anatomy and Physiology I Lab Human Anatomy and Physiology II Lab Immunology Immunology Immunology Immunology Hematology Hematology Lab	Specialized General III BIO 1100 BIO L100 CHM 1142 CHM L142 MTH 1125 Area V Require IS 2241 TROY 1101 BIO 1101 BIO L101 CHM 1143 CHM L143 Select one sequence of technology contour phy 2252 PHY L252 PHY L253 PHY L253 or	(3) (1) (3) (1) (4) ements (3) (1)	PROGRAM (55 HOURS) ies Requirements Principles of Biology Principles of Biology Lab General Chemistry I General Chemistry I Lab Calculus I Computer Concepts and Apps. University Orientation Organismal Biology Organismal Biology Organismal Biology Lab General Chemistry II General Chemistry II General Chemistry II Lab sics sequence not required for medical General Physics I General Physics I Lab General Physics II General Physics II 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 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	on:	

(3)	Microbiology
(1)	Microbiology Lab
(3)	Food Microbiology
(1)	Food Microbiology Lab
(3)	Toxicology
(1)	Toxicology Lab
(3)	Food Laws and Regulations
(3)	Biochemistry
(1)	Biochemistry Lab
(3)	Restaurant Management
(3)	Human Nutrition
	(1) (3) (1) (3) (1) (3) (3) (3) (1)

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

	······································	8
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 4488/4489/4	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:

	02	1 8
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

52 · COLLEGE OF ARTS AND SCIENCES

32 · COLLEGE O	r akis a	IND SCIENCES
BIO 4448	(3)	Mammalogy
BIO L448	(1)	Mammalogy Lab
BIO 4471	(3)	Parasitology
BIO L471	(1)	Parasitology Lab
210 2171	(1)	Turusiveregy Zue
Select one ecolog lab:	y/environn	nental course with its corresponding
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 ph	husiologu/	cell/molecular course with its
corresponding lab		cent/morecular course with its
BIO 3347	(3)	Human Anatomy and Physiology I
BIO L347	(1)	Human Anatomy and Physiology I
210 25 17	(1)	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

Downy		
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.

		2
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)

