COLLEGE OF ENGINEERING AND SCIENCE

The College of Engineering and Science offers a broad range of rigorous and stimulating baccalaureate programs which provide unexcelled educational opportunities. The innovative combination of engineering and science disciplines which comprises the College facilitates study and research in fields transcending the traditional disciplines. Students enjoy close interaction with a distinguished faculty committed to excellence in undergraduate education as well as in research. Additional information on the College and its programs is available at www.ces.clemson.edu.

Minors
Engineering and science students can complement their majors by selecting minor concentrations of study. Available minors include Bioengineering, Environmental Engineering, International Engineering and Science, one in each of the science majors, and in Textiles. (See page 97.)

International Programs
The world economy has become very tightly integrated, making it highly important that engineering and science students prepare themselves for this global environment. The College offers a minor in International Engineering and Science coupled with several programs that provide opportunities for students to gain international experience. These include study abroad at many locations around the world and EPIC (an international co-op program). In addition, engineering and science students are encouraged to pursue study of a foreign language. Information is available in the Undergraduate Studies Office (107 Riggs Hall) and at www.ces.clemson.edu/global.

ENGINEERING PROGRAMS
The professional Bachelor of Science engineering degrees in Bioengineering, Biosystems Engineering, Ceramic and Materials Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering are each accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The Biosystems Engineering program is administered jointly with the College of Agriculture, Forestry, and Life Sciences.

All engineering programs have the common goal of producing engineering graduates who are able to:
- conduct themselves professionally and ethically
- appreciate engineering’s global/societal context
- understand contemporary engineering issues
- apply modern engineering methods and tools
- appreciate the need for lifelong learning

Each engineering program has additional objectives specific to the discipline. All prepare students for a wide range of career opportunities and provide sound preparation for graduate study. Each curriculum provides opportunities for students to pursue individual areas of interest.

Admission Requirements
The University admission requirements are given under the section entitled Admission. Engineering applicants are strongly advised to include the following in their high school program:

Mathematics—Four units, including geometry, trigonometry, and introductory calculus
Laboratory Science—At least three units, including both chemistry and physics
Computing—At least one unit, including introduction to a programming language. Applicants should have good keyboarding skills.

General Engineering Program
All new engineering students (including transfer students who have not completed all courses in the freshman engineering curriculum) are admitted into General Engineering. The General Engineering Program provides students an opportunity to explore various engineering fields while getting a sound academic preparation for engineering study. To prepare students for entry into a specific engineering degree program, the second semester of the curriculum includes a Major Requirement of 6–7 credits. Additional information can be found at www.ces.clemson.edu/fgpe.

Freshman Curriculum
First Semester

1. 2 - CES 102 Engineering Disciplines and Skills
2. 4 - CH 101 General Chemistry
3. 3 - ENGL 103 Accelerated Composition
4. 4 - MTHSC 106 Calculus of One Variable I
5. 3 - Arts and Humanities Requirement or
6. 3 - Social Science Requirement

Second Semester

1. 4 - MTHSC 108 Calculus of One Variable II
2. 3 - PHYS 122 Physics with Calculus I
3. 3 - Arts and Humanities Requirement or
4. 3 - Social Science Requirement
5. 6-7 - Major Requirement

Advisors must approve any course taken for elective credit in the Engineering curriculum. Courses excluded for elective credit include PHYS 200, 207/209, 208/210.

Registration Requirements
A cumulative grade-point ratio of 2.0 or higher is required for registration in engineering courses numbered 300 or higher. Priority for registration in engineering courses is given to those majors for whom the course is a degree requirement. Exceptions to this requirement may be granted by the department offering the course.

Graduation Requirements
In addition to other institutional requirements, candidates for a baccalaureate degree in Engineering are required to have a 2.0 or higher cumulative grade-point ratio in all engineering courses taken at Clemson. All courses with “Engineering” in the course designator (e.g., ENGR 130, M E 453, etc.) are used in this calculation.
The baccalaureate programs in Engineering are designed to be completed in four years (eight regular semesters). Taking a reduced load or participating in cooperative education will extend this time. On average, Clemson engineering students take about four and one-half years to complete the requirements for graduation.

**BIOENGINEERING**

**Bachelor of Science**

The undergraduate program in Bioengineering is built upon a rigorous engineering science foundation that is, in turn, based upon a broad curriculum of applied and life sciences, mathematics, electives in humanities, social science, and design. Students select a formal focus that concentrates in a subfield of interest in bioengineering: Biomaterials Concentration or Bioelectric Concentration.

The curriculum provides undergraduates with a solid background in engineering and life sciences in preparation for advanced studies. Through the Bioengineering program, graduates acquire an understanding of biology, biochemistry, and physiology and the capability to apply advanced mathematics including differential equations and statistics, science, and engineering to solve the problems at the interface of engineering and biology. Graduates also have an ability to make measurements on and interpret data from living systems, addressing the problems associated with the interaction between living and nonliving materials and system.

**BIO MATERIALS CONCENTRATION**

**Freshman Year**

**First Semester**
1. CES 102 Engineering Disciplines and Skills
2. CH 101 General Chemistry
3. ENGL 103 Accelerated Composition
4. MTHSC 106 Calculus of One Variable I
3. Arts and Humanities Requirement or
3. Social Science Requirement
   16

**Second Semester**
4. C M E 210 Introduction to Materials Science
1. E C E 307 Basic Electrical Engineering
1. E C E 309 Electrical Engineering Lab. I
3. E M 201 Engineering Mechanics: Statics
4. MTHSC 208 Intro. to Ordinary Diff. Equations
3. Arts and Humanities Requirement or
3. Social Science Requirement
   17

**Junior Year**

**First Semester**
4. BIOSC 315 Functional Human Anatomy
3. C M E 319 Materials Processing I
3. C M E 326 Thermodynamics of Materials
3. C M E 327 Transport Phenomena
3. Arts and Humanities Requirement or
3. Social Science Requirement
   17

**Second Semester**
3. B IO E 302 Biomaterials
3. BIOCH 305 Essential Elements of Biochem.
3. C M E 422 Mechanical Behavior of Materials
3. Bioengineering Technical Requirement
   18

**Senior Year**

**First Semester**
3. B IO E 476 Biosurface Engineering
3. BIOSC 461 Cell Biology
2. BIOSC 462 Cell Biology Lab.
3. C M E 402 Solid State Materials
3. C M E 413 Noncrystalline Materials
3. PFC 415 Intro. to Polymer Science and Engr.
   18

**Second Semester**
3. C M E 210 Introduction to Materials Science
1. E C E 212 Electrical Engineering Lab. II
3. E C E 262 Electric Circuits II
3. E M 201 Engineering Mechanics: Statics
4. MTHSC 208 Intro. to Ordinary Diff. Equations
   17

**Sophomore Year**

**First Semester**
3. B IO E 201 Intro. to Biomedical Engineering
3. E C E 201 Logic and Computing Devices
3. E C E 202 Electric Circuits I
1. E C E 211 Electrical Engineering Lab. I
4. MTHSC 108 Calculus of One Variable II
3. MTHSC 208 Intro. to Ordinary Diff. Equations
   17

**Second Semester**
3. C M E 210 Introduction to Materials Science
1. E C E 212 Electrical Engineering Lab. II
3. E C E 262 Electric Circuits II
3. E M 201 Engineering Mechanics: Statics
4. MTHSC 208 Intro. to Ordinary Diff. Equations
   17

**Junior Year**

**First Semester**
4. CH 201 Survey of Organic Chemistry
1. E C E 311 Electrical Engineering Lab. III
3. E C E 320 Electronics I
3. E C E 330 Signals, Systems, and Transforms
3. E C E 380 Electromagnetics
3. Arts and Humanities Requirement or
3. Social Science Requirement
   17

**Second Semester**
3. B IO E 370 Bioinstrumentation and Bioimaging
3. BIOCH 305 Essential Elements of Biochem.
9. E C E Technical Requirement
   15

**Senior Year**

**First Semester**
3. B IO E 302 Biomaterials
3. B IO E 476 Biosurface Engineering
4. BIOSC 315 Functional Human Anatomy
3. BIOSC 461 Cell Biology
2. BIOSC 462 Cell Biology Lab.
3. Arts and Humanities Requirement or
3. Social Science Requirement
   18
Second Semester
1. BIO E 400 Senior Seminar
2. BIO E 401 Biomedical Design
3. BIO E 448 Tissue Engineering
4. Arts and Humanities Requirement or Social Science Requirement
5. Bioengineering Technical Requirement

Total Semester Hours: 128

Notes:
1. To transfer from General Engineering into the Bioengineering degree program, students must have a minimum cumulative grade-point ratio of 3.0 in courses taken at Clemson and must have earned a C or better in each course in the General Engineering freshman curriculum including the Arts and Humanities/Social Science Requirements.
2. A student is allowed to enroll in ECE courses (excluding EC 307, 308, 309 only when all prerequisites have been passed with a grade of C or better.
3. All Biomedical Engineering students must have a cumulative engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level ECE courses.
4. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any ECE course.

BIOSYSTEMS ENGINEERING

Bachelor of Science

The principal objective of the Biosystems Engineering program is to educate and prepare students for a wide range of engineering endeavors involving biological entities. Two main areas are supported: engineering for management of natural resources and the environment and engineering for production of value-added products from bioprocessing technologies.

Biosystems engineers work at the interface between engineering and life sciences and must be knowledgeable in both disciplines. In addition to the common objectives of all engineering programs listed on page 80, Biosystems Engineering students should achieve familiarity with both biosystems concentrations, experience an interdisciplinary education, and develop a career goal of professional recognition and licensure.

Students develop specialization in one of two concentrations. The Applied Biotechnology Concentration equips students to apply engineering and biological sciences to problem solving for biological systems and production of value-added bioproducts in a wide range of industries. The Natural Resources and Environment Concentration equips students to apply engineering, agricultural, and environmental sciences to assess and control the impact of human activities on the biosphere.

Students are urged to complete a minor and participate in the Cooperative Education, Biosystems Engineering Intern, and/or Study Abroad Programs. Those interested in medical careers should consider graduate study and/or medical school.

Additional information is available from the departmental offices or at www.clemson.edu/agbio/engh/home.htm.

APPLIED BIOTECHNOLOGY CONCENTRATION

Freshman Year

First Semester
1. CES 102 Engineering Disciplines and Skills
2. CH 101 General Chemistry
3. ENGL 103 Accelerated Composition
4. MTHSC 106 Calculus of One Variable I
5. Arts and Humanities Requirement or Social Science Requirement

Second Semester
1. CH 102 General Chemistry
2. ENGR 130 Engineering Fundamentals
3. MTHSC 108 Calculus of One Variable II
4. PHYS 221 Physics with Calculus I
5. Arts and Humanities Requirement or Social Science Requirement

Sophomore Year

First Semester
1. B E 210 Intro. to Biosystems Engineering
2. MTHSC 206 Calculus of Several Variables
3. PHYS 221 Physics with Calculus II
4. Biology Requirement
5. Statics Requirement

Second Semester
2. E G 209 Intro. to Engr./Computer Graphics
4. MICRO 305 General Microbiology
5. MTHSC 208 Intro. to Ordinary Diff. Equations
6. Dynamics Requirement

Junior Year

First Semester
2. C E 341 Introduction to Fluid Mechanics or CH E 230 Fluids/Heat Transfer
3. E C E 307 Basic Electrical Engineering
5. Organic Chemistry Requirement

Second Semester
2. B E 412 Heat and Mass Transport in BE
3. B E 415 Instrumentation and Control for Biosystems Engineers
4. Biochemistry Requirement

Senior Year

First Semester
1. B E 414 Biosystems Engr. Unit Operations
2. B E 438 Bioprocess Engineering Design
5. Arts and Humanities Requirement or Social Science Requirement
6. Life Science Requirement

Second Semester
1. B E 435 Appl. in Biotechnology Engineering
2. B E 475 Biosystems Engr. Capstone Design
3. Arts and Humanities Requirement or Social Science Requirement
4. Engineering Requirement
5. Elective

Total Semester Hours: 128

Notes:
1. All Biosystems Engineering students must have a cumulative engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level ECE courses.
2. Students accepted to a BS/MS program must take 600-level instead of 400-level courses for Life Science and Engineering Requirements.
3. To complete premedicne requirements, students must take BIOL 104 or 111, CH 224, 228, and PHYS 124, 223 as additional courses.

