All engineering programs have the common goal of producing engineering graduates who are able to:

- apply knowledge of math, science, and engineering
- identify, formulate, and solve engineering problems
- design and conduct experiments and analyze data
- design systems or components to meet needs within realistic constraints
- function on multidisciplinary teams
- communicate effectively
- conduct themselves professionally and ethically
- understand engineering’s global, economic, environmental, and societal context
- understand contemporary engineering issues
- apply modern engineering methods and tools
- appreciate the need for lifelong learning

Each engineering program has 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 programs:

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 pursue their major concentrations of study within realistic constraints.

Freshman Curriculum
First Semester
1 - ENGR 1070 Programming and Problem Solving I
1 - ENGR 1080 Programming and Problem Solving II
1 - ENGR 1090 Programming and Problem Solving Applications
1 - MATH 1060 Calculus of One Variable I
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I

Second Semester
1 - ENGR 1070 Programming and Problem Solving I
1 - ENGR 1080 Programming and Problem Solving II
1 - ENGR 1090 Programming and Problem Solving Applications
4 - MATH 1060 Calculus of One Variable I
3 - PHYS 1220 Physics with Calculus II
3 - ENGL 1030 Accelerated Composition
3 - PHYS 1210 Physics with Calculus I
4 - CH 1010 General Chemistry
4 - ENGL 1030 Accelerated Composition
1 - PHYS 1210 Physics with Calculus I

General Education Requirements for Engineering Curricula
Engineers have an obligation to practice their profession in a socially responsible manner. The education of engineers must prepare them for this responsibility and make them aware of the constraints imposed by societal and cultural factors. Thus, the humanities and social sciences are an important component of the engineering curriculum. Further, the program of study must include educational experiences addressing the intersection of science and technology with society and cross-cultural awareness.

In addition to the University General Education Requirements, some engineering majors are required to complete additional credit hours from a college approved list. Individual engineering curricula may have more specific requirements. For a complete list of acceptable courses, please speak with an advisor.

Minors
Engineering science students can complement their majors by selecting minor concentrations of study. Available minors include International Engineering and Science, and one in each of the science majors (see page 112).

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. A Certificate in International Engineering and Science, that combines language study and an international practicum, is also offered. Information is available in the Undergraduate Studies Office (107 Riggs Hall) and at www.clemson.edu/ces/students/global.

ENGINEERING PROGRAMS
The Bachelor of Science engineering degree programs in Bioengineering, Biosystems Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, Materials Science and Engineering (Inorganic Materials), and Mechanical Engineering are each accredited by the Engineering Accreditation Commission (EAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: (410) 347-7700. The new BS degree programs in Environmental Engineering and Materials Science and Engineering (Polymeric Materials) are designed to meet ABET requirements and will be submitted to ABET for accreditation review when eligible.

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Electives for Engineering Curricula
Advisors must approve any course taken for elective credit in the Engineering curricula. Courses excluded for elective credit include PHYS 2000, 2070/2090, 2080/2100.

Registration Requirements
A cumulative grade-point average of 2.0 or higher is required for registration in engineering courses numbered 3000 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 average in all engineering courses taken at Clemson. All courses with “Engineering” in the course designator (e.g., ENGR 1300, ME 4530, 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: Biomedical Concentration or Biomaterials 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 ability 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 systems.

Combined Bachelor’s/Master’s Plan
Bioengineering undergraduates may begin a Master of Science degree program while completing the Bachelor of Science degree and use a limited number of courses to satisfy the requirements of both the undergraduate and graduate degrees. Details are available from the Department of Bioengineering.

BIOELECTRICAL CONCENTRATION
Freshman Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
1 - ENGR 1050 Engineering Disciplines and Skills I
1 - ENGR 1060 Engineering Disciplines and Skills II
4 - MATH 1060 Calculus of One Variable I
3 - Arts and Humanities Requirement or Social Science Requirement
1 - Biology Requirement
16
Second Semester
4 - CH 1020 General Chemistry
1 - ENGR 1070 Programming and Problem Solving I
1 - ENGR 1080 Programming and Problem Solving II
1 - ENGR 1090 Programming and Problem Solving Applications
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
3 - Arts and Humanities Requirement or Social Science Requirement
1 - Biology Requirement
16
Second Semester
4 - CH 1020 General Chemistry
1 - ENGR 1070 Programming and Problem Solving I
1 - ENGR 1080 Programming and Problem Solving II
1 - ENGR 1090 Programming and Problem Solving Applications
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
3 - Arts and Humanities Requirement or Social Science Requirement
1 - Biology Requirement
16
Sophomore Year
First Semester
3 - BIOE 2010 Intro. to Biomedical Engineering
2 - ECE 2160 Logic and Computing Devices
3 - ECE 2020 Electric Circuits I
1 - ECE 2090 Logic and Computing Devices Lab.
1 - ECE 2110 Electrical Engineering Lab. I
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II
17
Second Semester
3 - CE 2010 Statics
1 - ECE 2120 Electrical Engineering Lab. II
3 - ECE 2620 Electric Circuits II
2 - ENGR 2080 Engineering Graphics and Machine Design
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - MSE 2100 Introduction to Materials Science
16
Junior Year
First Semester
4 - BIOL 3150 Functional Human Anatomy
3 - CH 2020 Survey of Organic Chemistry and Physiology
1 - ECE 3110 Electrical Engineering Lab. III
3 - ECE 3200 Electronics I
3 - ECE 3300 Signals, Systems, and Transforms
15
Second Semester
3 - BCHM 3050 Essential Elements of Biochem.
3 - BIOE 3200 Biomaterials
3 - BIOE 3700 Bioinstrumentation and Bioimaging
3 - ECE 3800 Electromagnetics
3 - BIOE or ECE Technical Requirement
15
Senior Year
First Semester
3 - BIOE 3200 Bio mechanics
3 - BIOE 4010 Bioengineering Design Theory
3 - BIOL 4610 Cell Biology
3 - Arts and Humanities Requirement or Social Science Requirement
3 - BIOE or ECE Technical Requirement
15
Second Semester
1 - BIOE 4000 Senior Seminar
3 - BIOE 4030 Applied Biomedical Design
3 - BIOE 4480 Tissue Engineering
3 - Arts and Humanities Requirement or Social Science Requirement
6 - BIOE or ECE Technical Requirement
16
128 Total Semester Hours

BIOMATERIALS CONCENTRATION
Freshman Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
1 - CH 2010 Survey of Organic Chemistry and Physiology
1 - ECE 3110 Electrical Engineering Lab. III
3 - ECE 3200 Electronics I
3 - ECE 3300 Signals, Systems, and Transforms
15
Second Semester
3 - BCHM 3050 Essential Elements of Biochem.
3 - BIOE 3200 Biomaterials
3 - BIOE 3700 Bioinstrumentation and Bioimaging
3 - ECE 3800 Electromagnetics
3 - BIOE or ECE Technical Requirement
15
Senior Year
First Semester
3 - BIOE 3200 Biomaterials
3 - BIOE 4010 Bioengineering Design Theory
3 - BIOL 4610 Cell Biology
3 - Arts and Humanities Requirement or Social Science Requirement
3 - BIOE or ECE Technical Requirement
15
Second Semester
1 - BIOE 4000 Senior Seminar
3 - BIOE 4030 Applied Biomedical Design
3 - BIOE 4480 Tissue Engineering
3 - Arts and Humanities Requirement or Social Science Requirement
6 - BIOE or ECE Technical Requirement
16
128 Total Semester Hours