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	BIO 4451	(3)	Toxicology
MTH 1125	(4)	Calculus I	BIO L451	(1)	Toxicology Lab
WIIII 1123	(+)	Calculus I	BIO 4471	(3)	Parasitology
			BIO 1471 BIO L471	(1)	Parasitology Lab
Area V Require	ements (20		BIO 4478	(3)	Cell Biology
BIO 1101	(3)	Organismal Biology			
BIO L101	(1)	Organismal Biology Lab	BIO L478	(1)	Cell Biology Lab
CHM 1143	(3)	General Chemistry II	BIO 4480	(3)	Histology
CHM L143	(1)	General Chemistry II Lab	BIO L480	(1)	Histology Lab
IS 2241	(3)	Computer Concepts and	BIO 4482	(3)	Molecular Biology
		Applications	BIO L482	(1)	Molecular Biology Lab
TROY 1101	(1)	University Orientation	CHM 3352 CHM L3352	(3) (1)	Biochemistry Biochemistry Lab
Select one seque technology conc		ics sequence not required for medical		CHE	MICTON EDUCATION
PHY 2252	(3)	General Physics I			MISTRY EDUCATION
PHY L252		General Physics I Lab	Students seeking	g Alabama	teacher certification should select
	(1)		dents should as	irst major a	and education as a second major. Stu- their advisers concerning all certification
PHY 2253	(3)	General Physics II	requirements C	18un win i HM 3352	is required for Alabama teacher certifi-
PHY L253	(1)	General Physics II Lab	cation.	11101 3332	is required for Alabama teacher certifi-
or	(2)	N : I : I CI I			
PHY 2262	(3)	Physics I with Calculus		CHEMIS	TRY MAJOR (37 HOURS)
PHY L262	(1)	Physics I with Calculus Lab			· · · · · · · · · · · · · · · · · · ·
PHY 2263	(3)	Physics II with Calculus	Specialized Ger	neral Stud	lies Requirements
PHY L263	(1)	Physics II with Calculus Lab	Area III		
			BIO 1100	(3)	Principles of Biology
Requirements	for the ma	jor	BIO L100	(1)	Principles of Biology Lab
Lectures and the	eir corresn	onding labs must be taken together.	CHM 1142	(3)	General Chemistry I
BIO 2229	(3)	General Ecology	CHM L142	(1)	General Chemistry I Lab
BIO L229	(1)	General Ecology Lab	MTH 1125	(4)	Calculus I
BIO 3320	(3)	Genetics		(.)	
BIO 1320		Genetics Lab	4 IZ D !		
	(1)		Area V Require		
BIO 3372	(3)	Microbiology	IS 2241	(3)	Computer Concepts and
BIO L372	(1)	Microbiology Lab	TDOV 1101	(1)	Applications
CHM 3342	(3)	Organic Chemistry I	TROY 1101	(1)	University Orientation
CHM L342	(1)	Organic Chemistry I Lab	G 1		
CHM 3343	(3)	Organic Chemistry II	Select one series		
CHM L343	(1)	Organic Chemistry II Lab	PHY 2252	(3)	General Physics I
MTH 2210	(3)	Applied Statistics	PHY L252	(1)	General Physics I Lab
			PHY 2253	(3)	General Physics II
Select 32 semest	ter hours fi	rom the courses listed below:	PHY L253	(1)	General Physics II Lab
BIO 3347	(3)	Human Anatomy and Physiology I	or		
BIO L347	(1)	Human Anatomy and Physiology I	PHY 2262	(3)	Physics with Calculus I
	()	Lab	PHY L262	(1)	Physics with Calculus I Lab
BIO 3348	(3)	Human Anatomy and Physiology II	PHY 2263	(3)	Physics with Calculus II
BIO L348	(1)	Human Anatomy and Physiology II	PHY L263	(1)	Physics with Calculus II Lab
		Lab			
BIO 3382	(3)	Immunology	Chemistry Cor	e (34 Hou	rs)
BIO L382	(1)	Immunology Lab	CHM 1143	(3)	General Chemistry II
BIO 3386	(3)	Hematology	CHM L143	(1)	General Chemistry II Lab
BIO L386	(1)	Hematology Lab	CHM 2242	(3)	Analytical Chemistry
BIO 4414	(3)	Food Microbiology			Analytical Chemistry Lab
BIO L414	(1)	Food Microbiology Lab	CHM L242	(1)	
BIO 4416	(3)	Environmental Microbiology.	CHM 3342	(3)	Organic Chemistry I
BIO L416	(1)	Environmental Microbiology Lab	CHM L342	(1)	Organic Chemistry I Lab
			CHM 3343	(3)	Organic Chemistry II
BIO 4430	(3)	Applied Genetics	CHM L343	(1)	Organic Chemistry II Lab
BIO L430	(1)	Applied Genetics Lab	CHM 3381	(3)	Physical Chemistry I
BIO 4432	(3)	Comparative Vertebrate Anatomy	CHM L381	(1)	Physical Chemistry I Lab
BIO L432	(1)	Comparative Vertebrate Anatomy	CHM 3382	(3)	Physical Chemistry II
DIO 4422	(2)	Lab	CHM 4444	(3)	Advanced Inorganic Chemistry
BIO 4433	(3)	Embryology	CHM 4445	(3)	Instrumental Analysis
BIO L433	(1)	Embryology Lab			-

CHM L445 MTH 1126	(1) (4)	Instrumental Analysis Lab Calculus II
Select three hours	s of chemis	stry electives: Biochemistry
CHM L352 CHM L382	(1) (1)	Biochemistry Lab Physical Chemistry II Lab
CHM 4400	(3)	Special Topics
CHM 4403 CHM L444	(3) (1)	Advanced Organic Chemistry Advanced Inorganic Chemistry Lab
CHM 4491/2 CHM 4493/4	(1-3) (1-3)	Guided Independent Research Guided Independent Study
CHM 4499	(1-3)	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

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, Mathe	ematics, a	nd 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 chemist	ry 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

M **(46 HOURS)**

Specialized	Ceneral	Studies	Requirements	
Specialized	Other ar	Studies	IXCQUII CIIICIIIS	

Specialized Gener	ral Studie	s 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 Requirem	ents	
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 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 Conce	ntration:	
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 one botany course with corresponding lab (four hours).

