

*SCHOOL*

*OF*

*NATURAL SCIENCES*

*AND*

*MATHEMATICS*

## **SCHOOL OF NATURAL SCIENCES AND MATHEMATICS**

*The Claflin Imperative: Preparing Students for Leadership and Service in a Multicultural, Global and Technological Society*

**Department of Biology**

**Department of Chemistry**

**Department of Mathematics and Computer Science**

The School endeavors to prepare students to meet the requirements for entry into medical, dental or other health professional schools and graduate school. The School also offers programs of study for obtaining certification in the teaching of biology and mathematics and dual-degree programs in Engineering, Engineering Technology, Physical Therapy, Occupational Therapy, and Pre-Chiropractic Studies. The School seeks to provide its graduates with knowledge and understanding that prepares them for leadership and service in a multicultural, global and technological society.

### **General Objectives of the School**

The Division of Natural Sciences and Mathematics strives to provide instruction and experiences that will produce students who:

1. can demonstrate a general knowledge and understanding of the spectrum of information in science, engineering, mathematics and related disciplines;
2. can display a knowledge and understanding of major issues and contemporary problems relating to a global and multicultural society in science, engineering, mathematics and related disciplines;
3. can speak and write coherently and think critically, logically and quantitatively;
4. can use technology and analytical skills to evaluate and interpret reports and design methodology for solving problems in science, engineering, mathematics and related disciplines;
5. are prepared for leadership and service and to pursue post baccalaureate studies in their respective disciplines; and
6. have gained an educational experience that includes a firm grounding in technology and also knowledge of scientific and aesthetic accomplishments of the forerunners of the college, state, nation and the world.

### **Pre-Professional Requirements**

Students who are planning to enter professional schools upon graduation should consult the pre-professional adviser and secure a statement of the requirements for admission. Most dental and medical schools require Bachelor of Science degrees for admission. However, a few professional schools admit students who have completed a minimum of 90 semester hours of college work of defined character.

Every student majoring in the School of Natural Sciences and Mathematics is required to complete the General Education courses, the General Education Exam, the Senior Exit Exam, the Student Portfolio and either a proposal or thesis prior to graduating from Claflin.

## **Minor**

A minor requires at least 18 hours of Biology, Chemistry, Computer Science or Mathematics courses. These courses are in addition to those required for general education.

## **Special Programs**

### **Health Careers and Other Special Programs**

The Departments of Biology and Chemistry work closely with the South Carolina Alliance for Minority Participation, the South Carolina Independent Colleges and Universities, the Savannah River Site, the USDA and Forest Service Field Station, the Experimental Programs to Stimulate Cooperative Research, the Honors College and the Center for Excellence in Science and Mathematics to make paid summer internships, academic year paid research assistantships, publication opportunities and other professional associations available to students. Special preparation for graduate and professional school admissions tests (e.g., GRE, DAT, MCAT, PCAT, etc.) is available. Paid laboratory assistantships are also available.

The School of Natural Sciences and Mathematics has its own Pre-Health Professions Advisory Committee for students planning to enter the health professions. Any student preparing to be a physician, chiropractor, dentist, pharmacist, occupational therapist, physical therapist, or veterinarian will be advised by this committee during the application process.

## **Dual-Degrees**

### **Department of Biology**

#### **Biotechnology**

Claflin University has a dual degree program in biotechnology with Orangeburg/Calhoun Technical College as follows:

The Associate Degree in Medical Laboratory Sciences from Orangeburg/Calhoun Technical College and Bachelor of Science Degree in Biotechnology from Claflin University (2 + 2)

The Two + Two Dual-Degree Articulation Agreement in Medical Laboratory Technology and Biotechnology programs between Orangeburg–Calhoun Technical College and Claflin University assures that students who successfully complete academic credit courses of study may transfer those courses with full credit between institutions.

The specifics of the Agreement are:

1. Students who complete an Associate Degree with a major in Medical Laboratory Technology at Orangeburg-Calhoun Technical College can receive 81-semester transfer credit hours of coursework toward a Bachelor of Science Degree in Biotechnology at Claflin University.
2. Students should complete the specific courses as outlined in the *Two + Two Dual-Degree Articulation Agreement in Medical Laboratory Technology and Biotechnology* curriculum guide at the two institutions respectively.

3. Students must earn a grade of “C” or better in any course eligible for transfer between institutions.
4. Orangeburg-Calhoun Technical College students must request an official transcript to be sent to the Registrar at Claflin University together with the regular application for admission.
5. Orangeburg-Calhoun Technical College students entering into the Baccalaureate Degree program at Claflin University will be subject to the requirements specified in the Claflin University catalog that is current at the time of the matriculation into the program.

**Program of Study at Claflin University (68 hours)**

**JUNIOR YEAR**

First Semester		Second Semester	
Courses	Hrs.	Courses	Hrs.
BIOL 121, General Biol I	4	BIOL 122, General Biol II	4
CHEM 121, General Chem I	4	CHEM 122, General Chem II	4
MATH 112, PreCalculus	4	Gen Ed Foreign Language	3
Gen Ed Foreign Language	3	STAT, 311, Intro to stats	3
ENGL 102, Composition II	3	ENGL 202, Public Speaking	3
ASMB 301, Assembly	<u>0.0</u>	ASMB 302, Assembly	<u>0.0</u>
Total	18	Total	17

**SENIOR YEAR**

First Semester		Second Semester	
Courses	Hrs.	Courses	Hrs.
BIOL 309, Cell Biology	4	BIOL 310, Molecular Biology	4
CHEM 201, Analytical Chem	4	Gen Ed Rlgn/Phil	3
CHEM 231, Organic Chem	4	Gen Ed Culture	3
HIST 101, African Am Herit	3	BIOL 461, Capstone Course:	4
BIOL 460, Capstone Course:	4	Microbiology, Parasitology	
Chemistry, Immunohematology		Hematology, Coagulation	
Immunology/Serology		ASMB 402, Assembly	<u>0.0</u>
ASMB 401, Assembly	<u>0.0</u>	Total	14
Total	19		

## Department of Mathematics and Computer Science

### Engineering

Clafin University has dual degree programs in Engineering and Engineering Technology with Clemson University and South Carolina State University respectively as follows:

The Bachelor of Science Degree in Applied Mathematics from Clafin University and the Bachelor of Science Degree in Engineering from Clemson University (3 + 2).

The Bachelor of Science Degree in Applied Mathematics from Clafin University and the Bachelor of Science Degree in Engineering Technology from South Carolina State University (3 + 2).

Students must meet the general departmental requirements. These curricula also specifically require students to complete with a grade of “C” or above all course specified in each respective program and have a minimum 2.8 GPA in science/math courses.

*The five-year Dual-Degree Program between Clafin and Clemson University* is designed to offer Clafin students who are interested in engineering careers a broad choice of the various fields of engineering. The program will allow students to complete the general education requirements for Clafin University as well as the pre-engineering courses within a three year period. Upon completion of the B.S. degree in engineering at Clemson University, dual-degree students will receive credit for one year of coursework transferred back to Clafin from Clemson and be awarded a bachelor’s degree in Applied Mathematics from Clafin. The list of course requirements that must be completed at Clafin before transfer to Clemson is shown below. While a student in the dual-degree program is still enrolled at Clafin, it may be advisable, depending upon his/her interest, to enroll in some summer courses at Clemson University or any other institution with EAC/ABET accreditation in Engineering.

### Program of Study at Clafin University (101 hours)

#### FRESHMAN YEAR

##### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
GENED, Communications I	3
ENGR 101, Engineering Graphics	3
MATH 201, Calculus I	4
HIST 101, African American Herit.	3
CHEM 121, General Chemistry I	4
EDUC 101, Orientation I	0.5
ASMB 101, Assembly	<u>0.5</u>
Total	18

##### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
GENED, Communications II	3
ENGR 102, Intro to Engineering	3
MATH 202, Calculus II	4
CSCI 225, Intro to Digital Logic Design	3
CHEM 121, General Chemistry II	4
EDUC 101, Orientation II	0.5
ASMB 102, Assembly	<u>0.5</u>
Total	18

#### SOPHOMORE YEAR

##### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 203, Prin of Physics I	4
GENED, Foreign Languages I	3
ENGR 215, Statics	3
GENED, Social/Behav./History I	3
MATH 301, Calculus III	3
GENED, Health & Human Perf. I	1
ASMB 201, Assembly	<u>0.5</u>
Total	17.5

##### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 204, Prin of Physics II	4
GENED, Foreign Languages II	3
GENED, Science	4
MATH 212, Linear Algebra	3
GENED, Health & Human Perf. II	1
ASMB 202, Assembly	<u>0.5</u>
Total	15.5

**JUNIOR YEAR****First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 341, Intro to Proba & Stat I	3
*CHEM 231, Organic Chemistry I	4
GENED, Culture I	3
CSCI 226, Intro to C Programming	3
+ENGR 216-Dynamics	3
ASMB 301, Assembly	<u>0</u>
Total	16

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
GENED, Communications III	3
*CHEM 232, Organic Chemistry II	4
GENED, Religion Philosophy	3
MATH 302, Differential Equations	3
GENED, Culture II	3
ASMB 302, Assembly	<u>0</u>
Total	16

*The five-year Dual-Degree Program between Claflin and South Carolina State University* is designed to allow students to complete the general education requirements for Claflin University as well as the pre-engineering courses within a three year period. Upon completion of the B.S. degree in engineering technology at South Carolina State University dual-degree students will receive credit for one year of coursework transferred back to Claflin from South Carolina State University and be awarded a bachelor's degree in Applied Mathematics from Claflin. The list of course requirements that must be completed at Claflin before transfer to South Carolina State University is shown below.

**Program of Study at Claflin University (101 hours)****FRESHMAN YEAR****First Semester**

<i>Courses</i>	<i>Sem. Hr.</i>
GENED, Communications I	3
ENGT 170, Intro to Engineering Tech.	3
MATH 112, Pre-Calculus	4
CHEM 121, General Chemistry I	4
EDUC 101, Orientation I	0.5
ASMB 101, Assembly	0.5
CSCI 200, Computer Concepts	<u>3</u>
Total	18

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
GENED, Communications II	3
ENGT 150, Engineering Graphics	3
MATH 201, Calculus I	4
CSCI 225, Intro to Digital Logic Design	3
HIST 101, African American Heritage	3
EDUC 101, Orientation II	0.5
ASMB 102, Assembly	<u>0.5</u>
Total	17

**SOPHOMORE YEAR****First Semester**

<i>Courses</i>	<i>Sem. Hr.</i>
PHYS 203, Prin of Physics I	4
GENED, Foreign Languages I	3
ENGT 215, Statics	3
GENED, Social/Behav./History I	3
MATH 302, Calculus II	3
GENED, Health & Human Perf. I	1
ASMB 201, Assembly	<u>0.5</u>
Total	17.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 204, Prin of Physics II	4
GENED, Foreign Languages II	3
GENED, Science	4
ECON 200	3
MATH 212, Linear Algebra	3
GENED, Health & Human Perf. III	1
ASMB 202, Assembly	<u>0.5</u>
Total	18.5

**JUNIOR YEAR****First Semester**

<i>Courses</i>	<i>Sem. Hr.</i>
STAT 341, Intro to Proba. & Stat I	3
ENGT 213, Strength of Materials	3
MATH 301, Calculus III	3
GENED, Culture I	3
CSCI 226, Intro to C Programming	3
ASMB 301, Assembly	<u>0</u>
Total	15

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
GENED, Communications III	3
ENGT 230, Circuit Analysis	3
GENED, Religion Philosophy	3
MATH 302, Differential Equations	3
GENED, Culture II	3
ASMB 302, Assembly	<u>0</u>
Total	15

## **DEPARTMENT OF BIOLOGY**

The Department of Biology endeavors to offer a curriculum that provides Claflin students with knowledge and understanding of and appreciation for the intricacies of living organisms and their interactions with the environment. Instruction and experiences are designed to prepare students to become informed and productive citizens ready for leadership and service in our multicultural, global and technological society. Relevant contemporary issues are incorporated into a program designed to prepare its majors for careers in the biological or biotechnical sciences and related areas, including entry into graduate and professional schools (medicine, dentistry, allied health, etc.).

### **UNDERGRADUATE PROGRAMS OF STUDY**

The **BACHELOR OF SCIENCE DEGREE WITH A MAJOR IN BIOLOGY AND A MINOR IN CHEMISTRY** is designed to prepare students to enter health care fields and/or to earn a Ph.D., M.D., Pharm.D., DMD, DVM, ID, PT, OT, DO, etc.

The **BACHELOR OF SCIENCE DEGREE WITH A MAJOR IN BIOTECHNOLOGY** is designed to prepare world-class scientists to participate in the shaping of our future. These students will be leaders in the biotechnology industry, in academia and in government. Students will learn about topics ranging from the latest developments in recombinant DNA technology to non-technical issues that students must understand to bring biotechnology products to market, such as bioethics, government regulatory policies, drug-approval policies and patent law.

The **BACHELOR OF SCIENCE DEGREE WITH A MAJOR IN ENVIRONMENTAL SCIENCE** is designed for students who desire to enter graduate school or professions as an environmental specialist with government, academia, industry, etc.

The **BACHELOR OF SCIENCE DEGREE WITH A MAJOR IN BIOINFORMATICS** is designed to prepare students for careers in this newly developing field that applies computer science and statistical methodologies to the biology subfields of genomics and proteomics. Students completing the major would be eligible for jobs in a wide range of disciplines or ready for graduate degree programs in the field.

#### **Minor in Biology**

For a minor in Biology, the student must take 18 hours of Biology beyond BIOL 121.

#### **General Objectives**

**The Department of Biology provides instruction and experiences that will produce students who:**

1. can demonstrate a general knowledge and understanding of the spectrum of information in the biological sciences and related disciplines, including both historical roots of the various biological disciplines and modern theories and technologies;
2. can speak and write coherently and think critically and logically, using higher-level thinking skills to analyze data, design experimental methodologies and solve problems in all areas of life;

3. display a knowledge and understanding of major issues and contemporary problems related to our biosphere and the life it supports;
4. apply the principles and techniques inherent in the various biological disciplines to the problems of contemporary multicultural society in an effort to improve the quality of their lives and the lives of those in their local and global communities; and
5. are prepared for leadership and service and to pursue study in biology or related areas at the graduate or professional level and/or seek gainful employment in academia, industry, private agencies or governmental agencies.

### **Requirements for Majors**

Students majoring in Biology, Bioinformatics, Biotechnology, or Environmental Science must complete all General Education requirements and also satisfy the requirements of the major program in which they are enrolled. In addition, each student must:

1. fill out (at the end of the year wherein BIOL 121, BIOL 122, CHEM 121 and CHEM 122) (CHEM 111 and 112 for Bioinformatics majors) have been completed with a grade of “C” or better a Departmental Application for Major form and submit this form for approval and acceptance by the Biology Department and the Division of Natural Sciences and Mathematics;
2. have a GPA of 2.5 or better to be accepted into any of the major programs offered by the Department of Biology (Note: Acceptance into a major or minor program is prerequisite to enrollment in courses above BIOL 200);
3. complete with a grade of “C” or better all Biology, Chemistry, Mathematics, Physics, Computer Science and English courses required for their degree;
4. successfully complete the General Education Exit Exam, which is to be taken at the end of the sophomore year (minimum of 45 semester hours completed);
5. achieve a passing score on the Departmental Senior Exit Examination;
6. write and present to the Division of Natural Sciences and Mathematics a senior research proposal (any student may opt to substitute a senior thesis for the proposal requirement); and
7. have a 2.0 overall GPA before applying for graduation, at which time he/she should consult with his/her academic adviser and complete an Application for Graduation form by the deadline as indicated in the current academic calendar.

### **Specific Objectives for the Major in Biology**

Upon completion of this program, students are expected:

1. to be able to discuss the organization of life on Earth, beginning at the subatomic level and progressing through to the biosphere;
2. to have developed skills of accuracy and precision in thinking, communication and experimental manipulation and observation;

3. to be able to employ the scientific method to analyze chemical and biological problems rationally and quantitatively;
4. to understand the intersection of principles of physics, chemistry and biology in life processes; and
5. to reconcile scientific information with moral doctrines.

## Curriculum Summary

### Major in Biology

#### General Education

47

#### The University Experience – Take all courses in this sequence

<u>Course No.</u>	<u>Course Title</u>	<u>Cr. Hrs.</u>
ASMB 101	Freshman Assembly	0.5
ASMB 102	Freshman Assembly	0.5
ASMB 201	Sophomore Assembly	0.5
ASMB 202	Sophomore Assembly	0.5
ASMB 301	Junior Assembly	0.0
ASMB 302	Junior Assembly	0.0
ASMB 401	Senior Assembly	0.0
ASMB 402	Senior Assembly	0.0
EDUC 101	Orientation	0.5
EDUC 102	Orientation	0.5

#### Communications – Take all courses in this sequence

ENGL 101	English Composition I	3.0
ENGL 102	English Composition II	3.0
ENGL 202	Public Speaking	3.0

#### Foreign Language – Select a series of 6 credit hours\*

FREN 101	Elementary French I	3.0
FREN 102	Elementary French II	3.0
FREN 203	Intermediate French I	3.0
	or	
SPAN 101	Elementary Spanish I	3.0
SPAN 102	Elementary Spanish II	3.0
SPAN 203	Intermediate Spanish I	3.0

\*All students must take a placement examination to determine the appropriate level of foreign language. Students may test out of courses through the Intermediate level. If so, then their requirement for foreign language will be satisfied.

#### Culture – Select a total of 6 credit hours

ARTS 200	Art Appreciation	3.0
ENGL 201	Intro. to Literature	3.0
MUSC 203	Music Appreciation	3.0
THEA 211	Intro. to Theatre Arts	3.0

**Religion and Philosophy– Select a total 3 credit hours**

PHIL 201	Intro. to Philosophy I: Ethics	3.0
PHIL 202	Intro. to Philosophy II	3.0
RLGN 201	Biblical Narrative Lit.	3.0
RLGN 205	Philosophy of Religion	3.0
RLGN 406	World Religions	3.0

**Health and Human Performance – Select at least 2 credit hours**

HLTH 101	Pers. & Comm. Health	3.0
HLTH 305	First Aid & Safety	2.0
HLTH 308	Mental Health	3.0
HLTH 312	Nutrition & Cons. Health	3.0
HLTH 330	Contemp. Health Problems	3.0
PHED 101	Basketball/Volleyball	1.0
PHED 102	Aerobics/Jogging	1.0
PHED 103	Tennis/Badminton	1.0
PHED 104	Golf/Badminton	1.0
PHED 105	Weight Training/Softball	1.0

**Mathematics – Select a total of at least 6 credit hours**

MATH 112	Pre-Calculus	4.0
MATH 201	Calculus I	4.0

**Science – Select a total of 4 credit hours**

BIOL 121	General Biology I	4.0
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**Social/Behavioral Science/History – Select a total of 3 credit hours**

CRMJ 201	Intro. to Criminal Justice	3.0
ECON 200	Survey of Economics	3.0
GRNT 201	Intro. to Gerontology	3.0
PSCI 301	American National Gov.	3.0
PSCI 302	American State & Local Gov.	3.0
PSYC 201	Intro. to Psychology	3.0
SOCI 201	Intro. to Sociology	3.0
HIST 300	Survey of World History	3.0
HIST 302	Intro. to African Am. Studies	3.0
HIST 304	Intro. to African Studies	3.0
HIST 305	The US through the 19 <sup>th</sup> Cent.	3.0
HIST 307	Contemporary World History	3.0
HIST 308	Contemporary US History	3.0
HIST 311	Euro. Hist. from 1500 to 1815	3.0
HIST 312	European History since 1815	3.0

**African American Heritage – Take this course**

HIST 101	African American Heritage	3.0
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**Major Courses**

BIOL 111-412, Biology Seminars	4.0
BIOL 122, General Biology II	4.0
BIOL 202, Botany	4.0
BIOL 210, Genetics	4.0

BIOL 302, Human Anatomy	4.0
BIOL 309, Cell Biology	4.0
BIOL 310, Molecular Biology	4.0
BIOL 342, Microbiology	4.0
BIOL 404, Human Physiology	4.0
BIOL 405, Ecology	4.0
BIOL 450, Bio-technical Methods	<u>4.0</u>
<b>Total</b>	<b>44</b>

### **Support Courses**

CHEM 121, General Chemistry I	4.0
CHEM 122, General Chemistry II	4.0
CHEM 231, Organic Chemistry I	4.0
CHEM 232, Organic Chemistry II	4.0
CHEM 401, Biochemistry I	4.0
Restricted Electives	8.0
MATH 201, Calculus I	4.0
PHYS 201, Physics I	4.0
PHYS 202, Physics II.	4.0
STAT 311, Elements of Statistical Methods	3.0
Free Elective	<u>3.0</u>
<b>Total</b>	<b>46</b>

### **Specific Objectives for the Major in Biotechnology**

Upon completion of this program, students are expected:

1. be able to articulate the ways in which biotechnology can positively impact the quality of life for humans and other species;
2. to have developed skills of accuracy and precision in thinking, communication and experimental manipulation and observation;
3. to be able to employ the scientific method to analyze chemical and biological problems rationally and quantitatively;
4. to understand the intersection of principles of physics, chemistry and biology in life processes; and
5. to reconcile scientific information with moral doctrines.
6. to understand the ethical implications of biotechnology and its potential for contribution to society as well as its potential for misuse.

### **Curriculum Summary**

#### **Major in Biotechnology**

#### **General Education**

**47**

**The University Experience – Take all courses in this sequence**

<u>Course No.</u>	<u>Course Title</u>	<u>Cr. Hrs.</u>
ASMB 101	Freshman Assembly	0.5
ASMB 102	Freshman Assembly	0.5
ASMB 201	Sophomore Assembly	0.5
ASMB 202	Sophomore Assembly	0.5
ASMB 301	Junior Assembly	0.0
ASMB 302	Junior Assembly	0.0
ASMB 401	Senior Assembly	0.0
ASMB 402	Senior Assembly	0.0
EDUC 101	Orientation	0.5
EDUC 102	Orientation	0.5

**Communications – Take all courses in this sequence**

ENGL 101	English Composition I	3.0
ENGL 102	English Composition II	3.0
ENGL 202	Public Speaking	3.0

**Foreign Language – Select a series of 6 credit hours\***

FREN 101	Elementary French I	3.0
FREN 102	Elementary French II	3.0
FREN 203	Intermediate French I	3.0
	or	
SPAN 101	Elementary Spanish I	3.0
SPAN 102	Elementary Spanish II	3.0
SPAN 203	Intermediate Spanish I	3.0

\*All students must take a placement examination to determine the appropriate level of foreign language. Students may test out of courses through the Intermediate level. If so, then their requirement for foreign language will be satisfied.