NATURAL RESOURCES AND ENVIRONMENTAL CONCENTRATION

Freshman Year

First Semester
1. CES 102 Engineering Disciplines and Skills
2. CH 101 General Chemistry
3. ENGL 103 Accelerated Composition
4. MTHSC 106 Calculus of One Variable I
5. Arts and Humanities Requirement or Social Science Requirement

Second Semester
1. CH 102 General Chemistry
2. ENGR 130 Engineering Fundamentals
3. MTHSC 108 Calculus of One Variable II
4. PHYS 221 Physics with Calculus I
5. Arts and Humanities Requirement or Social Science Requirement

Second Semester
2. B E 412 Heat and Mass Transport in BE
3. B E 415 Instrumentation and Control for Biosystems Engineers
4. Biochemistry Requirement

Notes:
1. See Policy on Social Sciences and Humanities for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.
2. Students planning to enter medical school should take CH 223/227 instead of CH 201 and take CH 224/228 as an additional course sequence.
3. Select from department-approved list.
4. To transfer from General Engineering into the Biotechnology program, students must have a minimum cumulative grade-point ratio of 3.0 in courses taken at Clemson and must have earned a C or better in each course in the General Engineering freshman curriculum including the Arts and Humanities/Social Science Requirements.

Notes:
1. See Policy on Social Sciences and Humanities for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.
2. Students planning to enter medical school should take CH 223/227 instead of CH 201 and take CH 224/228 as an additional course sequence.
3. Select from department-approved list.
4. To transfer from General Engineering into the Biotechnology program, students must have a minimum cumulative grade-point ratio of 3.0 in courses taken at Clemson and must have earned a C or better in each course in the General Engineering freshman curriculum including the Arts and Humanities/Social Science Requirements.
5. See Policy on Humanities and Social Sciences for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.
Sophomore Year
First Semester
1 - B E 210 Intro. to Biosystems Engineering
2 - B E 222 Geomeasurements
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
4 - Biology Requirement
3 - Statics Requirement
18
Second Semester
2 - B E 212 Fundamentals of Biosystems Engr.
2 - E G 209 Intro. to Engr./Comp. Graphics
3 - M E 310 Thermodynamics and Heat Transfer
4 - MICRO 305 General Microbiology
4 - MTHSC 208 Intro. to Ordinary Diff. Equations
2 - Dynamics Requirement
17

Junior Year
First Semester
3 - B E 312 Biol. Kinetics and Reactor Modeling
4 - C E 321 Geotechnical Engineering or
4 - CSENV 202 Soils
4 - C E 341 Introduction to Fluid Mechanics
2 - B E C E 307 Basic Electrical Engineering
3 - Mechanics of Materials Requirement
16
Second Semester
3 - B E 314 Biosystems Engr. Mechanical Design or
3 - M E 306 Fundamentals of Machine Design
3 - B E 322 Small Watershed Hydrology and Sedimentology
3 - B E 412 Heat and Mass Transport in BE
4 - B E 415 Instrumentation and Control for BE
3 - Structural Design Requirement
16

Senior Year
First Semester
3 - B E 414 Biosystems Engr. Unit Operations
3 - B E 464 Non-Point Source Mgt. in Engr. Ecosys.
2 - B E 474 Biosystems Engr. Design/Project Mgt.
6 - Arts and Humanities Requirement or
6 - Social Science Requirement
3 - Engineering Requirement
17
Second Semester
2 - B E 421 Engineering Syst. for Soil Water Mgt.
2 - B E 475 Biosystems Engr. Capstone Design
3 - Arts and Humanities Requirement or
3 - Social Science Requirement
3 - Engineering Requirement
2 - Elective
12

128 Total Semester Hours

CERAMIC AND MATERIALS ENGINEERING

Bachelor of Science
The School of Materials Science and Engineering offers undergraduate degrees in Ceramic and Materials Engineering, Polymer and Textile Chemistry, and Textile Management.

Ceramic and materials engineers design, develop, and participate in the manufacture of both standard and new materials intended for use in a wide variety of industries with diverse applications. These range from the semi-conductor to the aerospace and finally to the traditional ceramics industry. The broad scope of industrial responsibilities handled by ceramic and materials engineers requires knowledge in mathematics, science, engineering, and the social sciences, skills in problem solving, engineering analysis, design, and written and oral communication.

The baccalaureate program integrates laboratory with classroom experiences to prepare students for life-long learning. Courses covering thermodynamics, kinetics, mechanical behavior, processing, and characterization of materials prepare students for careers in industry and/or for graduate school.

In addition to the common educational objectives of all engineering programs listed on page 80, baccalaureate degree graduates in Ceramic and Materials Engineering will be able to
- demonstrate learning consistent with Accreditation Board for Engineering and Technology Engineering Criteria 2000 for ceramic and materials engineering programs
- function easily and well in the laboratory and plant environments and
- serve the local, national, and international ceramic and materials communities

Specifically, the Accreditation Board for Engineering and Technology Engineering Criteria 2000 requires that baccalaureate degree graduates in Ceramic and Materials Engineering be able to
- apply advanced scientific and engineering principles to ceramic and materials engineering systems
- demonstrate an integrated understanding of the scientific and engineering principles underlying structure, properties, processing, and performance relationships
- apply this understanding to the solution of ceramic and materials engineering selection and design problems and
- apply appropriate experimental, statistical, and computational methods to advantage in the solution of ceramic and materials problems

Freshman Year
First Semester
2 - CES 102 Engineering Disciplines and Skills
4 - CH 101 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Arts and Humanities Requirement or
3 - Social Science Requirement
16
Second Semester
4 - CH 102 General Chemistry
2 - ENGR 130 Engineering Fundamentals
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
3 - Arts and Humanities Requirement or
3 - Social Science Requirement
16

Sophomore Year
First Semester
3 - C M E 210 Introduction to Materials Science
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
6 - Arts and Humanities Requirement or
6 - Social Science Requirement
16
Second Semester
1 - C M E 241 Metrics Lab.
2 - E G 209 Intro. to Engr./Comp. Graphics
3 - E M 201 Engineering Mechanics: Statics
4 - MTHSC 208 Intro. to Ordinary Diff. Equations
3 - TEXT 324 Textile Statistics
3 - Arts and Humanities Requirement or
3 - Social Science Requirement
16

Junior Year
First Semester
3 - C M E 319 Materials Processing I
3 - C M E 326 Thermodynamics of Materials
3 - C M E 327 Transport Phenomena
3 - COMM 250 Public Speaking
3 - ENGL 314 Technical Writing
13
Second Semester
3 - C M E 328 Phase Diagrams for Materials Processing and Applications
2 - C M E 342 Structure/Property Lab.
3 - C M E 361 Process of Metals and Composites
3 - C M E 422 Mechanical Behavior of Materials
3 - IE 384 Engineering Economic Analysis
3 - FFC 303 Textile Chemistry
17

Senior Year
First Semester
3 - C M E 402 Solid State Materials
3 - C M E 413 Noncrystalline Materials
3 - C M E 432 Manufacturing Processes and Syst.
1 - C M E 441 Manufacturing Lab.
3 - FFC 415 Intro. to Polymer Science and Engr.
3 - Research Requirement
16
Second Semester
3 - C M E 407 Senior Capstone Design
3 - C M E 416 Electronic Properties of Materials
3 - C M E 424 Optical Materials and Applications
3 - C M E 433 Combustion Systems and Environmental Emissions
1 - C M E 445 Practice of Materials Engineering
13

125 Total Semester Hours
CHEMICAL ENGINEERING

Bachelor of Science

The Department of Chemical and Biomolecular Engineering offers the Bachelor of Science degree in Chemical Engineering. Chemical engineering is based on chemistry, physics, mathematics, and biology. The curriculum at Clemson includes a blend of classroom and laboratory instruction and emphasizes broadly applicable fundamental principles and current technology to prepare graduates for immediate, productive employment as well as life-long learning and professional growth. Communication skills and group projects are emphasized because chemical engineers frequently work in multidisciplinary teams. Graduates are prepared to engage successfully in chemical engineering practice or postgraduate education including medical and law school; apply their knowledge and use modern chemical engineering tools to design chemical processes and identify, formulate, and solve chemical engineering problems; educate themselves as knowledge and tools advance; and function effectively on teams, communicate effectively, and serve society through their professional contributions. Chemical engineers are involved in the research, manufacture, sales, and use of commodity and specialty chemicals, petroleum products, synthetic fibers and textiles, pharmaceuticals, pulp and paper, electronic components, food and consumer goods, and many other products. They work at the forefront of environmental pollution prevention and remediation and apply engineering science and technology to solve a variety of medical and health-related problems.

In addition to the Bachelor of Science degree, the Department of Chemical and Biomolecular Engineering offers advanced study leading to the Master of Science degree, the Master of Science and Doctor of Philosophy degrees.

Freshman Year

First Semester
2 - CES 102 Engineering Disciplines and Skills
4 - CH 101 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1

Second Semester
4 - CH 102 General Chemistry
3 - CH E 130 Chemical Engineering Tools
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1

Sophomore Year

First Semester
3 - CH 223 Organic Chemistry
4 - CH E 211 Intro. to Chemical Engineering
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
3 - Arts and Humanities Requirement1

Second Semester
3 - CH 224 Organic Chemistry
1 - CH 229 Organic Chemistry Lab.
3 - CH E 220 Chemical Engr. Thermodynamics I
4 - CH E 230 Fluids/Heat Transfer
4 - MTHSC 208 Intro. to Ordinary Diff. Equations

Junior Year

First Semester
3 - BIOCH 301 Molecular Biochemistry
1 - CH 339 Physical Chemistry Lab.
3 - CH E 307 Unit Operations Lab. I
1 - CH E 319 Engineering Materials
2 - E C E 307 Basic Electrical Engineering
1 - E C E 309 Electrical Engineering Lab. I
3 - Arts and Humanities Requirement2 or
3 - Social Science Requirement1

Second Semester
3 - CH 332 Physical Chemistry
1 - CH 340 Physical Chemistry Lab.
3 - CH E 321 Chemical Engr. Thermodynamics II
4 - CH E 330 Mass Transfer and Separation Proc.
3 - Emphasis Area2
3 - Arts and Humanities Requirement2 or
3 - Social Science Requirement1

Senior Year

First Semester
3 - CH E 407 Unit Operations Lab. II
3 - CH E 431 Chemical Process Design I
1 - CH E 443 Chemical Engr. Senior Seminar I
3 - CH E 450 Chemical Reaction Engineering
3 - Emphasis Area2
3 - Arts and Humanities Requirement2 or
3 - Social Science Requirement1

Second Semester
3 - CH E 353 Process Dynamics and Control
3 - CH E 433 Process Design II
1 - CH E 444 Chemical Engr. Senior Seminar II
3 - MICRO 413 Industrial Microbiology
3 - Emphasis Area2

127 Total Semester Hours

Note: Students must complete a minimum of 34 grade-point ratio, and must be admitted to the Graduate School prior to registering for graduate courses. Details of the suggested curriculum and program information are available from the department.