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

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

(3)

(1)

CHM L381

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

Physical Chemistry I Lab

jonoming.		
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 Concen	tration:	
PHY 4411	(3)	Advanced Modern Physics
PHY 4459	(3)	Ontics

(3)	Optics
(1)	Optics lab
(3)	Mechanics
(3)	Electromagnetic Fields
(3)	Topics in Physics
	(1) (3) (3)

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

	COMPUTER SCIENCE MINOR (18 HOURS)			
CS 2250	(3)	Computer Science I		
CS 2255	(3)	Computer Science II		

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

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

Select a four hour course/lab combination from the following: (Students must complete an eight 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

CS 2250	(3)	Computer Science I
MTH 1126	(4)	Calculus II
TROY 1101	(1)	University Orientation

Select a four hour course/lab combination from the following: (Students must complete an eight 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

CS 2255	(3)	Computer Science II
CS 3310	(3)	Foundations of Computer Science
CS 3323	(3)	Data Structures
CS 3329	(3)	Analysis of Algorithms
CS 3332	(3)	Software Engineering I
CS 3360	(3)	Concepts of Object-Oriented Programming I
CS 3365	(3)	Introduction to Computer Organization and Architectures
CS 3370	(3)	Nature of Programming Languages
CS 3372	(3)	Formal Languages and the Theory of Computation
CS 4420	(3)	Introduction to Database Systems
CS 4445	(3)	Data Communication and Networking
CS 4448	(3)	Operating Systems
MTH 2210	(3)	Applied Statistics
MTH 2215	(3)	Applied Discrete Mathematics

Select two of the following:

CS 3320	(3)	Business Systems Programming
CS 3325	(3)	Operations Research
CS 3331	(3)	Fundamentals of Artificial Intelligence
CS 3361	(3)	Concepts of Objected Oriented Programming II
CS 4401	(3)	Advanced Artificial Intelligence
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

56 · COLLEGE	OF ARTS	S AND SCIENCES			
CS 4462	(3)	Special Topics in Object-Oriented	Select one of the following:		7. 5.
		Technology	ART 1133	(2)	Visual Arts
CS 4495	(3)	Special Topics in Computer Science	DRA 2200	(2)	Introduction to Drama
			MUS 1131	(2)	Music Appreciation
СО	MPUTER	SCIENCE, APPLIED MAJOR (36 HOURS)	Area III		
Specialized Ge	neral Stud	lies Requirements	MTH 1125	(4)	Calculus I
Area III					
MTH 2201	(3)	Business Calculus	Select one scien	ce course	and corresponding lab:
Select addition	al Area III	I requirements as shown in the General	BIO 1100	(3)	Principles of Biology
Studies section	of this cate	alog.	BIO L100	(1)	Principles of Biology Lab
Area V Require	ements		SCI 2233	(3)	Physical Science
IS 2241	(3)	Computer Concepts and	SCI L233	(1)	Physical Science Lab
	. ,	Applications	SCI 2234	(3)	Earth and Space Science
MTH 2215	(3)	Applied Discrete Mathematics	SCI L234	(1)	Earth and Space Science Lab
TROY 1101	(1)	University Orientation			
			Area IV		
Major Require	ements		Select one of the following:		
CS 2250	(3)	Computer Science I	HIS 1101	(3)	Western Civilization I
CS 2255	(3)	Computer Science II	HIS 1102	(3)	Western Civilization II
CS 2265	(3)	Advanced Programming I	HIS 1111	(3)	U.S. to 1877
CS 3330	(3)	Data Structures and Algorithms	HIS 1112	(3)	U.S. since 1877
CS 4420	(3)	Introduction to Database Systems	HIS 1122	(3)	World History to 1500
CS 4443	(3)	Web-Based Software Development	HIS 1123	(3)	World History from 1500
CS 4445	(3)	Data Communications and			
		Networking	Area V		
CS 4447	(3)	Systems Analysis and Design	IS 2241	(3)	Computer Concepts and
CS 4448	(3)	Operating Systems			Applications
			TROY 1101	(1)	University Orientation
Select three of t	-				
CS 3320	(3)	Business Systems Programming	Additional requirements		
CS 3332	(3)	Software Engineering I	CS 2250	(3)	Computer Science I
CS 3347	(3)	Advanced Programming II	CS 2255	(3)	Computer Science II
CS 4449	(3)	Applied Networking	CS 3310	(3)	Foundations of Computer Science
CS 4451	(3)	Computer Security	CS 3323	(3)	Data Structures
CS 4495	(3)	Special Topics in Computer Science	CS 3329	(3)	Analysis of Algorithms
			CS 3332	(3)	Software Engineering I
COMP	UTER SC	IENCE A.S. DEGREE (60 HOURS)	CS 3365	(3)	Introduction to Computer
	Associ	ate of Science Degree	MTH 2215	(2)	Organization and Architectures
See the academ	ic regulati	ions section of this catalog for additional	MTH 2215	(3)	Applied Discrete Mathematics
information regarding associate degrees.			Select 10 hours	of free ele	ctives.