**Culture – Select a total of 6 credit hours**

ARTS 200	Art Appreciation	3.0
ENGL 201	Intro. to Literature	3.0
MUSC 203	Music Appreciation	3.0
THEA 211	Intro. to Theatre Arts	3.0

**Religion and Philosophy– Select a total 3 credit hours**

PHIL 201	Intro. to Philosophy I: Ethics	3.0
PHIL 202	Intro. to Philosophy II	3.0
RLGN 201	Biblical Narrative Lit.	3.0
RLGN 205	Philosophy of Religion	3.0
RLGN 406	World Religions	3.0

**Health and Human Performance – Select at least 2 credit hours**

HLTH 101	Pers. & Comm. Health	3.0
HLTH 305	First Aid & Safety	2.0
HLTH 308	Mental Health	3.0
HLTH 312	Nutrition & Cons. Health	3.0
HLTH 330	Contemp. Health Problems	3.0
PHED 101	Basketball/Volleyball	1.0
PHED 102	Aerobics/Jogging	1.0

PHED 103	Tennis/Badminton	1.0
PHED 104	Golf/Badminton	1.0
PHED 105	Weight Training/Softball	1.0

**Mathematics – Select a total of at least 6 credit hours**

MATH 201	Calculus I	4.0
STATS 341	Intro to Probability and Stats	3.0

**Science – Select a total of 4 credit hours**

BIOL 121	General Biology I	4.0
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**Social/Behavioral Science/History – Select a total of 3 credit hours**

CRMJ 201	Intro. to Criminal Justice	3.0
ECON 200	Survey of Economics	3.0
GRNT 201	Intro. to Gerontology	3.0
PSCI 301	American National Gov.	3.0
PSCI 302	American State & Local Gov.	3.0
PSYC 201	Intro. to Psychology	3.0
SOCI 201	Intro. to Sociology	3.0
HIST 300	Survey of World History	3.0
HIST 302	Intro. to African Am. Studies	3.0
HIST 304	Intro. to African Studies	3.0
HIST 305	The US through the 19 <sup>th</sup> Cent.	3.0
HIST 307	Contemporary World History	3.0
HIST 308	Contemporary US History	3.0
HIST 311	Euro. Hist. from 1500 to 1815	3.0
HIST 312	European History since 1815	3.0

**African American Heritage – Take this course**

HIST 101	African American Heritage	3.0
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**Major Courses**

BIOL 111-412, Biology Seminars	4.0
BIOL 122, General Biology II	4.0
BIOL 202, Botany	4.0
BIOL 210, Genetics	4.0
BIOL 309, Cell Biology	4.0
BIOL 321 Introduction to Immunology	4.0
BIOL 310, Molecular Biology	4.0
BIOL 342, Microbiology	4.0
BIOL 341, Bioinformatics I	4.0
BIOL 442, Advanced Microbiology	4.0
BIOL 451, Instrumental Methods in Biology	4.0

**Total** **44**

**Support Courses**

CHEM 121, General Chemistry I	4.0
CHEM 122, General Chemistry II	4.0
CHEM 231, Organic Chemistry I	4.0
CHEM 232, Organic Chemistry II	4.0
CHEM 401, Biochemistry I	4.0

CHEM 402, Biochemistry II	4.0
CSCI 226, Intro to Programming	3.0
PHYS 201, Physics I	4.0
PHYS 202, Physics II.	<u>4.0</u>
<b>Total</b>	<b>35</b>

**Electives**

Restricted elective in Biology	3.0
Restricted math or science elective	4.0
Free elective	<u>3.0</u>
<b>Total</b>	<b>10</b>

**Specific Objectives for the Major in Bioinformatics**

Upon completion of this program, students are expected:

1. to understand the ways that computer algorithms can be used to analyze genomics and proteomics databases to push forward our understanding of the biology of species;
2. to be able to employ the scientific method to analyze chemical and biological problems rationally and quantitatively;
3. to have developed skills of accuracy and precision in thinking, communication and experimental manipulation and observation;
4. to reconcile scientific information with moral doctrines.

**Curriculum Summary**

**Major in Bioinformatics**

<b>General Education</b>	<b>46</b>	
<b>The University Experience – Take all courses in this sequence</b>		
<u>Course No.</u>	<u>Course Title</u>	<u>Cr. Hrs.</u>
ASMB 101	Freshman Assembly	0.5
ASMB 102	Freshman Assembly	0.5
ASMB 201	Sophomore Assembly	0.5
ASMB 202	Sophomore Assembly	0.5
ASMB 301	Junior Assembly	0.0
ASMB 302	Junior Assembly	0.0
ASMB 401	Senior Assembly	0.0
ASMB 402	Senior Assembly	0.0
EDUC 101	Orientation	0.5
EDUC 102	Orientation	0.5
<b>Communications – Take all courses in this sequence</b>		
ENGL 101	English Composition I	3.0
ENGL 102	English Composition II	3.0
ENGL 202	Public Speaking	3.0
<b>Foreign Language – Select a series of 6 credit hours*</b>		
FREN 101	Elementary French I	3.0

FREN 102	Elementary French II	3.0
FREN 203	Intermediate French I	3.0
	or	
SPAN 101	Elementary Spanish I	3.0
SPAN 102	Elementary Spanish II	3.0
SPAN 203	Intermediate Spanish I	3.0

\*All students must take a placement examination to determine the appropriate level of foreign language. Students may test out of courses through the Intermediate level. If so, then their requirement for foreign language will be satisfied.

**Culture – Select a total of 6 credit hours**

ARTS 200	Art Appreciation	3.0
ENGL 201	Intro. to Literature	3.0
MUSC 203	Music Appreciation	3.0
THEA 211	Intro. to Theatre Arts	3.0

**Religion and Philosophy– Select a total 3 credit hours**

PHIL 201	Intro. to Philosophy I: Ethics	3.0
PHIL 202	Intro. to Philosophy II	3.0
RLGN 201	Biblical Narrative Lit.	3.0
RLGN 205	Philosophy of Religion	3.0
RLGN 406	World Religions	3.0

**Health and Human Performance – Select at least 2 credit hours**

HLTH 101	Pers. & Comm. Health	3.0
HLTH 305	First Aid & Safety	2.0
HLTH 308	Mental Health	3.0
HLTH 312	Nutrition & Cons. Health	3.0
HLTH 330	Contemp. Health Problems	3.0
PHED 101	Basketball/Volleyball	1.0
PHED 102	Aerobics/Jogging	1.0
PHED 103	Tennis/Badminton	1.0
PHED 104	Golf/Badminton	1.0
PHED 105	Weight Training/Softball	1.0

**Mathematics – Select a total of at least 6 credit hours**

MATH 201	Calculus I	4.0
MATH 205	Discrete Math	3.0

**Science – Select a total of 4 credit hours**

BIOL 121	General Biology I	4.0
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**Social/Behavioral Science/History – Select a total of 3 credit hours**

CRMJ 201	Intro. to Criminal Justice	3.0
ECON 200	Survey of Economics	3.0
GRNT 201	Intro. to Gerontology	3.0
PSCI 301	American National Gov.	3.0
PSCI 302	American State & Local Gov.	3.0
PSYC 201	Intro. to Psychology	3.0
SOCI 201	Intro. to Sociology	3.0

HIST 300	Survey of World History	3.0
HIST 302	Intro. to African Am. Studies	3.0
HIST 304	Intro. to African Studies	3.0
HIST 305	The US through the 19 <sup>th</sup> Cent.	3.0
HIST 307	Contemporary World History	3.0
HIST 308	Contemporary US History	3.0
HIST 311	Euro. Hist. from 1500 to 1815	3.0
HIST 312	European History since 1815	3.0

**African American Heritage – Take this course**

HIST 101	African American Heritage	3.0
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**Major Courses**

BIOL 111-412,	Biology Seminars	4.0
BIOL 122,	General Biology II	4.0
BIOL 210,	Genetics	4.0
BIOL 310,	Molecular Biology	4.0
BIOL 341,	Applied Bioinformatics I	4.0
BIOL 441,	Applied Bioinformatics II	<u>4.0</u>

**Total** **24**

**Support Courses**

CHEM 111,	Principles of Chemistry I	4.0
CHEM 112,	Principles of Chemistry II	4.0
MATH 202,	Calculus II	4.0
MATH 212,	Linear Algebra	3.0
STAT 341,	Introduction to Probability and Statistics I	3.0
STAT 342,	Introduction to Probability and Statistics II	3.0
STAT 421,	Applied Statistics/ Experimental Design	3.0
STAT 423,	Applied Regression/ANOVA	3.0
CSCI 215,	Basic Algorithm Design	4.0
CSCI 242	Data Structures	3.0
CSCI 335,	Numerical Methods	3.0
CSCI 401,	Senior Design Project	3.0
CSCI 415,	File Processing/ Databases	3.0
CSCI 455,	Special Topics	<u>3.0</u>

**Total** **46**

**Electives**

Restricted elective in CSCI, Math or Biology	9.0
Free Elective	<u>6.0</u>

**Total** **15**

**Specific Objectives for the Major in Environmental Science**

In addition to meeting the general departmental objectives and the specific objectives for students majoring in Biology, Environmental Science Majors advised in the Department of Biology are expected:

1. to have acquired the basic knowledge and skills essential to an understanding of biology, chemistry and the environment;

2. to have developed the ability to interpret the properties and reactions of chemicals at molecular levels and the interaction of these chemicals with the environment;
3. to be able to employ scientific methods to analyze chemical and environmental problems rationally and quantitatively; and
4. to have developed an understanding of the impact of chemistry and biology in meeting mankind's needs and of protecting the environment now and in the future.

## Curriculum Summary

### Major in Environmental Science

**General Education** **47**

**The University Experience – Take all courses in this sequence**

<u>Course No.</u>	<u>Course Title</u>	<u>Cr. Hrs.</u>
ASMB 101	Freshman Assembly	0.5
ASMB 102	Freshman Assembly	0.5
ASMB 201	Sophomore Assembly	0.5
ASMB 202	Sophomore Assembly	0.5
ASMB 301	Junior Assembly	0.0
ASMB 302	Junior Assembly	0.0
ASMB 401	Senior Assembly	0.0
ASMB 402	Senior Assembly	0.0
EDUC 101	Orientation	0.5
EDUC 102	Orientation	0.5

**Communications – Take all courses in this sequence**

ENGL 101	English Composition I	3.0
ENGL 102	English Composition II	3.0
ENGL 202	Public Speaking	3.0

**Foreign Language – Select a series of 6 credit hours\***

FREN 101	Elementary French I	3.0
FREN 102	Elementary French II	3.0
FREN 203	Intermediate French I	3.0
	or	
SPAN 101	Elementary Spanish I	3.0
SPAN 102	Elementary Spanish II	3.0
SPAN 203	Intermediate Spanish I	3.0

\*All students must take a placement examination to determine the appropriate level of foreign language. Students may test out of courses through the Intermediate level. If so, then their requirement for foreign language will be satisfied.

**Culture – Select a total of 6 credit hours**

ARTS 200	Art Appreciation	3.0
ENGL 201	Intro. to Literature	3.0
MUSC 203	Music Appreciation	3.0
THEA 211	Intro. to Theatre Arts	3.0

**Religion and Philosophy– Select a total 3 credit hours**

PHIL 201	Intro. to Philosophy I: Ethics	3.0
PHIL 202	Intro. to Philosophy II	3.0
RLGN 201	Biblical Narrative Lit.	3.0
RLGN 205	Philosophy of Religion	3.0
RLGN 406	World Religions	3.0

**Health and Human Performance – Select at least 2 credit hours**

HLTH 101	Pers. & Comm. Health	3.0
HLTH 305	First Aid & Safety	2.0
HLTH 308	Mental Health	3.0
HLTH 312	Nutrition & Cons. Health	3.0
HLTH 330	Contemp. Health Problems	3.0
PHED 101	Basketball/Volleyball	1.0
PHED 102	Aerobics/Jogging	1.0
PHED 103	Tennis/Badminton	1.0
PHED 104	Golf/Badminton	1.0
PHED 105	Weight Training/Softball	1.0

**Mathematics – Select a total of at least 6 credit hours**

MATH 112	Pre-Calculus	4.0
MATH 201	Calculus I	4.0

**Science – Select a total of 4 credit hours**

BIOL 121	General Biology I	4.0
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**Social/Behavioral Science/History – Select a total of 3 credit hours**

CRMJ 201	Intro. to Criminal Justice	3.0
ECON 200	Survey of Economics	3.0
GRNT 201	Intro. to Gerontology	3.0
PSCI 301	American National Gov.	3.0
PSCI 302	American State & Local Gov.	3.0
PSYC 201	Intro. to Psychology	3.0
SOCI 201	Intro. to Sociology	3.0
HIST 300	Survey of World History	3.0
HIST 302	Intro. to African Am. Studies	3.0
HIST 304	Intro. to African Studies	3.0
HIST 305	The US through the 19 <sup>th</sup> Cent.	3.0
HIST 307	Contemporary World History	3.0
HIST 308	Contemporary US History	3.0
HIST 311	Euro. Hist. from 1500 to 1815	3.0
HIST 312	European History since 1815	3.0

**African American Heritage – Take this course**

HIST 101	African American Heritage	3.0
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**Major Courses**

ESCI 221, Principles of Environmental Science	4.0
ESCI 222, Environmental Policy and Regulations	3.0
ESCI 321, Technology and Environmental Interaction	4.0
ESCI 322, Environmental Management	4.0

ESCI 405, Environmental Ecology	4.0
ESCI 422, Environmental Toxicology and Health	4.0
BIOL 122, General Biology II	4.0
BIOL 202, Botany	4.0
BIOL 309, Cell Biology	4.0
BIOL 342, Microbiology	4.0
BIOL 111-412, Seminars	4.0
CHEM 121, General Chemistry I	4.0
CHEM 122, General Chemistry II	4.0
CHEM 201, Analytical Chemistry	4.0
CHEM 231, Organic Chemistry I	4.0
CHEM 232, Organic Chemistry II	4.0
CHEM 404, Instrumental Methods	<u>4.0</u>
<b>Total</b>	<b>67</b>

**Support Courses**

PHYS 201, Physics I	4.0
PHYS 202, Physics II	4.0
Restricted Elective	3.0
STAT 311, Elements of Statistics	<u>3.0</u>
<b>Total</b>	<b>14</b>

**Electives**

Electives	<b>9</b>
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**Curriculum Leading to the Bachelor of Science Degree with a Major in Biology and a Minor in Chemistry – 136- 137.5 Semester Hours \*See below**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
BIOL 121 – General Biology I	4
CHEM 121 – General Chemistry I	4
MATH 112 – Pre-Calculus	4
ENGL 101 – Composition I	3
BIOL 111 – Freshman Seminar I	0.5
ASMB 101 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
BIOL 122 – General Biology II	4
CHEM 122 – General Chemistry	4
MATH 201 – Calculus I	4
ENGL 102 – Composition II	3
BIOL 112 – Fr. Seminar II	0.5
ASMB 102 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 202 – Botany or BIOL 210 – Genetics	4
CHEM 231 – Organic Chem. I	4
PHYS 201 – College Physics I	4
++Restricted Elective	4
BIOL 211 – Soph. Seminar I	0.5
ASMB 201 – Assembly	<u>0.5</u>
<b>Total</b>	<b>17</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 202 – Botany or BIOL 210 – Genetics	4
CHEM 232 – Organic Chem. II	4
PHYS 202 – College Physics II	4
ENGL 202 – Public Speaking	3
BIOL 212 – Soph. Seminar II	0.5
ASMB 202 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16</b>

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 309 – Cell Biology	4
BIOL 302 – Human Anatomy	4
CHEM 401 – Biochemistry I	4
Gen. Ed. – Foreign Language	3
Gen. Ed. – Culture	3
BIOL 311 – Jr. Seminar I or *HNTH 391 – Jr. Honors Sem. I	0.5
ASMB 301 – Assembly	<u>0</u>
<b>Total</b>	<b>18.5/19</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 310 – Molecular Biology	4
BIOL 342 – Microbiology	4
Gen. Ed. – Foreign Language	3
FREN/SPAN 204 – Foreign Lang.	3
HIST 101 – African Amer. Herit.	3
BIOL 312 – Jr. Sem. II or *HNTH 392 – Jr. Honors Sem. II	0.5
ASMB 302 – Assembly	<u>0</u>
<b>Total</b>	<b>18.5/19</b>

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 405 – Ecology	4
BIOL 450 – Biotech. Methods	4
++Restricted Elective	3/4
STAT 311 – Statistics	3
Gen. Ed. – Health & Human Perform.	2
BIOL 411 – Sr. Seminar I	0.5
ASMB 401 – Assembly	<u>0</u>
<b>Total</b>	<b>16.5/17.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 404 – Human Phys.	4
Gen. Ed. – Religion & Phil.	3
Gen. Ed. – Soc./Behav. Sci./Hist.	3
Gen. Ed. – Culture	3
Free Elective	3
BIOL 411 – Sr. Seminar II or *HNTH 491 – Sr. Honors Thes. III	0.5
ASMB 402 – Assembly	<u>0</u>
<b>Total</b>	<b>16.5/18</b>

++Students should consult with their academic advisor to select restrictive electives appropriate to their career goals. Restrictive elective must come from course within the School of Natural Sciences and Mathematics course catalog.

\*Thesis students only

**Curriculum Leading to the Bachelor of Science Degree with a Major in Biotechnology –  
135.5- 137.5\* Semester Hours. (\*See below)**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
BIOL 121 – General Biology I	4
CHEM 121 – General Chemistry I	4
MATH 201 – Calculus I	4
ENGL 101 – Composition I	3
BIOL 111 – Fr. Seminar I	0.5
ASMB 101 – Assembly	<u>0.5</u>
Total	16.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
BIOL 122 – General Biology II	4
CHEM 122 – General Chemistry II	4
STAT 341 – Statistics	3
ENGL 102 – Composition II	3
Gen. Ed. – Health & Human Perform.	2
BIOL 112 – Fr. Seminar II	0.5
ASMB 102 – Assembly	<u>0.5</u>
Total	17.5

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 202 – Botany	4
CHEM 231 – Organic Chem. I	4
PHYS 201 – College Physics I	4
Gen. Ed. – Culture	3
BIOL 211 – Soph. Seminar I	0.5
ASMB 201 – Assembly	<u>0.5</u>
Total	16

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 210 – Genetics	4
CHEM 232 – Organic Chem. II	4
PHYS 202 – College Physics II	4
CSCI 226 – Intro. to Comp. Science	3
BIOL 212 – Soph. Seminar II	0.5
ASMB 202 – Assembly	<u>0.5</u>
Total	16

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 309 – Cell Biology	4
BIOL 321 – Intro. to Immunology	4
CHEM 401 – Biochemistry I	4
Gen. Ed. – Foreign Language	3
BIOL 311 – Jr. Seminar I or	0.5
*HNTH 391 – Jr. Honors Seminar I	1
ASMB 301 – Assembly	<u>0</u>
Total	15.5/16

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 310 – Molecular Biology	4
BIOL 342 – Microbiology	4
ENGL 202 – Public Speaking	3
CHEM 402 – Biochemistry II	4
Gen. Ed. – Foreign Language	3
BIOL 312 – Jr. Seminar II or	0.5
*HNTH 392 – Jr. Honors Seminar II	1
ASMB 302 – Assembly	<u>0</u>
Total	18.5/19

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
++Restricted Biology Elective	3
BIOL 451 – Inst. Meth. In Biology	4
BIOL 341 – Bioinformatics I	4
Gen. Ed. – Culture	3
Gen. Ed. – African American Herit.	3
BIOL 411 – Sr. Seminar I	0.5
ASMB 401 – Assembly	<u>0</u>
Total	17.5/18

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 442 – Advanced Micro.	4
Gen. Ed. – Religion & Philosophy	3
Gen. Ed. – Soc./Hist. Soc./Hist.	3
Free Elective	3
Restricted Elective	3
BIOL 411 – Sr. Seminar II or	0.5
*HNTH 491 – Sr. Honors Thesis III	2
ASMB 402 – Assembly	<u>0</u>
Total	17.5/19

++Students should consult with their academic advisor to select restrictive electives appropriate to their career goals. Restrictive elective must come from course within the School of Natural Sciences and Mathematics course catalog.

\*Thesis students only

**Curriculum Leading to the Bachelor of Science Degree with a Major in Bioinformatics –  
131 to 133 Semester Hours (\*see below)**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
ENGL 101 – Eng. Comp. I	3
BIOL 121 – General Biol. I	4
CHEM 111 – Prin. of Chemistry	4
MATH 205 – Discrete Math	3
BIOL 111 – Freshman Seminar I	0.5
ASMB 101 – Assembly	<u>0.5</u>
Total	15.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
ENGL 102 – Eng. Comp. II	3
BIOL 122 – General Biol. II	4
CHEM 112 – Prin. of Chemistry	4
CSCI 215 – Basic Algor. Des.	4
BIOL 112 – Freshman Seminar II	0.5
ASMB 102 – Assembly	<u>0.5</u>
Total	16.5

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Health & Human Perform.	2
BIOL 210 – Genetics	4
HIST 101 – African American Herit.	3
Gen Ed. – Foreign Language	3
MATH 201 – Calculus I	4
BIOL 211 – Soph. Seminar I	0.5
ASMB 201 – Assembly	<u>0.5</u>
Total	17

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
ENGL 202 – Public Speaking	3
Gen. Ed. – Foreign Language	3
BIOL 310 – Molecular Biology	4
MATH 212 – Linear Algebra	3
MATH 202 – Calculus II	4
BIOL 212 – Soph. Seminar II	0.5
ASMB 202 – Assembly	<u>0.5</u>
Total	18

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 341 – Applied Bioinform. I	4
CSCI 335 – Numerical Methods	3
Restricted Elective	3
STAT 341 – Intro. to Prob. Stat. I	3
Gen. Ed. – Culture	3
BIOL 311 – Jr. Seminar I or	0.5
HNTH 391 – Jr. Honors Seminar I*	1
ASMB 301 – Assembly	<u>0</u>
Total	16.5/17*

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Culture	3
Free Elective	3
CSCI 242 – Data Structures	3
STAT 342 – Intro. to Prob. Stat. II	3
Restricted Elective	3
BIOL 312 – Jr. Seminar II or	0.5
HNTH 392 – Jr. Honors Seminar II*	1
ASMB 302 – Assembly	<u>0</u>
Total	15.5/16*

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Religion & Philosophy	3
CSCI 415 – File Proc./Database	3
CSCI 401 – Senior Design Project	3
CSCI 445 – Special Topics	3
STAT 421 – Appl. Stats./Exp. Des.	3
BIOL 411 – Sr. Seminar I*	0.5
ASMB 401 – Assembly	<u>0</u>
Total	15*/15.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Soc./Behav. Soc./Hist.	3
STAT 423 – App. Reg./ANOVA	3
BIOL 441 – Applied Bioinform.II	4
Elective	3
Restricted Elective	3
BIOL 411 – Sr. Seminar II or	0.5
HNTH 491 – Sr. Honors Thesis* III	2
ASMB 402 – Assembly	<u>0</u>
Total	16.5/18

\*Thesis students only

**Curriculum Leading to the Bachelor of Science Degree with a Major in Environmental Science – 137 Semester Hours (Non-Honors Students), 139 Semester Hours (Honors Students)**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
BIOL 121 – General Biology I	4
CHEM 121 – General Chemistry I	4
MATH 112 – Pre-Calculus	4
BIOL – 111- Freshman Seminar	0.5
Gen. Ed. – English 101	3
ASMB 101 – Assembly	<u>0.5</u>
Total	16.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
BIOL 122 – General Biology II	4
CHEM 122 – General Chemistry II	4
MATH 201 – Calculus I	4
BIOL 112 – Freshman Seminar II	0.5
Gen. Ed. – English 102	3
ASMB 102 – Assembly	<u>0.5</u>
Total	16.5

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 231 – Organic Chemistry I	4
CHEM 201 – Analytical Chemistry	4
ESCI 221 – Prin. of Env. Science	4
BIOL 202 – Botany	4
BIOL 211 – Soph. Seminar I	0.5
ASMB 201 – Assembly	<u>0.5</u>
Total	17

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 232 – Organic Chemistry II	4
ESCI 222 – Env. Policy/Reg.	3
Gen. Ed. – Culture	3
CSCI 200 – Computer Concepts	3
Gen. Ed. – History 101	3
BIOL 212 – Soph. Seminar II	0.5
ASMB 202 – Assembly	<u>0.5</u>
Total	17

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 201 – College Physics I	4
ESCI 321 – Tech. Env. Interact.	4
BIOL 309 – Cell Biology	4
Gen Ed. – Foreign Language	3
Gen. Ed. – Public Speaking	3
BIOL 311– Junior Seminar I	0.5
*HNTH 391 – Honors Thesis I	1
ASMB 301 – Assembly	<u>0</u>
Total	18.5/19

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 202 – College Physics II	4
ESCI 322 – Env. Mgmt.	4
STAT 311 – Elements of Stats.	3
Gen. Ed. – Foreign Language	3
Restricted Elective	3 or 4
Gen. Ed. – Health & Human Perform.	1
BIOL 312 – Junior Seminar II	0.5
*HNTH 392 – Honors Thesis II	1
ASMB 302 – Assembly	<u>0</u>
Total	18.5/19

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
ESCI 405 – Env. Ecology	4
Gen. Ed. – Soc./Behav. Sci./Hist.	3
***Elective	3
Elective	3
Elective	3
Gen. Ed. – Health & Human Perform.	1
BIOL 411 – Senior Seminar I	0.5
ASMB 401 – Assembly	<u>0</u>
Total	17/17.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 342 – Microbiology	4
CHEM 404 – Instr. Meth.	4
ESCI 422 – Env. Toxic/Health	4
Gen. Ed. – Culture	3
BIOL 412 – Senior Seminar II	0.5
*HNTH 491 – Honors Thesis III	2
ASMB 402 – Assembly	<u>0</u>
Total	15.5/17

++Students should consult with their academic advisor to select restrictive electives appropriate to their career goals. Restrictive elective must come from course within the School of Natural Sciences and Mathematics course catalog.