Freshman Year

First Semester
2 - CES 102 Engineering Disciplines and Skills
4 - CH 101 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1

CIVIL ENGINEERING

Bachelor of Science

Civil Engineering involves the planning, design, construction management, operation, and maintenance of facilities and systems in the built environment including bridges, buildings, airports, water supply systems, ports, dams, and highways.

The Civil Engineering program leads to the Bachelor of Science degree in Civil Engineering and includes the common educational goals listed on page 80 for the College of Engineering and Science. (The complete objectives of the program can be found at www.ce.clemson.edu.) The first two years provide students with building blocks necessary to be successful civil engineers. This includes proficiency in calculus, engineering mechanics, physics, and chemistry. During the junior year, students receive a broad introduction to the fundamental areas of civil engineering (structures, hydraulics, geotechnical, transportation, environmental, construction materials, and project management). Design experiences are integrated throughout the curriculum, culminating in the senior year with a major capstone design project. In addition, during the senior year, students can select from available emphasis areas which serve to strengthen their undergraduate background.

The Civil Engineering program prepares students to work immediately upon graduation in most areas of civil engineering or to pursue graduate degrees. Students are also exposed to issues related to professional practice, including professional registration, life-long learning, and communication and team skills. Because a concerned society demands a realistic consideration of the impacts of engineering projects, civil engineering students are also educated in the broad areas of the humanities and social sciences.

The Department of Civil Engineering allows students to count up to six hours of graduate credit (600- and 800-level courses) toward both the bachelor's and master's degrees. Students participating in this program must have completed the junior year, must have earned a minimum 3.4 grade-point ratio, and must be admitted to the Graduate School prior to registering for graduate courses. Details of the suggested curriculum and program information are available from the department.
### Bachelor of Science

Computer engineers have excellent career opportunities in the design and application of hardware and software components for a variety of computer applications. These include mainframe, desktop, and embedded microprocessor platforms as well as the networking of various types of computers and peripherals.

Based on a strong foundation in mathematics, computer science, and the physical sciences, the Computer Engineering program includes engineering science and design in circuits, electronics, computer organizations and design, peripheral interfacing, and software engineering. Emphasis is placed on hands-on experience with networked computer systems, micro-, mini-, and mainframe computers, and the solution of a wide range of practical problems, using engineering principles. In addition to these technical skills, students learn to communicate effectively and to develop interpersonal, teamwork, and management skills, all of which contribute to success in a professional engineering career. The program is also an excellent preparation for graduate study.

Information on the program and its objectives is available at www.ece.clemson.edu/ece/index.shtml.

### Freshman Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>3 - ENGL 102 Engineering Disciplines and Skills</td>
<td>1 - CH 101 General Chemistry</td>
</tr>
<tr>
<td>4 - CH 103 Accelerated Composition</td>
<td>4 - MTHSC 106 Calculus of One Variable I</td>
</tr>
<tr>
<td>3 - Arts and Humanities Requirement</td>
<td>3 - Social Science Requirement</td>
</tr>
<tr>
<td>3 - Technical Requirement</td>
<td>3 - Social Science Requirement</td>
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### Sophomore Year

<table>
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<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>2 - CES 102 Engineering Disciplines and Skills</td>
<td>3 - CP SC 111 Elementary Computer Programming in C/C++</td>
</tr>
<tr>
<td>4 - MTHSC 108 Calculus of One Variable II</td>
<td>3 - Arts and Humanities Requirement</td>
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<tr>
<td>3 - PHYS 122 Physics with Calculus I</td>
<td>3 - Social Science Requirement</td>
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<td>3 - Social Science Requirement</td>
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### Junior Year

<table>
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<tr>
<th>First Semester</th>
<th>Second Semester</th>
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<tbody>
<tr>
<td>3 - ART 211 Visual Arts Survey</td>
<td>3 - MTHSC 311 Linear Algebra</td>
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<td>3 - Social Science Requirement</td>
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### Senior Year

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - Arts and Humanities Requirement</td>
<td>3 - Computer Engineering Technical Requirement</td>
</tr>
<tr>
<td>3 - Social Science Requirement</td>
<td>3 - Oral Communication Requirement</td>
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</table>

### Second Semester

3 - E C E 453 Software Practicum

6 - Arts and Humanities Requirement or
6 - Social Science Requirement

6 - Computer Engineering Depth Technical Requirement

15

127 Total Semester Hours

1See Policy on Social Sciences and Humanities for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.

2Select from department-approved list.

3See General Education Requirements.

Notes:
1. A student is allowed to enroll in E C E courses (excluding E C E 107, 108, 109) only when all prerequisites have been passed with a grade of C or better.
2. All Computer Engineering students must have a cumulative engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level E C E courses.
3. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any E C E course.
ELECTRICAL ENGINEERING

Bachelor of Science

Electrical engineers are in high demand for a wide range of influential positions. Professional duties range from analytical problem solving to the design of components and systems. The scope of employment requires a unique breadth and depth of knowledge and technical skills, which are reflected in the Electrical Engineering program. This program also offers an excellent preparation for graduate education. Detailed information can be found at www.ece.clemson.edu/ecceedx.shtml.

Building on a foundation of mathematical and physical sciences, students progress into the application of these in the engineering science areas of circuits, electronics, communications, controls, power, and electromagnetics. In these subjects, students also begin to apply the concepts and techniques learned to the design of circuits and systems. Senior technical design courses offer the opportunity to further develop expertise in a selected area.

In addition to these technical skills, students learn to communicate effectively, both orally and with the written word. Because engineers work for the benefit of society, the curriculum includes a strong component of humanities and social science courses. Also, many project design assignments enable the development of interpersonal, teamwork, and management skills which are necessary for success in a professional engineering career.

Freshman Year

First Semester
3 - CES 102 Engineering Disciplines and Skills
3 - CH 101 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
16

Second Semester
4 - CH 102 General Chemistry
3 - CP SC 111 Elementary Computer Programming in C/C++
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
17

Sophomore Year

First Semester
3 - ECE 201 Logic and Computing Devices
3 - ECE 202 Electrical Circuits I
1 - ECE 211 Electrical Engineering Lab. I
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
3 - Technical Requirement (ECE)1 or
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
17

Second Semester
1 - ECE 212 Electrical Engineering Lab. II
3 - ECE 262 Electric Circuits II
4 - ECE 272 Computer Organization
3 - M 201 Engineering Mechanics: Statics
4 - MTHSC 208 Intro. to Ordinary Diff. Equations
15

Junior Year

First Semester
1 - ECE 311 Electrical Engineering Lab. III
3 - ECE 320 Electronics I
3 - ECE 330 Signals, Systems, and Transforms
4 - ECE 371 Microcomputer Interfacing
3 - ECE 380 Electromagnetics
3 - Technical Requirement (Adv. Mathematics)1

Second Semester
1 - ECE 312 Electrical Engineering Lab. IV
3 - ECE 317 Random Signal Analysis
3 - ECE 321 Electronics II
3 - ECE 360 Electric Power Engineering
3 - ECE 381 Fields, Waves, and Circuits
3 - ENGL 314 Technical Writing
16

Senior Year

First Semester
3 - ECE 409 Continuous and Discrete Syst. Des.
3 - ECE 427 Communications Systems
2 - ECE 495 Integrated Systems Design I
3 - Oral Communication Requirement4
3 - Technical Requirement (ECE)2
14

Second Semester
2 - ECE 496 Integrated System Design II
6 - Arts and Humanities Requirement1 or
6 - Social Science Requirement1
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1 or
3 - Technical Requirement (ECE)3
3 - Technical Requirement Depth (ECE)2
14

126 Total Semester Hours

INDUSTRIAL ENGINEERING

Bachelor of Science

Industrial engineers design, install, and improve the complex systems that provide goods and services vital to our society and economy. These systems place unique demands for breadth of preparation on industrial engineers. Baccalaureate degree graduates demonstrate the ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy. Graduates will demonstrate the ability to apply the principles and techniques of industrial engineering analysis and design supported by a foundation in mathematical, physical and social sciences, and economic, operational, and engineering analyses. Graduates will possess a breadth of knowledge that allows them to practice industrial engineering with an appropriate awareness of information issues in systems improvement. In addition, graduates are able to work and communicate effectively with colleagues at every level in the organization.

The traditional arenas for the practice of industrial engineering are the manufacturing facilities of industry; however, many practicing industrial engineers are employed in non-manufacturing institutions such as hospitals, banks, and government agencies. In addition to numerous employment opportunities in professional practice, industrial engineering graduates may further their formal education. The Department of Industrial Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees.

The Department of Industrial Engineering allows students to count up to 12 hours of graduate credit (approved 600- and 800-level courses) toward both the bachelor's and master's degrees. Students participating in this program must have a minimum grade-point ratio of 3.4 and be admitted to the Graduate School prior to registering for graduate courses. Details of the suggested curriculum and program information are available from the Industrial Engineering Department.

Detailed curriculum and department information is available at www.ces.clemson.edu/ie.

Freshman Year

First Semester
2 - CES 102 Engineering Disciplines and Skills
4 - CH 101 General Chemistry I
3 - ENGL 103 Accelerated Composition
4 - MTHSC 108 Calculus of One Variable II
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
16

Second Semester
4 - CH 102 General Chemistry
3 - CP SC 111 Elementary Computer Programming in C/C++
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
17

See Policy on Humanities and Social Sciences for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.

Select from department-approved list.

Students may enroll in ECE 222 for a common semester with Computer Engineering. Those not selecting this option should complete the Technical Requirement (ECE) in the senior year.

See General Education Requirements.

Notes:
1. A student is allowed to enroll in ECE courses (excluding ECE 307, 308, 309) only when all prerequisites have been passed with a grade of C or better.
2. All Electrical Engineering students must have a cumulative engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level ECE courses.
3. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any ECE course.

Second Semester
4 - CH 102 General Chemistry II
2 - ENGR 130 Engineering Fundamentals
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
17
Sophomore Year
First Semester
2 - E G 209 Intro. to Engr./Computer Graphics1
4 - I E 201 System Design I
3 - I E 220 Design of Information Systems in Industrial Engineering or
3 - CP SC 161 Intro. to Visual Basic Program.
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II

Second Semester
3 - C M E 210 Introduction to Materials Science
3 - E M 201 Engineering Mechanics: Statics
4 - I E 210 Design and Analysis of Work Systems
3 - I E 280 Methods of Operational Research I
3 - I E 384 Engineering Economic Analysis

Junior Year
First Semester
2 - E C E 307 Basic Electrical Engineering
1 - E C E 309 Electrical Engineering Lab. I
3 - H I S T 122 History, Technology, and Society
3 - I E 360 Ind. Appl. of Probability and Statistics
4 - I E 440 Decision Support Systems in Ind. Engr.
3 - I E 465 Facilities Planning and Design

Second Semester
3 - COMM 150 Intro. to Human Comm. or
3 - COMM 250 Public Speaking
3 - I E 361 Industrial Quality Control
1 - I E 368 Professional Practice in Ind. Engr.
3 - I E 381 Methods of Operational Research II
3 - I E 386 Production Planning and Control
3 - Engineering Science Requirement4

Senior Year
First Semester
3 - ENGL 314 Technical Writing
3 - I E 461 Quality Engineering
4 - I E 482 Systems Modeling
3 - Engineering Science Requirement4
3 - Technical Requirement3

Second Semester
3 - I E 467 Systems Design II
3 - M G T 201 Principles of Management
3 - PO SC 102 Intro. to International Relations
3 - Arts and Humanities Requirement4 or
3 - Social Science Requirement4
3 - Technical Requirement3

128 Total Semester Hours

MECHANICAL
ENGINEERING

Bachelor of Science
Breadth, individuality, and flexibility are inherent characteristics of the mechanical engineering profession. Mechanical engineers, in a broad sense, make major contributions to the creation of products and systems that benefit mankind. They work in a variety of areas including bioengineering, energy systems, environmental and life-support systems, propulsion and transportation systems, food production, materials processing, automated manufacturing, and construction. A wide spectrum of career opportunities is open to them. The practice of mechanical engineering includes one or more of the following activities: manufacturing, testing, research, development, design, technical management, technical sales and marketing, construction, and teaching.