Notes:
1. To transfer from General Engineering into the Bioengineering degree program, students must have a minimum cumulative grade-point average 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 ECE 2070, 2080, 3060) only when all prerequisites have been passed with a grade of C or better.
3. All Bioelectrical Concentration students must have a cumulative engineering grade-point average of 2.0 to enroll in any 2000- or 4000-level ECE courses.
4. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any ECE course.
Sophomore Year
First Semester
3 - BIOE 2010 Intro. to Biomedical Engineering
3 - CH 2010 Survey of Organic Chemistry
4 - MATH 2060 Calculus of Several Variables
3 - MSE 2100 Introduction to Materials Science
3 - PHYS 2210 Physics with Cal II

Second Semester
3 - BIOE 3020 Biomaterials
3 - CE 2010 Statics
2 - ECE 2070 Basic Electrical Engineering
1 - ECE 2080 Electrical Engineering Lab. I
2 - ENGR 2080 Engineering Graphics and Machine Design
4 - MATH 2080 Intro. to Ordinary Diff. Equations

Junior Year
First Semester
3 - BIOE 3220 Biomechanics
4 - BIOL 3150 Functional Human Anatomy
3 - MSE 3190 Materials Processing I
3 - MSE 3260 Thermodynamics of Materials
3 - MSE 3270 Transport Phenomena

Second Semester
3 - BCHM 3050 Essential Elements of Biochem.
3 - BIOE 3210 Biofluid Mechanics
3 - BIOE 3700 Biostatistics and Bioimaging
3 - MATH 3020 Statistics for Science and Engr.
3 - BIOE Technical Requirement1

Senior Year
First Semester
3 - BIOE 4010 Bioengineering Design Theory
3 - BIOL 4610 Cell Biology
3 - MSE 4150 Intro. to Polymer Science and Engr.
3 - Arts and Humanities Requirement or
3 - Social Science Requirement
3 - BIOE Technical Requirement1

Second Semester
1 - ENGR 4000 Senior Seminar
3 - BIOE 4030 Applied Biomedical Design
3 - MATH 4080 Calculus of Several Variables
3 - PHYS 2210 Physics with Cal II

BIOSYSTEMS ENGINEERING
Bachelor of Science
Biosystems engineering is the field of engineering most closely allied with advances in biology. Biosystems engineers apply engineering design and analysis to biological systems and incorporate fundamental biological principles to engineering designs to achieve ecological balance.

The Biosystems engineering program emphasizes two main areas - sustainable bioprocess engineering, with its basis in microbiology, and ecological engineering, with its basis in ecology. Bioprocess engineering focuses on the sustainable production of biofinery compounds - biofuels, nutraceuticals, bioactive molecules, and biomaterials - using metabolic pathways found in nature and green processing technologies. Ecological engineering focuses on the design of sustainable communities utilizing low-impact development strategies such as bioretention basins, rainwater harvesting, and bioswales for stormwater retention, treatment, and management. Both emphasis areas interface with ecologically-sound food and energy production systems.

Biosystems engineers lead teams to:
- Design bioprocesses and systems for biofuels (biodiesel, hydrogen, ethanol), biopharmaceutical, bioplastics, and food processing industries
- Develop ecological designs (permeable pavement, bioswales, green infrastructure) to integrate water management into the landscape
- Integrate biological sustainability into energy, water and food systems
- Provide engineering expertise for agriculture, food processing, and manufacturing industries.

Biosystems engineering graduates are highly qualified to pursue graduate studies in biosystems engineering, biomedical engineering or ecological engineering fields, or medical or veterinary school.

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 school can fulfill requirements with the Biosystems Engineering BS degree.

Additional information is available from the departmental offices or at: http://www.clemson.edu/majors/biosystems-engineering.

Combined Bachelor’s/Master’s Program
Under this plan, students may reduce the time necessary to earn both degrees by applying graduate credits to both undergraduate and graduate program requirements.

Undergraduate students in Biosystems Engineering may begin a Master of Science or a Master of Engineering Degree in Environmental Engineering and Science or Master of Science Degree in Biomechanical Engineering while completing the BS degree.

Students are encouraged to obtain the specific requirements for the dual degree from the academic departments involved as early as possible in their undergraduate program. See Academic Regulations in this catalog for enrollment guidelines and procedures.

Freshman Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
1 - ENGR 1050 Engineering Disciplines and Skills I
1 - ENGR 1060 Engineering Disciplines and Skills II
4 - MATH 1060 Calculus of One Variable
3 - Arts and Humanities Requirement or
3 - Social Science Requirement

Second Semester
4 - CH 1020 General Chemistry
1 - ENGR 1070 Programming and Problem Solving I
1 - ENGR 1080 Programming and Problem Solving II
1 - ENGR 1090 Programming and Problem Solving Applications
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
3 - Arts and Humanities Requirement or
3 - Social Science Requirement

Sophomore Year
First Semester
2 - ENGR 2100 Computer-Aided Design and Engineering Applications
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - ME 3100 Thermodynamics and Heat Transfer
4 - MICR 3050 General Microbiology

Junior Year
First Semester
3 - BIOL 3020 Principles of Geomatics
3 - BIOL 4100 Biol. Kinetics and Reactor Modeling
3 - CH 2230 Organic Chemistry
1 - CH 2270 Organic Chemistry Laboratory
2 - ECE 2070 Basic Electrical Engineering
1 - ECE 2080 Electrical Engineering Lab. I
3 - Mechanics of Materials Requirement

Second Semester
3 - BIOL 3220 Small Watershed Hydrology and Sedimentology
3 - BIOL 4120 Heat and Mass Transport in BE
3 - BIOL 4380 Bioprocess Engineering Design
4 - CE 3410 Introduction to Fluid Mechanics
3 - Arts and Humanities Requirement or
3 - Social Science Requirement

Students should choose courses to fulfill General Education requirements including Humanities, Social Science, Cross-Cultural Awareness and Science and Technology in society components. See Undergraduate Announcements and academic advisor for details.

*ME 2010 may be substituted for CE 2010 and 2080
**BIOL 1030/1035 or 1100
*CSE 2000 or ME 2040

Note: To transfer from General Engineering into the Biosystems engineering degree program, students must have a minimum cumulative grade point average of 3.0 in courses taken at Clemson and must have earned a C or better in each course in the General Engineering freshmen curriculum including the Arts and Humanities/Science Requirements.

1See General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.

2Students planning to enter medical school should take CH 2230/2270 instead of CH 2010/2020 and take CH 2240/2280 as an additional course sequence. Students planning to enter medical school should also take physics laboratories as additional courses (PHYS 1220 course with PHYS 1240 lab and PHYS 2210 course with PHYS 2230 lab).

3Students should choose courses to fulfill General Education requirements including Humanities, Social Science, Cross-Cultural Awareness and Science and Technology in society components. See Undergraduate Announcements and academic advisor for details.