\*Thesis students only

## **DEPARTMENT OF BIOLOGY COURSE DESCRIPTIONS**

### **Biology (BIOL)**

#### **BIOL 111-112: Freshman Seminar**

Weekly sessions designed to introduce freshman biology students to the world of biological sciences, including career options, curricula options, departmental requirements, college requirements, study habits, test-taking strategies, library searches and critical thinking skills. Discussion and study groups will be formed among students and faculty. Final grades will be based on attendance and completion of assignments. One-half hour each semester. One hour.

#### **BIOL 121: General Biology I**

Prerequisite: None. This is an introductory lecture-laboratory course studying the unity and diversity of life and emphasizing the chemistry of life, the cell theory, structure and function, energy transformation through living systems and the mechanisms of heredity and genetic variability. Three lectures and one laboratory per week. Four hours.

#### **BIOL 122: General Biology II**

Prerequisite: A grade of "C" or better in BIOL 121. A lecture-laboratory course that is a continuation of BIOL121, emphasizing the evolutionary history of biological diversity, natural selection, behavior and environmental adaptation, animal form and function, plant form and function, reproduction and ecology. Three lectures and one laboratory per week. Four hours.

#### **BISP 200 – 299: Special Topics in Biology**

Prerequisite: BIOL 102 or BIOL 121. Seminar and/or laboratory course covering a current topic selected by the Department. Two hours.

NOTE: Enrollment in any of the following BIOL courses requires acceptance into a major or minor Biology or Biochemistry program – see Requirements for Majors above or refer to Requirements for Majors within the Chemistry Department.

#### **BIOL 202: Botany**

Prerequisites: A grade of "C" or better in BIOL 121, BIOL 122, CHEM 121 and CHEM 122. (CHEM 111 and CHEM 112 for Bioinformatics majors). An introductory plant biology course for biology majors. The biology of plants as autotrophic organisms is studied in the context of their primary role in the ecosystem. Lecture and laboratory activities in morphology, anatomy and physiology of plant organs are explored. Taxonomic classifications of plants are also explored as introduction to plant nomenclature. Special emphasis is placed on plant growth and development from germination, vegetative growth and flowering to seed formation and maturation. Greenhouse experiences to demonstrate practical application of lecture and laboratory concepts are emphasized. Three lectures and one laboratory per week. Four hours.

#### **BIOL 210: Genetics**

Prerequisites: A grade of "C" or better in BIOL 121, BIOL 122, CHEM 121 and CHEM 122. (CHEM 111 and CHEM 112 for Bioinformatics majors). A basic course in the principles of heredity, including Mendelian genetics and Mendelian variations. Designed to acquaint the student with the fundamental principles of genetics, with their cytological basis and with their application to human heredity. Three lectures and one laboratory per week. Four hours.

#### **BIOL 211-212: Sophomore Seminar**

Prerequisites: A grade of “C” or better in BIOL 111, BIOL 112, BIOL 121, BIOL 122, CHEM 121 and CHEM 122. (CHEM 111 and CHEM 112 for Bioinformatics majors). Weekly sessions designed to introduce sophomore biology students to the scientific method, scientific writing and problem solving. Assignments and discussions will concentrate on basic science skills, including scientific experimentation and analyses, reading comprehension for scientific literature and writing and problem-solving skills. Reviews in preparation for departmental and standardized exams will be conducted. Final grades will be based on attendance and completion of assignments. One-half hour each semester. One hour.

### **BIOL 301: Biophysics**

Prerequisites: A grade of “C” or better in BIOL 111, BIOL 112, BIOL 121, BIOL 122, CHEM 121 and CHEM 122 and Physics 202 (or 203). This is an introductory biophysics class to apply physics principle to biological systems. The class helps the students to understand biological phenomenon from physics point of view. The class covers the principles and technologies in biological field, such as hydrodynamic methods, thermodynamics and equilibrium, ligand binding, electrophoresis, chromatography, spectroscopic technology, mass spectrometry, nuclear magnetic resonance (NMR), electron spin resonance (ESR), and Lasers. Three lecture hours per week. Three hours.

### **BIOL 302: Human Anatomy**

Prerequisites: A grade of “C” or better in BIOL 121, BIOL 122, CHEM 121 and CHEM 122. (CHEM 111 and CHEM 112 for Bioinformatics majors). The anatomy of the human integumentary, skeletal, muscular, nervous, endocrine, circulatory, excretory, respiratory, immune, digestive (micro and gross) and reproductive systems. Three lectures and one laboratory per week. Four hours.

### **BIOL 309: Cell Biology**

Prerequisites: A grade of “C” or better in BIOL 121, BIOL 122, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232. A study of ultra structural and macro-molecular organization of cells and tissues, emphasizing the convergence of structure and function in life phenomena; principles of molecular aggregation and physiochemical organization of cells; energetics, transport, mobility, irritability and homeostatic mechanisms; cell growth and cell division; cell differentiation and transformation; evolutionary potential of cells; origin of multi cellularity; and techniques useful to the study of cell biology. Three lectures and one laboratory per week. Four hours.

### **BIOL 310: Molecular Biology**

Prerequisites: A grade of “C” or better in BIOL 121, BIOL 122, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232. A study of the structure, organization, and regulation of genetic material. Emphasis is placed on the molecular and biochemical regulation of gene expression (including transcription and translation) and on the molecular techniques used in recombinant DNA manipulations. Three lectures and one laboratory per week. Four hours.

### **BIOL 311-312: Junior Seminar**

Prerequisites: A grade of “C” or better in BIOL 121, BIOL 122, BIOL 211 and 212, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232. Weekly sessions will be designed to initiate the senior proposal preparation process for junior biology majors. Note: Any student wishing to select the senior research thesis option rather than the proposal may do so. Juniors will select a proposal (or thesis) topic and will collect and review scientific literature related to their topic. Students will also present in-class seminars from

the literature review of their topics. Current signal papers in the scientific literature will be reviewed through in-class discussions. Final grades for the first semester will be based on attendance and on the successful completion of an acceptable literature review for the senior research proposal (or thesis). Final grades for the second semester will be based on attendance, on the mini-seminar and on successful acceptance of the prospectus by the Department. The deadline for the prospectus will be October 15 (for off-sequence students) or March 15. One-half hour each semester. One hour.

### **BIOL 321: Intro to Immunology**

Prerequisites: A grade of "C" or better in BIOL 121, BIOL 122, BIOL 211 and 212, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors). Introduction to human immune system. Topics to be covered would include: Roles of innate and acquired immunity, T-lymphocytes, B lymphocytes, macrophages and complement system, cellular aspects of cancer immunity, AIDS, transplantation and autoimmune diseases. Three lectures and one lab per week. Four hours.

### **BIOL 341: Applied Bioinformatics I**

Prerequisites: A grade of "C" or better in BIOL 121, BIOL 122, BIOL 310, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) MATH 205, and CSCI 226. Introduction to basic bioinformatics tools including, human genome project, DNA sequence databases, RNA sequence databases, protein sequence databases. Advance use of informational tools such as BLAST, Entrez, Swissprot, phylogenetic trees and others. Three lecture hours and three lab hours per week. Four hours.

### **BIOL 342: Introduction to Microbiology**

Prerequisites: A grade of "C" or better in BIOL 121, BIOL 122, BIOL 211 and 212, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) and CHEM 231. The form, structure, reproduction, physiology, metabolism and identification of bacteria, fungi, protozoa, rickettsiae and viruses; significance of microbes in general sanitation, industry, agriculture, home economics and medicine. Three lectures and one laboratory per week. Four hours.

### **BIOL 404: Human Physiology**

Prerequisites: A grade of "C" or better in BIOL 121, BIOL 122, BIOL 211, BIOL 212, BIOL 302, BIOL 309, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232. A study of integrative physiological processes inherent at all organizational levels which enhance the normal operation of the human body as a single mechanical unit. Consideration will be given to disease and environmental factors that may disrupt the homeostatic operation of the human body. Three lectures and one laboratory per week. Four hours.

### **BIOL 405: Ecology**

Prerequisites: A grade of "C" or better in BIOL 121, BIOL 122, BIOL 202, CHEM 121, and CHEM 122. (CHEM 111 and CHEM 112 for Bioinformatics majors). Concepts and principles of the relationships between the physical and biotic factors of the environment and living organisms. Practical field experience in techniques, the use of equipment and technology of ecological investigations are covered. Three lectures and one laboratory per week. Four hours.

### **BIOL 411-412: Senior Seminar**

Prerequisites: Graduating senior status and a grade of "C" or better in BIOL 121, BIOL 122, BIOL 211 and 212, BIOL 311 and BIOL 312, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232. First-semester seniors will work

toward the completion of a proposal/thesis draft for their proposal adviser. (Students opting for the thesis will also conduct the necessary research during this time and may be concurrently enrolled in BIOL 420, 421, 422 or 423, Senior Research.) Second-semester seniors will present a proposal/thesis seminar to the department. Students opting for the research thesis will also be required to formally defend their thesis before their thesis committee. Final grades will be based on attendance and on the successful and timely (October 15 or March 15, depending upon graduation status) completion and submission of the senior proposal/thesis. One-half hour each semester. One hour.

#### **BIOL 420, 421, 422, and 423: Senior Research**

Prerequisites: Junior standing and a grade of “C” or better in BIOL 121, BIOL 122, BIOL 211 and 212, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232 or permission of the Department. This course provides an opportunity for exposure to research under the guidance of a faculty member. Students will be shown how to use current literature and how to apply experimental techniques via the performance of an original research project. A written report will be made to the Department of Biology before a grade will be awarded. These courses may be used to receive credit for summer internship research if approved by the Department **before** the internship takes place. The course, if taken in-house, will meet for 4 to 10 hours each week, and a maximum of 2 credit hours will be awarded. If used to receive credit for an internship, the program must consist of a minimum of 6 weeks of research, and a maximum of 2 credit hours will be awarded. Two to eight hours.

#### **BIOL 441: Applied Bioinformatics II**

Prerequisites: Senior standing and a grade of “C” or better in BIOL 121, BIOL 122, BIOL310, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) MATH 205, MATH 201, MATH 202, STAT 341, STAT 342, STAT 421, CSCI 240, CSCI 226 and CSCI 436. Research oriented course designed to develop tools by which to compare genomic and proteomics libraries for various organisms. These tools will help students develop ideas related to drug design, gene therapy and other therapeutic modalities. 1 hour recitation per week and independent laboratory study. Four hours.

#### **BIOL 443: Advanced Microbiology**

Prerequisites: grade of “C” or better in BIOL 121, BIOL 122, BIOL 211 and 212, BIOL 341, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) and CHEM 231. Advanced treatment of topics to include microbial genetics, virology, and parasitology. Three lectures and one lab per week. Four hours.

#### **BIOL 450: Biotechnical Methods Laboratory**

Prerequisites: A grade of “C” or better in BIOL 121, BIOL 122, BIOL 211 and 212, BIOL 310, BIOL 311 and BIOL 312, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232 and CHEM 401. Advanced laboratory course designed to train students in modern biological laboratory techniques necessary for successful careers in science. Topics to be covered include, but are not limited to, advanced laboratory safety, record keeping, data analysis (including computer-generated graphical analysis), technical writing, techniques for protein analysis, techniques for recombinant DNA analysis, techniques in immunochemistry, tissue culture techniques, chromatography techniques, polymerase chain reaction, micromanipulation, DNA sequencing, DNA fingerprinting and spectrophotometry. Two three-hour laboratories and one recitation per week. Four hours.

#### **BIOL 451: Instrumental Methods in Bioresearch**

Prerequisites: A grade of “C” or better in BIOL 121, BIOL 122, BIOL 211, BIOL 212, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232. Theoretical and technical training in research instrumentation to include operation and troubleshooting for: spectrophotometry, high performance liquid chromatography, gas chromatography, mass spectroscopy, microscopy, x-ray crystallography, and nuclear magnetic resonance. Three lectures and one lab per week. Four hours.

#### **BIOL 460: Plant Biotechnology**

Prerequisites: BIOL 121, BIOL 122, BIOL 202, BIOL 210, BIOL 309, BIOL 310. Methods and research applications of plant biotechnology followed by genetic manipulation of plants. Students will gain advanced knowledge on plant biotechnology techniques and tools that can be applied for the following: to develop and improve plant biotechnology products; for improving quantity and quality of food, feed, fiber and renewable energy needs; the use of transgenic plants as bioreactors to produce pharmaceuticals such as vaccines and therapeutic proteins; and to clean environmental pollutants to provide healthy living environment. This course will also provide sound knowledge of genetically modified organisms (GMO) with reference to the legislative framework and economic, social, moral and ethical issues, thereby further preparing students for productive careers in the plant biotechnological sciences Three lecture hours and three laboratory hours per week. Four hours.

#### **Honors Courses**

##### **BIOL 121H: Honors General Biology I**

Prerequisite: None. This is an accelerated Honors introductory lecture-laboratory course in which the unity and diversity of life are studied and the chemistry of life, the cell theory, structure and function, energy transformation through living systems and the mechanisms of heredity and genetic variability are emphasized. Three lectures and one laboratory per week. Four hours.

##### **BIOL 122H: Honors General Biology II**

Prerequisite: A grade of “C” or better in BIOL 121. An accelerated honors lecture-laboratory course that is a continuation of BIOL 121, emphasizing the evolutionary history of biological diversity, natural selection, behavior and environmental adaptation, animal form and function, plant form and function, reproduction and ecology. Three lectures and one laboratory per week. Four hours.

##### **HNTH 391-392: Honors Thesis Seminar I and II**

Prerequisites: Junior status in Honors College and A grade of “C” or better in BIOL 121, BIOL 122, BIOL 211 and 212, CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232. Non-Honors College students electing to prepare a thesis in place of a proposal may enroll in this course in the place of BIOL 411/412 if other course prerequisites are satisfied. A two-semester sequence designed to initiate the thesis process required for graduation from the Honors College. The first semester is an introduction to research, the scientific method, scientific writing and problem solving. Students will collect and review scientific literature related to areas of interest and select a thesis topic in addition to satisfying other course requirements described above. During the second semester, students will write a research prospectus outlining the goals and methodology for their thesis project. The student must take initiative in seeking a mentor to help in the design and supervision of the project. The deadline for submission of the prospectus to the Department will fall on October 15 (for off-sequence students) or March 15. Final grades will be based on attendance and acceptance of the prospectus by the Department. One hour each semester. Two hours.

### **HNTH 491: Honors Thesis Seminar III**

Prerequisites: Graduating senior status and a grade of “C” or better in BIOL 121, BIOL 122, BIOL 211 and 212, HNTH 391, HNTH 392 (or BIOL 311 and BIOL 312 may be substituted for HNTH 391 and 392), CHEM 121, CHEM 122, (CHEM 111 and CHEM 112 for Bioinformatics majors) CHEM 231 and CHEM 232. A year-long laboratory research/technical writing project done during the senior year under the supervision of a mentor from the appropriate department. A final document (prepared according to the specific format approved by the Division of Natural Sciences and Mathematics) will be prepared along with a seminar presentation. Following the seminar the student will formally defend the thesis in front of his/her thesis committee. The deadline for completion of the thesis is October 15 (for December graduation) and March 15 (for May graduation). Two hours.

### **Environmental Science (ESCI)**

#### **ESCI 220: Environmental Issues and Regulations (for non-environmental science majors)**

Prerequisites: A Grade of “C” or better in either BIOL 102, BIOL 121, CHEM 102, or CHEM 121. Environmental issues and concerns in modern society are explored. The policies and regulations promulgated by various governmental agencies to address these issues are catalogued. Standards-setting and enforcement procedures are detailed along with opportunities for and responsibilities of corporations, private organizations and individual citizens. Financial liability and bonding options are discussed. The conflicting interests of society and individuals along with public health issues are explored. Three hours of lecture per week. Three hours.

#### **ESCI 221: Principles of Environmental Science**

Prerequisites: A grade of “C” or better in BIOL 121, BIOL 122, CHEM 121 and CHEM 122. Basic concepts of environmental science and the impact of human activities on the environment will be introduced. Energy generation, population growth, food production, vector-borne diseases, sources of radiation, pollution of air, land and water and their effects on living things and on the physical environment will be discussed. The basic testing in chemical and biological testing techniques are taught. Sampling methodology is reviewed. Three lectures and one laboratory per week. Four hours.

#### **ESCI 222: Environmental Policies and Regulations**

Prerequisites: A grade of “C” or better in BIOL 121, BIOL 122, CHEM 121, CHEM 122, and ESCI 221. Environmental issues and concerns in modern society are explored. The policies and regulations promulgated by various governmental agencies to address these issues are catalogued. The standards setting and enforcement procedures are detailed along with opportunities for and responsibilities of corporations, private organizations, and individual citizens. Financial liability and bonding options are discussed. The conflicting interests of society and individuals along with public health issues are explored. Three lectures per week. Three hours.

#### **ESCI 321: Technology and Environmental Interaction**

Prerequisites: ESCI 222, CHEM 231 and CHEM 232. The role of commercialized technologies in meeting human needs is discussed. The impact of industrial and technological processes on the environment is discussed. The complex problems of acid rain, global warming, groundwater depletion, hazardous waste and air, water and soil pollution will be considered. The role of microbial organisms and technology in the abatement and remediation of these problems is also investigated. Energy production and conservation measures in industrial activities are included. Regulatory and compliance processes are introduced. Three lectures and one laboratory per week. Four hours.

**ESCI 322: Environmental Management**

Prerequisites: ESCI 321, CHEM 231 and CHEM 232. Planning, management and conservation of terrestrial, aquatic and forest resources for a sustainable use in both urban and non-urban habitats. Residential, commercial and industrial wastes are included as both a resource and a pollutant with methods of reduction, control and management discussed. Three lectures and one laboratory per week. Four hours.

**ESCI 405: Environmental Ecology**

Prerequisites: ESCI 322 and BIOL 202. Concepts and principles of the relationships between the physical and biotic factors of the environment and living organisms. Practical field experience in techniques, the use of equipment and technology of ecological investigations are covered. Three lectures and one laboratory per week. Four hours.

**ESCI 407: Waste Characterization and Management**

Prerequisite: ESCI 322. Available technology is applied to the classification of residential, commercial and industrial waste. Current quantities of generation are estimated. Polluting effects are identified. The most common current methods of reduction, control and management are discussed along with possible options for the future. Three lectures and one laboratory per week. Four hours.

**ESCI 422: Environmental Toxicology and Health**

Prerequisites: ESCI 322 and BIOL 309. Provides an overview of the impact of hazardous substances on ecological systems and human health. Basic principles of toxicology, acute and chronic, ranging from the molecular level to the dynamics of an ecosystem, will be studied. Topics included are biodegradation, structure activity relationship, routes of entry, mode of action, acceptable limits of toxic substances and potential biomarkers. Three lectures and one laboratory per week. Four hours.

## **DEPARTMENT OF CHEMISTRY**

### ***The Claflin Imperative: Preparing Students for Leadership and Service in a Multicultural, Global and Technological Society***

The purpose of the Department of Chemistry is to produce graduates with a solid understanding of and practical experience in the chemical sciences so that they will be able to compete effectively and be successful in graduate school, professional school and the work place. Success in their careers will enable them to both serve society and become leaders in their fields. In addition to classroom learning, the Department of Chemistry uses laboratory experiments, research and summer internships to expose students to the multicultural, technological and global world in which they will be expected to function.

### **Curricula**

The *Bachelor of Science Degree with a Major in Chemistry* is approved by *The American Chemical Society* and is designed for students planning to enter either a graduate school program leading to an M.S. or Ph.D. degree, or to enter the work force as a chemist.

The *Bachelor of Science with a major in Biochemistry* is designed for students entering into health care fields and/or planning to earn a Ph.D., M.D., Pharm D., DMD,DVM, OD, PT, OT, DO, etc.

The *Bachelor of Science Degree with a major in Environmental Science* is designed for students who desire to enter graduate school or professions as environmental specialists with government, academia, industry, etc.

### **General Objectives for the Department of Chemistry**

1. To prepare students to compete successfully in graduate and professional schools, and in the work place in government agencies, industry or health care.
2. To develop skills of accuracy and precision in thinking, communication and experimental manipulation and observation.
3. To teach the laws, theories and practices of chemistry.
4. To train students in laboratory skills and methods for demonstrating physical and chemical laws.
5. To teach students to perform chemical analysis, synthesize compounds, and use state-of-the-art laboratory instruments.

### **Requirements for All Majors**

Students majoring in Biochemistry, Chemistry or Environmental Science must complete all General Education requirements and also satisfy the requirements for the major program in which they are enrolled. In addition, student must:

1. fill out (at the end of the year wherein CHEM 121 and CHEM122 have been completed with a grade of "C" or better) a Departmental Application for Major form and submit this form for approval and acceptance by the Chemistry Department and the Division of Natural Sciences and Mathematics.

2. have a GPA of 2.5 or better to be accepted into any of the major programs offered by the Department of Chemistry. (Note: acceptance into a major or minor program is prerequisite to enrollment into courses above CHEM 122.)
3. complete with a grade of "C" or better all Biology, Chemistry, Math, Physics and English courses required for their degree.
4. successfully complete the General Education Exit Exam which is to be taken at the end of the sophomore year (minimum of 45 semester hours completed).
5. achieve a passing score on the Senior Exit Examination.
6. write and present to the Division of Natural Sciences and Mathematics a senior research proposal (any student may opt to substitute a senior thesis for the proposal requirement).
7. have a 2.0 overall GPA before applying for graduation, at which time he/she should consult with his/her academic adviser and complete an Application for Graduation form by the deadline as indicated in the current academic calendar.

### **Department Policy**

Students planning to major in Chemistry, Biochemistry or Environmental Science should consult with a departmental adviser during the first semester of their freshman year.

### **Major in Chemistry**

#### **Specific Objectives for the Major in Chemistry**

Upon completion of the program, students are expected:

1. to have acquired the basic knowledge and skills essential to an understanding of chemistry;
2. to have developed the ability to interpret the properties and reactions of matter at atomic and molecular levels;
3. to be able to employ scientific methods to analyze chemical problems rationally and quantitatively and to apply these methods to the solution of other problems; and
4. to have developed an understanding of the historical application of chemistry in meeting mankind's needs for food, shelter, clothing and transportation and the ability to apply this understanding in terms of future needs.