Select 10 hours of free electives.

General Studies Requirements

Kequireme	ents
(3)	Composition and Modern English I
(3)	Composition and Modern English II
ollowing:	
(3)	World Literature before 1660
(3)	World Literature after 1660
(3)	American Literature before 1875
(3)	American Literature after 1875
(3)	British Literature before 1785
(3)	British Literature after 1785
	(3) (3) (3) (3) (3) (3) (3) (3) (3)

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:

jrom me j	onowing 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	I AND SPA	CE 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)

Area V Require	ements	
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 Require	ments	
ENG 3341	(3)	Advanced Grammar
ENG 4495	(3)	Senior Seminar

Select an additional 30 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 Pro- fessional Writing
ENG 3345 ENG 3365	(3) (3)	Technical and Professional Editing 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 addit	ional four c	ourses:
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
-		
	ENGLI	SH MINOR (18 HOURS)
ENG 3341		. 1 . 1
ENG 3341	(3)	Advanced Grammar
		Advanced Grammar
Select one sequ	ence:	
Select one sequence ENG 2211	vence:	American Literature before 1875
Select one sequ	ence:	
Select one sequence ENG 2211	vence:	American Literature before 1875
Select one sequ ENG 2211 ENG 2212	vence:	American Literature before 1875
Select one seque ENG 2211 ENG 2212 or	(3) (3)	American Literature before 1875 American Literature after 1875

Select an additional nine hours of upper division English courses.

ENG 3351	(3)	, CREATIVE WRITING (18 HOURS Introduction to Creative Writing
Select an addit	ional 15 ho	urs from the following:
ENG 3352	(3)	Advanced Creative Writing I
ENG 3353 ENG 3354 ENG 3355	(3) (3) (3)	Advanced Creative Writing II Advanced Nonfiction Writing Verse Writing
ENG 3356	(3)	Forms and Theory of Fiction
ENG 4420 ENG 4427 ENG 4489	(3) (3) (3)	Selected Topics in Creative Writing Contemporary American Literature Internship
ENG		OR, PROFESSIONAL WRITING HASIS (18 HOURS)

ENGL		OR, PROFESSIONAL WRITING
	EMPI	HASIS (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 additi	onal six ho	ours 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