4ME 2010 may be substituted for CE 2010 and 2080
5BIOL 1030/1035 or 1100
6CSE 2000 or ME 2040
BIOPROCESS ENGINEERING

EMPHASIS AREA

Senior Year
First Semester
3 - BE 4280 Biochemical Engineering
2 - BE 4740 Biosystems Engr. Design/Project Mgt.
2 - BE 4750 Biosystems Engr. Capstone Design
3 - BIOL 4410 Ecology
5 - Biochemistry Requirement†
15
Second Semester
6 - Engineering Requirement‡
3 - Life Science Requirement†
6 - Arts and Humanities Requirement* or 6 - Social Science Requirement* 15
128 Total Semester Hours

† Students should choose courses to fulfill General Education requirements including Humanities, Social Science, Cross-Cultural Awareness and Science and Technology in society components. See Undergraduate Announcements and academic advisor for details.

‡ See Departmental List (Minimum 6000 level for BS/MS program.

Chemical engineering is based on chemistry, biology, physics, and mathematics. The curriculum at Clemson includes classroom and laboratory instruction and emphasizes broadly applicable fundamental principles and current technology to prepare graduates for professional practice and professional growth. The Educational Objective of the BS degree program is for graduates to have careers characterized by:
- success in chemical engineering practice, post-graduate education, or other areas making use of engineering skills, as defined by accomplishments and/or job satisfaction;
- demonstrated success in the design of chemical processes and/or identification, formulation, and solution of chemical engineering problems;
- ethical behavior in all endeavors;
- demonstrated effectiveness in teamwork, communication, and service to society through professional contributions;
- demonstrated technical and/or managerial leadership; and
- demonstrated commitment to lifelong learning.

Chemical engineers are involved in the research, manufacture, sales, and use of commodity and specialty chemicals, fuels, pharmaceuticals, electronic components, synthetic fibers and textiles, food and consumer goods, and many other products. They work on environmental pollution prevention and remediation and apply engineering science to solve medical and health-related problems.

Combined Bachelor of Science/Master of Science

Qualified students can reduce the time to earn a Master’s Degree by applying graduate credits to both the Bachelor’s and Master’s program requirements. Undergraduate Chemical and Biomolecular Engineering students who have earned a grade-point average of 3.4 or above and completed 90 credit hours can begin work toward a Master of Science in Chemical Engineering or a Master of Science in Environmental Engineering and Science by selecting approved graduate courses for their emphasis area. Details are available in the CBE Undergraduate Handbook, which can be found at www.clemson.edu/ces/cbe.
### Senior Year

**First Semester**
- 3 - CHE 4070 Unit Operations Lab. II
- 3 - CHE 4310 Chemical Process Design II
- 1 - CHE 4440 Chemical Engr. Senior Seminar II
- 3 - MICR 4130 Industrial Microbiology
- 3 - Arts and Humanities Requirement 1 or 2
- 3 - Social Science Requirement 1 or 2
- 3 - Emphasis Area Requirement 1

**Second Semester**
- 3 - CHE 3530 Process Dynamics and Control
- 3 - CHE 4330 Process Design II
- 1 - CHE 4440 Chemical Engr. Senior Seminar II
- 3 - MICR 4130 Industrial Microbiology
- 3 - Arts and Humanities Requirement 1 or 2
- 3 - Social Science Requirement 1 or 2
- 3 - Emphasis Area Requirement 1

Total Semester Hours: 129

### Junior Year

**First Semester**
- 3 - CHE 4070 Unit Operations Lab. II
- 3 - CHE 4310 Chemical Process Design II
- 1 - CHE 4440 Chemical Engr. Senior Seminar II
- 3 - CHE 4500 Chemical Reaction Engineering
- 3 - STAT 4110 Statistical Methods for Process Development and Control
- 3 - Engineering Requirement 1 or 2

**Second Semester**
- 3 - BMOL 4250 Biomolecular Engineering
- 3 - CHE 3210 Chemical Engr. Thermodynamics II
- 4 - CHE 3300 Mass Transfer and Separation Proc.
- 3 - PHYS 2210 Physics with Calculus II
- 3 - Arts and Humanities Requirement 1 or 2
- 3 - Social Science Requirement 1 or 2

Total Semester Hours: 131

### Sophomore Year

**First Semester**
- 4 - CHE 1010 General Chemistry
- 3 - ENGL 1030 Accelerated Composition
- 1 - ENGR 1050 Engineering Disciplines and Skills I
- 1 - ENGR 1060 Engineering Disciplines and Skills II
- 4 - MATH 1060 Calculus of One Variable I
- 3 - Arts and Humanities Requirement 1 or 2
- 3 - Social Science Requirement 1 or 2

**Second Semester**
- 4 - CHE 1020 General Chemistry
- 2 - CHE 1300 Chemical Engineering Tools
- 4 - MATH 1080 Calculus of One Variable II
- 3 - PHYS 1220 Physics with Calculus I
- 3 - Arts and Humanities Requirement 1 or 2
- 3 - Social Science Requirement 1 or 2

Total Semester Hours: 19

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### BIO MOLECULAR ENGINEERING CONCENTRATION

**Freshman Year**

**First Semester**
- 4 - CH 1010 General Chemistry
- 3 - ENGL 1030 Accelerated Composition
- 1 - ENGR 1050 Engineering Disciplines and Skills I
- 1 - ENGR 1060 Engineering Disciplines and Skills II
- 4 - MATH 1060 Calculus of One Variable I
- 3 - Arts and Humanities Requirement 1 or 2
- 3 - Social Science Requirement 1 or 2

**Second Semester**
- 4 - CHE 1020 General Chemistry
- 2 - CHE 1300 Chemical Engineering Tools
- 4 - MATH 1080 Calculus of One Variable II
- 3 - PHYS 1220 Physics with Calculus I
- 3 - Arts and Humanities Requirement 1 or 2
- 3 - Social Science Requirement 1 or 2

Total Semester Hours: 16

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### 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 Bachelor of Science degree program in Civil Engineering includes the common educational goals listed on page 93 for the College of Engineering and Science. The complete objectives of the program can be found at www.clemson.edu/ce.

The first two years provide students with building blocks necessary to be successful civil engineers, including 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 construction engineering and 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 that 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, lifelong 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.

To be eligible for admission into the Bachelor of Science degree program in Civil Engineering, students must have completed the courses outlined in the freshman core curriculum and have a cumulative grade-point average of 2.6 or higher.

The Department of Civil Engineering allows eligible students to count up to six hours of graduate credit (6000- and 8000-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 average, and must be approved by the department.

Details of the suggested curriculum and program information are available from the department.