Preparation for a 40-45 year professional career requires development of the whole person through a balanced program encompassing the humanities, social sciences, communication and computer skills, physical and engineering sciences, design, and laboratory experience. Students start with the physical sciences and communication skills and progress through the engineering sciences, ultimately applying the principles learned in such areas as energy conversion and transfer, mechanical design, and systems analysis. Throughout the curriculum, the fundamental nature of engineering as a problem-solving discipline is emphasized.

Most graduates take positions in industry, government, or business. Many, however, continue their formal education in a graduate program. The Department of Mechanical Engineering offers study leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees.

Mechanical Engineering students who have a cumulative grade-point ratio or cumulative engineering grade-point ratio (EGPR) below 2.0 are on probation and will have restricted enrollment in classes. Students whose cumulative grade-point ratio is below 2.0 are subject to the regulations stipulated under Continuing Enrollment Policy. Students on probation for EGPR below 2.0 who fail to recover in the first regular semester (fall or spring) will not be allowed to register for mechanical engineering classes. After one year, such students may petition the Mechanical Engineering Department for continued enrollment. An advising policy for students on probation is available from the Mechanical Engineering Department.

Additional information can be found at www.ces.clemson.edu/me.

Freshman Year
First Semester
2 - CES 102 Engineering Disciplines and Skills
4 - CH 101 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Arts and Humanities Requirement4 or
3 - Social Science Requirement4

Second Semester
3 - ENGR 141 Programming and Problem Solving in Mechanical Engineering
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
3 - Arts and Humanities Requirement4 or
3 - Social Science Requirement4

Sophomore Year
First Semester
5 - M E 201 Statics and Dynamics for Mech. Engr.
2 - M E 222 Mechanical Engineering Lab. I
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
3 - 5 - Science Requirement5
17-19

Second Semester
2 - E C E 307 Basic Electrical Engineering
1 - E C E 309 Electrical Engineering Lab. I
3 - M E 202 Foundations of Mechanical Systems
3 - M E 203 Found. of Thermal and Fluid Systems
4 - MTHSC 208 Intro. to Ordinary Diff. Equations
2 - Numerical Analysis Requirement6
16

Junior Year
First Semester
3 - M E 302 Mechanics of Materials
3 - M E 303 Thermodynamics
3 - M E 305 Model. and Analysis of Dynamic Syst.
3 - M E 308 Fluid Mechanics
2 - M E 333 Mechanical Engineering Lab. II
3 - Arts and Humanities Requirement4 or
3 - Social Science Requirement4
17

Second Semester
3 - M E 401 Mechanical Engineering Design
3 - M E 403 Control and Integration of Multi-Domain Dynamic Systems
2 - M E 444 Mechanical Engineering Lab. III
6 - Technical Requirement7
14

Senior Year
First Semester
3 - M E 402 Mechanics of Materials
3 - M E 403 Control and Integration of Multi-Domain Dynamic Systems
2 - M E 444 Mechanical Engineering Lab. III
6 - Technical Requirement7
14

Second Semester
1 - M E 400 Senior Seminar
3 - M E 402 Internship in Engineering Design
6 - Arts and Humanities Requirement4 or
3 - Social Science Requirement4
3 - Technical Requirement7
13

124-126 Total Semester Hours

1See policy on Social Sciences and Humanities for Engineering curricula.
2Students may take PHYS 223 in the sophomore year in lieu of PHYS 124.
3EG 228 may be substituted.
4EM 202, EM 302, 308, or 310
5Select from I E 452, 456, 460, 485, 487, 489. With preap-
6See policy on Social Sciences and Humanities for Engineering curricula.
7Students may petition the Mechanical Engineering Department for continued enrollment. An advising policy for students on probation is available from the Mechanical Engineering Department.

Additional information can be found at www.ces.clemson.edu/me.


**SCIENCE PROGRAMS**

The College offers curricula leading to the Bachelor of Science in Chemistry, Computer Information Systems, Computer Science, Geology, Mathematical Sciences, Physics, Polymer and Textile Chemistry, and Textile Management. The Bachelor of Arts is offered in Chemistry, Computer Science, Geology, Mathematical Sciences, and Physics.

The science departments in the College work closely with the other academic departments in the University, including such disciplines as economics and management as well as engineering. This allows students in the sciences great flexibility and responsibility in designing their own programs.

**Bachelor of Science Curricula**

The Bachelor of Science degree prepares graduates for professional employment or graduate study in the chosen science discipline. BS curricula are more highly structured than BA curricula but nonetheless offer opportunity for students to pursue a minor or secondary area of interest.

**Bachelor of Arts Curricula**

The curricula leading to the Bachelor of Arts degree are designed to meet the needs of students who desire a broad general education. They require a minor (or a second major) as well as the major concentration. A major requires a minimum of 24 credits from courses above the sophomore level including or in addition to courses specified by the major department. In some major disciplines, certain prescribed courses at the sophomore level are counted toward the 24 credit requirement.

Students have a large degree of flexibility and responsibility in selecting a minor area from those listed on page 97. Courses for these minors are to be selected in consultation with the appropriate department.

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**CHEMISTRY**

**Bachelor of Science**

Chemistry, an experimental discipline based on observation guided by molecular theory, is of fundamental importance in much of modern science and technology. Its molecular concepts form the basis for ideas about complex material behavior. Due to the fundamental nature and extensive application of chemistry, an unusually large variety of challenging opportunities to contribute in the science-oriented community are open to students whose education is built around the principles of this discipline.

The curriculum, through the career requirement options and the large number of electives, provides students the opportunity to select a coherent program of study beyond the basic courses. Career requirement options are provided for students anticipating graduate study in chemistry or related fields; employment following the BS degree in laboratory, production, technical sales, or management positions; professional studies (e.g., medicine); chemical physics; geochemistry; and employment in fields requiring extensive preparation in courses other than sciences (e.g., patent law and technical writing). Significant features of the curriculum are the student's extensive participation in experimental work and the opportunity to take part in a research investigation during the junior and senior years.

**Freshman Year**

**First Semester**

1. CH 101 General Chemistry
2. CH 141 Chemistry Orientation
3. ENGL 103 Accelerated Composition
4. MTHSC 106 Calculus of One Variable I
5. Arts and Humanities Requirement or
6. Social Science Requirement

**Second Semester**

1. CH 102 General Chemistry
2. CH 152 Chemistry Communication I
3. MTHSC 108 Calculus of One Variable II
4. PHYS 122 Physics with Calculus I
5. Arts and Humanities Requirement or
6. Social Science Requirement

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**Sophomore Year**

**First Semester**

1. CH 223 Organic Chemistry
2. CH 227 Organic Chemistry Lab.
3. MTHSC 206 Calculus of Several Variables
4. PHYS 221 Physics with Calculus II
5. PHYS 223 Physics Lab. II
6. Foreign Language Requirement

**Second Semester**

1. CH 205 Introduction to Inorganic Chemistry
2. CH 224 Organic Chemistry
3. CH 228 Organic Chemistry Lab.
4. MTHSC 208 Intro. to Ordinary Diff. Equations
5. PHYS 222 Physics with Calculus III
6. PHYS 224 Physics Lab. III

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**Junior Year**

**First Semester**

1. BLOCH 301 Molecular Biochemistry
2. CH 313 Quantitative Analysis
3. CH 315 Quantitative Analysis Lab.
4. CH 331 Physical Chemistry
5. CH 339 Physical Chemistry Lab.
6. ENGL 314 Technical Writing

**Second Semester**

1. CH 332 Physical Chemistry
2. CH 340 Physical Chemistry Lab.
3. CH 411 Instrumental Analysis
4. CH 412 Instrumental Analysis Lab.
5. Arts and Humanities (Literature) Requirement or
6. Elective

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**Senior Year**

**First Semester**

1. CH 342 Inorganic Chemistry
2. CH 303 Advanced Synthetic Techniques
3. CH 443 Research Problems
4. Arts and Humanities Requirement or
5. Social Science Requirement
6. Chemistry Requirement

**Second Semester**

1. CH 444 Research Problems
2. CH 450 Chemistry Capstone
3. CH 452 Chemistry Communication II
4. Arts and Humanities Requirement or
5. Social Science Requirement
6. Chemistry Requirement
7. Elective

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**122 Total Semester Hours**

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**CHEMISTRY: Bachelor of Arts**

**Freshman Year**

**First Semester**

1. CH 101 General Chemistry
2. CH 141 Chemistry Orientation
3. ENGL 103 Accelerated Composition
4. MTHSC 106 Calculus of One Variable I
5. Arts and Humanities Requirement or
6. Social Science Requirement or
7. Arts and Humanities Requirement or
8. Social Science Requirement

**Second Semester**

1. CH 102 General Chemistry
2. CH 152 Chemistry Communication I
3. MTHSC 108 Calculus of One Variable II
4. PHYS 122 Physics with Calculus I
5. Arts and Humanities Requirement or
6. Social Science Requirement or
7. Arts and Humanities Requirement or
8. Social Science Requirement

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**Sophomore Year**

**First Semester**

1. CH 223 Organic Chemistry
2. CH 227 Organic Chemistry Lab.
3. MTHSC 206 Calculus of Several Variables
4. PHYS 221 Physics with Calculus II
5. PHYS 223 Physics Lab. II
6. Foreign Language Requirement

**Second Semester**

1. CH 205 Introduction to Inorganic Chemistry
2. CH 224 Organic Chemistry
3. CH 228 Organic Chemistry Lab.
4. MTHSC 208 Intro. to Ordinary Diff. Equations
5. PHYS 222 Physics with Calculus III
6. PHYS 224 Physics Lab. III

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**Junior Year**

**First Semester**

1. BLOCH 301 Molecular Biochemistry
2. CH 313 Quantitative Analysis
3. CH 315 Quantitative Analysis Lab.
4. CH 331 Physical Chemistry
5. CH 339 Physical Chemistry Lab.
6. ENGL 314 Technical Writing

**Second Semester**

1. CH 332 Physical Chemistry
2. CH 340 Physical Chemistry Lab.
3. CH 411 Instrumental Analysis
4. CH 412 Instrumental Analysis Lab.
5. Arts and Humanities (Literature) Requirement or
6. Elective

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**Senior Year**

**First Semester**

1. CH 342 Inorganic Chemistry
2. CH 303 Advanced Synthetic Techniques
3. CH 443 Research Problems
4. Arts and Humanities Requirement or
5. Social Science Requirement
6. Chemistry Requirement

**Second Semester**

1. CH 444 Research Problems
2. CH 450 Chemistry Capstone
3. CH 452 Chemistry Communication II
4. Arts and Humanities Requirement or
5. Social Science Requirement
6. Chemistry Requirement
7. Elective

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**122 Total Semester Hours**

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1See Policy on Social Sciences and Humanities for Engineering Curricula. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.

2See advisor. Select from department-approved list.