### **Curriculum Summary for the Major in Chemistry**

#### **General Education**

**45**

#### **The University Experience – Take all courses in this sequence**

<u>Course No.</u>	<u>Course Title</u>	<u>Cr. Hrs.</u>
ASMB 101	Freshman Assembly	0.5
ASMB 102	Freshman Assembly	0.5
ASMB 201	Sophomore Assembly	0.5

ASMB 202	Sophomore Assembly	0.5
ASMB 301	Junior Assembly	0.0
ASMB 302	Junior Assembly	0.0
ASMB 401	Senior Assembly	0.0
ASMB 402	Senior Assembly	0.0
EDUC 101	Orientation	0.5
EDUC 102	Orientation	0.5

**Communications – Take all courses in this sequence**

ENGL 101	English Composition I	3.0
ENGL 102	English Composition II	3.0
ENGL 202	Public Speaking	3.0

**Foreign Language – Select a series of 6 credit hours\***

FREN 101	Elementary French I	3.0
FREN 102	Elementary French II	3.0
FREN 203	Intermediate French I	3.0
	or	
SPAN 101	Elementary Spanish I	3.0
SPAN 102	Elementary Spanish II	3.0
SPAN 203	Intermediate Spanish I	3.0

\*All students must take a placement examination to determine the appropriate level of foreign language. Students may test out of courses through the Intermediate level. If so, then their requirement for foreign language will be satisfied.

**Culture – Select a total of 6 credit hours**

ARTS 200	Art Appreciation	3.0
ENGL 201	Intro. to Literature	3.0
MUSC 203	Music Appreciation	3.0
THEA 211	Intro. to Theatre Arts	3.0

**Religion and Philosophy– Select a total 3 credit hours**

PHIL 201	Intro. to Philosophy I: Ethics	3.0
PHIL 202	Intro. to Philosophy II	3.0
RLGN 201	Biblical Narrative Lit.	3.0
RLGN 205	Philosophy of Religion	3.0
RLGN 406	World Religions	3.0

**Health and Human Performance – Select at least 2 credit hours**

HLTH 101	Pers. & Comm. Health	3.0
HLTH 305	First Aid & Safety	2.0
HLTH 308	Mental Health	3.0
HLTH 312	Nutrition & Cons. Health	3.0
HLTH 330	Contemp. Health Problems	3.0
PHED 101	Basketball/Volleyball	1.0
PHED 102	Aerobics/Jogging	1.0
PHED 103	Tennis/Badminton	1.0
PHED 104	Golf/Badminton	1.0
PHED 105	Weight Training/Softball	1.0

**Mathematics – Select a total of at least 6 credit hours**

MATH 112	Pre-Calculus	4.0
MATH 201	Calculus I	4.0
	or	
MATH 201 and higher	Calculus I	4.0

**Science – Select a total of 4 credit hours**

BIOL 121	General Biology I	4.0
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**Social/Behavioral Science/History – Select a total of 3 credit hours**

CRMJ 201	Intro. to Criminal Justice	3.0
ECON 200	Survey of Economics	3.0
GRNT 201	Intro. to Gerontology	3.0
PSCI 301	American National Gov.	3.0
PSCI 302	American State & Local Gov.	3.0
PSYC 201	Intro. to Psychology	3.0
SOCI 201	Intro. to Sociology	3.0
HIST 300	Survey of World History	3.0
HIST 302	Intro. to African Am. Studies	3.0
HIST 304	Intro. to African Studies	3.0
HIST 305	The US through the 19 <sup>th</sup> Cent.	3.0
HIST 307	Contemporary World History	3.0
HIST 308	Contemporary US History	3.0
HIST 311	Euro. Hist. from 1500 to 1815	3.0
HIST 312	European History since 1815	3.0

**African American Heritage – Take this course**

HIST 101	African American Heritage	3.0
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**Major Courses**

CHEM 191-492, Chemistry Seminars	4.0
CHEM 121, General Chemistry I	4.0
CHEM 122, General Chemistry II	4.0
CHEM 201, Analytical Chemistry	4.0
CHEM 231, Organic Chemistry I	4.0
CHEM 232, Organic Chemistry II	4.0
CHEM 304, Inorganic Chemistry	4.0
CHEM 305, Physical Chemistry I	4.0
CHEM 401, Biochemistry I	4.0
CHEM 404, Instrumental Methods	4.0
CHEM 420, Undergraduate Research	<u>3.0</u>
<b>Total</b>	<b>43</b>

**Support Courses**

MATH 201, Calculus I	4.0
MATH 202, Calculus II	4.0
MATH 212, Linear Algebra	3.0
MATH 301, Calculus III	3.0

MATH 302, Differential Equations	3.0
PHYS 203, Principles of Physics I	4.0
PHYS 204, Principles of Physics II	4.0
STAT 341, Intro. to Probability and Statistics	<u>3.0</u>
<b>Total</b>	<b>28</b>

#### **Elective Courses**

Elective	<u>12</u>
<b>Total</b>	<b>12</b>

### **Major in Biochemistry**

#### **Specific Objectives for the Major in Biochemistry**

Upon completion of this program, students are expected:

1. to have acquired the basic knowledge and skills essential to an understanding of chemistry and biology;
2. to have developed the ability to interpret the properties and reactions of matter at atomic, molecular and cellular levels;
3. to be able to employ the scientific method to analyze chemical and biological problems rationally and quantitatively and to apply these methods to the solution of other problems;
4. to have developed an understanding of the historical contributions arising from the studies of both biology and chemistry; and
5. to understand the intersection of principles of physics, chemistry and biology in life processes.

#### **Curriculum Summary for the Major in Biochemistry**

**General Education** **45**

#### **The University Experience – Take all courses in this sequence**

<u>Course No.</u>	<u>Course Title</u>	<u>Cr. Hrs.</u>
ASMB 101	Freshman Assembly	0.5
ASMB 102	Freshman Assembly	0.5
ASMB 201	Sophomore Assembly	0.5
ASMB 202	Sophomore Assembly	0.5
ASMB 301	Junior Assembly	0.0
ASMB 302	Junior Assembly	0.0
ASMB 401	Senior Assembly	0.0
ASMB 402	Senior Assembly	0.0
EDUC 101	Orientation	0.5
EDUC 102	Orientation	0.5

#### **Communications – Take all courses in this sequence**

ENGL 101	English Composition I	3.0
ENGL 102	English Composition II	3.0

ENGL 202 Public Speaking 3.0

**Foreign Language – Select a series of 6 credit hours\***

FREN 101 Elementary French I 3.0  
FREN 102 Elementary French II 3.0  
FREN 203 Intermediate French I 3.0  
or  
SPAN 101 Elementary Spanish I 3.0  
SPAN 102 Elementary Spanish II 3.0  
SPAN 203 Intermediate Spanish I 3.0

\*All students must take a placement examination to determine the appropriate level of foreign language. Students may test out of courses through the Intermediate level. If so, then their requirement for foreign language will be satisfied.

**Culture – Select a total of 6 credit hours**

ARTS 200 Art Appreciation 3.0  
ENGL 201 Intro. to Literature 3.0  
MUSC 203 Music Appreciation 3.0  
THEA 211 Intro. to Theatre Arts 3.0

**Religion and Philosophy– Select a total 3 credit hours**

PHIL 201 Intro. to Philosophy I: Ethics 3.0  
PHIL 202 Intro. to Philosophy II 3.0  
RLGN 201 Biblical Narrative Lit. 3.0  
RLGN 205 Philosophy of Religion 3.0  
RLGN 406 World Religions 3.0

**Health and Human Performance – Select at least 2 credit hours**

HLTH 101 Pers. & Comm. Health 3.0  
HLTH 305 First Aid & Safety 2.0  
HLTH 308 Mental Health 3.0  
HLTH 312 Nutrition & Cons. Health 3.0  
HLTH 330 Contemp. Health Problems 3.0  
PHED 101 Basketball/Volleyball 1.0  
PHED 102 Aerobics/Jogging 1.0  
PHED 103 Tennis/Badminton 1.0  
PHED 104 Golf/Badminton 1.0  
PHED 105 Weight Training/Softball 1.0

**Mathematics – Select a total of at least 6 credit hours**

MATH 112 Pre-Calculus 4.0  
MATH 201 Calculus I 4.0

**Science – Select a total of 4 credit hours**

BIOL 121 General Biology I 4.0

**Social/Behavioral Science/History – Select a total of 3 credit hours**

CRMJ 201 Intro. to Criminal Justice 3.0  
ECON 200 Survey of Economics 3.0  
GRNT 201 Intro. to Gerontology 3.0

PSCI 301	American National Gov.	3.0
PSCI 302	American State & Local Gov.	3.0
PSYC 201	Intro. to Psychology	3.0
SOCI 201	Intro. to Sociology	3.0
HIST 300	Survey of World History	3.0
HIST 302	Intro. to African Am. Studies	3.0
HIST 304	Intro. to African Studies	3.0
HIST 305	The US through the 19 <sup>th</sup> Cent.	3.0
HIST 307	Contemporary World History	3.0
HIST 308	Contemporary US History	3.0
HIST 311	Euro. Hist. from 1500 to 1815	3.0
HIST 312	European History since 1815	3.0

**African American Heritage – Take this course**

HIST 101	African American Heritage	3.0
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**Major Courses**

CHEM191-492, Seminars	4.0
CHEM 121, General Chemistry I	4.0
CHEM 122, General Chemistry II	4.0
CHEM 201, Analytical Chemistry	4.0
CHEM 231, Organic Chemistry I	4.0
CHEM 232, Organic Chemistry II	4.0
CHEM 305, Physical Chemistry I	4.0
CHEM 401, Biochemistry I	4.0
CHEM 402, Biochemistry II	4.0
CHEM 404, Instrumental Methods	4.0
CHEM 420, Research	3.0
BIOL 122, General Biology II	4.0
BIOL 210, Genetics	4.0
BIOL 308, Cell Biology	4.0
BIOL 310, Molecular Biology	<u>4.0</u>
<b>Total</b>	<b><u>59</u></b>

**Support Courses**

MATH 201, Calculus I	4.0
MATH 202, Calculus II	4.0
STAT 341, Intro. to Probability and Statistics	3.0
PHYS 203, Principles of Physics I	4.0
PHYS 204, Principles of Physics II	<u>4.0</u>
<b>Total</b>	<b><u>19</u></b>

**Elective Courses**

**Elective	4.0
Elective	<u>6.0</u>
<b>Total</b>	<b><u>10</u></b>

**\*\* Biology Electives: BIOL 342, 302, 304, 342, 404, 405, 450**

**Major in Environmental Science**

**Specific Objectives for the Major in Environmental Science**

In addition to meeting the general departmental objectives and the specific objectives for students majoring in Chemistry, Environmental Science Majors advised in the Department of Chemistry are expected:

1. to have acquired the basic knowledge and skills essential to an understanding of biology, chemistry and the environment;
2. to have developed the ability to understand and interpret the properties and interactions of chemical and biological processes within the environment;
3. to be able to employ scientific methods to analyze environmental problems rationally and quantitatively; and
4. to have developed an understanding of the impact of biological and chemical processes in meeting mankind's needs and of protecting the environment now and in the future.

### **Curriculum Summary for the Major in Environmental Science**

#### **General Education**

**47**

#### **The University Experience – Take all courses in this sequence**

<u>Course No.</u>	<u>Course Title</u>	<u>Cr. Hrs.</u>
ASMB 101	Freshman Assembly	0.5
ASMB 102	Freshman Assembly	0.5
ASMB 201	Sophomore Assembly	0.5
ASMB 202	Sophomore Assembly	0.5
ASMB 301	Junior Assembly	0.0
ASMB 302	Junior Assembly	0.0
ASMB 401	Senior Assembly	0.0
ASMB 402	Senior Assembly	0.0
EDUC 101	Orientation	0.5
EDUC 102	Orientation	0.5

#### **Communications – Take all courses in this sequence**

ENGL 101	English Composition I	3.0
ENGL 102	English Composition II	3.0
ENGL 202	Public Speaking	3.0

#### **Foreign Language – Select a series of 6 credit hours\***

FREN 101	Elementary French I	3.0
FREN 102	Elementary French II	3.0
FREN 203	Intermediate French I	3.0
	or	
SPAN 101	Elementary Spanish I	3.0
SPAN 102	Elementary Spanish II	3.0
SPAN 203	Intermediate Spanish I	3.0

\*All students must take a placement examination to determine the appropriate level of foreign language. Students may test out of courses through the Intermediate level. If so, then their requirement for foreign language will be satisfied.

#### **Culture – Select a total of 6 credit hours**

ARTS 200	Art Appreciation	3.0
ENGL 201	Intro. to Literature	3.0
MUSC 203	Music Appreciation	3.0
THEA 211	Intro. to Theatre Arts	3.0

**Religion and Philosophy– Select a total 3 credit hours**

PHIL 201	Intro. to Philosophy I: Ethics	3.0
PHIL 202	Intro. to Philosophy II	3.0
RLGN 201	Biblical Narrative Lit.	3.0
RLGN 205	Philosophy of Religion	3.0
RLGN 406	World Religions	3.0

**Health and Human Performance – Select at least 2 credit hours**

HLTH 101	Pers. & Comm. Health	3.0
HLTH 305	First Aid & Safety	2.0
HLTH 308	Mental Health	3.0
HLTH 312	Nutrition & Cons. Health	3.0
HLTH 330	Contemp. Health Problems	3.0
PHED 101	Basketball/Volleyball	1.0
PHED 102	Aerobics/Jogging	1.0
PHED 103	Tennis/Badminton	1.0
PHED 104	Golf/Badminton	1.0
PHED 105	Weight Training/Softball	1.0

**Mathematics – Select a total of at least 6 credit hours**

MATH 112	Pre-Calculus	4.0
MATH 201	Calculus I	4.0

**Science – Select a total of 4 credit hours**

BIOL 121	General Biology I	4.0
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**Social/Behavioral Science/History – Select a total of 3 credit hours**

CRMJ 201	Intro. to Criminal Justice	3.0
ECON 200	Survey of Economics	3.0
GRNT 201	Intro. to Gerontology	3.0
PSCI 301	American National Gov.	3.0
PSCI 302	American State & Local Gov.	3.0
PSYC 201	Intro. to Psychology	3.0
SOCI 201	Intro. to Sociology	3.0
HIST 300	Survey of World History	3.0
HIST 302	Intro. to African Am. Studies	3.0
HIST 304	Intro. to African Studies	3.0
HIST 305	The US through the 19 <sup>th</sup> Cent.	3.0
HIST 307	Contemporary World History	3.0
HIST 308	Contemporary US History	3.0
HIST 311	Euro. Hist. from 1500 to 1815	3.0
HIST 312	European History since 1815	3.0

**African American Heritage – Take this course**

HIST 101	African American Heritage	3.0
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**Major Courses**

ESCI 221, Principles of Environmental Science	4.0
ESCI 222, Environmental Policy and Regulations	3.0

ESCI 321, Technology and Environmental Interaction	4.0
ESCI 322, Environmental Management	4.0
ESCI 405, Environmental Ecology	4.0
ESCI 422, Environmental Toxicology and Health	4.0
BIOL 122, General Biology II	4.0
BIOL 202, Botany	4.0
BIOL 309, Cell Biology	4.0
BIOL 342, Microbiology	4.0
CHEM191-492, Seminars	4.0
CHEM 121, General Chemistry I	4.0
CHEM 122, General Chemistry II	4.0
CHEM 201, Analytical Chemistry	4.0
CHEM 231, Organic Chemistry I	4.0
CHEM 232, Organic Chemistry II	4.0
CHEM 404, Instrumental Methods	<u>4.0</u>
<b>Total</b>	<b>67</b>
<b>Support Courses</b>	
PHYS 201, Physics I	4
PHYS 202, Physics II	4
STAT 311, Elements of Statistics	<u>3</u>
<b>Total</b>	<b>11</b>
<b>Elective Courses</b>	
Elective	<u>9</u>
<b>Total</b>	<b>9</b>

### **Minor in Chemistry**

For a minor in Chemistry, the student must take **18 hours** of chemistry beyond CHEM 121.

**(Approved by the American Chemical Society) – 133 Semester Hours (Non-Honors Students), 135.5 Semester Hours (Honors Students)**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
ASMB 101 – Assembly	0.5
EDUC 101 – Orientation	0.5
CHEM 121 – General Chemistry I	4
BIOL 121 – General Biology I	4
MATH 201 – Calculus I	4
CHEM 191 – Fr. Seminar I	1
Gen. Ed. – English 101	<u>3</u>
Total	17

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
ASMB 102 – Assembly	0.5
EDUC 102 – Orientation	0.5
CHEM 122 – General Chemistry II	4
CSCI 226 – Intro. Prog.	3
MATH 202 – Calculus II	4
CHEM 192 – Fr. Seminar II	1
Gen. Ed. – English 102	<u>3</u>
Total	16

**SOHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 231 – Organic Chem. I	4
CHEM 201 – Analytical Chem.	4
PHYS 203 – Prin. of Physics I	4
MATH 301 – Calculus III	3
CHEM 291 – Soph. Seminar I	0.5
Gen. Ed. – Health & Human Perform. I	1
ASMB 201 – Assembly	<u>0.5</u>
Total	17

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 232 – Organic Chem. II	4
ENGL 344 – Technical Writ.	3
PHYS 204 – Prin. of Physics II	4
MATH 212 – Linear Algebra	3
CHEM 292 – Soph. Seminar II	0.5
Gen. Ed. – Health & Human Perform. II	1
ASMB 202 – Assembly	<u>0.5</u>
Total	16

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 401 – Biochemistry I	4
Elective	3
STAT 341 – Intro. to Prob. & Stat. I	3
Gen. Ed. – History 101	3
Gen. Ed. – Culture	3
CHEM 391 – Junior Seminar I	0.5
*HNTH 391 – Honors Thesis I	1
ASMB 301 – Assembly	<u>0</u>
Total	16.5/17

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 304 – Inorganic Chem.	4
Elective	3
MATH 302 – Differential Equat.	3
Gen. Ed. – Soc./Behav. Sci./Hist.	3
Gen. Ed. – Public Speaking	3
CHEM 392 – Junior Seminar II	0.5
**HNTH 391 – Honors Thesis II	1
ASMB 302 – Assembly	<u>0</u>
Total	16.5/17

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 305 – Physical Chem. I	4
CHEM 420 – Research	3
Gen. Ed. – Religion & Philosophy I	3
Gen. Ed. – Foreign Language	3
Elective	3
CHEM 491 – Senior Seminar I	0.5
ASMB 401 – Assembly	<u>0</u>
Total	16.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 306 – Physical Chem. II	4
CHEM 404 – Instr. Methods	4
Elective	3
Gen. Ed. – Foreign Language	3
Gen. Ed. – Culture	3
CHEM 492 – Senior Seminar II	0.5
***HNTH 491 – Honors Thesis III	2
ASMB 402 – Assembly	<u>0</u>
Total	17.5/19

\*For Honor Students only. Taken in place of CHEM 391.

\*\* For Honor Students only. Taken in place of CHEM 392.

\*\*\* For Honor Students only. Taken in place of CHEM 491 and CHEM 492.

**Curriculum Leading to the Bachelor of Science Degree with a Major in Biochemistry – 138**

## Semester Hours (Non-Honors Students), 140.5 Semester Hours (Honors Students)

### FRESHMAN YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
CHEM 121 – General Chem. I	4
BIOL 121 – General Biology I	4
MATH 112 – Pre-Calculus	4
CHEM 191 – Freshman Seminar I	0.5
Gen. Ed. – English 101	3
ASMB 101 – Assembly	<u>0.5</u>
Total	17

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
CHEM 122 – General Chem. II	4
BIOL 122 – General Biology II	4
MATH 201 – Calculus I	4
CHEM 192 – Freshman Seminar II	0.5
Gen. Ed. – English 102	3
ASMB 102 – Assembly	<u>0.5</u>
Total	17

### SOPHOMORE YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 231 – Organic Chemistry I	4
CHEM 201 – Analytical Chem.	4
PHYS 203 – Prin. of Phys. I	4
MATH 202 – Calculus II	4
Gen. Ed. – Health & Human Perform.	1
CHEM 291 – Soph. Seminar I	0.5
ASMB 201 – Assembly	<u>0.5</u>
Total	18

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 232 – Organic Chemistry II	4
BIOL 210 – Genetics	4
PHYS 204 – Prin. of Phys. II	4
CSCI 226 – Intro. to Program.	3
Gen. Ed. – Health & Human Perform.	1
CHEM 292 – Soph. Seminar II	0.5
ASMB 202 – Assembly	<u>0.5</u>
Total	17

### JUNIOR YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 401 – Biochemistry I	4
BIOL 309 – Cell Biology	4
STAT 341 – Intro. to Prob. & Stat. I	3
Gen. Ed. – History 101	3
Gen. Ed. – Culture	3
CHEM 291 – Junior Seminar I	0.5
*HNTH 391 – Honors Thesis I	1
ASMB 301 – Assembly	<u>0</u>
Total	17.5/18

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 402 – Biochemistry II	4
BIOL 310 – Molecular Biology	4
Elective	3
Gen. Ed. – Soc./Behav. Sci./Hist.	3
Gen. Ed. – Public Speaking	3
CHEM 392 – Junior Seminar II	0.5
**HNTH 392 – Honors Thesis II	1
ASMB 302 – Assembly	<u>0</u>
Total	17.5/18

### SENIOR YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 305 – Physical Chem. I	4
CHEM 420 – Research	3
Elective	3
Gen. Ed. – Foreign Language	3
Elective	3
CHEM 491 – Senior Seminar I	0.5
ASMB 401 – Assembly	<u>0</u>
Total	16.5

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 404 – Instr. Methods	4
***Elective	4
Gen. Ed. – Religion & Philosophy	3
Gen. Ed. – Foreign Language	3
Gen. Ed. – Culture	3
CHEM 492 – Senior Seminar II	0.5
****HNTH 491 – Honors Thesis III	2
ASMB 402 – Assembly	<u>0</u>
Total	17.5/19

\*For Honor Students only. Taken in place of CHEM 391.

\*\* For Honor Students only. Taken in place of CHEM 392.

\*\*\* Biology Electives: BIOL 342, 302, 304, 404, 405, 450

\*\*\*\*For Honor Students only. Taken in place of CHEM 491 and CHEM 492.