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**Freshman Year**

**First Semester**
- 4 - CH 1010 General Chemistry
- 3 - ENGL 1030 Accelerated Composition
- 1 - ENGR 1050 Engineering Disciplines and Skills I
- 1 - ENGR 1060 Engineering Disciplines and Skills II
- 4 - MATH 1060 Calculus of One Variable I
- 3 - Arts and Humanities Requirement 1 or 2
- 3 - Social Science Requirement 1 or 2

**Second Semester**
- 4 - CHE 4070 Unit Operations Lab. II
- 3 - CHE 4310 Chemical Process Design II
- 1 - CHE 4440 Chemical Engr. Senior Seminar I
- 3 - CHE 4500 Chemical Reaction Engineering
- 3 - STAT 4110 Statistical Methods for Process Development and Control
- 3 - Engineering Requirement 1 or 2

Total Semester Hours: 16

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**Second Semester**
- 3 - Biochemistry Option 1 or 2
- 3 - Social Science Requirement 1 or 2
- 3 - Arts and Humanities Requirement 1 or 2

Total Semester Hours: 19

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**Sophomore Year**

**First Semester**
- 5 - BIOL 1100 Principles of Biology I
- 3 - CHE 2230 Organic Chemistry
- 4 - CHE 2110 Intro. to Chemical Engineering
- 4 - MATH 2060 Calculus of Several Variables
- 3 - Arts and Humanities Requirement 1 or 2
- 3 - Social Science Requirement 1 or 2

**Second Semester**
- 4 - CHE 4070 Unit Operations Lab. II
- 3 - CHE 4310 Chemical Process Design II
- 1 - CHE 4440 Chemical Engr. Senior Seminar I
- 3 - CHE 4500 Chemical Reaction Engineering
- 3 - STAT 4110 Statistical Methods for Process Development and Control
- 3 - Engineering Requirement 1 or 2

Total Semester Hours: 16

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**Third Semester**
- 3 - Biochemistry Option 1 or 2
- 3 - Social Science Requirement 1 or 2
- 3 - Arts and Humanities Requirement 1 or 2

Total Semester Hours: 19
Sophomore Year
First Semester
3 - CE 2010 Statics
3 - CE 2550 Geometrics
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II
1 - PHYS 2230 Physics Lab. II
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
17

Second Semester
4 - CE 2060 Structural Mechanics
2 - CE 2080 Dynamics
2 - CE 3520 Economic Evaluation of Projects
3 - COMM 2500 Public Speaking
4 - MATH 2080 Intro. to Ordinary Diff. Equations
15

Junior Year
First Semester
3 - CE 3010 Structural Analysis
3 - CE 3310 Construction Engineering and Mgt.
4 - CE 3410 Introduction to Fluid Mechanics
4 - CE 3510 Civil Engineering Materials
3 - MATH 3020 Statistics for Engineering and Science
3

Second Semester
3 - CE 3110 Transportation Engineering Planning and Design
4 - CE 3210 Geotechnical Engineering
3 - CE 3420 Applied Hydraulics and Hydrology
1 - CE 3530 Professional Seminar
3 - EES 4010 Environmental Engineering
3 - Design Technical Requirement2
17

Senior Year
First Semester
3 - ENGL 3140 Technical Writing
3 - Design Technical Requirement2
6 - Technical Requirement1
3 - Technical Requirement Restricted1
15

Second Semester
3 - CE 4590 Capstone Design Project
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
3 - Arts and Humanities (Literature) Requirement1
3 - Technical Requirement1
3 - Elective
15
129 Total Semester Hours

Notes:
1. Civil Engineering students may neither enroll in nor receive credit for any CE or EM course unless they have a 2.0 Engineering grade-point average.
2. Civil Engineering students enrolling in any CE course (except CE 4590) must have a grade of C or better in the prerequisites for that course.

COMPUTER ENGINEERING
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 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.clemson.edu/ces/departments/ece/.

Freshman Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
1 - ENGR 1050 Engineering Disciplines and Skills I
1 - ENGR 1070 Programming and Problem Solving I
4 - MATH 1080 Calculus of One Variable I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
16

Second Semester
1 - ECE 2090 Logic and Computing Devices Lab.
1 - ECE 2120 Electrical Engineering Lab. II
3 - ECE 2220 Computer Organization
1 - ECE 2730 Computer Organization Laboratory
4 - MATH 2080 Intro. to Ordinary Diff. Equations
15

Second Semester
1 - ECE 2120 Electrical Engineering Lab. II
3 - ECE 2220 Systems Programming Concepts for Computer Engineering
3 - ECE 2620 Electric Circuits II
3 - ECE 2720 Computer Organization
1 - ECE 2730 Computer Organization Laboratory
4 - MATH 2080 Intro. to Ordinary Diff. Equations
15

Junior Year
First Semester
3 - ECE 2330 Computer Systems Engineering
1 - ECE 3110 Electrical Engineering Lab. III
3 - ECE 3200 Electronics I
3 - ECE 3300 Signals, Systems, and Transforms
3 - ECE 3710 Microcontroller Interfacing
1 - ECE 3720 Microcontroller Interfacing Lab.
3 - MATH 3110 Linear Algebra
17

Second Semester
3 - ECE 3170 Random Signal Analysis
3 - ECE (CPSCE) 3220 Intro. to Operating Systems
3 - ECE 3270 Digital Computer Design
3 - ECE 3520 Programming Systems
3 - MATH 4190 Discrete Math. Structures I
15

Senior Year
First Semester
3 - COMM 1500 Intro. to Human Comm. or
3 - COMM 2500 Public Speaking
3 - ECE 4090 Continuous and Discrete Sys. Design
2 - ECE 4950 Integrated System Design I
3 - ENGL 3140 Technical Writing
6 - Computer Engineering Technical Requirement2
17

Second Semester
2 - ECE 4960 Integrated System Design II
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
6 - Computer Engineering Technical Requirement2
3 - Special Requirement1
14
127 Total Semester Hours

Notes:
1. See General Education section of the Undergraduate Announcements. Six of these credit hours must also satisfy General Education Cross-Cultural Awareness and Science and Technology in Society Requirements.
2. Select from department-approved list.
3. Additional credits of university or college approved Arts and Humanities or Social Science courses; or ELE 3010 or 4010; or any additional three-credit, 4000-level course from the departmental Computer Engineering Technical Requirement list or Electrical Engineering Technical Requirement list, or one additional course selected from MATH 4120, 4340, 4350, 4400, 4410, or 4530.
4. A student is allowed to enroll in ECE courses (excluding ECE 2070, 2080, 3080) only when all prerequisites have been passed with a grade of C or better.
5. All Computer Engineering students must have a cumulative engineering grade-point average of 2.0 to enroll in any 3000- or 4000-level ECE courses.
6. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any ECE 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.clemson.edu/ces/departments/eee/.

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
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
1 - ENGR 1050 Engineering Disciplines and Skills I
1 - ENGR 1060 Engineering Disciplines and Skills II
4 - MATH 1060 Calculus of One Variable I
3 - Arts and Humanities Requirement* or
  3 - Social Science Requirement*

Second Semester
1 - ENGR 1070 Programming and Problem Solving I
4 - MATH 1080 Calculus of One Variable II
3 - ENGR 2100 Computer-Aided Design and Applications
3 - PHYS 1220 Physics with Calculus I
1 - ECE 2010 Logic and Computing Devices
2 - CE 2080 Dynamics
3 - BIOL 1050 General Biology Lab*

Second Semester
1 - ECE 2720 Computer Organization
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - Arts and Humanities Requirement* or
  3 - Social Science Requirement*

Junior Year
First Semester
1 - ECE 3110 Electrical Engineering Lab. III
3 - ECE 3200 Electronics I
3 - ECE 3300 Signals, Systems, and Transforms
3 - ECE 3600 Electric Power Engineering
3 - ECE 3800 Electromagnetics
3 - Advanced Mathematics Requirement*

Second Semester
1 - ECE 3120 Electrical Engineering Lab. IV
3 - ECE 3710 Random Signal Analysis
3 - ECE 3720 Communications Systems
1 - ECE 3740 Integrated Systems Design I
3 - ECE 3810 Fields, Waves, and Circuits
3 - ENGL 3140 Technical Writing

Senior Year
First Semester
3 - COMM 1500 Intro. to Human Comm. or
  3 - COMM 2500 Public Speaking
3 - ECE 4270 Communications Systems
2 - ECE 4950 Integrated Systems Design I
3 - Electrical Engineering Technical Requirement*

Second Semester
2 - ECE 4960 Integrated System Design II
3 - Arts and Humanities Requirement* or
  3 - Social Science Requirement*
6 - Electrical Engineering Technical Requirement*
3 - Social Requirement*

126 Total Semester Hours

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

**MATH 4100, 4340, 4350, 4530, or 4540

Select from department-approved list.