Note: A student is allowed to enroll in any M E course only when all prerequisites, as defined by current official listings for that course, have been passed with a grade of C or higher.

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**CHEMISTRY: Bachelor of Arts**

**Freshman Year**

**First Semester**

1. CH 101 General Chemistry
2. CH 141 Chemistry Orientation
3. ENGL 103 Accelerated Composition
4. MTHSC 106 Calculus of One Variable I
5. Arts and Humanities Requirement or
6. Social Science Requirement

**Second Semester**

1. CH 102 General Chemistry
2. CH 152 Chemistry Communication I
3. MTHSC 108 Calculus of One Variable II
4. PHYS 122 Physics with Calculus I
5. Arts and Humanities Requirement or
6. Social Science Requirement

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**Sophomore Year**

**First Semester**

1. CH 223 Organic Chemistry
2. CH 227 Organic Chemistry Lab.
3. MTHSC 206 Calculus of Several Variables
4. PHYS 221 Physics with Calculus II
5. PHYS 223 Physics Lab. II
6. Foreign Language Requirement

**Second Semester**

1. CH 205 Introduction to Inorganic Chemistry
2. CH 224 Organic Chemistry
3. CH 228 Organic Chemistry Lab.
4. MTHSC 208 Intro. to Ordinary Diff. Equations
5. PHYS 222 Physics with Calculus III
6. PHYS 224 Physics Lab. III

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**Junior Year**

**First Semester**

1. BLOCH 301 Molecular Biochemistry
2. CH 313 Quantitative Analysis
3. CH 315 Quantitative Analysis Lab.
4. CH 331 Physical Chemistry
5. CH 339 Physical Chemistry Lab.
6. ENGL 314 Technical Writing

**Second Semester**

1. CH 332 Physical Chemistry
2. CH 340 Physical Chemistry Lab.
3. CH 411 Instrumental Analysis
4. CH 412 Instrumental Analysis Lab.
5. Arts and Humanities (Literature) Requirement or
6. Elective

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**Senior Year**

**First Semester**

1. CH 342 Inorganic Chemistry
2. CH 303 Advanced Synthetic Techniques
3. CH 443 Research Problems
4. Arts and Humanities Requirement or
5. Social Science Requirement
6. Chemistry Requirement

**Second Semester**

1. CH 444 Research Problems
2. CH 450 Chemistry Capstone
3. CH 452 Chemistry Communication II
4. Arts and Humanities Requirement or
5. Social Science Requirement
6. Chemistry Requirement
7. Elective

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**122 Total Semester Hours**

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1See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

2One semester in any modern foreign language is required.

3See advisor.
Junior Year
First Semester
3 - CH 313 Quantitative Analysis
1 - CH 317 Quantitative Analysis Lab.
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
3 - Arts and Humanities (Literature) Requirement1
3 - Foreign Language Requirement2
3 - Minor Requirement
16
Second Semester
3 - CH 331 Physical Chemistry
3 - ENGL 314 Technical Writing
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
3 - Foreign Language Requirement2
3 - Minor Requirement
15
Senior Year
First Semester
3 - CH 332 Physical Chemistry
3 - Chemistry Requirement1
3 - Minor Requirement
6 - Elective
15
Second Semester
3 - CH 450 Chemistry Capstone
1 - CH 452 Chemistry Communication II
3 - Chemistry Requirement1
6 - Minor Requirement
13
122 Total Semester Hours
1See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.
2Four semesters (through 202) of the same modern foreign language are required.
3See advisor.

COMPUTER INFORMATION SYSTEMS
Bachelor of Science
The Computer Information Systems degree program is oriented toward computer applications in management-related problems. The program emphasizes functional areas of management including accounting, production, marketing, and finance and the applications of computers in these areas. The curriculum is designed to prepare students for careers in areas such as systems design and analysis, applications programming, database administration, and information retrieval as well as for continued study toward an advanced degree.

Students who change majors into Computer Information Systems must have a cumulative grade-point ratio of 2.0 or higher.

Additional information can be found at www.cs.clemson.edu.

Freshman Year
First Semester
4 - CP SC 101 Computer Science I
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Social Science Requirement1,2
14
Second Semester
4 - CP SC 102 Computer Science II
4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 119 Introduction to Discrete Methods
3 - Arts and Humanities (Non-Lit.) Requirement1,2
3 - Social Science Requirement1,2
17
Sophomore Year
First Semester
4 - CP SC 212 Algorithms and Data Structures
3 - Arts and Humanities (Literature) Requirement1
3 - Humanities or Social Science Requirement1,3
4 - Natural Science Requirement1
5 - Oral Communication Requirement1
17
Second Semester
3 - CP SC 215 Tools and Tech. for Software Dev.
4 - CP SC 231 Intro. to Computer Organization
3 - CP SC 291 Seminar in Professional Issues I
3 - MTHSC 210 Applied Matrix Algebra or
3 - MTHSC 311 Linear Algebra
4 - Natural Science Requirement1
15
Junior Year
First Semester
3 - ACCT 201 Financial Accounting Concepts
3 - CP SC 322 Introduction to Operating Systems
3 - CP SC 372 Intro. to Software Development
3 - ECON 211 Principles of Microeconomics
3 - MTHSC 301 Statistical Methods I
15
Second Semester
3 - ACCT 202 Managerial Accounting Concepts
3 - CP SC 360 Networks and Network Program.
3 - CP SC 371 Systems Analysis or
3 - MGT 452 Systems Analysis and Design
3 - MGT 201 Principles of Management
3 - Elective
15
122 Total Semester Hours
1See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.
2Select from courses in A A H, A A S, ANTH, ART, CHIN, COMM, DANCE, E A S, ECON, ENGL, FR, GEOG, GER, HIST, HUM, ITAL, JAPN, MUSIC, P A, PHIL, PO SC, PSYCH, REL, RUSS, SOC, SPAN, THEA, W S.
3Select from one of the following sequences: BIOL 103/104; 110, 111; CH 103/102; 105,106; PHYS 122/124, 221/223; 207/209, 208/210.
4CP SC H195 may be substituted.
5FIN 306, MGT 390, or 400
6Select from CP SC courses numbered 300 or higher.
7MGT 452, 454, 455, 456, or 400-level CP SC course
Notes:
1. For graduation, a candidate for the BS degree in Computer Information Systems must have earned a grade of C or better in each CP SC course applied to the degree.
2. A grade of C or better must be earned in all prerequisite courses (including CP SC and MTHSC courses) before enrolling in the next CP SC course.

COMPUTER SCIENCE
Bachelor of Science
The Computer Science program is oriented toward design, implementation, and application of software systems to solve information processing problems. Emphasis areas outside computer science allow students to tailor the program to their individual needs and interests. This program is more technically oriented than the Computer Information Systems curriculum. It prepares students for employment in the computer software field or for continued study toward an advanced degree in computer science. This program is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET). Additional information can be found at www.cs.clemson.edu.

Students who change majors into Computer Science must have a cumulative grade-point ratio of 2.0 or better.

Combined Bachelor's/Master's Plan
The Department of Computer Science allows students to count up to nine hours of graduate credit (600- and 800-level courses) toward both the bachelor's and master's degrees. Students participating in this program must have a minimum grade-point ratio of 3.4 and be admitted to the Graduate School prior to registering for graduate courses. Details of the suggested curriculum and program information are available from the Department.

Freshman Year
First Semester
4 - CP SC 101 Computer Science I
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Social Science Requirement1
14
Second Semester
4 - CP SC 102 Computer Science II
4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 119 Introduction to Discrete Methods
3 - Arts and Humanities (Non-Lit.) Requirement1
3 - Social Science Requirement1
17
Sophomore Year

First Semester
4 - CP SC 212 Algorithms and Data Structures
3 - PHYS 122 Physics with Calculus I
3 - Arts and Humanities Requirement1 or Social Science Requirement2
3 - Arts and Humanities (Literature) Requirement1
3 - Oral Communication Requirement1
16

Second Semester
3 - CP SC 215 Tools and Tech. for Software Dev.
4 - CP SC 231 Intro. to Computer Organization
1 - CP SC 291 Seminar in Professional Issues I
3 - MTHSC 301 Statistical Methods I or
3 - MTHSC 302 Stats. for Science and Engr.
3 - PHYS 221 Physics with Calculus II
14

Junior Year

First Semester
3 - CP SC 330 Computer Systems Organization
3 - CP SC 360 Networks and Network Program.
3 - CP SC 372 Intro. to Software Development
3 - MTHSC 311 Linear Algebra
4 - Natural Science Requirement1
16

Second Semester
3 - CP SC 322 Introduction to Operating Systems
3 - CP SC 350 Foundations of Computer Science
3 - CP SC 362 Distributed and Cluster Computing
3 - Emphasis Area4
4 - Natural Science Requirement1
16

Senior Year

First Semester
3 - CP SC 428 Design and Implementation of Programming Languages
3 - Advanced Writing Requirement1
3 - Computer Science Requirement1
3 - Emphasis Area4
3 - Elective
15

Second Semester
1 - CP SC 491 Seminar in Professional Issues IIb
3 - Arts and Humanities and Requirement1 or Social Science Requirement1
3 - Computer Science Requirement1
3 - Emphasis Area4
4 - Elective
14
122 Total Semester Hours

Notes:
1. Select nine hours from any single University approved minor.
2. At least three hours must be at the 300-level or above.
3. Select from 400-level CP SC courses. At least three hours must be selected from CP SC 405, 411, 429, 462, 472.
4. CP SC H395 may be substituted.

COMPUTER SCIENCE

Bachelor of Arts

The Bachelor of Arts in Computer Science is ideal for students interested in acquiring a broad-based liberal arts education that includes a strong and solid understanding of computer science. The curriculum is oriented toward design, implementation, and application of computer software systems to solve information processing problems. The program prepares students for employment in the computer software field or for continued study toward an advanced degree in computer science. Additional information can be found at www.cs.clemson.edu.

Students who change majors into Computer Science must have a cumulative grade-point ratio of 2.0 or higher.

Freshman Year

First Semester
4 - CP SC 101 Computer Science I
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
4 - Foreign Language Requirement3
15

Second Semester
4 - CP SC 102 Computer Science II
4 - MTHSC 108 Calculus of One Variable II
3 - MTHSC 119 Introduction to Discrete Methods
4 - Foreign Language Requirement3
15

Sophomore Year

First Semester
4 - CP SC 212 Algorithms and Data Structures
3 - Arts and Humanities (Literature) Requirement1
3 - Foreign Language Requirement3
4 - Natural Science Requirement1
3 - Oral Communication Requirement1
17

Second Semester
3 - CP SC 215 Tools and Tech. for Software Dev.
4 - CP SC 231 Intro. to Computer Organization
1 - CP SC 291 Seminar in Professional Issues I
4 - Foreign Language Requirement3
4 - Natural Science Requirement1
15

Junior Year

First Semester
6 - Computer Science Requirement4
3 - Mathematical Sciences Requirement2
3 - Minor Requirement
3 - Social Science Requirement2,6
15

Second Semester
3 - Advanced Writing Requirement2
3 - Arts and Humanities (Non-Lit.) Requirement2,6
3 - Computer Science Requirement4
6 - Minor Requirement
15

Senior Year

First Semester
6 - Computer Science Requirement4
3 - Departmental Humanities Requirement6,7
3 - Minor Requirement
3 - Social Science Requirement2,6
15

Second Semester
1 - CP SC 491 Seminar in Professional Issues II3
3 - Computer Science Requirement4
3 - Fine Arts Requirement3
3 - Minor Requirement
5 - Elective
15
122 Total Semester Hours

Notes:
1. For graduation, a candidate for the BS degree in Computer Science must have earned a grade of C or better in each CP SC course applied to the degree.
2. A grade of C or better must be earned in all prerequisite courses (including CP SC and MTHSC courses) before enrolling in the next CP SC course.