**Curriculum Leading to the Bachelor of Science Degree with a Major in Environmental Science – 137 Semester Hours (Non-Honors Students), 139 Semester Hours (Honors Students)**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
BIOL 121 – General Biology I	4
CHEM 121 – General Chemistry I	4
MATH 112 – Pre-Calculus	4
CHEM 191 – Freshman Seminar I	0.5
Gen. Ed. – English 101	3
ASMB 101 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
BIOL 122 – General Biology II	4
CHEM 122 – General Chemistry II	4
MATH 201 – Calculus I	4
CHEM 192 – Freshman Seminar II	0.5
Gen. Ed. – English 102	3
ASMB 102 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 231 – Organic Chemistry I	4
CHEM 201 – Analytical Chemistry	4
ESCI 221 – Prin. of Env. Science	4
BIOL 202 – Botany	4
CHEM 291 – Soph. Seminar I	0.5
ASMB 201 – Assembly	<u>0.5</u>
<b>Total</b>	<b>17</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CHEM 232 – Organic Chemistry II	4
ESCI 222 – Env. Policy/Reg.	3
Gen. Ed. – Culture	3
CSCI 200 – Computer Concepts	3
Gen. Ed. – History 101	3
CHEM 292 – Soph. Seminar II	0.5
ASMB 202 – Assembly	<u>0.5</u>
<b>Total</b>	<b>17</b>

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 201 – College Physics I	4
ESCI 321 – Tech. Env. Interact.	4
BIOL 309 – Cell Biology	4
Gen Ed. – Foreign Language	3
Gen. Ed. – Public Speaking	3
CHEM 391 – Junior Seminar I	0.5
*HNTH 391 – Honors Thesis I	1
ASMB 301 – Assembly	<u>0</u>
<b>Total</b>	<b>18.5/19</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 202 – College Physics II	4
ESCI 322 – Env. Mgmt.	4
STAT 311 – Elements of Stats.	3
Gen. Ed. – Foreign Language	3
Gen. Ed. – Health & Human Perform.	1
CHEM 392 – Junior Seminar II	0.5
**HNTH 392 – Honors Thesis II	1
ASMB 302 – Assembly	<u>0</u>
<b>Total</b>	<b>18.5/19</b>

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
ESCI 405 – Env. Ecology	4
Gen. Ed. – Soc./Behav. Sci./Hist.	3
***Elective	3
Elective	3
Elective	3
Gen. Ed. – Health & Human Perform.	1
CHEM 491 – Senior Seminar I	0.5
ASMB 401 – Assembly	<u>0</u>
<b>Total</b>	<b>17/17.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
BIOL 342 – Microbiology	4
CHEM 404 – Instr. Meth.	4
ESCI 422 – Env. Toxic/Health	4
Gen. Ed. – Culture	3
CHEM 492 – Senior Seminar II	0.5
***HNTH 491 – Honors Thesis III	2
ASMB 402 – Assembly	<u>0</u>
<b>Total</b>	<b>15.5/17</b>

\*For Honor Students only. Taken in place of CHEM 391.

\*\* For Honor Students only. Taken in place of CHEM 392.

\*\*\* For Honor Students only. Taken in place of CHEM 491 and CHEM 492. \*\*\*Research Strongly Suggested.

## DEPARTMENT OF CHEMISTRY COURSE DESCRIPTIONS

### CHEMISTRY

#### **CHEM 101: Physical Science**

Co-requisites: MATH 111, CHEM 101L. May not be taken for credits toward majors in the Departments of Biology or Chemistry. This course is an introduction to modern concepts of Astronomy, Physics, Chemistry, Meteorology and Geology. Studies include the structure of the universe and the laws of mechanics that govern it. The nature of the elements and the substances that they form are also investigated. Studies also include the nature of heat, light, and sound. Overviews of weather and the structure of the earth are included. Three hours lecture per week. Three hours.

#### **CHEM 101L: Physical Science Laboratory**

Co-requisite: CHEM 101. May not be taken for credits toward majors in the Departments of Biology or Chemistry. This lab is designed to develop laboratory skills, and focus on safety procedures and experimental design and observation. The lab also reinforces the principles and concepts taught in Chem. 101 by means of hands-on application. The student will learn the metric system, preparation of gases and chemicals, and the basics of heat, energy, electricity and mechanics. Students will acquire enhanced writing skills through the recording of data and preparation of reports. One two-hour lab per week. One hour.

#### **CHEM 103: Earth Science**

Prerequisite: CHEM 101. May not be taken for credits toward majors in the Departments of Biology (Except Biology Education) or Chemistry. This course is an introduction to the principles of geology, meteorology and hydrology. Discusses the origins, current status, and interactions of the various ecosystems affecting life on earth. For students majoring in education. Cannot be used as an elective for science or math majors. Three hours lecture, two hours laboratory per week. Four hours.

#### **CHEM 111: Principles of Chemistry**

Prerequisite: MATH 111. This course is an introduction of the basic concepts of chemistry, covering broad topics such as physical and chemical properties of matter and the changes which it undergoes, using both qualitative and quantitative thought processes. This one-semester course will satisfy majors needing one semester only of general chemistry. Three hours of lecture and three hours of laboratory per week. Four credits.

#### **CHEM 121: General Chemistry I**

Prerequisites: MATH 111. Corequisites: MATH 112 and ENGL 101. This course is an introduction to the modern concepts of matter and the changes which it undergoes. The study includes topics such as the description of matter and the nature of atoms, molecules, and molecular bonding. Formulae and equations representing these changes are also studied. The study follows with a discussion of the kinetic theory of gases and reviews of liquids and solutions (including acids, bases, and salts). Three hours of lecture and three hours of laboratory per week. Four hours.

#### **CHEM 122: General Chemistry II**

Prerequisites: A "C" or better in CHEM 121. A continuation of CHEM 121 covering chemical kinetics, thermodynamics, equilibrium, oxidation and reduction reactions, and applications of these phenomena. The inorganic chemistry of the elements IA-VIIIA and an introduction to

organic and biochemistry are also presented. Three hours of lecture and three hours of laboratory per week. Four hours.

#### **CHEM 191-192: Freshman Seminar I & II**

Prerequisites: Academic advisement in the Department of Chemistry or academic advisement in Student Support Services with an intended major amongst those offered by the Department of Chemistry. This course provides background information, skills, and self-evaluations to help students make a successful transition from the structured, closely monitored high school environment to the more unstructured, independent life at college. Included in the topics covered are time management, study skills, personalized curriculum planning, problem solving, grades enhancement, special demands of science courses, and successful laboratory performance. This course provides exposure to and information on some of the career options available to students in the Department of Chemistry. Outside speakers present seminars to the students. Students are encouraged and assisted in applying for summer internships and undergraduate research experiences. One-half hour each semester. One hour.

#### **CHEM 200: Special Topics**

Prerequisites: CHEM 121 or a major within the Division of Natural Science and Mathematics. Seminar and/or laboratory course covering current topics selected by the Department. Two hours.

#### **CHEM 201: Analytical Chemistry**

Prerequisites: CHEM 122 and MATH 112. An introduction to the principles and procedures of modern quantitative analysis. Quantitative aspects of stereochemistry, solution chemistry, and chemical equilibria are studied. Electroanalytical chemistry, complexometry and separation techniques are also covered. Standard volumetric and gravimetric techniques are covered. Emphasis is on quantitative measurements by non-instrumental methods. Three hours of lecture, three hours of lab and one hour of recitation per week. Four hours.

#### **CHEM 231: Organic Chemistry I**

Prerequisites: CHEM 122. The fundamental aspects of chemical bonding, structural theory, stereochemistry and reaction mechanisms of organic compounds are introduced. Nomenclatures, occurrence, properties, preparations and reactions of aliphatic and aromatic compounds are included. Three hours of lecture and one three-hour laboratory per week. Four hours.

#### **CHEM 232: Organic Chemistry II**

Prerequisite: CHEM 231. Nomenclatures, properties, preparations and reactions of organic compounds via functional group organization are studied. Types of reaction mechanisms and spectroscopic methods of analyzing organic compounds are introduced. Three hours of lecture and one three-hour laboratory per week. Four hours.

#### **CHEM 291-292: Sophomore Seminar I & II**

Prerequisites: Academic advisement in the Department of Chemistry or academic advisement in Student Support Services with an intended major amongst those offered by the Department of Chemistry. Weekly session designed to introduce sophomore chemistry students to the scientific method, scientific writing and problem solving. Assignments and discussions will concentrate on basic science skills, including scientific experimentation and analyses, reading comprehension for scientific literature, writing and problem solving skills. Reviews in preparation for departmental and standardized exams will be covered. Final grades will be based upon attendance and completion of assignments. One-half hour each semester. One hour.

**CHEM 304: Inorganic Chemistry**

Prerequisites: CHEM 201, CHEM 231, and MATH 201. An advanced survey of theoretical and descriptive inorganic chemistry emphasizing such topics as atomic and molecular structure, periodic trends, theory of bonding, descriptive chemistry of transition metals and physical methods of examining inorganic compounds. Three hours of lecture and three hours of laboratory per week. Four hours.

**CHEM 305: Physical Chemistry I**

Prerequisites: MATH 201, PHY 204, and CHEM 122. The applications of mathematics and physics to the solution of problems in chemistry. Topics covered are gases, the kinetic-molecular theory, the laws of thermodynamics, phases, solutions, equilibria, electrochemistry and chemical kinetics. Three hours of lecture and three hours of lab per week. Four hours.

**CHEM 306: Physical Chemistry II**

Prerequisite: CHEM 305. A continuation of Physical Chemistry I. Topics covered are quantum theory, chemical bonds, spectroscopy, molecular structure, statistical mechanics and crystal structure. Three hours of lecture and three hours of lab per week. Four hours.

**CHEM 391-392: Junior Seminar I & II**

Prerequisite: Academic advisement in the Department of Chemistry and Junior status. Weekly sessions designed to initiate the senior proposal preparation process for junior chemistry majors. Students will select a proposal topic and will collect and review scientific literature related to their thesis. Students will also present an in-class seminar from the literature review of their proposal topic. Current signal papers in the scientific literature will be reviewed by in-class discussions. Final grades will be based upon attendance and upon the successful completion of an acceptable literature review for the senior research proposal. One half-hour each semester. One hour.

**CHEM 401: Biochemistry I**

Prerequisites: CHEM 232 and BIOL 121 or BIOL 122. An introduction to the chemistry of biological compounds including a systematic study of carbohydrates, lipids, amino acids, proteins, nucleic acids, and enzymes kinetics. Metabolism of biological compounds is studied, as are the interrelations among the carbon, nitrogen, and energy cycles. A laboratory program designed to introduce the student to enzyme kinetics and the use of quantification. A brief introduction to instrumentation will be included. Three hours lecture and three hours laboratory per week. Four hours.

**CHEM 402: Biochemistry II**

Prerequisite: CHEM 401. A continuation of Biochemistry I with an emphasis on the chemistry of physiological systems. Topics include but are not limited to biosynthesis of amino acids and nucleotides, molecular biology, coenzymes and vitamins, and immunogenetics. A laboratory program designed to introduce the student to the study of biological molecules includes experiments with procedures for the quantification, isolation, and characterization of various cellular components. Three hours lecture and three hour laboratory per week. Four hours.

**CHEM 404: Instrumental Methods**

Prerequisites: CHEM 201 and MATH 201. An advanced level study of the theories and techniques of instrumental analysis. The nature of electromagnetic radiation and its applications to UV-visible, infrared, atomic absorption and mass spec are studied. Gas chromatography (GC), high-pressure liquid chromatography (HPLC), Nuclear Magnetic Resonance (NMR), polarographic and electroanalytical techniques are covered. The scientific application of

electronics and optics are emphasized. Three hours lecture, three hours lab and one hour recitation per week. Four hours.

#### **CHEM 420: Undergraduate Research**

Prerequisite: Junior standing and completion of CHEM 231 & 232 or permission of the department. This course provides an opportunity for exposure to research under the guidance of a faculty member. Students will be shown how to use current literature and how to apply experimental techniques in the investigation of an original research project. A written report will be submitted before completion of course (ACS style guide). This course may be used to receive credit for summer internship research if approved by the department before the internship takes place. The course, if taken in-house, will meet for 3 hours (minimum) each week and three credit hours will be awarded. If used to receive credit for an internship, the program must consist of a minimum of 6 weeks of research and a written report must be submitted to department of Chemistry. Three credit hours.

#### **CHEM 491-492: Senior Seminar I & II**

Prerequisites: Advisement in the Chemistry Department and Senior standing or permission of the department. First Semester seniors will work toward the completion of a proposal draft to their proposal advisor. Second semester seniors will present a proposal defense seminar to the department. Final grades will be based upon attendance and upon the successful and timely completion and submission of the senior proposal. One-half hour each semester. One hour.

### **ENVIRONMENTAL SCIENCE**

#### **ESCI 220: Environmental Issues and Regulations(for non-environmental science majors)**

Prerequisites: A Grade of "C" or better in either BIOL 102, BIOL 121, CHEM 102, or CHEM 121. Environmental issues and concerns in modern society are explored. The policies and regulations promulgated by various governmental agencies to address these issues are catalogued. Standards-setting and enforcement procedures are detailed along with opportunities for and responsibilities of corporations, private organizations and individual citizens. Financial liability and bonding options are discussed. The conflicting interests of society and individuals along with public health issues are explored. Three hours of lecture per week. Three hours.

#### **ESCI 221: Principles of Environmental Science**

Prerequisites: A grade of "C" or better in BIOL 121, BIOL 122, CHEM 121 and CHEM 122. (CHEM 111 and CHEM 112 for Bioinformatics majors). Basic concepts of environmental science and the impact of human activities on the environment will be introduced. Energy generation, population growth, food production, vector-borne diseases, sources of radiation, pollution of air, land and water and their effects on living things and on the physical environment will be discussed. The basic testing in chemical and biological testing techniques are taught. Sampling methodology is reviewed. Three lectures and one laboratory per week. Four hours.

#### **ESCI 222: Environmental Policies and Regulations**

Prerequisites: A grade of "C" or better in BIOL 121, BIOL 122, CHEM 121, CHEM 122 (CHEM 111 and CHEM 112 for Bioinformatics majors), and ESCI 221. Environmental issues and concerns in modern society are explored. The policies and regulations promulgated by various governmental agencies to address these issues are catalogued. The standards setting and enforcement procedures are detailed along with opportunities for and responsibilities of corporations, private organizations, and individual citizens. Financial liability and bonding options are discussed. The conflicting interests of society and individuals along with public health issues are explored. Three lectures per week. Three hours.

**ESCI 321: Technology and Environmental Interaction**

Prerequisites: ESCI 222, CHEM 231 and CHEM 232. The role of commercialized technologies in meeting human needs is discussed. The impact of industrial and technological processes on the environment is discussed. The complex problems of acid rain, global warming, groundwater depletion, hazardous waste and air, water and soil pollution will be considered. The role of microbial organisms and technology in the abatement and remediation of these problems is also investigated. Energy production and conservation measures in industrial activities are included. Regulatory and compliance processes are introduced. Three lectures and one laboratory per week. Four hours.

**ESCI 322: Environmental Management**

Prerequisite: ESCI 321, CHEM 231 and CHEM 232. Planning, management and conservation of terrestrial, aquatic and forest resources for a sustainable use in both urban and non-urban habitats. Residential, commercial and industrial wastes are included as both a resource and a pollutant with methods of reduction, control and management discussed. Three lectures and one laboratory per week. Four hours.

**ESCI 405: Environmental Ecology**

Prerequisites: ESCI 322 and BIOL 202. Concepts and principles of the relationships between the physical and biotic factors of the environment and living organisms. Practical field experience in techniques, the use of equipment and technology of ecological investigations are covered. Three lectures and one laboratory per week. Four hours.

**ESCI 407: Waste Characterization and Management**

Prerequisite: ESCI 322. Available technology is applied to the classification of residential, commercial and industrial waste. Current quantities of generation are estimated. Polluting effects are identified. The most common current methods of reduction, control and management are discussed along with possible options for the future. Three lectures and one laboratory per week. Four hours.

**ESCI 422: Environmental Toxicology and Health**

Prerequisites: ESCI 322 and BIOL 309. Provides an overview of the impact of hazardous substances on ecological systems and human health. Basic principles of toxicology, acute and chronic, ranging from the molecular level to the dynamics of an ecosystem, will be studied. Topics included are biodegradation, structure activity relationship, routes of entry, mode of action, acceptable limits of toxic substances and potential biomarkers. Three lectures and one laboratory per week. Four hours.

**HONORS COLLEGE****HNTH 391-392: Honors Thesis Seminar I & II**

Prerequisites: Junior status and Honors College membership. A two-semester sequence designed to initiate the thesis process required for graduation from the Honors College. The first semester is an introduction to research, the scientific method, scientific writing, and problem solving. Students will collect and review scientific literature related to areas of interest and select a thesis topic in addition to other course requirements described above. During the second semester, students will write a research prospectus outlining the goals and methodology for their thesis project. The student must take initiative in seeking a mentor to help in the design and supervision of the project. The deadline for submission of the prospectus to the department will fall on October 15<sup>th</sup> (for December graduation) or March 15<sup>th</sup> (for May graduation). Final grades will be

based upon attendance and successful acceptance of the prospectus by the department. One hour each semester. Two hours.

**HNTH 491: Honors Thesis Seminar III**

Prerequisite: HNTH 392. A year-long writing project done during the senior year under the supervision of a mentor from the appropriate department. The student must take initiative in seeking a mentor to help in the design and supervision of the project. A final document prepared following a specific format will be presented. The deadline for completion of the thesis is October (for December graduation) and March (for May graduation). Two (2) hours.

**CHEM 121H: Honors General Chemistry I**

Prerequisites: MATH 111. Corequisites: MATH 112 and ENGL 101. This is an accelerated honors introductory lecture-laboratory course to the modern concepts of matter and the changes which it undergoes. The study includes topics such as the description of matter and the nature of atoms, molecules, and molecular bonding. Formulae and equations representing these changes are also studied. The study follows with a discussion of the kinetic theory of gases and reviews of liquids and solutions (including acids, bases, and salts). Three hours of lecture and three hours of laboratory per week. Four hours.

**CHEM 122H: Honors General Chemistry II**

Prerequisites: A "C" or better in CHEM 121. An accelerated honors lecture-laboratory course that is a continuation of CHEM 121 covering chemical kinetics, thermodynamics, equilibrium, oxidation and reduction reactions, and applications of these phenomena. The inorganic chemistry of the elements IA-VIIIA and an introduction to organic and biochemistry are also presented. Three hours of lecture and three hours of laboratory per week. Four hours.

## **DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE**

### ***The Claflin Imperative: Preparing Students for Leadership and Service in a Multicultural, Global and Technological Society***

The Department of Mathematics and Computer Science endeavors to provide programs for students in general education, mathematics education and pre-engineering and for students wishing to pursue professional careers or graduate study in the fields of mathematics, computer science and management information systems.

#### **Curricula**

A student may major in Mathematics, Mathematics Education, Computer Science, Computer Engineering or Management Information Systems by completing the requirements for the professional program in the chosen major. A major in Mathematics, Computer Science, or Computer Engineering includes options for selecting a minor, a track.

A student majoring in Management Information Systems is required to satisfy the requirements for this program, which includes a concentration in Business. There is no option for a minor in Management Information Systems.

A student majoring in Mathematics Education is required to satisfy the requirements of the Teacher Education Program, which is designed to qualify students for teacher certification in South Carolina.

A student may pursue a dual degree in Applied Mathematics, Engineering or Engineering Technology by completing the curriculum as prescribed in the dual-degree section of the catalog and then finishing at least two years of study at Clemson University or South Carolina State University. Dual-degree candidates from Claflin University are eligible to seek B.S. degrees in the following majors at Clemson University: Bio-systems Engineering, Chemical Engineering, Ceramic Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering. The areas of Engineering Technology available at South Carolina State University are Mechanical Engineering, Electrical Engineering, Civil Engineering and Industrial Engineering.

#### **General Objectives for the Department of Mathematics and Computer Science**

All students, as a result of enrolling in the General Education courses offered by the Department, will be able to:

1. display basic skills in computational mathematics;
2. state and apply mathematical principles;
3. understand the role computer technology plays in our civilization;
4. use application software to prepare documents and process data;
5. use high-level critical thinking skills of analysis, synthesis and evaluation to solve problems in their disciplines; and
6. read and understand expositions involving quantitative analysis of local, national and international problems.

The Department of Mathematics and Computer Science provides instruction, educational experiences and advisement for students majoring in programs offered by the Department so that all graduates will have a knowledge and understanding of mathematics, technology and their applications that prepare them to provide leadership and service in a multicultural, global and technological society.

The specific objectives of programs offered by this department are to produce graduates who can:

1. perform at the fiftieth percentile or higher on standardized tests such as the GRE, Praxis II, and GMAT;
2. attain entry into graduate programs in the appropriate discipline;
3. attain employment and become leaders in their disciplines in a competitive job market;
4. use technology, speak and write coherently, think critically, logically and quantitatively and conduct independent inquiry within their disciplines;
5. read scholarly journals in their disciplines; and
6. demonstrate a knowledge and an awareness of the role that mathematics and technology have played and continues to play in our multicultural global and technological society.

### **Program Requirements**

Students entering mathematics and computer science programs must meet standards prescribed by the institution for selecting a major. In addition, students must have a minimum overall grade point average of 2.5 at the time of acceptance. Students should have taken and passed with a C or above on selected core course through the end of the sophomore year. Students may apply for admittance to the Department in their sophomore year. Acceptance will be based upon overall grade point average and performance in the designated foundation courses taken prior to the time of application.

Each student majoring in an area offered by the Department must meet the following requirements:

1. obtain a grade of “C” or better in all major, support and restricted elective courses;
2. pass the General Education Exam and the Senior Exit Examination covering the objectives of the required courses in his/her program;
3. submit a departmentally approved senior thesis (for honors college students) or a senior project proposal (non honors college students) that attempts the solution of a problem; and
4. attend and pass departmental seminar courses.

### **Minor in Computer Science**

Students who have elected a minor in Computer Science must complete at least 18 semester hours of basic mathematics and computer science courses as outlined below. A grade of “C” or better must be earned in each course in this minor.

The required courses are: MATH 207, CSCI 215, CSCI 220 and CSCI 227. The remaining two courses are to be chosen from the following group: both CSCI 325 and CSCI 346, CSCI 415, or CSCI 436.

### **Minor in Mathematics**

Students who elect Mathematics as their minor must complete at least 20 semester hours of mathematics courses as outlined below. A grade of “C” or better must be earned in each course in this minor.

The following courses are required: MATH 201, MATH 202, MATH 212 and MATH 401. The remaining two courses are to be chosen from one of the following groups in the sequence shown:

- (1) STAT 341, STAT 342 or STAT 401
- (2) MATH 301, MATH 306
- (3) MATH 302, MATH 409
- (4) MATH 403, MATH 405
- (5) MATH 336, CSCI 335

### **Required General Education**

**45/46**

### **Major in Mathematics**

#### **A. Objectives**

In addition to meeting the objectives for all departmental majors, students majoring in mathematics should, upon graduation, be able to:

1. formulate mathematical models and use them to solve problems in various disciplines;
2. enter graduate programs in mathematics, applied mathematics or statistics; and
3. explain mathematical concepts to undergraduate students.

#### **B. Acceptance into the Major/Tracks**

**Mathematics:** A grade of “C” or better in the following courses: MATH 201, MATH 202, and MATH 205

**Applied Math Track:** A grade of “C” or better in the following courses: MATH 201, MATH 202, and MATH 205, ENGR101

#### **Computer Science Track:**

A grade of “C” or better in the following courses: MATH 201, MATH 202, and MATH 205, CSCI 227

#### **Actuarial Science Track:**

A grade of “C” or better in the following courses: MATH 201, MATH 202, and MATH 205.

### **C. Curriculum Summary for the Major in Mathematics**

#### **General Education**

**46**

**Note: The following courses substitute for requirements in the General Education Program:**

1. MATH 201 [Calculus I (4 hrs.)], MATH 205 [Discrete Math (3 hrs)] replaces General Ed-Math requirement
2. General Ed-Science must be BIOL 102 [Biology Health & Environment (4 hrs)] or BIOL 121 [General Biology]

**Major Courses**

MATH 202 – Calculus II	4
MATH 207 – Applied Discrete Math	3
MATH 212 – Linear Algebra	3
MATH 216 – Set Theory & Functions	3
MATH 301 – Calculus II	3
MATH 302 - Differential Equations	3
MATH 306 – Vector Analysis	3
MATH 308 – Number Theory	3
MATH 336 – Linear Programming	3
MATH 191-492 – Freshman/Junior/Senior Seminar	5
MATH 401 – Modern Algebra	3
MATH 403 – Real Analysis	3
MATH 405 – Complex Variables	3
MATH 409 – Applied Mathematics	3
MATH 410 – Elements of General Topology	3
STAT 341 – Introduction to Statistics I	3
STAT 342 – Introduction to Statistics II	3
STAT 401 – Data Analysis	3
CSCI 226 – Introduction to Programming	3
CSCI 335 – Numerical Methods	3
CHEM 111 – Principles of Chemistry	4
PHYS 203 – Principles of Physics I	4
PHYS 204 – Principles of Physics II	4
<b>Total</b>	<b>75</b>

**Major in Computer Science**

**A. Objectives**

In addition to achieving departmental goals, graduates of the computer science program should:

1. obtain a broad general education assuring an adequate foundation in science and mathematics relevant to computing.
2. gain a solid understanding of concepts fundamental to the discipline of computer science.
3. gain good analytic, design, and implementation skills required to formulate and solve computing problems.
4. function, communicate, and continue to learn effectively as ethically and socially responsible computer science professionals.