Three additional credits of university or college approved Arts and Humanities or Social Science courses; or ELE 3010 or 4010; or any additional three-credit, 4000-level course from the departmental Computer Engineering Technical Requirement list; or Electrical Engineering Technical Requirement list; or one additional course selected from MATH 3110, 4120, 4190, 4340, 4350, 4410, 4530, or 4540.

Notes:
1. A student is allowed to enroll in ECE courses (excluding ECE 2070, 2080, 3080) 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 average of 2.0 to enroll in any 3000- or 4000-level ECE courses.
3. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any ECE course.

ENVIRONMENTAL ENGINEERING
Bachelor of Science

Our complex world faces many challenges, including contaminated water supplies, hazardous wastes, an increasing population and limited resources. Environmental engineers help to solve many of the environmental problems faced by society using the principles of biology, chemistry, physics, mathematics and earth sciences. An undergraduate degree in Environmental Engineering opens the door to a variety of rewarding career options. Environmental engineers protect water quality by designing water and wastewater treatment systems; ensure public safety by managing solid, hazardous and radioactive wastes; improve air quality by controlling emissions from mobile and stationary sources; reduce human health risks by tracking contaminants as they move through the environment; clean up toxic waste spills and restore historically contaminated sites; and design a more sustainable future by understanding our use of resources.

The curriculum for the Bachelor of Science degree in Environmental Engineering consists of 127 credit hours. All students participate in one professional seminar course and complete a capstone design project.

Freshman Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
1 - ENGR 1050 Engineering Disciplines and Skills I
1 - ENGR 1060 Engineering Disciplines and Skills II
4 - MATH 1060 Calculus of One Variable I
3 - Arts and Humanities Requirement* or
  3 - Social Science Requirement*

Second Semester
4 - CH 1020 General Chemistry
1 - ENGR 1070 Programming and Problem Solving I
1 - ENGR 1080 Programming and Problem Solving II
1 - ENGR 1090 Programming and Problem Solving Applications
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
1 - ECE 2090 Logic and Computing Devices Lab.
2 - CE 2080 Dynamics
3 - BIOL 1050 General Biology Lab*
3 - CE 2010 Statics
3 - EES 2010 Environmental Engineering Fund. I
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II

Sophomore Year
First Semester
3 - BIOL 1030 General Biology
1 - BIOL 1050 General Biology Lab*
3 - CE 2010 Statics
3 - EES 2010 Environmental Engineering Fund. I
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II

Second Semester
2 - CE 2080 Dynamics
3 - CH 2010 Survey of Organic Chemistry
4 - EES 2020 Environmental Engineering Fund. II
2 - ENGR 2100 Computer-Aided Design and Engineering Applications*
4 - MATH 2080 Intro. to Ordinary Diff. Equations
Junior Year
First Semester
1. ENGR 1060 Engineering Disciplines and Skills I
2. ENGR 1070 Programming and Problem Solving I
3. ENGR 1080 Programming and Problem Solving II
4. PHYS 2210 Physics with Calculus I
5. HIST 1240 satisfies three credit hours of the social science requirement.
6. Arts and Humanities Requirement 1 or Social Science Requirement 1

Second Semester
1. ENGR 2070 Basic Electrical Engineering
2. ECE 2070 Basic Electrical Engineering Lab I
3. ECE 2080 Electrical Engineering Lab I
4. ECE 2110 Electrical Engineering Lab. I
5. ECE 2110 Introduction to Electrical Engineering
6. Arts and Humanities Requirement 1 or Social Science Requirement 1

Senior Year
First Semester
1. EES 4300 Air Pollution Engineering
2. EES 4380 Municipal Solid Waste Mgt.
3. EES 4850 Environmental Risk Assessment
4. EES 4860 Environmental Sustainability
5. Engineering Economics Requirement
6. Engineering or Science Requirement 1

Second Semester
1. EES 4750 Capstone Design Project
2. Engineering or Science Requirement 1
3. Arts and Humanities Requirement 1 or Social Science Requirement 1

127 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. The Industrial Engineering baccalaureate program prepares graduates to: (1) design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy using appropriate analytical, computational and experimental practices; (2) apply information technologies to the practice of industrial engineering; (3) conduct themselves in a professional and ethical manner; and (4) 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 6000- and 8000-level courses) toward both the bachelor’s and master’s degrees. Students participating in this program must have a minimum grade-point average 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.ees.clemson.edu/ie.

Freshman Year
First Semester
1. CH 1010 General Chemistry
2. ENGL 1030 Accelerated Composition
3. ENGR 1050 Engineering Disciplines and Skills I
4. ENGR 1060 Engineering Disciplines and Skills II
5. MATH 1060 Calculus of One Variable I
6. Arts and Humanities Requirement 1 or Social Science Requirement 1

Second Semester
1. ENGR 1070 Programming and Problem Solving I
2. ENGR 1080 Programming and Problem Solving II
3. ENGR 1090 Programming and Problem Solving Applications
4. MATH 1080 Calculus of One Variable II
5. PHYS 2220 Physics with Calculus I
6. Arts and Humanities Requirement 1 or Social Science Requirement 1
7. Lab Science Requirement

Sophomore Year
First Semester
1. IE 2000 Sophomore Seminar in IE
2. IE 2070 Basic Electrical Engineering
3. IE 2080 Electrical Engineering Lab I
4. IE 2080 Electrical Engineering Lab II
5. IE 3100 Introduction to Materials Science
6. Arts and Humanities Requirement 1 or Social Science Requirement 1

Second Semester
1. IE 4630 Design and Control of Industrial Sys. I
2. IE 4630 Professional Practice in IE
3. IE 4400 Decision Support Systems in IE
4. Arts and Humanities Requirement 1 or Social Science Requirement 1

Junior Year
First Semester
1. IE 3600 Design and Control of Industrial Sys. I
2. IE 3680 Professional Practice in IE
3. IE 4400 Decision Support Systems in IE
4. Arts and Humanities Requirement 2 or Social Science Requirement

Second Semester
1. COMM 1500 Intro. to Human Comm.
2. COMM 2500 Public Speaking
3. ECE 2020 Electric Circuits I
4. ECE 2110 Electrical Engineering Lab. I
5. ECE 2080 Electrical Engineering Lab I
6. ECE 3810 Methods of Operational Research II
7. IE 3860 Production Planning and Control