GEOLOGY

Bachelor of Science

Geology involves the physics and chemistry of materials which comprise the earth, but equally important, it considers the development of life on earth. Fundamentally, the chemical, physical, and biological responses to environments on and in the earth must be thoroughly understood so that the historical development of the earth can be deduced, predictions of the future inferred, and natural resources intelligently developed. Industry depends on minerals and rocks; metals have their origin in them as do our chief power sources: coal, petroleum, and radioactive minerals.

Employment opportunities for geologists include such far-reaching fields as mineral-producing industries, railroads, municipalities, engineering firms, and water authorities. It is important, therefore, that a geology education rest on a broad yet rigorous base.
Students pursuing a Bachelor of Science degree in Geology have three concentrations from which to choose. The “traditional” curriculum provides the fundamentals of geology and excellent support in the other basic sciences. Graduates are prepared for employment or for graduate study in any field of geology. The Environmental Science Concentration prepares students for careers in the environmental consulting industry or graduate school in environmental fields. Students in this concentration take 15 credits of Environmental Science Requirement, including at least nine credits from one of three subdisciplines: geology, soil science, biology, ecology, or chemistry/physics. The Hydrogeology Concentration may be taken by students interested in applying engineering principles to geologic problems. Engineering geologists are increasingly called upon to perform geologic site evaluations for construction projects and to minimize the threat of geologic hazards. The curriculum involves courses in engineering and soil mechanics plus 15 credits of Engineering Geology Requirement selected from courses in civil, environmental, and biosystems engineering or advanced mathematics.

### Freshman Year

**First Semester**
- 4 - CH 101 General Chemistry
- 3 - ENGL 103 Accelerated Composition
- 3 - GEOL 101 Physical Geology
- 1 - GEOL 103 Physical Geology Lab.
- 4 - MTHSC 106 Calculus of One Variable I

**Second Semester**
- 4 - CH 102 General Chemistry
- 4 - GEOL 102 Earth History
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - Arts and Humanities (Non-Lit.) Requirement

### Sophomore Year

**First Semester**
- 4 - BIOL 103 General Biology I
- 4 - GEOL 206 Mineralogy and Intro. Petrology
- 4 - GEOL 211 Geoanalysis I
- 1 - GEOL 291 Introduction to Research I
- 3 - Social Science Requirement

**Second Semester**
- 4 - CSENV 202 Soils
- 4 - GEOL 212 Geoanalysis II
- 2 - GEOL 216 Petrography
- 1 - GEOL 292 Introduction to Research II
- 3 - PHYS 122 Physics with Calculus I

### Junior Year

**First Semester**
- 3 - EN SP 200 Intro. to Environmental Science
- 4 - GEOL 302 Structural Geology
- 3 - GEOL 316 Igneous and Metamorphic Petrology
- 1 - GEOL 391 Research Methods I
- 3 - Arts and Humanities (Literature) Requirement

**Second Semester**
- 3 - GEOL 300 Environmental Geology
- 4 - GEOL 313 Sedimentology and Stratigraphy
- 1 - GEOL 392 Research Methods II
- 3 - Geology Requirement
- 3 - Social Science Requirement
- 2 - Elective

### Summer
- 6 - Summer Geology Field Course

### Senior Year

**First Semester**
- 4 - GEOL 405 Surficial Geology
- 3 - GEOL 408 Geohydrology
- 4 - GEOL 491 Research Synthesis I
- 2 - Elective

**Second Semester**
- 4 - GEOL 409 Subsurface Methods
- 4 - GEOL 492 Research Synthesis II
- 3 - Geology Requirement
- 1 - Elective

<table>
<thead>
<tr>
<th>Total Semester Hours</th>
<th>121</th>
</tr>
</thead>
</table>

### ENVIRONMENTAL SCIENCE CONCENTRATION

#### Freshman Year

**First Semester**
- 4 - CH 101 General Chemistry
- 3 - ENGL 103 Accelerated Composition
- 3 - GEOL 101 Physical Geology
- 1 - GEOL 103 Physical Geology Lab.
- 4 - MTHSC 106 Calculus of One Variable I

**Second Semester**
- 4 - CH 102 General Chemistry
- 4 - GEOL 102 Earth History
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - Arts and Humanities (Non-Lit.) Requirement

<table>
<thead>
<tr>
<th>Total Semester Hours</th>
<th>122</th>
</tr>
</thead>
</table>

### Second Semester

- 3 - CH 223 Organic Chemistry or
- 3 - CH 413 Chemistry of Aqueous Systems
- 4 - GEOL 492 Research Synthesis II
- 6 - Environmental Science Requirement

### Summer

- 3 - Field Experience

### HYDROGEOLOGY CONCENTRATION

#### Freshman Year

**First Semester**
- 4 - BIOL 104 General Biology II
- 4 - GEOL 212 Geoanalysis II
- 1 - GEOL 292 Introduction to Research II
- 3 - GEOL 300 Environmental Geology
- 3 - PHYS 122 Physics with Calculus I

**Second Semester**
- 4 - GEOL 405 Surficial Geology
- 3 - GEOL 408 Geohydrology
- 4 - GEOL 491 Research Synthesis I
- 2 - Elective

<table>
<thead>
<tr>
<th>Total Semester Hours</th>
<th>121</th>
</tr>
</thead>
</table>

### Junior Year

**First Semester**
- 3 - EN SP 200 Intro. to Environmental Science
- 1 - GEOL 391 Research Methods I
- 9 - Environmental Science Requirement
- 3 - Social Science Requirement

**Second Semester**
- 3 - GEOL 318 Introduction to Geochemistry
- 1 - GEOL 392 Research Methods II
- 9 - Environmental Science Requirement
- 3 - Social Science Requirement

| Total Semester Hours | 16 |

### Summer

- 3 - Field Experience

### Senior Year

**First Semester**
- 3 - EN SP 400 Studies in Environmental Science
- 3 - GEOL 408 Geohydrology
- 4 - GEOL 491 Research Synthesis I
- 3 - Environmental Science Requirement

| Total Semester Hours | 13 |

### Second Semester

- 3 - CH 223 Organic Chemistry or
- 3 - CH 413 Chemistry of Aqueous Systems
- 4 - GEOL 492 Research Synthesis II
- 6 - Environmental Science Requirement

| Total Semester Hours | 13 |

### Summer

- 3 - Field Experience
Sophomore Year
First Semester
4 - GEOL 206 Mineralogy and Intro. Petrology
4 - GEOL 211 Geoanalysis II
1 - GEOL 291 Introduction to Research I
3 - Arts and Humanities (Literature) Requirement¹
3 - Technical Requirement¹
15

Second Semester
4 - GEOL 212 Geoanalysis II²
1 - GEOL 292 Introduction to Research II
3 - GEOL 300 Environmental Geology
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
3 - Social Science Requirement¹
15

Junior Year
First Semester
4 - GEOL 302 Structural Geology
1 - GEOL 391 Research Methods I
3 - GEOL 408 Geohydrology
3 - PHYS 221 Physics with Calculus II
3 - Geology Requirement⁴
14

Second Semester
4 - GEOL 313 Sedimentology and Stratigraphy
3 - GEOL 318 Introduction to Geochemistry
1 - GEOL 392 Research Methods II
3 - Social Science Requirement¹
3 - Technical Requirement¹
14

Summer
6 - GEOL 475 Summer Geology Field Camp

Senior Year
First Semester
3 - GEOL 421 GIS Applications in Geology
4 - GEOL 491 Research Synthesis I
3 - Technical Requirement¹
13

Second Semester
3 - EE&S 401 Environmental Engineering
4 - GEOL 409 Subsurface Methods
4 - GEOL 492 Research Synthesis II
3 - Technical Requirement¹
14

121 Total Semester Hours
¹See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Re-
rquirement.
²MTHSC 206 and 208 or 301 or EX ST 101 substitute.
³Select from department-approved list.
⁴Any 300- or 400-level geology course

GEOL
Bachelor of Arts
Freshman Year
First Semester
4 - CH 101 General Chemistry
3 - ENGL 103 Accelerated Composition
3 - GEOL 101 Physical Geology
1 - GEOL 103 Physical Geology Lab.
3 - Mathematics Requirement¹
14

Second Semester
4 - CH 102 General Chemistry
3 - GEOG 103 World Regional Geography
4 - GEOL 102 Earth History
3 - Mathematics Requirement¹
2 - Elective
16

Sophomore Year
First Semester
4 - BIOL 103 General Biology
4 - GEOL 206 Mineralogy and Intro. Petrology
1 - GEOL 291 Introduction to Research I
3 - Arts and Humanities (Non-Lit.) Requirement¹
4 - Foreign Language Requirement¹
16

Second Semester
4 - BIOL 104 General Biology II
1 - GEOL 292 Introduction to Research II
3 - GEOL 300 Environmental Geology
4 - Foreign Language Requirement¹
3 - Minor Requirement¹
15

Junior Year
First Semester
1 - GEOL 391 Research Methods I
3 - Foreign Language Requirement¹
3 - Geology Requirement¹
3 - Minor Requirement¹
16

Second Semester
1 - GEOL 392 Research Methods II
3 - Foreign Language Requirement¹
3 - Geology Requirement¹
3 - Minor Requirement¹
3 - Social Science Requirement¹
6 - Elective
16

Senior Year
First Semester
4 - GEOL 491 Research Synthesis I
3 - Arts and Humanities (Literature) Requirement¹
3 - Minor Requirement¹
3 - Elective
13

Second Semester
4 - GEOL 492 Research Synthesis II
3 - Minor Requirement¹
3 - Technical Requirement¹
6 - Elective
16

122 Total Semester Hours
¹MTHSC 106 and 108 are recommended; however, MTHSC 101 and 102 or MTHSC 102 and 203 may be substituted.
²See General Education Requirements.
³Spanish is recommended. Two years (through 202) in the same foreign language are required.
⁴Any 300- or 400-level geology course

MATH
MATHEMATICAL
SCIENCES
Bachelor of Science
The Mathematical Sciences curriculum is designed to be versatile. Students gain a broad knowledge of mathematical concepts and methods that are applicable in sciences, engineering, business, industry, and other professions desiring a strong mathematical background. In addition to the basic courses which provide necessary mathematical skills, the curriculum allows students to select an emphasis area or concentration, providing an introduction to a specific area where mathematics is applied. These are Applied and Computational Mathematics, Biology, Computer Science, Operations Research/Management Science, and Statistics. All mathematical sciences majors are required to complete a capstone experience which provides an opportunity to pursue research, independent study, or an approved internship under the direction of a faculty member or the opportunity to study mathematical models in some area of the mathematical sciences. The capstone experience requires a written report (thesis, computer code, project description, intern experience, etc.) and an oral or poster presentation by each student.

Combined Bachelor's/Master's Plan
Under this plan, students may reduce the time necessary to earn both degrees by applying graduate credits to both undergraduate and graduate program requirements. Students are encouraged to obtain the specific requirements for the dual degree from the Department of Mathematical Sciences (www.math.clemson.edu) as early as possible in their undergraduate program. Enrollment guidelines and procedures can be found under Academic Regulations in this catalog.