ENG	NI TOTT I	ANGUA CE A DEC BROCRAM	BIO 4479	(3)	Environmental Assessment
ENC		ANGUAGE ARTS PROGRAM	BIO 1479	(1)	Environmental Assessment Lab
	g Alabama	139 HOURS) u teacher certification should complete	BIO 4420	(4)	Field Vertebrate Zoology (combined lecture and lab)
addition to selec	cting educa	required courses for language arts, in tion as a second major. Students should erning all certification requirements.	BIO 4425	(4)	Field Botany or BIO 4402 (combined lecture and lab)
		ies Requirements	BIO 4476	(1-4)	Special Topics (combined lecture and lab)
See the general information.	al studies :	section of this catalog for additional	BIO 4491	(1-4)	Guided Independent Research (combined lecture and lab)
Area II			CHM 3350	(3)	Principles of Physical Chemistry
COM 2241	(3)	Fundamentals of Speech	CHM L350	(1)	Principles of Physical Chemistry
DRA 2200	(2)	Introduction to Drama	CIIIVI L550	(1)	Lab
ENG 2205	(3)	World Literature before 1660	CHM 3352	(3)	Biochemistry
ENG 2206	(3)	World Literature after 1660	CHM L352	(1)	Biochemistry Lab
E11G 2200	(3)	World Effectature after 1000	CHM 4445	(3)	Instrumental Analysis
C-14	- C-11	_	CHM L445	(1)	Instrumental Analysis Lab
Select one of the			CIIVI E 1 13	(1)	monant mary sis Euc
ART 1133	(2)	Visual Arts	ENI	UIDONIME	NTAL CCIENCE PROCESS
MUS 1131	(2)	Music Appreciation	EN		NTAL SCIENCE PROGRAM 55 HOURS)
Area V Requir	ements		Specialized Ge	neral Studi	es Requirements
ENG 2211	(3)	American Literature before 1875	Area III		
ENG 2212	(3)	American Literature after 1875	BIO 1100	(3)	Principles of Biology
ENG 2244	(3)	British Literature before 1785	BIO L100	(1)	Principles of Biology Lab
ENG 2245	(3)	British Literature after 1785	CHM 1142	(3)	General Chemistry I
IS 2241	(3)	Computer Concepts and Apps.	CHM L142	(1)	General Chemistry I Lab
COM 1101	(3)	Introduction to Communication	MTH 1125	(4)	Calculus I
TROY 1101	(1)	University Orientation		` ′	Calculus I
1101 1101	(1)	Chiversity Criticianion	Area V Requir		
Deguired Cour	and for I as	managa Auta	IS 2241	(3)	Computer Concepts and Apps.
Required Cour			TROY 1101	(1)	University Orientation
COM 3342	(3)	Argumentation and Debate	BIO 1101	(3)	Organismal Biology
COM 4441	(2)	Oral Interpretation	BIO L101	(1)	Organismal Biology Lab
DRA 2211	(1)	Theatre for Youth	CHM 1143	(3)	General Chemistry II
DRA 2245	(1)	Stagecraft Lab	CHM L143	(1)	General Chemistry II Lab
DRA 3301	(2)	Acting I			
DRA 4451	(3)	Directing I	Select one sequ	ience (phys	ics sequence not required for medical
ENG 3341	(3)	Advanced Grammar	technology cond		
ENG 3371	(3)	Literature for Young Adults	PHY 2252	(3)	General Physics I
ENG 4405	(3)	History of the English Language	PHY L252	(1)	General Physics I Lab
ENG 4478	(3)	Theory and Practice of Composition:	PHY 2253	(3)	General Physics II
		Writing and Learning Across the Curriculum	PHY L253	(1)	General Physics II Lab
JRN 3326	(3)	Advising Student Publications	or		
	` '	_	PHY 2262	(3)	Physics I with Calculus
		division English electives, six of which el, three of which may be upper-level	PHY L262	(1)	Physics I with Calculus Lab
creative writing		i, three of which may be appearieved	PHY 2263	(3)	Physics II with Calculus
			PHY L263	(1)	Physics II with Calculus Lab
ENVIRO	NMENTAI	L SCIENCE MINOR (18-20 HOURS)	n ~		
BIO 2202	(3)	Principles of Environmental Science	Program Requ		D: :1 6C !! D: !
BIO L202	(1)	Principles of Environmental Science	BIO 2220	(3)	Principles of Cell Biology
		Lab	BIO L220	(1)	Principles of Cell Biology Lab
BIO 3328	(3)	Environmental Pollution and Control	BIO 2229 BIO L229	(3) (1)	General Ecology General Ecology Lab
BIO L328	(1)	Environmental Pollution and Con-	BIO 3320	(3)	Genetics
510 E520	(1)	trol Lab	BIO 5320 BIO L320	(1)	Genetics Lab
			CHM 3342		Organic Chemistry I
Select 12 hours	from the fo	llowing:	CHM L342	(3)	Organic Chemistry I Lab
BIO 4451	(3)	Toxicology		(1)	
BIO L451	(1)	Toxicology Lab	CHM 3343	(3)	Organic Chemistry II
BIO 4452	(3)	Industrial Hygiene	CHM L343	(1)	Organic Chemistry II Lab
BIO 4432 BIO L452	(1)	Industrial Hygiene Lab	MTH 2210	(3)	Applied Statistics
DIO L432	(1)	muusutat tiygiche Lau			