5. be able to use various computer operating systems efficiently;
6. be able to program in more than one high-level languages and be efficient in at least one of those;
7. be able to enter graduate programs in computer science, computer engineering or information systems and successfully complete them.

**B. Acceptance into the Major**

A grade of “C” or better in the following courses: CSCI 215, CSCI 220, CSCI 225, CSCI 227, and MATH 207.

**C. Curriculum Summary for the Major in Computer Science**

**General Education** **46**

Note: The following courses substitute for requirements in the General Education Program:

1. MATH 201 [Calculus I (4 hrs.)],MATH 207 [Applied Discrete Math] replaces Gen-Ed Math requirement

**Major Courses**

CSCI 215 – Basic Algorithmic Design	4
CSCI 220 – Introduction to Object-Oriented Design & Ana.	3
CSCI 225 – Introduction to Digital Logic Design	4
CSCI 227 – Object-Oriented Programming using C++	3
CSCI 242 – Data Structure & Algorithm Design	3
CSCI 325 – Comp. Org. & Assembly Language	3
CSCI 340 – Operating Systems	3
CSCI 346 – Computer System Architecture	3
ENGL 344 – Technical Writing	3
CSCI 191-492 – Freshman/Junior/Senior Seminar	5
CSCI 401 – Senior Design Project	3
CSCI 404 – Introduction to Artificial Intelligence	3
CSCI 406 – Intro. to Grap. App. Dev. in a Vis. Env.	3
CSCI 415 – Database System Design and Analysis	3
CSCI 425 – Intro. to Theoretical Con. in Computer Science	3
CSCI 436 – Computer Networks	3
CSCI 437 – Fundamentals of Software Engineering	3
MATH 202 – Calculus II	4
MATH 212 – Linear Algebra	3
STAT 341 – Intro. to Prob. & Statistics: Inference I	3
PHYS 203 – Principles of Physics I	4
PHYS 204 – Principles of Physics II	4
CHEM 111 –Principles of Chemistry	<u>4</u>
<b>Total</b>	<b>77</b>

**Elective Course in the Major (3 hrs. from the following)**

CSCI 335 – Numerical Methods	3
CSCI 402 – Introduction to Internet Technologies	3

CSCI 403 – Introduction to Java Language	3
CSCI 405 – Introduction to Computer Security	3
CSCI 438 – Multimedia Systems Design	3
CSCI 455 - Special Topics	<u>3</u>
<b>Total</b>	<b>18</b>

## **Major in Computer Engineering**

### **A. Objectives**

In addition to achieving departmental goals, graduates of the computer engineering program should be able to:

1. apply knowledge of mathematics, science, and engineering
2. design and conduct experiments, as well as to analyze and interpret data
3. design a system, component, or process to meet desired needs
4. function on multi-disciplinary teams
5. identify, formulate, and solve engineering problems
6. show understanding of professional and ethical responsibility
7. communicate effectively
8. master the broad education necessary to understand the impact of engineering solutions in a global and societal context
9. recognize of the need for, and demonstrate the ability to engage in life-long learning
10. exhibit knowledge of contemporary issues
11. use the techniques, skills, and modern engineering tools necessary for engineering practice.
12. enter graduate programs in computer science, computer engineering or information systems and successfully complete those programs.

### **B. Acceptance into the Major**

A grade of “C” or better in the following courses: CSCI 215, CSCI 220, CSCI 225, CSCI 227, and MATH 207.

### **C. Curriculum Summary for the Major in Computer Engineering**

#### **General Education**

**46**

Note: The following courses substitute for requirements in the General Education Program:

1. MATH 201 [Calculus I (4 hrs.)],MATH 207 [Applied Discrete Math] replaces Gen-Ed Math requirement
2. CHEM 111-Principles of Chemistry (4hrs) ] replaces the Gen-Ed –science requirement

### **Major Courses**

CSCE 211 – Introduction to Computer Engineering	0.5
CSCI 215 – Basic Algorithmic Design	4
CSCI 220 – Introduction to Object-Oriented Design & Ana.	3
CSCI 225 – Introduction to Digital Logic Design	4
CSCI 227 – Object-Oriented Programming using C++	3
CSCI 242 – Data Structure & Algorithm Design	3
CSCI 325 – Comp. Org. & Assembly Language	3
CSCI 340 – Operating Systems	3
CSCI 346 – Computer System Architecture	3
CSCI 192-492 – Freshman/Junior/Senior Seminar	4.5
CSCI 401 – Senior Design Project	3
CSCI 425 – Intro. to Theoretical Con. in Comp. Sci.	3
CSCI 436 – Computer Networks	3
CSCI 437-Software Engineering	3
MATH 202 – Calculus II	4
STAT 341 – Intro. to Prob. & Statistics: Inference I	3
PHYS 203 – Principles of Physics I	4
PHYS 204 – Principles of Physics II	4
ENGR 230 – Circuit Analysis	3
ENGR 231, Intro. To Electronic Cts	4
ENGR 321 – Systems and Signals	3
ENGR 322 – Digital Signal Processing	3
ENGL 344-Technical Writing	3
CSCE 407 – Embedded Systems	3
MATH 302 – Differential Equations	3
MATH 409 – Applied Mathematics	<u>3</u>
<b>Total</b>	<b>83</b>

### **Major in Management Information Systems**

#### **A. Objectives**

Graduates of this program will be prepared for careers in large industries or small companies as analysts, developers and managers of data entry, storage and retrieval systems. They will also be prepared to enter graduate programs in Management Information Systems.

Students completing the program will be able to:

1. assess information needs of business management, marketing and accounting operations;
2. design database management systems to solve information management problems;
3. implement and develop documentation for efficient application programs in C and C++ Languages;
4. use various operating systems (e.g., Windows and Unix) efficiently; and
5. select and use appropriate software applications to solve information management problems.

#### **B. Acceptance into the Major**

A grade of “C” or better in the following courses: CSCI 215, CSCI 220, CSCI 227, and MATH 205.

### C. Curriculum Summary for the Major in Management Information Systems

#### General Education 46

Note: The following modifications of the General Education program apply to the Major in Management Information Systems.

1. MATH 112 [PreCalculus (4hrs)], MATH 205 [Discrete Math (3hrs)] replaces the General-Ed mathematics requirement.
2. There is no option for Gen-Ed-Social/Behavioral/History. Students with this major must take ECON 200.

#### Major Courses

MATH 201 – Calculus	4
CSCI 215 – Basic Algorithmic Design	4
CSCI 220 – Intro. to Object-Oriented Design & Ana.	3
CSCI 230 – Business Application Software	3
CSCI 227 – Introduction to C++ Programming	3
CSCI 191-492 – Freshman/Junior/Senior Seminar	5
CSCI 402 – Introduction to Internet Technologies	3
CSCI 415 – Database System Design and Analysis	3
CSCI 436 – Computer Networks	3
CSCI 438 – Multimedia Systems Design	<u>3</u>
<b>Total</b>	<b>34</b>

#### Business Courses

ACCT 211 – Financial Accounting	3
ACCT 212 – Managerial Accounting	3
BADM 201 – Business Communications	3
BADM 311 – Business Finance	3
BADM 314 – Business Research	3
ECON 312 – Quantitative Methods	3
MGMT 201 – Principles of Management	3
MGMT 403 – Productions and Operations Management	3
MGMT 407 – Management Information Systems	3
MRK 201 – Principles of Marketing	<u>3</u>
<b>Total</b>	<b>30</b>

#### Support Courses

MATH 212 – Linear Algebra	3
MATH 336 – Linear Programming	3
STAT 341 – Intro. to Prob. & Statistics: Inference I	3
STAT 401 – Data Analysis	<u>3</u>
<b>Total</b>	<b>12</b>

### Major in Mathematics Education

#### A. Objectives

Students completing this program will be able to:

1. demonstrate a knowledge of basic skills in reading, composition and mathematics;
2. demonstrate a broad general knowledge required by the General Education curriculum;
3. demonstrate an appropriate knowledge base in all areas of mathematics;
4. demonstrate knowledge and skills in the selection of appropriate assessment methods;
5. demonstrate an awareness of cultural diversity and the ability to work with children and youth of diverse social, economic, religious and ethnic backgrounds and disabilities (physical and emotional);
6. demonstrate the application of pedagogical theory and practice;
7. model the characteristics of an educational leader;
8. relate mathematics to other disciplines;
9. demonstrate skills in planning and preparation of instruction;
10. demonstrate knowledge, skills and the application of effective classroom management;
11. select and use appropriate technology;
12. demonstrate knowledge and application of the history of mathematics;
13. demonstrate skills using the workplace-centered approach to teaching algebra and geometry; and
14. select and use appropriate service learning models to enhance teaching and learning.

**B. Acceptance into the Major**

- A grade of “C” or better in the following courses: MATH 201, MATH 202, and MATH 205.
- Minimum overall GPA of 2.75 and at least 45 semester hours of course work.
- A passing score on all three parts of the PRAXIS I
- A grade of “C” or better in the course: EDUC 104
- Submit applications to the Schools of Education and Natural Sciences and Mathematics.
- For additional information, refer to Admission of the School of Education.

**C. Specific Requirements**

- Submit a departmentally approved thesis, project, or proposal.
- Pass all parts of PRAXIS II

- Demonstrate competent performance as measured by ADEPT.

## D. Curriculum Summary for the Major in Mathematics Education

**General Education** **46**

Note: The following modifications to the General Education Program apply to the Major in Mathematics Education:

1. MATH 201 [Calculus I (4 hrs.)], MATH 205[Discrete Math(3hrs)] replaces General-Ed mathematics requirement

### Math /Computer Science Courses

MATH 202 – Calculus II	4
MATH 203 – College Geometry	3
MATH 212 – Linear Algebra	3
MATH 301 – Calculus III	3
MATH 302 – Differential Equations	3
MATH 403 – Real Analysis	3
MATH 310 – Applied Algebra and Geometry	3
MATH 191-491 – Junior/Senior Seminar	4/5
MATH 401 – Modern Algebra	3
MATH 407 – History of Mathematics	1
PHYS 203 – Principles of Physics I	4
CSCI 226 – Introduction to Programming	3
STAT 341 – Introduction to Probability and Statistics	3
STAT 401 – Data Analysis	<u>3</u>
<b>Total</b>	<b>43/44</b>

### Education Courses

EDUC 104 – Introduction to Education	3
EDUC 203 – Human Growth and Development	3
EDUC 320 – History, Prin., & Phil.	3
EDUC 230 – Working with Diverse Learners	3
EDUC 316 – Educational Psychology	3
EDUC 323 – Instructional Strategies	3
EDUC 328 – The Teaching of Reading	3
EDUC 433 – Methods of Teaching Math in Middle and Sec. Sch.	3
EDUC 450 – Professional Clinical Practice	<u>12</u>
<b>Total</b>	<b>36</b>

**Curriculum Leading to the Bachelor of Science Degree with a major in Mathematics  
Education – 125-126 Semester Hours**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
Gen. Ed. – Communications I	3
Gen. Ed. – Science	4
MATH 205 – Discrete Math	3
HIST 101 – African American Heritage	3
Gen. Ed. – Health & Human Perform. I	1
MATH 191 – Freshman Seminar I	0.5
ASMB 101 – Assembly	<u>0.5</u>
<b>Total</b>	<b>15.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
Gen. Ed. – Communications II	3
MATH 201 – Calculus I	4
CSCI 226 – Intro. to Prog. Using C	3
EDUC 104 – Intro. to Education	3
Gen. Ed. – Health & Human Perform. II	1
MATH 192 – Freshman Seminar II	0.5
ASMB 102 – Assembly	<u>0.5</u>
<b>Total</b>	<b>15.5</b>

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
MATH 202 – Calculus II	4
MATH 203 – College Geometry	3
STAT 341– Intro to Prob. & Stat. I	3
Gen. Ed. – Culture I	3
Gen. Ed. – Social\Behavior\Hist.	3
ASMB 201 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
MATH 212 – Linear Algebra	3
Gen.Ed. – Culture II	3
EDUC 230 –Working with Diverse Lrns.	3
EDUC 326 – Human, Growth & Dev.	3
Gen. Ed – Religion & Philosophy	3
Gen. Ed – Communications III	3
ASMB 202 – Assembly	<u>0.5</u>
<b>Total</b>	<b>18.5</b>

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 203 – Principles of Physics I	4
MATH 301 – Calculus III	3
STAT 401 – Data Analysis	3
EDUC 316 – Educ. Psychology	3
MATH 391 – Junior Seminar I	1
*HNTH 391 – Honors Thesis Sem. I	1
MATH 310 – Applied Alg & Geometry	3
ASMB 301 – Assembly	<u>0</u>
<b>Total</b>	<b>17</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
MATH 302 – Differential Equations	3
EDUC 323 – Instructional Strategies	3
EDUC 328 – Teaching of Reading	3
EDUC 320– Hist. Prin. & Phil.	3
MATH 392 – Junior Seminar II	1
*HNTH 392 – Honors Thesis Sem. II	1
Gen. Ed. – Foreign Languages I	3
ASMB 302 – Assembly	<u>0</u>
<b>Total</b>	<b>16</b>

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
MATH 403 – Real Analysis	3
MATH 401 – Modern Algebra	3
EDUC 433 – Methods of Teaching Math. in Middle and Sec. School	3
MATH 407 – History of Mathematics	1
MATH 491 – Senior Seminar I	1
*HNTH 491 – Honors Thesis Seminar III	2
Gen. Ed. – Foreign Languages II	3
ASMB 401 – Assembly	<u>0</u>
<b>Total</b>	<b>14/15</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 450 – Professional Clinical Prac.	<u>12</u>
<b>Total</b>	<b>12</b>

\* For Honor Students only.

**Curriculum Leading to the Bachelor of Science Degree with a major in Mathematics  
– 127 Semester Hours**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
Gen. Ed. – Communications I	3
CHEM 111 –Principles of Chemistry	4
MATH 205 – Discrete Math	3
HIST 101 – African American Heritage	3
Gen. Ed. – Health and Human Perform. I	1
MATH 191 – Freshman Seminar I	0.5
ASMB 101 – Assembly	<u>0.5</u>
<b>Total</b>	<b>15.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
Gen. Ed. – Communications II	3
MATH 201 - Calculus I	4
CSCI 226 – Intro. to Program. Using C	3
Gen. Ed. – Science I or II	4
Gen. Ed. – Health & Human Perform. II	1
MATH 192 – Freshman Seminar II	0.5
ASMB 102 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hr.</i>
Gen. Ed. – Foreign Languages I	3
MATH 202 – Calculus II	4
Gen. Ed – Culture I	3
MATH 203 – College Geometry	3
PHYS 203 – Prin. of Physics I	4
ASMB 201 – Assembly	<u>0.5</u>
<b>Total</b>	<b>17.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Foreign Languages II	3
MATH 216 – Set, Theory & Functions	3
Gen. Ed – Culture II	3
MATH 212 – Linear Algebra	3
PHYS 204 – Prin. of Physics II	4
ASMB 202 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 341 – Intro to Proba & Stat I	3
MATH 207 – Applied Discrete Math	3
Gen. Ed. – Social/Behavioral/History	3
MATH 301 – Calculus III	3
MATH 391 – Junior Seminar I	1
ASMB 301 – Assembly	0
*HNTH 391 – Honors, Thesis, Sem. I	1
Gen. Ed – Communications III	<u>3</u>
<b>Total</b>	<b>16</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 342 – Intro to Proba & Stat II	3
MATH 306 – Vector Analysis	3
MATH 308 – Number Theory	3
MATH 302 – Differential Equations	3
MATH 392 – Junior Seminar II	1
ECON 200 – Survey of Economics	3
ASMB 302 – Assembly	0
*HNTH 392 – Honors, Thesis, Sem. II	<u>1</u>
<b>Total</b>	<b>16</b>

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 401 – Data Analysis	3
MATH 401 – Modern Analysis	3
MATH 409 – Applied Math	3
MATH 403 – Real Analysis	3
MATHT 491 – Senior Seminar I	1
ASMB 401 – Assembly	0
CSCI 335 – Numerical Methods	<u>3</u>
<b>Total</b>	<b>15/16</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
MATH 405 – Complex Variables	3
MATH 410 – Elements of Gen. Topology	3
MATH 336 – Linear Programming	3
Gen. Ed. – Religion & Philosophy	3
MATH 492 – Senior Seminar II	1
ASMB 402 – Assembly	0
*HNTH 491 – Honors, Thesis, Sem. III	<u>2</u>
<b>Total</b>	<b>14/13</b>

\* For Honor Students only

**Curriculum Leading to the Bachelor of Science Degree with a Major in Mathematics  
(Actuarial Sciences Track) – 127 Semester Hours**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
Gen. Ed. – Communication I	3
CHEM 111 – Principles of Chemistry	4
MATH 205 – Discrete Math	3
HIST 101 – African Amer-Heritage	3
Gen. Ed. – Health and Human Perf. I	1
MATH 191 – Freshman Seminar I	0.5
ASMB 101 – Assembly	<u>0.5</u>
Total	15.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
Gen. Ed. – Communications II	3
MATH 201 – Calculus I	4
CSCI 226 – Intro to Prog. Using C	3
Gen. Ed. – Science I or II	4
Gen. Ed. –Health and Human Perf. II	1
ASMB 102 – Assembly	0.5
MATH 192 – Freshman Seminar II	<u>0.5</u>
Total	16.5

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – ECON 200	3
MATH 202 – Calculus II	4
Gen. Ed. – Culture I	3
ACCT 211 – Financial Acct.	3
PHYS 203 – Prin. of Physics I	4
ASMB 201 – Assembly	0.5
Total	17.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Foreign Languages I	3
MATH 212 – Linear Algebra	3
Gen. Ed. – Culture II	3
ACCT 212 – Managerial Acct.	3
PHYS 204 – Prin of Physics II	4
ASMB 202 – Assembly	<u>0.5</u>
Total	16.5

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 341 – Intro to Proba & Stat I	3
MATH 301 – Calculus III	3
ECON 201 – Macro Economics	3
Gen. Ed. – Foreign Languages II	3
MATH 391 – Junior Seminar I	1
ASMB 301 – Assembly	0
*HNTH 391 – Honors-Thesis-Sem. I	1
Gen. Ed. – Communications III	<u>3</u>
Total	16

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 342 – Intro to Proba & Stat II	3
MATH 306 – Vector Analysis	3
ECON 202 – Micro Economics	3
MATH 302 – Differential Equations	3
MATH 392 – Junior Seminar II	1
ASMB 302 – Assembly	0
*HNTH 392 – Honors-Thesis-Sem. II	1
MATH 336 – Linear Programming	<u>3</u>
Total	16

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 401 – Data Analysis	3
MATH 401 – Modern Algebra	3
STAT 394 – Advanced Probability	3
MATH 403 – Real Analysis	3
MATH 491 – Senior Seminar I	1
ASMB 401 – Assembly	0
Restricted Elective	<u>3</u>
Total	15/16

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
MATH 405 – Complex Variables	3
STAT 402 – Mathematical Statistics	3
MATH 412 – Mathematics of Finance	3
Gen. Ed. – Religion 7 Philosophy	3
MATH 492 – Senior Seminar II	1
ASMB 402 – Assembly	0
*HNTH 491 – Hons Senior Thesis Sem. III	<u>2</u>
Total	14/13

\* For Honor Students only.

**Curriculum Leading to the Bachelor of Science Degree with a major in Mathematics  
(Applied Mathematics Track) – 128 Semester Hours**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
Gen. Ed. – Communications I	3
CHEM 111 – Principles of Chemistry	4
MATH 205 – Discrete Math	3
HIST 101 – African Amer. Heritage	3
Gen. Ed. – Health & Health Perf. I	1
ASMB 101 – Assembly	0.5
MATH 191 – Freshman Seminar I	<u>0.5</u>
<b>Total</b>	<b>15.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
Gen. Ed. – Communications II	3
MATH 201 – Calculus I	4
CSCI 227 – Intro to Prog using C++	3
Gen. Ed. – Science I or II	3
Gen. Ed. – Health & Health Perf. II	1
ASMB 102 – Assembly	0.5
MATH 192 – Freshman Seminar II	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed – Foreign Languages I	3
MATH 202 – Calculus II	4
Gen. Ed. – Culture I	3
ENGR 101 – Engineering Drawing	3
PHYS 203 – Prin. of Physics I	4
ASMB 201 – Assembly	<u>0.5</u>
<b>Total</b>	<b>17.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Foreign Languages II	3
ENGR 102 – Intro to Engineering	3
Gen. Ed – Culture II	3
MATH 212 – Linear Algebra	3
PHYS 204 – Prin. of Physics II	4
ASMB 202 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 341 – Intro to Proba. & Stat I	3
CSCI 225 – Intro to Digital Logic	4
Gen. Ed. – Social/Behavioral/History	3
MATH 301 – Calculus III	3
MATH 391 – Junior Seminar I	1
ASMB 301 – Assembly	0
*HNTH 391 – Honors Thesis Sem. I	1
Gen. Ed – Communications III	<u>3</u>
<b>Total</b>	<b>17/18</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 342 – Intro to Proba. & Stat. II	3
MATH 306 – Vector Analysis	3
ENGT 230 – Circuit Analysis	3
MATH 302 – Differential Equations	3
MATH 392 – Junior Seminar II	1
ASMB 302 – Assembly	0
*HNTH 391 – Honors Thesis Sem. II	1
Restricted Elective	<u>3</u>
<b>Total</b>	<b>16/17</b>

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 401 – Data Analysis	3
ENGR 215 – Engineering Statics	3
MATH 409 – Applied Math	3
Restricted Elective	3
MATH 491 – Senior Seminar I	1
ASMB 401 – Assembly	0
CSCI 335 – Numerical Methods	<u>3</u>
<b>Total</b>	<b>15/16</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
MATH 405 – Complex Variables	3
ENGR 216/Phys 310 – Mechanics	3
MATH 336 – Linear Programming	3
Gen. Ed – Religion & Philosophy	3
MATH 492 – Senior Seminar II	1
ASMB 402 – Assembly	0
*HNTH 491 – Honors Thesis Sem. III	<u>2</u>
<b>Total</b>	<b>14/13</b>