Freshman Year
First Semester
3 - ECON 211 Principles of Microeconomics
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
1 - Elective
14
Second Semester
- MTHSC 108 Calculus of One Variable II
- PHYS 122 Physics with Calculus I
- Computer Science Requirement
- Social Science Requirement
- 15 Total Semester Hours

Sophomore Year
First Semester
- MTHSC 206 Calculus of Several Variables
- MTHSC 250 Intro. to Mathematical Sciences
- MTHSC 360 Intermediate Math. Computing
- Arts and Humanities (Literature) Requirement
- Natural Science Requirement
- 17 Total Semester Hours

Junior Year
First Semester
- ENGL 314 Technical Writing
- MTHSC 400 Theory of Probability
- MTHSC 440 Linear Programming
- Science and Technology in Society Requirements.
- 15 Total Semester Hours

Senior Year
First Semester
- MTHSC 453 Advanced Calculus I
- Capstone
- Emphasis Area
- Science and Tech. in Society Requirement
- Elective
- 15 Total Semester Hours

Second Semester
- MTHSC 454 Advanced Calculus II
- MTHSC 492 Professional Development
- Capstone
- Emphasis Area
- Elective
- 15 Total Semester Hours

122 Total Semester Hours

1Three credits in any foreign language or American Sign Language numbered 102 or above
2See General Education Requirements. Three of these credit hours must also satisfy the General Education Cross-Cultural Awareness Requirement.
3A two-semester sequence selected from BIOL 103 and 104; CH 101 and 102; PHYS 221/223 and 222/224; GEOL 101/103 and 102

EMPHASIS AREAS
Applied and Computational Mathematics
- MTHSC 434 Advanced Engineering Math.
- MTHSC 460 Intro. to Numerical Analysis I
- Applications Area

Computer Science
- CP SC 215 Tools and Tech. for Software Dev.
- Computer Science 300-level Requirement

Operations Research/Management Science
- IE 482 Systems Modeling
- IE 384 Engineering Economic Analysis
- MGT 402 Operations Planning and Control
- MTHSC 407 Regress. and Time-Ser. Analysis
- MTHSC 441 Intro. to Stochastic Models

Statistics
- MTHSC 403 Intro. to Statistical Theory
- MTHSC 405 Statistical Theory and Meth. II
- MTHSC 406 Sampling Theory and Methods
- MTHSC 407 Regress. and Time-Ser. Analysis

1Select from 300-level or higher CP SC courses.

BIOL SC 302, 303, 304, or 305

BIOLOGY CONCENTRATION

Freshman Year
First Semester
- BIOL 110 Principles of Biology I
- ENGL 103 Accelerated Composition
- MTHSC 108 Calculus of One Variable I
- Foreign Language Requirement
- 15 Total Semester Hours

Second Semester
- BIOL 111 Principles of Biology II
- MTHSC 108 Calculus of One Variable II
- Computer Science Requirement
- 15 Total Semester Hours

1Three credits in any foreign language or American Sign Language numbered 102 or above
2See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.
3Any 400-level MTHSC course approved by advisor
4May be satisfied by (1) completion of six credits of MTHSC 482 or H482; (2) completion of six credits of MTHSC 491 or an approved substitution; or (3) completion of three credits of MTHSC 450 and three credits of an additional course approved by the advisor.

Sophomore Year
First Semester
- CH 101 General Chemistry
- ECON 200 Economic Concepts or
- ECON 211 Principles of Microeconomics
- MTHSC 206 Calculus of Several Variables
- MTHSC 250 Intro. to Mathematical Sciences
- PHYS 207 General Physics I
- PHYS 209 General Physics I Lab.
- 16 Total Semester Hours

Second Semester
- CH 102 General Chemistry
- MTHSC 208 Intro. to Ordinary Diff. Equations
- MTHSC 311 Linear Algebra
- PHYS 208 General Physics II
- PHYS 210 General Physics II Lab.
- 15 Total Semester Hours

Junior Year
First Semester
- CH 223 Organic Chemistry
- CH 227 Organic Chemistry Lab.
- ENGL 314 Technical Writing
- MTHSC 360 Intermediate Math. Computing
- MTHSC 440 Linear Programming
- Arts and Humanities (Literature) Requirement
- 16 Total Semester Hours

Second Semester
- CH 224 Organic Chemistry
- CH 228 Organic Chemistry Lab.
- COMM 250 Public Speaking
- MTHSC 302 Statistics for Science and Engr.
- Arts and Humanities (Non-Lit.) Requirement
- Math Science Requirement
- 16 Total Semester Hours

Senior Year
First Semester
- MTHSC 400 Theory of Probability
- MTHSC 453 Advanced Calculus I or
- MTHSC 463 Mathematical Analysis I or
- Animal or Plant Diversity Requirement
- Capstone Experience
- Social Science Requirement
- 15 Total Semester Hours

Second Semester
- MTHSC 412 Introduction to Modern Algebra
- MTHSC 454 Advanced Calculus II
- Biological Sciences Requirement
- Capstone Experience
- 13 Total Semester Hours

121 Total Semester Hours

College of Engineering and Science
Mathematical Sciences

Bachelor of Arts

Freshman Year
First Semester
3 - ECON 200 Economic Concepts or
3 - ECON 211 Principles of Microeconomics
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Foreign Language Requirement\(^1\)
1 - Elective
14
Second Semester
4 - MTHSC 108 Calculus of One Variable II
3 - Computer Science Requirement\(^2\)
3 - Foreign Language Requirement\(^1\)
3 - Social Science Requirement\(^3\)
16

Sophomore Year
First Semester
4 - MTHSC 206 Calculus of Several Variables
1 - MTHSC 250 Intro. to Mathematical Sciences
3 - MTHSC 360 Interned. Math. Computing or
3 - EDSEC 437 Technology in Sec. Math.
3 - Arts and Humanities (Literature) Requirement\(^1\)
3 - Elective
14
Second Semester
4 - MTHSC 208 Intro. to Ordinary Diff. Equations
3 - MTHSC 302 Statistics for Science and Engr.
3 - MTHSC 311 Linear Algebra
3 - Arts and Humanities (Non-Lit.) Requirement\(^1\)
3 - Minor Requirement\(^4\) or
3 - Second Major Requirement
16

Junior Year
First Semester
3 - ENGL 314 Technical Writing
3 - MTHSC 453 Advanced Calculus I
3 - Arts and Humanities Requirement\(^6\) or
3 - Education Requirement\(^6\)
3 - Capstone Experience\(^7\)
3 - Minor Requirement\(^4\) or
3 - Second Major Requirement
3 - Science and Tech. in Society Requirement\(^1\)
15
Second Semester
1 - MTHSC 492 Professional Development
3 - Capstone Experience\(^7\)
3 - Math Science Requirement\(^5\)
6 - Minor Requirement\(^4\) or
6 - Second Major Requirement
2 - Elective
15
122 Total Semester Hours

Notes:
1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required MTHSC courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.
3. May be satisfied by (1) completion of six credits of MTHSC 482 or H482; (2) completion of six credits of MTHSC 491 or an approved substitution; (3) completion of three credits of MTHSC 450 and three credits of an additional course approved by advisor; or (4) EDSEC 446 for students seeking a double major in Secondary Education–Mathematics.

Physics

Bachelor of Science

Physics, the most fundamental of the natural sciences, forms the basis of study upon which the other branches of science are founded. Physics is concerned with the fundamental behavior of matter and energy. Classical physics encompasses the fields of mechanics, heat and thermodynamics, electricity and magnetism, acoustics and optics. Modern physics is concerned with the study of atoms and molecules, atomic nuclei, elementary particles and the properties of liquids, crystalline solids, and other materials, as well as the areas of relativity, cosmology, and the large-scale structure of the universe.

The undergraduate Physics curricula provide students with a strong background in the classical areas of physics as well as an introduction into the more important aspects of modern physics. The BS curriculum is directed toward preparing students for graduate study ultimately leading to the PhD degree or toward research and development work in industrial or governmental laboratories. It also provides a good background for graduate study or industrial work in many areas or engineering physics and applied science.

Senior Year
First Semester
3 - MTHSC 453 Advanced Calculus I
3 - Arts and Humanities Requirement\(^6\) or
3 - Education Requirement\(^6\)
3 - Capstone Experience\(^7\)
3 - Minor Requirement\(^4\) or
3 - Second Major Requirement
3 - Science and Tech. in Society Requirement\(^1\)
15
Second Semester
1 - MTHSC 492 Professional Development
3 - Capstone Experience\(^7\)
3 - Math Science Requirement\(^5\)
6 - Minor Requirement\(^4\) or
6 - Second Major Requirement
2 - Elective
15
122 Total Semester Hours

Freshman Year
First Semester
3 - ASTR 105 Physics of the Universe
4 - CH 101 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
1 - PHYS 101 Current Topics in Modern Physics
15
Second Semester
4 - CH 102 General Chemistry
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
3 - Arts and Humanities (Non-Lit.) Requirement\(^1\)
15
Sophomore Year
First Semester
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
4 - Foreign Language Requirement\(^2\)
3 - Oral Communication Requirement\(^1\)
15
Second Semester
4 - MTHSC 208 Intro. to Ordinary Diff. Equations
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
4 - Foreign Language Requirement\(^2\)
3 - Social Science Requirement\(^3\)
15
Junior Year
First Semester
3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
3 - PHYS 321 Mechanics I
3 - PHYS 325 Experimental Physics I
3 - Advanced Writing Requirement\(^1\)
3 - Emphasis Area\(^6\)
15
Second Semester
1 - PHYS 300 Introduction to Research
3 - PHYS 312 Methods of Theoretical Physics II
3 - PHYS 322 Mechanics II
3 - PHYS 326 Experimental Physics II
1 - PHYS 356 Modern Physics Overview
3 - PHYS 441 Electromagnetics I
3 - Emphasis Area\(^6\)
17
Senior Year
First Semester
3 - PHYS 401 Senior Thesis
3 - PHYS 442 Electromagnetics II
3 - PHYS 455 Quantum Physics I
3 - Emphasis Area\(^6\)
3 - Science Requirement\(^7\)
15
Second Semester
1 - HIST 172 or 173 Western Civilization
3 - PHYS 456 Quantum Physics II
3 - Arts and Humanities (Literature) Requirement\(^6\)
3 - Emphasis Area\(^6\)
15
122 Total Semester Hours
See General Education Requirements.

Two semesters (through 102) in the same modern foreign language are required.

See General Education Requirements. This course must also satisfy the Science and Technology in Society Requirement.

Select from department-approved list of courses in astronomy, chemistry, computer science, engineering, environmental engineering, geology, mathematical sciences, and physics. Twelve credit hours in one of these areas, with at least six at the 300–400 level, are required. Note: Requirements for a minor in one of these areas might be satisfied with three additional credits at the 300–400 level.

Any 200–400-level science course

Select any ENGL course from General Education Arts and Humanities (Literature) Requirement.

BIOPHYSICS

CONCENTRATION

The Biophysics Concentration offers an excellent preparation for medical school or graduate work in biological sciences. It includes the flexibility of selecting courses in chemistry, biological sciences, physics, and mathematics. This concentration also provides the necessary background for employment in industry, manufacturing, and instrumentation for clinical or molecular biology applications.

See Bachelor of Science curriculum for freshman year requirements.

Sophomore Year

First Semester
5 - BIOL 110 Principles of Biology
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
3 - Oral Communication Requirement①

Second Semester
4 - MTHSC 208 Intro. to Ordinary Diff. Equations
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
4 - Biophysics Requirement②
3 - Social Science Requirement③

15

Second Semester Hours

Senior Year

First Semester
3 - PHYS 442 Electromagnetics II
3 - PHYS 455 Quantum Physics I
3 - Advanced Writing Requirement④
3 - Biophysics Requirement②
3 - Science Requirement⑤

Second Semester
3 - HIST 172 or 173 Western Civilization
3 - PHYS 456 Quantum Physics II
3 - PHYS 465 Thermodynamics and Statistical Mechanics
3 - Arts and Humanities (Literature) Requirement⑥
3 - Biophysics Requirement②

125 Total Semester Hours

PHYSICS

Bachelor of Arts

The BA in Physics program is ideal for students interested in acquiring a broad-based liberal education that includes a strong and solid understanding of either science or a broad exposure to engineering with a strong physics foundation.