Space Science Space Science Lab

Environmenta	al Science C	Core (32 semester hours):	SCI L233	(1)	Physical Science Lab
BIO 2202	(3)	Principles of Environmental Science	SCI 2234	(3)	Earth and Space Science
BIO L202	(1)	Principles of Environmental Science Lab	SCI L234	(1)	Earth and Space Science La
BIO 3328	(3)	Environmental Pollution and Control	Area IV		
BIO L328	(1)	Environmental Pollution and	Select one of the	he following:	
	()	Control Lab	HIS 1101	(3)	Western Civilization I
BIO 4413	(3)	Limnology	HIS 1102	(3)	Western Civilization II
BIO L413	(1)	Limnology Lab	HIS 1111	(3)	U.S. to 1877
BIO 4451	(3)	Toxicology	HIS 1112	(3)	U.S. since 1877
BIO L451	(1)	Toxicology Lab	HIS 1122	(3)	World History to 1500
BIO 4452	(3)	Industrial Hygiene	HIS 1123	(3)	World History from 1500
BIO L452	(1)	Industrial Hygiene Lab			
BIO 4479	(3)	Environmental Assessment	Area V		
BIO L479	(1)	Environmental Assessment Lab	IS 2241	(3)	Computer Concepts and Applications

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 catalog for additional information regarding associate degrees.

General Studies Requirements

Select one of the following:

Area I

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

Area II

ART 1133	(2)	Visual Arts
DRA 2200	(2)	Introduction to Drama
MUS 1131	(2)	Music Appreciation
Select one of the	following:	
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

British Literature after 1785

Select six hours of one foreign language.

(3)

Area III

ENG 2245

Select	one	of	the	fol	lowing:
Scieci	Onc	\circ_{j}	me.	jυι	wing.

MTH 1110	(3)	Finite Mathematics
MTH 1112	(3)	Pre-calculus Algebra
Select one scien	ice course i	and corresponding lab:

(3) BIO 1100 Principles of Biology

BIO L100 (1) Principles of Biology Lab SCI 2233 (3) Physical Science

Additional	requirements

(1)

TROY 1101

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)

University Orientation

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.

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 of the following:

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

Select one of the following:

Server one of the	jono ming.	
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 of the following:

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

Select one science course and corresponding lab:

60 · COLLEGE OF ARTS AND SCIENCES

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 of the	e following	:
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		
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)				
GEN 1 2200	•			
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

		ing
CEM 1 220 (1	15	C
GEM L220 (1	.)	Basics of Cartography and Surveying Lab
GEM 3330 (3	3)	Advanced Measurement Analysis
GEM L330 (1	i)	Advanced Measurement Analysis Lab
GEM L371 (1	l)	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 Sens-
CEM L266	(1)	Ing
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 Pro-
		gramming 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 nine 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 nine 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 18 hours of approved upper-level American/Latin American

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 Requirements

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 Requirements

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

-		
LEAD	ERSHIP	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
		l 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 4403	(1)	Contemporary Issues in Leadership
LDR 4444	(3-6)	Leadership Internship
LDR 4450	(1-6)	Leadership Service Learning
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

(3)

Area III

CHM 1143

Area V Requirements

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

IS 2241	(3)	Computer Concepts and Apps.
TROY 1101	(1)	University Orientation
BIO 1101	(3)	Organismal Biology
BIO L101	(1)	Organismal Biology Lab

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 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

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:					
(3)	General Chemistry I				
(1)	General Chemistry I Lab				
(3)	General Physics I				
(1)	General Physics I Lab				
(3)	Physical Science				
(1)	Physical Science Lab				
(3)	Earth and Space Science				
(1)	Earth and Space Science Lab				
	(3) (1) (3) (1) (3) (1)				

Area V Requirements

TROY 1101	(1)	University Orientation
MTH 2220	(3)	Computer Programming for Mathe-
		matics

Requirements for the Major

	J	
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:

server one of me forto miles.				
(3)	Real Analysis II			
(3)	Abstract Algebra II			
or both of the following:				
(3)	Mathematical Statistics I			
(3)	Mathematical Statistics II			
	(3) (3) owing: (3)			

Students selecting MTH 4451 and MTH 4452: select nine 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 3304	(1)	Leadership Lab		
MSL 3305	(1)	Leadership Lab		
MSL 4401	(3)	Leadership and Management		
MSL 4402	(3)	Officership		
MSL 4404	(1)	Leadership Lab		
MSL 4405	(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 serie	es:					
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 (three to four semester hours).

-	PHYSICS MINOR (19 HOURS)				
PHY 4410	(3)	Modern Physics			
PHY L410	(1)	Modern Physics Lab			
PHY 4420	(3)	Mechanics			
Select one serie	es:				
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.