Senior Year
First Semester
1. IE 4610 Quality Engineering
2. IE 4650 Facilities Planning and Design
3. IE 4820 Systems Modeling
4. Technical Requirement

Second Semester
1. IE 4670 Systems Design II
2. Management Requirement
3. Mathematics or Natural Science Requirement
4. Technical Requirement

125 Total Semester Hours

Notes:
1. The following courses must be completed with a C or better: CE 2010, CE 2080, CE 3410, MATH 2260, MATH 2080, PHYS 2210.
2. CH 1010 is five hours.
3. May substitute ENGR 2070 for MATH 1060, MATH 1080, PHYS 2210.
4. PHYS 1220 or PHYS 2210 may be substituted.
5. Phys 1240 or PHYS 2220 may be substituted.
6. Arts and Humanities Requirement 1 or Social Science Requirement 1

1See Policy on Humanities and Social Sciences for Engineering Curricula. Three of these credit hours must also satisfy the Cross-Cultural Awareness General Education requirement. Students are encouraged (but not required) to take PHIL 3450 (Environmental Ethics) to fulfill the non-literature humanities requirement.
2HIST 1240 satisfies three credit hours of the social science requirement and the Science and Technology in Society General Education requirement. If a student is unable to enroll in the second semester of the freshman year, this course may be taken at another time.
3May substitute BIOL 1100 for BIOL 1050 and BIOL 1050.
4May substitute CH 2250.
5May substitute ENGR 2080.
6May substitute PES 2020 for GEOL 1010 and GEOL 1030.
7Select CE 3520 or IE 3840.
8Select any combination of engineering and/or science courses from a department-approved list.
9This course must be passed with a C or better either to transfer into IE from General Engineering or to satisfy later course prerequisites.
10See General Education Requirements. Six of these credit hours must also satisfy the Cross-Cultural Awareness and Science and Technology in Society Requirements.
11Select from department-approved list. See advisor.
MATERIALS SCIENCE AND ENGINEERING

Bachelor of Science

Materials scientists and engineers design, develop, and produce traditional and new advanced materials with diverse applications intended for use in a wide variety of industries. These include traditional materials-intensive industries such as structural clay, foundry, whiteacre, polymers, plastics, fibers, textiles, composite materials, and automotive industries. Also included are high performance technology industries such as semiconductor, defense, biomaterials, aerospace, and communication industries. The broad career responsibilities of this discipline require competence in science, engineering, mathematics, and the social sciences. The curriculum develops skills in problem solving, engineering analysis, and design, as well as oral and written communication.

The School of Materials Science and Engineering offers two areas of concentration within the Bachelor of Science degree in Materials Science and Engineering. The Inorganic Materials Concentration provides for more in-depth study of the engineering and science of materials such as ceramics, glasses, metals, optical and electronic materials; while the Polymeric Materials Concentration provides more emphasis on plastics, elastomers, fibers and fibrous materials, films, coatings and adhesives. Students select either the Inorganic Materials Concentration or the Polymeric Materials Concentration at the beginning of their sophomore year. Both concentrations in Materials Science and Engineering integrate laboratory with classroom experiences to prepare students for lifelong learning and exciting career opportunities. Courses covering thermodynamics, kinetics, mechanical behavior, processing, fabrication and characterization of materials prepare students for careers in industry and for graduate school.

In addition to the common educational objectives of all engineering programs, baccalaureate degree graduates in Materials Science and Engineering will be able to:

• demonstrate learning consistent with Accreditation Board for Engineering and Technology Engineering Criteria 2011 for materials engineering programs;
• function easily and well in the laboratory and plant environments; and
• serve the local, national, and international materials communities.

Specifically, the Accreditation Board for Engineering and Technology Engineering Criteria 2011 requires that baccalaureate degree graduates in Materials Science and Engineering be able to:

• apply advanced scientific and engineering principles to materials 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 materials engineering selection and design problems; and
• apply appropriate experimental, statistical, and computational methods to advantage in the solution of materials problems.

INORGANIC MATERIALS CONCENTRATION

Freshman Year

First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
1 - ENGR 1050 Engineering Disciplines and Skills I
1 - ENGR 1060 Engineering Disciplines and Skills II
4 - MATH 1060 Calculus of One Variable I
3 - Arts and Humanities Requirement* or
− 3 - Social Science Requirement
16

Second Semester
4 - CH 1020 General Chemistry
1 - ENGR 1070 Programming and Problem Solving I
1 - ENGR 1080 Programming and Problem Solving II
1 - ENGR 1090 Programming and Problem Solving Applications
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
3 - Arts and Humanities Requirement* or
− 3 - Social Science Requirement
17

Sophomore Year

First Semester
3 - CH 2010 Survey of Organic Chemistry
1 - CH 2020 Survey of Organic Chemistry Laboratory
3 - MSE 2100 Introduction to Materials Science
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II
3 - Arts and Humanities Requirement* or
− 3 - Social Science Requirement
17

Second Semester
3 - CE 2010 Statics
2 - ENGR 2080 Engineering Graphics and Machine Design
1 - MSE 2410 Metrics Laboratory
4 - MATH 2080 Intro. to Ordinary Diff. Equations
6 - Arts and Humanities Requirement* or
− 6 - Social Science Requirement
16

Junior Year

First Semester
3 - COMM 2500 Public Speaking
3 - MSE 3190 Materials Processing I
3 - MSE 3260 Thermodynamics of Materials
3 - MSE 3270 Transport Phenomena
3 - MSE 4150 Intro. to Polymer Sci. and Engr.
15

Second Semester
3 - IE 3840 Engineering Economic Analysis
3 - MATH 3020 Statistics for Science and Engr. or
3 - STAT 2300 Statistical Methods I
3 - MSE 3280 Phase Diagrams for Materials Processing and Applications
2 - MSE 3420 Structure/Property Laboratory
3 - MSE 3610 Proc. Metals and Their Composites
3 - MSE 4220 Mechanical Behavior of Materials
17

Senior Year

First Semester
3 - MSE 4020 Solid State Materials
3 - MSE 4130 Noncrystalline Materials
3 - MSE 4320 Manufacturing Processes and Sys.
1 - MSE 4410 Manufacturing Laboratory
3 - MSE 4910 Undergraduate Research
13

Second Semester
3 - MSE 4070 Senior Capstone Design
3 - MSE 4160 Electrical Properties of Materials
3 - MSE 4240 Optical Materials and Applications
3 - MSE 4330 Combustion System and Environmental Emissions
1 - MSE 4450 Practice of Materials Engineering
13

124 Total Semester Hours

*See Policy on Humanities and Social Sciences for Engineering Curricula. Six of these credits must also satisfy the Cross-Cultural Awareness and the Science and Technology in Society General Education requirements.