**One restricted elective selected from:**

**CSCI 402, CSCI 403, CSCI 404, CSCI 405, CSCI 407, CSCI 438, CSCI 455**

**One restricted elective selected from:**

**MATH 401, MATH 403, MATH 410, and any MATH 400 series- \* For Honor Students only**

**Curriculum Leading to the Bachelor of Science Degree with a major in Mathematics  
(Computer Science Track) – 130 Semester Hours**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
Gen. Ed. – Communications I	3
CHEM 111 – Principles of Chemistry	4
MATH 205 – Discrete Math	3
HIST 101 – African Amer. Heritage	3
Gen. Ed – Health & Human Perf. I	1
ASMB 101 – Assembly	0.5
MATH 191 – Freshman Seminar I	<u>0.5</u>
<b>Total</b>	<b>15.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
Gen. Ed. – Communications II	3
MATH 201 – Calculus I	3
CSCI 215 – Basic Algorithm Design	4
Gen. Ed. – Science I or II	4
Gen. Ed. – Health & Human Perf. II	1
ASMB 102 – Assembly	0.5
MATH 192 – Freshman Seminar II	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Foreign Languages I	3
MATH 202 – Calculus II	4
MATH 207 – Applied Discrete Math	3
PHYS 203 – Prin. of Physics I	4
ASMB 201 – Assembly	0.5
CSCI 227 – Programming Using C++	<u>3</u>
<b>Total</b>	<b>17.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Foreign Languages II	3
Gen. Ed. – Culture I	3
MATH 212 – Linear Algebra	3
MATH 301 – Calculus III	3
CSCI 242 – Data Structures & Algorithm	3
PHYS 204 – Prin of Physics II	4
ASMB 202 – Assembly	<u>0.5</u>
<b>Total</b>	<b>19.5</b>

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 341 – Intro to Proba & Stat I	3
Gen. Ed. – Culture II	3
CSCI 325 – Computer Organ.& Asmb	3
Gen. Ed. – Social/Behavioral/History	3
MATH 391 – Junior Seminar I	1
ASMB 301 – Assembly	0
*HNTH 391 – Honors, Thesis Sem. I	1
Gen. Ed. – Communications III	<u>3</u>
<b>Total</b>	<b>16</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 342 – Intro to Proba & Stat III	3
MATH 306 – Vector Analysis	3
MATH 336 – Linear Programming	3
MATH 216 – Set Theory & Function	3
MATH 392 – Junior Seminar II	1
ASMB 302 – Assembly	0
*HNTH 391 – Honors, Thesis Sem. II	1
MATH 302 – Differential Equations	<u>3</u>
<b>Total</b>	<b>16</b>

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
MATH 409 – Applied Math	3
MATH 401 – Modern Algebra	3
Restricted Elective	3
Restricted Elective	3
MATH 491 – Senior Seminar I	1
ASMB 401 – Assembly	0
CSCI 335 – Numerical Methods	<u>3</u>
<b>Total</b>	<b>15/16</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Restricted Elective	3
Restricted Elective	3
CSCI 425 – Computer Science Theory	3
Gen. Ed. Religion & Philosophy	3
MATH 492 – Senior Seminar II	1
ASMB 402 – Assembly	0
*HNTH 491 – Honors, Thesis, Sem. III	<u>2</u>
<b>Total</b>	<b>14/13</b>

**4 restricted electives(Computer Science Track) from: CSCI 230, MATH 308, STAT 401, CSCI 402, CSCI 403, CSCI 415, MATH 403, MATH 405**

\* For Honor Students only

**Curriculum Leading to the Bachelor of Science Degree with a major in Computer Science –  
129 Semester Hours**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
Gen. Ed. – Communications I	3
CHEM 111 –Principles of Chemistry	4
MATH 201 – Calculus I	4
CSCI 215 – Basic Alg. Design	4
CSCI 192 – Freshman Seminar II	0.5
CSCI 215 – Basic Alg. Design Lab	0
ASMB 101 – Assembly	<u>0.5</u>
Total	16.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
Gen. Ed. – Communications II	3
MATH 202 – Calculus II	4
CSCI 220 – OO Design & Analysis	3
Gen. Ed. Health & Hum Perf. I	1
Gen. Ed. – Science Biol 102/Lab	4
ASMB 102 – Assembly	0.5
CSCI 192, Freshman Seminar II	<u>0.5</u>
Total	16.5

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Communications III	3
CSCI 225 – Intro to Digital Logic	4
PHYS 203 – Principles of Physics I	4
CSCI 227 – Intro to C++ Programming	3
Gen. Ed. – Foreign Language I	3
Gen. Ed. – Health & Hum Perf. II	1
ASMB 201 – Assembly	<u>0.5</u>
Total	18.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CSCI 242 – Data Structures & Alg.	3
MATH 207 – Applied Discrete Math	3
Gen. Ed. – Foreign Language II	3
ENGL 344 – Technical Writing	3
PHYS 204 – Principles of Physics II	4
ASMB 202 – Assembly	0.5
Total	16.5

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CSCI/Math, Elective	3
Gen. Ed. – Culture	3
CSCI 325 – Comp. Org. & Asmb Lang.	3
STAT 341 – Intro to Prob. & Stat. I	3
Gen. Ed. – Social/Behav./History	3
ASMB 301 – Assembly	0
CSCI 391 – Junior Seminar I	1
*HNTH 391 – Honors-Thesis-Sem. I	<u>1</u>
Total	16

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CSCI 340 – Operating Systems	3
MATH 212 – Linear Algebra	3
CSCI 406 – Graphical UI Development	3
CSCI 404 – AI/Knowledge Rep.	3
CSCI 346 – Computer Architecture	3
ASMB 302 – Assembly	0
CSCI 392 – Junior Seminar II	1
*HNTH 392 – Honors-Thesis-Sem. I	<u>1</u>
Total	16

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CSCI 401 – Project Design	3
CSCI 425 – Theoretical Conc. In CS	3
CSCI 415 – Database System Design	3
CSCI 437 – Software Engineering	3
Gen. Ed. – Culture	3
ASMB 401 – Assembly	0
CSCI 491 – Senior Seminar I	<u>1</u>
Total	15/16

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
CSCI 436 – Computer Networks	3
CSCI Elective	3
Gen. Ed. – Religion & Philosophy	3
HIST 101 – African American Heritage	3
ASMB 401 – Assembly	0
CSCI 492 – Senior Seminar II	1
*HNTH 491 – Hons Senior Thesis Sem. III	<u>2</u>
Total	14/13

\* For Honor Students only

## Curriculum Leading to the Bachelor of Science Degree with a major in Computer Engineering – 129 Semester Hours

### FRESHMAN YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation I	0.5
Gen. Ed. – Communications I	3
CHEM 111 – Principles of Chemistry I	4
MATH 201 – Calculus I	4
ASMB 101 – Assembly	0.5
CSCI 215 – Basic Alg. Design	4
CSCE 211 – Intro to CSCE	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation I	0.5
Gen. Ed. – Communications II	3
MATH 207 – App. Discrete Math	3
MATH 202 – Calculus II	4
CSCI 220 – OO Design & Anal	3
ASMB 102 – Assembly	0.5
Gen. Ed – Health & Human. Perf.	1
CSCI 192 – Freshman Seminar II	<u>0.5</u>
<b>Total</b>	<b>15.5</b>

### SOPHOMORE YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Foreign Language	3
CSCI 227 – Intro to Prog usg C++	3
CSCI 225 – Intro to Digital Logic	4
PHYS 203 – Prin of Phys I	4
Gen. Ed. – Communications III	3
ASMB 201 – Assembly	0.5
Gen. Ed – Hlth. & Hum. Performance	<u>1</u>
<b>Total</b>	<b>18.5</b>

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed – Foreign Languages	3
ENGT 230 – Circuit Analysis	3
MATH 302 – Diff. Equation	3
PHYS 204 – Prin of Phys II	4
CSCI 242 – Data Struct & Alg	3
ASMB 202 – Assembly	<u>0.5</u>
<b>Total</b>	<b>16.5</b>

### JUNIOR YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
CSCI 325 – Comp Org & Asmb	3
STAT 341 – Intro to Prob & Stat I	3
MATH 409 – Applied Mathematics	3
Gen. Ed. – Social/Behavior/History	3
Gen. Ed. – Culture	3
ASMB 301 – Assembly	0
CSCE 391 – CS/Engr Project I	1
*HNTH 391 – Hon Thesis Sem I	<u>1</u>
<b>Total</b>	<b>16</b>

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
CSCI 346 – Comp Architecture	3
ENGR 231 – Intro to Electronic Cts.	4
CSCI 340 – Operating System	3
Gen. Ed. – Religion & Philosophy	3
ENGL 344 – Tech Writing	3
ASMB 302 – Assembly	0
CSCE 391 – CS/Engr Project II	1
*HNTH 391 – Hon Thesis Sem II	<u>1</u>
<b>Total</b>	<b>17</b>

### SENIOR YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
ENGR 321 – Systems and Signals	3
CSCI 425 – Theoretical Con in CS	3
CSCI 437 – Software Engineering	3
CSCI 401 – Project Design	3
ASMB 401 – Assembly	0
CSCI 491 – Senior Seminar I	1
CSCE 407 – Embedded Systems	<u>3</u>
<b>Total</b>	<b>15/16</b>

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
ENGR 322 – Dig. Sig. Processing	3
CSCI 436 – Computer Networks	3
HIST 101 – Afr. Amer. Heritage	3
Gen. Ed. – Culture	3
ASMB 401 – Assembly	0
CSCE 492 – CS/Engr Project II	1
*HNTH 491 – Hon Thesis Sem III	<u>2</u>
<b>Total</b>	<b>14/13</b>

\* For Honor Students only

## Curriculum Leading to the Bachelor of Science Degree with a Major in Management Information Systems – 125 Semester Hours

### FRESHMAN YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 101 – Orientation	0.5
Gen. Ed. – Communications I	3
Gen. Ed. – Science	4
MATH 112 – Pre-Calculus	4
CSCI 191 – Freshman Seminar	0.5
CSCI 230 – Business Application Software	3
Gen. Ed. – Health & Human Perform. I	1
ASMB 101 – Assembly	<u>0.5</u>
Total	16.5

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
EDUC 102 – Orientation	0.5
Gen. Ed. – Communications II	3
MATH 205 – Discrete Math	3
CSCI 215 – Basic Alg. Design	4
CSCI 192 – Freshman Seminar II	0.5
Gen. Ed. – Health & Human Perform. II	1
ECON 200 – Survey of Economics	3
ASMB 102 – Assembly	<u>0.5</u>
Total	15.5

### SOPHOMORE YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Foreign Languages I	3
CSCI 220 – OO Design & Analysis	3
Gen. Ed. – Communications III	3
MATH 201 – Calculus I	4
BADM 201 – Bus. Communication	3
ASMB 201 – Assembly	<u>0.5</u>
Total	16.5

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
MATH 212 – Linear Algebra	3
Gen. Ed. – Culture I	3
Gen. Ed. – Foreign Languages II	3
CSCI 227 – Intro. to Prog. Using C++	3
MRKT 201 – Principles of Marketing	3
ASMB 202 – Assembly	<u>0.5</u>
Total	15.5

### JUNIOR YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 341 – Intro. to Prob. & Stat. I	3
Gen. Ed. – Culture II	3
ACCT 211 – Financial Acct.	3
MGMT 201 – Principles of Management	3
CSCI 415 – File Process & Data Base	3
CSCI 391 – Junior Seminar I	1
*HNTH 391 – Honors Thesis Sem.	1
ASMB 301 – Assembly	<u>0</u>
Total	16

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
ACCT 212 – Managerial Accounting	3
Gen. Ed. – Religion & Philosophy	3
CSCI/Business Elective	3
ECON 312 – Quantitative Methods	3
BADM 314 – Business Research	3
CSCI 392 – Junior Seminar II	1
*HNTH 391 – Honors Thesis Sem.	1
ASMB 301 – Assembly	<u>0</u>
Total	16

### SENIOR YEAR

#### First Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
BADM 311 – Business Finance	3
MGMT 403 – Prod. & Op. Mgmt.	3
MGMT 407 – Mgmt. Info. Systems	3
CSCI 491 – Senior Seminar I	1
CSCI 438 – Multi-Media Sys. Des.	3
STAT 401 – Data Analysis	3
ASMB 401 – Assembly	<u>0</u>
Total	15/16

#### Second Semester

<i>Courses</i>	<i>Sem. Hrs.</i>
CSCI 402 – Intro. to Internet Tech.	3
CSCI 436 – Comp. Networks	3
MATH 336 – Linear Program	3
HST 101 – African American Heritage	3
CSCI 392 – Senior Seminar II	1
*HNTH 491 – Honors Thesis Sem. III	2
ASMB 402 – Assembly	<u>0</u>
Total	14/13

\* For Honor Students only

**Dual Degree (3+2) Transfer Program in Engineering**  
**Clemson University Curriculum leading to the Bachelor of Science degree in Applied**  
**Mathematics and Engineering – 104 semester hours before transfer**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed – Communications I	3
ENGR 101 – Engineering Graphics	3
MATH 201 – Calculus I	4
HIST 101 – African American Herit.	3
CHEM 121 – General Chemistry I	4
EDUC 101 – Orientation I	0.5
ASMB 101 – Assembly	<u>0.5</u>
Total	18

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Communications II	3
ENGR 102 – Intro to Engineering	3
MATH 202 – Calculus II	4
CSCI 225 – Intro to Digital Logic Design	3
CHEM 122 – General Chemistry II	4
EDUC 101 – Orientation II	0.5
ASMB 102 – Assembly	<u>0.5</u>
Total	18

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 203 – Prin of Physics I	4
Gen. Ed. – Foreign Languages I	3
ENGR 215 – Statics	3
Gen. Ed – Social/Behav./History I	3
MATH 301 – Calculus III	3
Gen. Ed. – Health & Human Perf. I	1
ASMB 201 – Assembly	<u>0.5</u>
Total	17.5

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 204 – Prin of Physics II	4
Gen. Ed. – Foreign Languages II	3
Gen. Ed. – Science	4
MATH 212 – Linear Algebra	3
Gen. Ed. – Health & Human Perf. II	1
ASMB 202 – Assembly	<u>0.5</u>
Total	15.5

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 341 – Intro to Proba & Stat I	3
*CHEM 231 – Organic Chemistry I	4
Gen. Ed. – Culture I	3
CSCI 226 – Intro to C Programming	3
ENGR 216 – Dynamics	3
ASMB 301 – Assembly	<u>0</u>
Total	16

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Communications III	3
*CHEM 232 – Organic Chemistry II	4
Gen. Ed. – Religion Philosophy	3
MATH 302 – Differential Equations	3
Gen. Ed. – Culture II	3
MATH 306- Vector Analysis	3
ASMB 302 – Assembly	<u>0</u>
Total	19

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Clemson University	

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
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\* For Honor Students only

**Dual Degree (3+2) Transfer Program in Engineering Technology  
South Carolina State University Curriculum leading to the Bachelor of Science degree in  
Applied Mathematics and Engineering Technology – 102 hours before transfer**

**FRESHMAN YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Communications I	3
ENGT 170 – Intro to Engineering Tech.	3
MATH 112 – Pre-Calculus	4
CHEM 121 – General Chemistry I	4
EDUC 101 – Orientation I	0.5
ASMB 101 – Assembly	0.5
CSCI 200 – Computer Concepts	<u>3</u>
<b>Total</b>	<b>18</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Communications II	3
ENGT 150 – Engineering Graphics	3
MATH 201 – Calculus I	4
CSCI 225 – Intro to Digital Logic Design	3
HIST 101 – African American Heritage	3
EDUC 101 – Orientation II	0.5
ASMB 102 – Assembly	<u>0.5</u>
<b>Total</b>	<b>17</b>

**SOPHOMORE YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 203 – Prin of Physics I	4
Gen. Ed. – Foreign Languages I	3
ENGT 215 – Statics	3
Gen. Ed. – Social/Behav./History I	3
MATH 302 – Calculus II	3
Gen. Ed. – Health & Human Perf. I	1
ASMB 201 – Assembly	<u>0.5</u>
<b>Total</b>	<b>18.5</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
PHYS 204 – Prin of Physics II	4
Gen. Ed. – Foreign Languages II	3
Gen. Ed. – Science	4
Gen. Ed. – ECON 200	3
MATH 212 – Linear Algebra	3
Gen. Ed. – Health & Human Perf. III	1
ASMB 202 – Assembly	<u>0.5</u>
<b>Total</b>	<b>18.5</b>

**JUNIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
STAT 341 – Intro to Proba. & Stat I	3
ENGT 213 – Strength of Materials	3
MATH 301 – Calculus III	3
Gen. Ed. – Culture I	3
CSCI 226 – Intro to C Programming	3
ASMB 301 – Assembly	<u>0</u>
<b>Total</b>	<b>15</b>

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
Gen. Ed. – Communications III	3
ENGT 230 – Circuit Analysis	3
Gen. Ed. – Religion Philosophy	3
MATH 302 – Differential Equations	3
Gen. Ed. – Culture II	3
ASMB 302 – Assembly	<u>0</u>
<b>Total</b>	<b>15</b>

**SENIOR YEAR**

**First Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>
South Carolina State University	

**Second Semester**

<i>Courses</i>	<i>Sem. Hrs.</i>

## **DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE COURSE DESCRIPTIONS**

### **Computer Science (CSCI)**

#### **CSCI 191, 192: Freshman Seminar I and II**

Weekly sessions designed to introduce freshman Computer Science students to the world of computer technology, including career options, curricula options, departmental requirements, college requirements, study habits, test-taking strategies, library searches and critical thinking skills. Discussion and study groups will be formed among students and faculty. Final grades will be based on attendance and completion of assignments. One hour per week. One-half hour per course.

#### **CSCI 215: Basic Algorithmic Design**

Co-requisite: MATH 201. Problem-solving, algorithmic design and computer programs. Windows and UNIX operating systems will be used. Two lecture hours and two lab hours per week. Four hours.

#### **CSCI 220: Introduction to Object-Oriented Design and Analysis**

Prerequisite: A grade of "C" or better in CSCI 215 or its equivalent. Introduction to object-oriented concepts and techniques; multiple inheritance; memory management; operator overloading; polymorphism; performance issues. Three hours.

#### **CSCI 225: Introduction to Digital Logic Design**

Emphasis on digital computer hardware and software, fundamentals of boolean algebra, switching and switching functions, applications to logic design, minimization of Boolean function, logic design with arrays, finite state model for sequential state minimization. Four hours.

#### **CSCI 226: Introduction to Programming Using C Language**

Prerequisite: A grade of "C" or better in MATH 111 or its equivalent. An introduction to the syntax, semantics and application of C programming language. Covers topics in declaration, variables, input, output, loops, functions, recursion, arrays, strings, pointers, programming style and documentation. Three hours.

#### **CSCI 227: Introduction to Programming Using C++ Language**

Prerequisite: A grade of "C" or better in CSCI 220 or its equivalent. Program design and implementation in the C++ programming language. Programming using object-oriented concepts including objects, class structure and behavior, inheritance and reuse, polymorphism, dynamic binding and object identity. The UNIX operating system is used. Three hours.

#### **CSCI 230: Business Application Software**

Prerequisite: A grade of "C" or better in CSCI 200 or its equivalent. Hands-on application of database management software and spreadsheet software for solution of business problems. Emphasis in the course will be on the development of skill in the use of advanced program features of microcomputer software packages using spreadsheet macros and a database programming language. A project will be required. Three hours.

#### **CSCI 242: Introduction to Data Structures and Algorithm**

Prerequisite: A grade of "C" or better in CSCI 227 or its equivalent. Design and analysis of algorithms with an emphasis on data structures. Classical algorithm design techniques, including

one/two-dimensional arrays, stack, queues, linked-lists, trees, graphs, etc., different sorting and searching techniques. Concepts on algorithm complexity. Three hours.

**CSCI 245: Introduction to COBOL Programming Language**

Prerequisite: A grade of “C” or better in CSCI 215 or its equivalent. An introduction to data processing using COBOL programming language and business-related applications. Structured programming and proper programming style are emphasized. Three hours.

**CSCI 325: Computer Organization and Assembly Language Programming**

Prerequisite: A grade of “C” or better in CSCI 227 or its equivalent. Memory organization, input-output organization. Digital logic circuits, digital components, data representation, register transfer and micro operations. Basic computer organization, design, and development of the basic computer. Central processing unit, hard-wired control, and micro-program control, memory organization, input/output organization. Three hours.

**CSCI 335: Numerical Methods**

Prerequisites: A grade of “C” or better in CSCI 227, MATH 202 and MATH 212. Errors and their propagation in numerical computation; concepts of convergence and stability of an algorithm. Solution of non-linear equations – iterative methods, acceleration of convergence, Newton’s method of polynomials, quotient difference of linear questions, computation of inverse and Eigen values of a matrix. Solution of ordinary differential equations. Three hours.

**CSCI 340: Operating Systems**

Prerequisite: A grade of “C” or better in CSCI 346 or its equivalent. Basic concepts and terminology of operating systems: interrupt programming, machine structure, memory management and virtual memory resource management. Three hours.

**CSCI 341: Data Communications and Networking**

Prerequisite: A grade of “C” or better in CSCI 225 and CSCI 227 or their equivalents. OSI Communication model, data communications, protocol and protocol architecture, data transmission, transmission media, data, data communication interface, data link control, multiplexing. Three hours.

**CSCI 346: Introduction to Computer Architecture**

Prerequisite: A grade of “C” or better in CSCI 325 or its equivalent. Architectural classification (Von Newman architecture, parallel architecture, etc.), various terminologies, parallelism in uniprocessor system, memory interleaving. Pipelining and vector processing, multiprocessor architectures. Three hours.

**CSCI 391, 392, 491, 492: Junior/Senior Seminars**

Prerequisite: Acceptance as departmental major as prescribed by the program requirements in the beginning of the section. This seminar is designed to help prepare students for the successful completion of their senior thesis project and for transition into graduate/professional school or workplace within their major discipline. Lectures and exercises in areas such as technical writing will be conducted. Students will present a minimum of two briefings; each student will make a brief presentation of his/her thesis proposal during CSCI 391 and a final thesis presentation during CSCI 491. The seminar will also serve as a student-faculty informal forum for communication and exchange of ideas and discussion of topics in the areas of mathematics and computer science. Occasional presentations by invited guests. One hour per week. One hour per course.

**CSCI 401: Senior Design Project**

Prerequisite: Completion of all required CSCI courses. Students work in teams to conceive, specify, design, implement, test and document a major project of current relevance. Students make oral and written reports throughout the semester in addition to a final report and demonstration of the finished project. The course should be taken during the semester in which graduation is projected. Three hours.

**CSCI 402: Introduction to Internet Technologies**

Prerequisite: A grade of "C" or better in CSCI 227 or its equivalent. An introductory course in developing applications for the Internet and the WWW. Website development, client-server paradigm, scripting languages, e-commerce, and Internet security. Syntax and semantics of a string manipulation languages. Discussion of string processing languages such as PERL, VBScript, JavaScript, and ASP.

**CSCI 403: Introduction to Java Language**

Prerequisite: A grade of "C" or better in CSCI 227 or its equivalent. Program design and implementation in the Java programming language. Programming using object-oriented concepts including objects, class structure and behavior, inheritance and reuse, polymorphism, dynamic binding and object identity. The Windows operating system and the Microsoft Visual Studio will be used. A major project is required. Three hours.

**CSCI 404: Introduction to Artificial Intelligence**

Prerequisite: A grade of "C" or better in CSCI 227 and MATH 207 or their equivalent. Overview and definitions of Artificial Intelligence (AI). Search, including depth-first and breadth-first techniques with backtracking. Knowledge representation with emphasis on logical methods, Horn databases, resolution, quantification, unification, skolemization and control issues; non-monotonic reasoning; frames; semantic nets. AI systems, including planning, learning, natural language and expert systems. An AI programming language may be taught at the instructor's discretion. Three hours.

**CSCI 405: Introduction to Computer Security**

Prerequisite: A grade of "C" or better in CSCI 227 or its equivalent. Basic concepts in information security and management such as risks and vulnerabilities, encryption practices, program security, operating system security, trusted operating system design, database security, distributed system security, security administration, and legal issues. Coverage of high-level concepts such as confidentiality, integrity, and availability applied to hardware, software, and data. Case studies of actual program threats and secure operating systems followed up with secure programming practices. Textbook augmented by readings and class discussions of current events. Three hours.