POI	LITICAL	SCIENCE MAJOR (36 HOURS)
Area V Require	ements	
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 Require	ements	
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	foll	owing:

select 13 hours	jrom ine jo	llowing.
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 3355	(3)	Southern Politics
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 Relations

<u>International Politics Concentration:</u>

(3)

(3)

POL 3351

POL 4476

POL 4410 POL 4433	(3) (3)	International Political Economy Comparative Government			
Select six hours	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 4467	(3)	Asian Politics			
POL 4470	(3)	European Politics			
POL 4474	(3)	Terrorism and Political Violence			

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

Politics of Southeast Asia

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

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 of the five following concentrations:

Anthropology Concentration:

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.

General Social Science Concentration:

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.

Geography Concentration:

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

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

Select an additional 24 hours of approved upper-level sociology courses.

SOCIOLOGY MINOR (18 HOURS)

Select 18 hours of approved, upper-level Sociology courses. SOC 2280 may be applied toward the minor.

Leadership Concentration:

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:

select an additional 10 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)	Small Groups	

Sociology Concentration:

717 D

SS 4499

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.

SOCIOLOGY MAJOR (36 HOURS)

Area IV Kequii	rements	
SOC 2275	(3)	Introduction to Sociology
Area V Requir	ements	
IS 2241	(3)	Computer Concepts and Applications
TROY 1101	(1)	University Orientation
SOC 2280	(3)	Social Problems in Contemporary Society
Requirements	for the Ma	ajor
SS 3375	(3)	Introduction to Social Science Inquiry
aa aa = ((0)	1 1: .:

Application of Social Scientific SS 3376

Senior Seminar

(3) Inquiry SOC 4420 Sociological Theory (3)

(3)

SURVEYING AND GEOMATICS SCIENCES PROGRAM (59 HOURS)

Area II Requirements

ART 2201 Introductory Drawing

Select one of the following courses:

DRA 2200 (2)Introduction to Drama MUS 1131 (2)Music Appreciation

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

Area III Requirements

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

Select a physics course/lab combination:

sereer a projects	e o m ser rere	· comomunion.
PHY 2252	(3)	General Physics I
PHY L252	(1)	General Physics I Laboratory
or		
PHY 2262	(3)	Physics I with Calculus
PHY L262	(1)	Physics I with Calculus Laboratory

Area IV Requirements

ECO 2251	(3)	Principles of Macroeconomics
ECO 2252	(3)	Principles of Microeconomics
HIS 1111	(3)	U.S. History to 1877
HIS 1112	(3)	U.S. History since 1877

Area V Requirements

CS 2250	(3)	Computer Science I
IS 2241	(3)	Computer Concepts and
		Applications
MTH 1126	(4)	Calculus II
MTH 2210	(3)	Applied Statistics
TROY 1101	(1)	University Orientation

Select a physics course/lab combination:

PHY 2253	(3)	General Physics II
PHY L253	(1)	General Physics II Laboratory
or		
PHY 2263	(3)	Physics II with Calculus
PHY L263	(1)	Physics II with Calculus Laboratory

Program Requirements

GEM 1100	(2)	Computer-Aided Drafting
GEM L100	(2)	Computer-Aided Drafting Lab
GEM 2220	(3)	Basics of Surveying
GEM L220	(1)	Basics of Surveying Lab
GEM 3309	(3)	Land Parcel Admin & Law
GEM L309	(1)	Land Parcel Admin & Law Lab

66 · COLLEGE OF ARTS AND SCIENCES

GEM 3310	(3)	Land Surveying Practice
GEM L310	(1)	Boundary Retracement Seminar
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 & Geodetics
GEM L370	(1)	Geodesy & Geodetics Lab
GEM 3379	(3)	Introduction to Least Squares Adjustment
GEM L379	(1)	Introduction to Least Squares Adjustment Lab
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 4405	(3)	Route & Construction Surveying
GEM L405	(1)	Route & Construction Surveying Lab
GEM 4407	(3)	Land Development
GEM L407	(1)	Land Development Lab
GEM 4409	(3)	Hydrology
GEM L409	(1)	Hydrology Lab
GEM 4410	(3)	Introduction to Global Positions
GEM L410	(1)	Introduction to Global Positions Lab
GEM 4490	(1)	Geomatics Capstone
Select two hours b	elow:	
GEM 4499	(2)	Geomatics/GIS Projects
or		
GEM 3395	(1)	Cooperative Work Experience I, and
GEM 4496	(1)	Cooperative Work Experience II