Freshman Year

First Semester
3 - ASTR 105 Physics of the Universe
4 - CH 101 General Chemistry
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
1 - PHYS 101 Current Topics in Modern Physics

Second Semester
4 - CH 102 General Chemistry
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
1 - PHYS 124 Physics Lab. I
3 - Arts and Humanities (Non-Lit.) Requirement⑦

15

122 Total Semester Hours

Second Semester
4 - MTHSC 208 Intro. to Ord. Diff. Equations
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
4 - Foreign Language Requirement⑧
3 - Social Science Requirement⑨

15

Junior Year

First Semester
3 - PHYS 431 Intro. to Meth. of Theoretical Phys.
3 - PHYS 455 Quantum Physics I
3 - Advanced Writing Requirement④
6 - Minor Requirement⑩
3 - Physics Requirement④

Second Semester
3 - PHYS 441 Electromagnetics I
3 - PHYS 456 Quantum Physics II
3 - Foreign Language Requirement④
3 - Minor Requirement④

17

Senior Year

First Semester
3 - PHYS 431 Intro. to Meth. of Theoretical Phys.
3 - PHYS 455 Quantum Physics I
3 - Advanced Writing Requirement④
6 - Minor Requirement⑩
3 - Physics Requirement④

Second Semester
3 - HIST 172 or 173 Western Civilization
3 - Arts and Humanities (Literature) Requirement⑥
3 - Minor Requirement④
3 - Physics Requirement④
3 - Elective

15

See General Education Requirements.

Four semesters (through 202) in the same modern foreign language are required.

See General Education Requirements. This course must also satisfy the Science and Technology in Society Requirement.

See advisor.

Any 300- or 400-level physics course

Select any ENGL course from General Education Arts and Humanities (Literature) Requirement.

POLYMER AND TEXTILE CHEMISTRY AND TEXTILE MANAGEMENT

The School of Materials Science and Engineering offers undergraduate degrees in Ceramic and Materials Engineering, Polymer and Textile Chemistry, and Textile Management.

The Bachelor of Science degree in Polymer and Textile Chemistry is based on a foundation of core physical and mathematical science courses. From this base, students are taught, using classroom instruction, laboratory courses, and individual research, to apply their scientific knowledge to...
the solution of problems in polymeric and fiber-based materials for diverse applications ranging from biomedical and sports to construction and communication. There are two emphasis areas in Polymer and Textile Chemistry; both allow students to prepare for graduate work in a number of science and engineering disciplines.

Textiles students study the production, structure, and properties of natural and man-made fibers; the processes for converting these fibers into textile structures; the science of coloring agents and finishes to improve the desirability and serviceability of the product; and the methods for evaluating the performance of textile materials.

Graduates in Polymer and Textile Chemistry and Textile Management hold jobs in corporate and personnel management, manufacturing management, design, research, development, technical service, quality control, and sales. They create new products and processes and solve problems. They create styles, patterns, textures, and colors for apparel, home, industry, and special applications. Their jobs utilize computers, automation, and product quality and are concerned with plant design, environmental control, and consumer safety.

**POLYMER AND TEXTILE CHEMISTRY**

**Bachelor of Science**

**Freshman Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
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<tbody>
<tr>
<td>3 - CH 101 General Chemistry</td>
<td>3 - MTHSC 108 Calculus of One Variable I</td>
</tr>
<tr>
<td>3 - ENGL 103 Accelerated Composition</td>
<td>3 - PHYS 122 Physics with Calculus I</td>
</tr>
<tr>
<td>4 - MTHSC 106 Calculus of One Variable I</td>
<td>1 - PHYS 124 Physics Lab. I</td>
</tr>
<tr>
<td>3 - TEXT 175 Intro. to Textile Manufacturing</td>
<td>3 - Arts and Humanities Requirement* or 3 - Social Science Requirement*</td>
</tr>
<tr>
<td>1 - Elective</td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second Semester</th>
<th>First Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - CH 102 General Chemistry</td>
<td>3 - CH 457 Dyeing and Finishing I</td>
</tr>
<tr>
<td>4 - MTHSC 108 Calculus of One Variable II</td>
<td>1 - PFC 459 Dyeing and Finishing I Lab.</td>
</tr>
<tr>
<td>3 - PHYS 122 Physics with Calculus I</td>
<td>3 - TEXT 422 Properties of Textile Structures</td>
</tr>
<tr>
<td>1 - PHYS 124 Physics Lab. I</td>
<td>5 - Approved Requirement*</td>
</tr>
<tr>
<td>3 - Arts and Humanities Requirement* or 3 - Social Science Requirement*</td>
<td>3 - Departmental Requirement*</td>
</tr>
<tr>
<td>15</td>
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</table>

**Sophomore Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - CH 223 Organic Chemistry</td>
<td>2 - MS&amp;E 450 Materials Sci. and Engr. Portfolio</td>
</tr>
<tr>
<td>1 - CH 227 Organic Chemistry Lab.</td>
<td>3 - PFC 458 Dyeing and Finishing II</td>
</tr>
<tr>
<td>4 - MTHSC 206 Calculus of Several Variables</td>
<td>1 - PFC 460 Dyeing and Finishing II Lab.</td>
</tr>
<tr>
<td>3 - PHYS 221 Physics with Calculus II</td>
<td>3 - TEXT 429 Textile Research</td>
</tr>
<tr>
<td>1 - PHYS 223 Physics Lab. II</td>
<td>12</td>
</tr>
<tr>
<td>4 - TEXT 201 Yarn Structures and Formation</td>
<td>120 Total Semester Hours</td>
</tr>
</tbody>
</table>

*See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

**Junior Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
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</thead>
<tbody>
<tr>
<td>3 - CH 331 Physical Chemistry</td>
<td>3 - PHYS 223 Physics Lab. II</td>
</tr>
<tr>
<td>3 - ENGL 314 Technical Writing</td>
<td>3 - PHYS 221 Physics with Calculus II</td>
</tr>
<tr>
<td>3 - PFC 415 Intro. to Polymer Science and Engr.</td>
<td>3 - TEXT 201 Yarn Structures and Formation</td>
</tr>
<tr>
<td>1 - PFC 417 Polymer and Fiber Lab.</td>
<td>3 - Arts and Humanities Requirement* or 3 - Social Science Requirement*</td>
</tr>
<tr>
<td>6 - Social Science Requirement**</td>
<td>3 - PSYCH 201 Introduction to Psychology</td>
</tr>
<tr>
<td>6</td>
<td>4 - TEXT 201 Yarn Structures and Formation</td>
</tr>
<tr>
<td>16</td>
<td></td>
</tr>
</tbody>
</table>

**Senior Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - PFC 457 Dyeing and Finishing I</td>
<td>3 - PFC 415 Intro. to Polymer Science and Engr.</td>
</tr>
<tr>
<td>1 - PFC 459 Dyeing and Finishing I Lab.</td>
<td>2 - MS&amp;E 450 Materials Sci. and Engr. Portfolio</td>
</tr>
<tr>
<td>3 - TEXT 422 Properties of Textile Structures</td>
<td>3 - PFC 460 Dyeing and Finishing II Lab.</td>
</tr>
<tr>
<td>5 - Approved Requirement*</td>
<td>3 - TEXT 429 Textile Research</td>
</tr>
<tr>
<td>3 - Departmental Requirement*</td>
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</tr>
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</table>

**TEXTILE MANAGEMENT**

**Bachelor of Science**

**Freshman Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - CH 101 General Chemistry</td>
<td>2 - MS&amp;E 450 Materials Sci. and Engr. Portfolio</td>
</tr>
<tr>
<td>3 - CH 105 Begin. Gen. and Organic Chem.</td>
<td>3 - PFC 458 Dyeing and Finishing II</td>
</tr>
<tr>
<td>3 - ENGL 103 Accelerated Composition</td>
<td>1 - PFC 460 Dyeing and Finishing II Lab.</td>
</tr>
<tr>
<td>3 - MTHSC 102 Intro. to Mathematical Analysis</td>
<td>3 - TEXT 175 Intro. to Textile Manufacturing</td>
</tr>
<tr>
<td>3 - TEXT 175 Intro. to Textile Manufacturing</td>
<td>3 - Arts and Humanities Requirement* or 3 - Social Science Requirement*</td>
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<td>1 - Elective</td>
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**Sophomore Year**

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<thead>
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<tr>
<td>1 - CH 227 Organic Chemistry Lab.</td>
<td>3 - PFC 458 Dyeing and Finishing II</td>
</tr>
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<td>1 - PFC 460 Dyeing and Finishing II Lab.</td>
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<td>3 - TEXT 429 Textile Research</td>
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<tr>
<td>1 - PHYS 223 Physics Lab. II</td>
<td>3 - Arts and Humanities Requirement* or 3 - Social Science Requirement*</td>
</tr>
<tr>
<td>4 - TEXT 201 Yarn Structures and Formation</td>
<td>3 - MGT 307 Personnel Management</td>
</tr>
<tr>
<td>16</td>
<td></td>
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</tbody>
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**Junior Year**

<table>
<thead>
<tr>
<th>First Semester</th>
<th>Second Semester</th>
</tr>
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<tbody>
<tr>
<td>3 - TEXT 470 Text. Cost. and Inventory Control</td>
<td>3 - EMGT 200 Economic Concepts</td>
</tr>
<tr>
<td>6 - Concentration*</td>
<td>3 - Emphasis Area*</td>
</tr>
<tr>
<td>3 - Arts and Humanities Requirement*</td>
<td>3 - Social Science Requirement*</td>
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**Senior Year**

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<td>3 - Social Science Requirement*</td>
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**Note:**

1. See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.

2. See advisor.
MINORS

Following are minors acceptable for students in the College of Engineering and Science. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting
Adult/Extension Education
Aerospace Studies
Agricultural Business Management
Agricultural Mechanization and Business
American Sign Language Studies
Animal and Veterinary Sciences
Anthropology
Athletic Leadership
Biochemistry
Bioengineering
Biological Sciences
Business Administration
Chemistry
Cluster
Communication Studies
Communications
Community Recreation Management
Computer Science—not open to Computer Information Systems majors
Crop and Soil Environmental Science
East Asian Studies
Economics
Education
English
Entomology
Entrepreneurship
Environmental Engineering
Environmental Science and Policy
Equine Business
Film Studies
Financial Management
Fine Arts
Food Science
Forest Products
Forest Resource Management
Genetics
Geography
Geology
Global Politics
Great Works
Health Science
History
Horticulture
Human Resource Management
International Engineering and Science
Legal Studies
Management
Mathematical Sciences
Microbiology
Military Leadership
Modern Languages
Music
Natural Resource Economics
Nonprofit Leadership
Operations Management
Packaging Science
Pan African Studies
Park and Protected Area Management
Philosophy
Physics
Plant Pathology
Political Science
Poultry Science
Psychology
Public Policy
Religion
Russian Area Studies
Science and Technology in Society
Screenwriting
Sociology
Spanish-American Area Studies
Sport Management
Textiles—not open to Polymer and Textile Chemistry or Textile Management majors
Theatre
Therapeutic Recreation
Travel and Tourism
Turfgrass
Urban Forestry
Wildlife and Fisheries Biology
Women’s Studies
Writing

See pages 36–39 for details.