**CSCI 406: Introduction to Graphical Application Development in a Visual Environment**

Prerequisite: A grade of "C" or better in CSCI 227 or its equivalent. Programming in Windows 95/NT using the Visual Studio (C++/J++/ Basic) and tools. The focus is on using the Microsoft Foundation Classes (MFC) to develop graphical user interfaces, understanding the Win32 API, and modern operating systems concepts. Three hours.

**CSCE 407: Embedded Systems**

Prerequisite: A grade of "C" or better in CSCI 227 and CSCI 346. Architecture of purpose-specific digital systems incorporating software, hardware and configurable components and their role in computer engineering. Operating system aspects for embedded microcomputers, including real time scheduling, process coordination, communication, and resiliency. Design aspects

integrating software and hardware elements. Design, optimization, evaluation, and simulation of digital and analog interfaces; real time microcomputer software; applications, including data acquisition and control. Three hours.

**CSCI 415: Introduction to Database System Design & Analysis**

Prerequisite: A grade of “C” or better in CSCI 227 or its equivalent. Database systems. File structures for database search, including indexing and hashing. The relational data model and the SQL language. Conceptual database design and normalization. Overview of other data models. Three hours.

**CSCI 425: Introduction to Theoretical Concepts in Computer Science**

Prerequisite: A grade of “C” or better in MATH 207 or its equivalent. Selected theoretical concepts including automata and formal languages, computability, reducibility, and complexity using Turing Machines and Automaton. Three hours.

**CSCI 436: Computer Network Design and Analysis**

Prerequisite: A grade of “C” or better in CSCI 227 and CSCI 225 or their equivalent. Design and analysis of computer networks. Emphasis on the OSI architecture but discusses other schemes (e.g., ARPAnet). Data link control, local networks, protocols/architectures, network access protocols, internetworking and ISDN. Three hours.

**CSCI 437: Fundamentals of Software Engineering**

Prerequisites: CSCI 242 and CSCI 325. Software engineering principles, process and techniques; software development approaches focusing on functional analysis and functional design methods. Configuration management, implementation strategies and testing. Three hours.

**CSCI 438: Multimedia Systems Design**

Prerequisite: Senior standing. A hands-on approach to the study of principles underlying multimedia systems. Topics include multimedia systems design, multimedia hardware and software, issues in effective representation, processing and communication of multimedia data such as text, graphics, audio, images and video. Three hours.

**CSCI 455: Special Topics**

Prerequisite: Consent of instructor. Departmental approval required in advance to use for degree credit. New developments in the field of computer science and engineering. Topic may vary from semester to semester. May be repeated for credit when topic changes. Three hours.

**Pre-Engineering (ENGR)**

**ENGR 101: Engineering Graphics**

Prerequisite: A grade of “C” or better in MATH 112 or its equivalent. An introductory course in engineering graphics, which includes beginning drawing techniques, lettering and dimensioning, multi-view drawings, sectional and auxiliary views and principles and practices of graphing representations using modern computer-aided design tools. One hour of lecture and two hours of laboratory per week. Three hours.

**ENGR 102: Introduction to Engineering**

Prerequisite: A grade of “C” or better in MATH 112. Students are introduced to the engineering profession and engineering disciplines. Professional ethics, computers and its applications in engineering practice, teamwork activities, and technical communication. Project Management concepts and skills will be taught. NASA-related science, projects, research, and its theme.

Analytical and problem solving techniques such as estimation and approximation, solution by graphing and computation methods. Three hours.

**ENGR 215: Statics**

Prerequisites: A grade of “C” or better in MATH 201 and PHYS 203. For all engineering majors. Introduction to principles of mechanics, equilibrium of particles and rigid bodies in two and three dimensions, components, resultants and moments. Distributed forces, centroids, friction and virtual work. Analysis with vector methods. Three hours.

**ENGR 216: Dynamics**

Prerequisite: A grade of “C” or better in ENGR 215. For Civil and Mechanical Engineering majors. Kinematics of particles and rigid bodies, with emphasis on Newton’s laws: work, energy, momentum and impulse methods for the solution of problems. Three hours.

**ENGR 231: Introduction to Electronic Circuits:** Prerequisite: A grade of “C” or better in ENGT 230. A first course in modeling, characterization, and application of semiconductor devices and integrated circuits. Development of appropriate models for circuit-level behavior of diodes, bi-polar and field effect transistors, and non-ideal op-amps. Application in analysis and design of linear amplifiers. Frequency domain characterization of transistor circuits. Four hours.

**ENGR 310: Engineering Computing**

See CSCI 226 or CSCI 227.

**ENGR 321: Systems and Signals**

Prerequisite: A grade of “C” or better in ENGT 230 and MATH 409. Introduction to signal processing and linear systems. Concepts of signal and system analysis in time and frequency domains as applied to electric circuits. Laplace transform, Fourier series, and Fourier techniques are stressed. Three hours.

**ENGR 322: Digital Signal Processing**

Prerequisite: A grade of “C” or better in ENGR 321. An introduction to digital signal processing. Signal processing of discrete-time systems. Sampling, z-transform, discrete and fast Fourier transforms, flow graphs, design techniques for digital filters, effects of finite word length, and applications. Three hours.

**Engineering Technology (ENGT)**

**ENGT 150: Engineering Graphics**

Prerequisite: A grade of “C” or better in MATH 112 or its equivalent. An introductory course in engineering graphics, which includes beginning drawing techniques, lettering and dimensioning, multi-view drawings, sectional and auxiliary views, principles and practices of graphing representations using modern computer-aided design tools - AutoCAD. One hour of lecture and two hours of laboratory per week. Three hours.

**ENGT 170: Introduction to Engineering Technology**

Prerequisite: A grade of “C” or better in MATH 112. Students are introduced to the engineering profession and engineering disciplines. Professional ethics, computers and its applications in engineering practice, teamwork activities, and technical communication. Project Management concepts and skills will be taught. NASA-related science, projects, research, and its theme. Analytical and problem solving techniques such as estimation and approximation, solution by graphing and computation methods. Three hours.

**ENGT 215: Statics**

Prerequisites: A grade of “C” or better in MATH 201 and PHYS 203. For all engineering majors. Introduction to principles of mechanics, equilibrium of particles and rigid bodies in two and three dimensions, components, resultants and moments. Distributed forces, centroids, friction and virtual work. Analysis with vector methods. Three hours.

**ENGT 213: Strength of Materials**

Prerequisite: A grade of “C” or better in ENGR 212. Concepts of stress and strain. Axial loading, torsions, bending and shear. Stress transformations. Bending moments, beam deflection, Mohr’s cycle and columns. Three hours.

**ENGT 230: Circuit Analysis**

Prerequisite: A grade of “C” or better in MATH 201. Basic DC electricity: voltage, current, resistance and Ohm’s Law; series, parallel and composite circuits. Analysis using Kirchoff’s Laws and basic current theorems; analysis of DC circuits. Introduction to AC. Three hours.

**ENGT 310: Engineering Computing**

See CSCI 226 or CSCI 227.

**Honors Thesis (HNTH)****HNTH 391: Honors Junior Seminar I**

Prerequisites: Junior status, Honors College membership, and acceptance as departmental major as prescribed by the program requirements in the beginning of this section. A two-semester sequence designed to initiate the thesis process required for graduation from the Honors College. The first semester concerns an introduction to research, technical writing, and problem solving. Students will collect and review scientific literature related to an area of interest and select a thesis topic in addition to meeting other course requirements described above. One hour.

**HNTH 392: Honors Junior Seminar II**

Prerequisites: A grade of “C” or better in HNTH 391. During the second semester. Students will write a research prospectus outlining the goals and methodology for their thesis projects. The student must take the initiative in seeking a mentor to help in the design and supervision of the project. The deadline for submission of the prospectus to the Department will fall on October 15 (for December graduation) or March 15 (for May graduation). Final grades will be based upon attendance and acceptance of the prospectus by the Department. One hour.

**HNTH 491: Honors Thesis Seminar III**

Prerequisites: Senior status and a grade of “C” or better in HNTH 392. This seminar centers on a year-long writing project to be completed during the senior year under the supervision of a mentor from the appropriate department. Lectures and exercises in areas of mathematics and computer science will be conducted to improve the technical writing. The seminar will also serve as a student-faculty informal forum for communication and exchange of ideas in the areas of mathematics and computer science. Two hours.

**Mathematics (MATH)****MATH 111: College Algebra**

Prerequisite: MATH 110 (institutional credit course) or its equivalent. This course is a review of properties of numbers, exponents and operations on polynomials, linear and quadratic equations

and applications, inequalities, functions and graphs, operations with functions, inverse functions and graphs, remainder theorem, synthetic division, factor theorem, fundamental theorem of algebra, graphs of polynomial functions and rational functions and exponential and logarithmic functions and properties. Four contact hours. Three hours.

### **MATH 112: Pre-Calculus**

Prerequisite: A grade of “C” or better in MATH 111 or its equivalent. Exponential, Logarithmic functions, angles and measurements, trigonometric functions and their graphs, period, amplitude and phase shift, inverse trig functions, right triangle trigonometry, trigonometric identities and equations, the laws of sine and cosine. Vectors, partial fractions, systems of equations in two or three variables, solving linear systems using matrices, Cramer’s Rule. Five contact hours. Four hours.

### **MATH 191, 192: Freshman Seminars**

Weekly sessions designed to introduce freshman Math students to the current trends in the area of mathematics and mathematical research, including career options, curricula options, departmental requirements, college requirements, study habits, test-taking strategies, library searches and critical thinking skills. Discussion and study groups will be formed among students and faculty. Final grades will be based on attendance and completion of assignments. One hour per week. One-half hour per course.

### **MATH 200: Integrated Mathematics**

Prerequisite: A grade of “C” or better in MATH 111 or its equivalent. This course features concepts from number and operations, algebra, geometry, measurement, and data analysis. Test-taking strategies will be infused into the assessment of the application of the concepts. Reasoning and proof, communication, representation, connections, and problem solving skills will be enhanced as the students explore, discuss and write about different concepts using graphing calculators, and MS Excel. This course is recommended for prospective education majors before taking Praxis I. Three hours.

### **MATH 201: Calculus I**

Prerequisite: A grade of “C” or better in MATH 112 or its equivalent. Piece-wise functions, limits and continuity, intermediate value theorem, derivatives using limit definition. Power Rule, sum and difference rule, scalar multiple rule, derivatives of polynomials, exponential functions, product and quotient rule, Chain rule, derivatives of logarithmic functions and trigonometric functions, higher-order derivatives, implicit differentiation, related rates, Newton’s method, curve sketching, maximum and minimum problems. Four hours.

### **MATH 202: Calculus II**

Prerequisite: A grade of “C” or better in MATH 201 or its equivalent. Indefinite integrals, the definite integral as area and as the limit of a sum, numerical integration, trapezoidal and Simpson’s rule, Fundamental theorem of calculus, indefinite integrals of trigonometric functions, methods of integration, substitution, trigonometric substitution, integration by parts, convergence and divergence of improper integrals. Four hours.

### **MATH 203: College Geometry**

Prerequisite: A grade of “C” or better in MATH 201 or its equivalent. Basic concepts of Euclidean and non-Euclidean geometries are studied. Perspectives on synthetics, coordinates, transformation and vectors. This course examines visual thinking, inductive reasoning along with geometric constructions, analysis of geometric figures, informal deduction, formal deduction, simple algebraic and paragraph proofs, properties and applications of right-triangle trigonometry,

tessellations, and fractals. Three hours.

**MATH 205: Discrete Mathematics**

Prerequisite: A grade of “C” or better in MATH 111 or its equivalent. Truth tables, logical equivalence, necessary and sufficient conditions, valid and invalid arguments, binary and decimal representation of numbers, universal and existential quantifiers, direct proof and counter example, elementary number theory, mathematical induction, basic set theory, probability, permutations and combinations, one-to-one and inverse functions. Three hours.

**MATH 207: Applied Discrete Mathematics for Computer Scientists**

Prerequisite: A grade of “C” or better in MATH 111 or its equivalent. Propositional logic and the predicate calculus. Logic gates and circuits. Methods of proof. Elementary set theory. Mathematical induction. Recursive definitions and algorithms. Solving recurrences. The analysis of algorithms and asymptotic growth of functions. Elementary combinatorics. Introduction to graph theory. Ordered sets, including posets and equivalence relations. Introduction to formal languages and automata. Three hours.

**MATH 212: Linear Algebra**

Prerequisite: Prerequisite: A grade of “C” or better in MATH 201 or its equivalent. Systems of linear equations. Gaussian elimination, inverses of matrices and elementary matrices. Properties of determinants, cofactor expansion, Cramer’s Rule, applications, vectors in two and three spaces, general vector spaces, subspaces, span, null space dimension, rank of matrix, matrices as linear transformations, orthogonal bases and Gram-Schmidt Process, Eigen values and Eigen vectors. Three hours.

**MATH 216: Set, Theory & Functions**

Prerequisites: Grade of “C” or better in MATH 205

An introduction to the language of logic and set theory, elementary set theory, properties of the real number system, functions, symbolic logic and its relationship to theory, algorithms and their complexity, set counting methods and recurrence relations. Special attention will be given to proof of the various theorems and properties.

**MATH 301: Calculus III**

Prerequisite: A grade of “C” or better in MATH 202 or its equivalent. Sequences and series. Vectors in three dimensions, dot product and cross product, limits and derivatives of functions of several variables, tangent, normal and binomial vectors, curvature and radius of curvature of curves in three dimensions. Three hours.

**MATH 302: Differential Equations**

Prerequisite: A grade of “C” or better in MATH 202 or its equivalent. Initial value problems, separable variables, exact equations, linear first-order equations, modeling with first-order equations, systems of linear and nonlinear equations, boundary values problems, homogenous linear equations with constant coefficients, method of undetermined coefficients, superposition principle, variation of parameters, modeling with higher-order equations. Three hours.

**MATH 306: Vector Analysis**

Prerequisite: A grade of “C” or better in MATH 301 or its equivalent. Functions of several variables and their limits and continuity. Partial and directional derivatives and their applications to tangent planes and normal lines. Extrema of functions of several variables. Lagrange multipliers. Multiple integrals with cylindrical and spherical coordinates. Vector fields, Green’s divergence and Stokes theorems are introduced. Three hours.

**MATH 308: Introduction to Number Theory**

Prerequisite: A grade of “C” or better in MATH 201 or its equivalent

A study of the properties of the integers with theorems on primes, divisibility, congruence, Diophantine equations and continued fractions.

**MATH 310: Applied Algebra and Geometry**

Prerequisite: A grade of “C” or better in MATH 301 or its equivalent. This course employs an interactive, contextual and workplace-centered approach to the teaching of algebra and geometry. It emphasizes the use of mathematics in the workplace, covering five occupational areas: agribusiness and agriculture, business and marketing, family and consumer science, health occupations and industrial technology. Interactive discovery occurs through hands-on “math labs.” Students will be able to integrate geometry with ideas from algebra, probability, statistics, discrete mathematics and trigonometry. Technology will serve as a tool in the development of concepts. This course is required for prospective high school mathematics teachers. Three hours.

**MATH 336: Linear Programming**

Prerequisite: A grade of “C” or better in MATH 212 or its equivalent. Review of vectors and matrices, linear independence and span of vectors, systems of equations, inverse of a matrix, simplex method, slack variables, feasible solutions and extreme points, the dual of linear problem, transportation problems, critical path and shortest path, convexity and location of extreme in two variables and the n-variable case. Three hours.

**MATH 391, 392, 491, 492: Junior/Senior Seminar I, II, III, IV**

Prerequisite: Acceptance as departmental major as prescribed by the program requirements in the beginning of this section. This seminar is designed to help prepare students for the successful completion of their senior thesis project and for transition into graduate/professional school or work place within their major discipline. Lectures and exercises in areas such as technical writing will be conducted. Students will present a minimum of two briefings; each student will present his/her thesis proposal during MATH 391 and make a final thesis presentation during MATH 491. The seminar will also serve as a student-faculty informal forum for communication and exchange of ideas and discussion of topics in the area of mathematics and computer science. Occasional presentations by invited guests. (A “Z” grade will be awarded for successful completion of MATH 391, MATH 392 and MATH 491, with an overall grade awarded for all four courses at the completion of the senior thesis and MATH 492.) One hour per week. One hour per course.

**MATH 401: Modern Algebra**

Prerequisite: A grade of “C” or better in MATH 212 or its equivalent. Sets, composition of mappings, binary operations, matrices, mathematical induction, divisibility, prime factors and greatest common divisor, congruence of integers and congruence classes, groups, subgroups, cyclic groups, isomorphism and homomorphism, permutation groups, normal groups, quotient groups, definition of ring, integral domains and fields. Three hours.

**MATH 403: Real Analysis**

Prerequisite: A grade of “C” or better in MATH 301 or its equivalent. Properties of real numbers, supremum and infimum of sets of real numbers, limits of sequences, series, convergence and divergence of series. Tests for convergence of series, comparison test, quotient test, integral test, and alternating series test. Three hours.

**MATH 405: Complex Variables**

Prerequisite: A grade of “C” or better in MATH 403 or its equivalent. The algebra of complex numbers, analytic functions, Cauchy- Reimann conditions, geometry of elementary functions, power series and contour integration. Three hours.

**MATH 407: History of Mathematics**

Prerequisite: A grade of “C” or better in MATH 301 or its equivalent. This course emphasizes the intellectual, historical and philosophical nature of mathematics. Students will recognize the multiculturalism of mathematics from a global perspective. This course is required for prospective high school mathematics teachers. One hour.

**MATH 409: Applied Mathematics**

Prerequisite: A grade of “C” or better in MATH 302 and MATH 306. Fourier series and integrals, Fourier transforms and applications, power series solutions of differential equations, Laplace transforms and applications, partial differential equations, Bessel’s Equation and Legendre’s Equations. Three hours.

**MATH 410: Elements of General Topology**

Prerequisite: A grade of “C” or better in MATH 216 and MATH 202 or its equivalent. Metric spaces, separation axioms, compactness, completeness, convergence, connectedness, path connectedness. Three hours.

**MATH 412: Mathematics of Finance**

Prerequisite: A grade of “C” or better in MATH 306 or its equivalent. A theory of interest, annuities, amortization and sinking funds, bonds, and other investments, depreciation, depletion and capital cost, insurance mathematics, life annuities, premiums and reserves. Three Hours.

**Physics (PHYS)**

**PHYS 201: College Physics I**

Prerequisite: A grade of “C” or better in MATH 112 or its equivalent. This is a non-calculus based introductory physics course. It is offered to students in the life sciences and pre-professional health fields whose mathematical preparation has not gone beyond a pre-calculus course. The class work is complemented by laboratory experiments in mechanics, properties of matter and sound. Three one-hour lectures and one two-hour laboratory per week. Four hours.

**PHYS 202: College Physics II**

Prerequisite: A grade of “C” or better in PHYS 201 or its equivalent. This is a continuation of PHYS 201. Subject matter includes heat and thermodynamics and electricity and magnetism, optics and modern physics. Three one-hour lectures and one two-hour laboratory per week. Four hours.

**PHYS 203: Principles of Physics I**

Prerequisites: A grade of “C” or better in MATH 201. A calculus-based introduction to the principles of physics. This course is required for mathematics, physical sciences/engineering technology majors who enroll in a calculus course. Mathematical formulation of physics problems. Subject matter includes mechanics, sound waves and thermal physics. Three one-hour lectures and one two-hour laboratory per week. Four hours.

**PHYS 204: Principles of Physics II**

Prerequisite: A grade of “C” or better in PHYS 203 or its equivalent. This is a continuation of PHYS 203. Subject matter includes electricity and magnetism and optics and modern physics. Three one hour lectures and one two-hour laboratory per week. Four hours.

**PHYS 310: Mechanics**

Prerequisites: A grade of “C” or better in PHYS 204 and MATH 202 or its equivalent. Kinematics and dynamics of motion in one, two and three dimensions, vector analysis, harmonic motion, motion of systems of particles, rigid body motion. Three hours.

**PHYS 311: Classical Laboratory**

Prerequisites: A grade of “C” or better in PHYS 202, PHYS 204 and MATH 202 or their equivalent. Experiments in gravitation, optics, electromagnetism, mechanics and heat. Error analysis. One one-hour lecture and four hours of laboratory per week. Three hours.

**PHYS 322: Electricity and Magnetism**

Prerequisites: A grade of “C” or better in PHYS 204 and MATH 202 or their equivalent. Electrostatics, current, magnetostatics, properties of electric and magnetic fields, Maxwell’s equations and vector calculus. Three hours.

**PHYS 352: Modern Physics**

Prerequisites: A grade of “C” or better in PHYS 202, PHYS 204 and MATH 202 or their equivalent. Special relativity, introductory quantum mechanics, atomic and nuclear physics and the solid state. Three hours of lecture and four hours of laboratory per week. Four hours.

**Statistics (STAT)**

**STAT 311: Elements of Statistical Methods**

Prerequisite: A grade of “C” or better in MATH 111. Discrete and continuous data, data displays, Ogives and histograms, measures of central tendency, dispersion, linear regression, elementary concepts of probability, permutations, combinations, binomial and normal distributions, basic concepts of hypothesis testing, estimation and confidence intervals, t-tests and chi-square tests. Three hours.

**STAT 341: Introduction to Probability and Statistics: Inference I**

Prerequisites: A grade of “C” or better in MATH 201 or its equivalent. Descriptive statistics, sample mean, median, variance, and standard deviation. Elementary probability, conditional probability and independent events, Bayes Theorem. Random variables, discrete and continuous probability distributions, mathematical expectation. Three hours.

**STAT 342: Introduction to Probability and Statistics: Inference II**

Prerequisite: A grade of “C” or better in STAT 341 or its equivalent. Moment generating functions, sampling distributions, central limit theorem. Parameter estimation, hypothesis testing, regression analysis. Three hours.

**STAT 394: Probability I**

Prerequisite: A grade of “C” or better in MATH 301 or its equivalent. Sample spaces, basic axioms of probability, combination probability, conditional probability and independence, binomial, Poisson and normal distributions. Three hours.

**STAT 401: Data Analysis**

Prerequisite: A grade of “C” or better in STAT341 or its equivalent displaying and describing distributions, normal distributions, scatter plots, correlation, multiple comparison, least square regression, sampling design, analysis of variance, use of computer statistical package. Three hours.

**STAT 402: Mathematical Statistics**

Prerequisite: Grade of “C” or better in STAT 394. This course provides a mathematical foundation of statistics emphasizing the theory behind statistical procedures and methodologies. Topics include sampling distributions, parameter estimation, hypothesis testing, linear regression, analysis of variance.

**STAT 421: Applied Statistics and Experimental Design**

Prerequisites: A grade of “C” or better in STAT 342 or its equivalent. Computer-aided data analysis using comparisons between batches, analysis of variance and regression. Evaluation of assumptions, data transformation and reliability of statistical measures (Jackknife, bootstrap). Fisher-Gosset controversy. Three hours.

**STAT 423: Applied Regression and Analysis of Variance**

Prerequisite: A grade of “C” or better in STAT 342 or STAT 421. Regression analysis, problems in interpreting regression coefficients, estimation, including two-stage least squares, guided regression, building linear models, selecting carriers, regression residuals, analysis of variance, non-parametric regression, factorial designs and response surface methods. Three hours.

**STAT 427: Introduction to Categorical Data Analysis**

Prerequisite: A grade of “C” or better in STAT 421. Introduction to topics in the analysis of categorical data, indices of association, loglinear models, ordered response categories, discriminant analysis and factor analysis of polychotomous observation. Computational techniques will be emphasized, illustrated primarily by social, behavioral and biological science examples. Three hours.