POLYMERIC MATERIALS CONCENTRATION

Freshman Year

First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
1 - ENGR 1050 Engineering Disciplines and Skills I
1 - ENGR 1060 Engineering Disciplines and Skills II
4 - MATH 1060 Calculus of One Variable I
3 - Arts and Humanities Requirement* or
− 3 - Social Science Requirement
16

Second Semester
4 - CH 1020 General Chemistry
1 - ENGR 1070 Programming and Problem Solving I
1 - ENGR 1080 Programming and Problem Solving II
1 - ENGR 1090 Programming and Problem Solving Applications
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
3 - Arts and Humanities Requirement* or
− 3 - Social Science Requirement
17

Sophomore Year

First Semester
3 - CH 2010 Survey of Organic Chemistry
1 - CH 2270 Organic Chemistry Laboratory
3 - MSE 2100 Introduction to Materials Science
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II
3 - Arts and Humanities Requirement* or
− 3 - Social Science Requirement
15

Second Semester
4 - CH 1020 General Chemistry
1 - ENGR 1070 Programming and Problem Solving I
1 - ENGR 1080 Programming and Problem Solving II
1 - ENGR 1090 Programming and Problem Solving Applications
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
3 - Arts and Humanities Requirement* or
− 3 - Social Science Requirement
17

Junior Year

First Semester
3 - COMM 2500 Public Speaking
3 - MSE 3190 Materials Processing I
3 - MSE 3260 Thermodynamics of Materials
3 - MSE 3270 Transport Phenomena
3 - MSE 4150 Intro. to Polymer Sci. and Engr.
15

Second Semester
3 - IE 3840 Engineering Economic Analysis
3 - MATH 3020 Statistics for Science and Engr. or
3 - STAT 2300 Statistical Methods I
3 - MSE 3280 Phase Diagrams for Materials Processing and Applications
2 - MSE 3420 Structure/Property Laboratory
3 - MSE 3610 Proc. Metals and Their Composites
3 - MSE 4220 Mechanical Behavior of Materials
17

Senior Year

First Semester
3 - MSE 4020 Solid State Materials
3 - MSE 4130 Noncrystalline Materials
3 - MSE 4320 Manufacturing Processes and Sys.
1 - MSE 4410 Manufacturing Laboratory
3 - MSE 4910 Undergraduate Research
13

Second Semester
3 - MSE 4070 Senior Capstone Design
3 - MSE 4160 Electrical Properties of Materials
3 - MSE 4240 Optical Materials and Applications
3 - MSE 4330 Combustion System and Environmental Emissions
1 - MSE 4450 Practice of Materials Engineering
13

124 Total Semester Hours

*See Policy on Humanities and Social Sciences for Engineering Curricula. Six of these credits must also satisfy the Cross-Cultural Awareness and the Science and Technology in Society General Education requirements.
Junior Year
First Semester
3 - CH 3310 Physical Chemistry
3 - COMM 2500 Public Speaking
3 - MSE 3270 Transport Phenomena
3 - MSE 4150 Intro. to Polymer Sci. and Engineering
1 - MSE 4550 Polymer and Fiber Lab.
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
16
Second Semester
3 - CH 3320 Physical Chemistry
3 - IE 3840 Engineering Economic Analysis
3 - MATH 3020 Stat. for Science and Engr. or
3 - STAT 2300 Statistical Methods I
3 - MSE 4220 Mechanical Behavior or Materials
3 - MSE 4560 Polymer and Fiber Science II
15
Senior Year
First Semester
3 - MSE 4580 Surface Phenomena in Materials Science and Engineering
1 - MSE 4600 Surface Phenomena in Materials Science and Engineering Laboratory
3 - MSE 4610 Polymer and Fiber Science III
3 - MSE 4910 Undergraduate Research
3 - Technical Requirement2
13
Second Semester
3 - MSE 4070 Senior Capstone Design
1 - MSE 4450 Practice of Materials Engineering
3 - MSE 4570 Color Science
1 - MSE 4590 Color Science Laboratory
3 - Arts and Humanities Requirement2 or
3 - Social Science Requirement1
3 - Technical Requirement2
14
124 Total Semester Hours

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 Bachelor of Science and Doctor of Philosophy degrees.

Mechanical Engineering students who have a cumulative grade-point average or cumulative engineering grade-point average (EGPA) below 2.0 are on probation and will have restricted enrollment in classes. Students whose cumulative grade-point average is below 2.0 are subject to the regulations stipulated under Academic Eligibility 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.clemson.edu/me.

Sophomore Year
First Semester
1 - ME 2000 Sophomore Seminar
5 - ME 2010 Statics and Dynamics for Mech. Engr.
2 - ME 2220 Mechanical Engineering Lab. I or
3 - MSE 2100 Intro. to Materials Science2
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II
15-16
Second Semester
2 - ECE 2070 Basic Electrical Engineering
1 - ECE 2080 Electrical Engineering Lab. I
3 - ME 2030 Found. of Thermal and Fluid Systems
3 - ME 2040 Mechanics of Materials
2 - ME 2220 Mechanical Engineering Lab. I or
3 - MSE 2100 Intro. to Materials Science2
4 - MATH 2080 Intro. to Ordinary Diff. Equations
15-16

Junior Year
First Semester
3 - ENGL 3140 Technical Writing
3 - ME 3030 Thermodynamics
3 - ME 3070 Foundations of Mechanical Systems
3 - ME 3080 Fluid Mechanics
2 - ME 3330 Mechanical Engineering Lab. II or
3 - Statistics Requirement1 or
3 - MATH 3650 Numerical Methods for Engineers
17-18
Second Semester
3 - ME 3040 Heat Transfer
3 - ME 3050 Model. and Analysis of Dynamic Syst.
3 - ME 3060 Fundamentals of Machine Design
3 - ME 3120 Manufacturing Processes and Their Application
2 - ME 3330 Mechanical Engineering Lab. II or
3 - Statistics Requirement1 or
14-15

Senior Year
First Semester
3 - ME 4030 Mechanical Engineering Design
3 - ME 4030 Control and Integration of Multi-Domain Dynamic Systems
2 - ME 4440 Mechanical Engineering Lab. III or
3 - Technical Requirement1 or
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
3 - Mechanical Engineering Technical Requirement4
14-15
Second Semester
1 - ME 4000 Senior Seminar
3 - ME 4020 Internship in Engineering Design
2 - ME 4440 Mechanical Engineering Lab. III or
3 - Technical Requirement1
6 - Arts and Humanities Requirement1 or
6 - Social Science Requirement1
3 - Mechanical Engineering Technical Requirement4
15-16
125 Total Semester Hours
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 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 minor 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 from those listed on page 112. Courses for these minors are to be selected in consultation with the appropriate department.

SCIENCE PROGRAMS

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

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 Chemistry 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
4 - CH 1010 General Chemistry
1 - CH 1410 Chemistry Orientation
3 - ENGL 1030 Accelerated Composition
4 - MATH 1060 Calculus of One Variable I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1

Second Semester
4 - CH 1020 General Chemistry
2 - CH 1520 Chemistry Communication I
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1

Sophomore Year
First Semester
3 - CH 2230 Organic Chemistry
1 - CH 2270 Organic Chemistry Lab.
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II
1 - PHYS 2230 Physics Lab. II
4 - Foreign Language Requirement2

Second Semester
3 - CH 2050 Introduction to Inorganic Chemistry
3 - CH 2240 Organic Chemistry
1 - CH 2280 Organic Chemistry Lab.
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - PHYS 2220 Physics with Calculus III
1 - PHYS 2240 Physics Lab. III

Junior Year
First Semester
3 - CH 3130 Quantitative Analysis
2 - CH 3150 Quantitative Analysis Lab.
3 - CH 3310 Physical Chemistry
1 - CH 3390 Physical Chemistry Lab.
3 - ENGL 3140 Technical Writing
3 - Elective

Second Semester
3 - CH 3320 Physical Chemistry
1 - CH 3400 Physical Chemistry Lab.
3 - CH 3600 Chemical Biology
3 - CH 4110 Instrumental Analysis
2 - CH 4120 Instrumental Analysis Lab.
3 - Arts and Humanities (Literature) Requirement2

Senior Year
First Semester
3 - CH 4020 Inorganic Chemistry
3 - CH 4430 Research Problems
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
3 - Chemistry Requirement1
3 - Elective

Second Semester
2 - CH 4030 Advanced Synthetic Techniques
3 - CH 4440 Research Problems
3 - CH 4500 Chemistry Capstone
1 - CH 4520 Chemistry Communication II
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1
3 - Chemistry Requirement1

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 (through 1020) in any modern foreign language is required.
3See advisor.

Chemistry
Bachelor of Arts
Freshman Year
First Semester
4 - CH 1010 General Chemistry
1 - CH 1410 Chemistry Orientation
3 - ENGL 1030 Accelerated Composition
4 - MATH 1060 Calculus of One Variable I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1

Second Semester
4 - CH 1020 General Chemistry
2 - CH 1520 Chemistry Communication I
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
3 - Arts and Humanities Requirement1 or
3 - Social Science Requirement1

Sophomore Year
First Semester
3 - CH 2230 Organic Chemistry
1 - CH 2270 Organic Chemistry Lab.
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II
1 - PHYS 2230 Physics Lab. II
4 - Foreign Language Requirement2

Second Semester
3 - CH 2050 Introduction to Inorganic Chemistry
3 - CH 2240 Organic Chemistry
1 - CH 2280 Organic Chemistry Lab.
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - PHYS 2220 Physics with Calculus III
1 - PHYS 2240 Physics Lab. III
Sophomore Year
First Semester
3 - CH 2230 Organic Chemistry
1 - CH 2270 Organic Chemistry Lab.
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2210 Physics with Calculus II
4 - Foreign Language Requirement
15
Second Semester
3 - CH 2050 Introduction to Inorganic Chemistry
3 - CH 2240 Organic Chemistry
1 - CH 2280 Organic Chemistry Lab.
6 - Arts and Humanities Requirement or Social Science Requirement
4 - Foreign Language Requirement
Arts and Humanities Requirement
1 - CH 4520 Chemistry Communication II
3 - CH 3320 Physical Chemistry
1 - CH 3170 Quantitative Analysis Lab.
Accounting, production, marketing, and finance management-related problems. The program emphasizes 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 average of 2.0 or higher.
Additional information can be found at www.cs.clemson.edu.

Freshman Year
First Semester
4 - CPSC 1010 Computer Science I
3 - ENGL 1030 Accelerated Composition
1 - MATH 1020 Intro. to Mathemat. Analysis or MATH 1060 Calculus of One Variable
4 - Natural Science Requirement
1 - Elective
15
Second Semester
4 - CPSC 1020 Computer Science II
3 - MATH 2070 Multivariable Calculus or MATH 1080 Calculus of One Variable II
1 - Arts and Humanities (Non-Lit.) Requirement
1 - Natural Science Requirement
1 - Social Science Requirement
1 - Elective
17
Sophomore Year
First Semester
3 - CPSC 2070 Discrete Structures for Computing
4 - CPSC 2120 Algorithms and Data Structures
3 - Arts and Humanities (Literature) Requirement or Oral Communication Requirement
3 - Natural Science Requirement
16
Second Semester
3 - CPSC 2150 Software Development Foundations
4 - CPSC 2310 Intro. to Computer Organization
1 - CPSC 2900 Seminar in Professional Issues I
1 - MGT 2010 Principles of Management
3 - STAT 3090 Introductory Business Statistics
14
Junior Year
First Semester
3 - ACCT 2010 Financial Accounting Concepts
3 - CPSC 2200 Microcomputer Applications
3 - CPSC 3220 Introduction to Operating Systems
3 - CPSC 3720 Intro. to Software Engineering
3 - Writing Requirement
15
Second Semester
3 - ACCT 2020 Managerial Accounting Concepts
3 - CPSC 3600 Networks and Network Program.
3 - CPSC 3710 Systems Analysis or CPSC 3720 Systems Analysis and Design
3 - ECON 2110 Principles of Microeconomics
3 - Computer Science Requirement
15
Senior Year
First Semester
3 - CPSC 4200 Computer Security Principles or CPSC 4240 System Admin. and Security
3 - CPSC 4620 Database Management Systems
3 - CPSC 4910 Seminar in Professional Issues II
3 - Business Requirement
3 - Computer Science Requirement
15
Second Semester
3 - MGT 3120 Decision Models for Management
3 - MKT 3010 Principles of Marketing
3 - Business Requirement
3 - Computer Science Requirement
3 - Information Systems Requirement
15
122 Total Semester Hours

Select either the MATH 1020/2070, 1060/2070 or 1060/1080 sequences. Students who select the 1060/1080 sequence will have satisfied the two elective credits in the freshman year.
1Select from courses in BIOL, BCHM, CH, GEOL, MICRO, PHYS, or ENSP 2000. At least one course must include a laboratory and satisfy the Natural Science General Education Requirement.
2See General Education Requirements.
3Select from COMP 1500, 2500, HON 2230, or the cluster of courses AS 3090, 3100, 4090, 4100, or ML 1010, 1020.
4MATH 2060 and 3020, or STAT 2300 and 3300 may be substituted.
5MATH 2060 and 3020, or STAT 2300 and 3300 may be substituted.
6Select from MGT 3900, 4000 and FIN 3060.
7Select from MGT 3900, 4540, 4550, 4560, or any 4000 level CPSC course. CPSC 4810 may not be used.
8Select from MGT 3900, 4540, 4550, 4560, or any 4000 level CPSC course. CPSC 4810 may not be used.
9Select from MGT 3900, 4000 and FIN 3060.
10Select from CPSC 3990 or 4580 or MGT 3900 or 4580 may be used, and no more than six credits of CPSC 4580 may be used.
11Select from MGT 3900, 4540, 4550, or any 4000 level CPSC course. CPSC 4810 may not be used.
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 CPSC course applied to the non-elective requirements of the degree.
2. A grade of C or better must be earned in all prerequisite courses (including CPSC and MATH courses) before enrolling in the next CPSC course.
3. General Education Cross-Cultural Awareness and Science and Technology in Society requirements must be satisfied.

COMPUTER INFORMATION SYSTEMS
Bachelor of Science
The Computer Information Systems degree 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 (CAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: (410) 347-7700. Additional information can be found at www.cs.clemson.edu.
Students who change majors into Computer Science must have a cumulative grade-point average of 2.0 or higher.

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 (CAC) of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone: (410) 347-7700. Additional information can be found at www.cs.clemson.edu.
Students who change majors into Computer Science must have a cumulative grade-point average of 2.0 or higher.
Combined Bachelor's/Master's Plan
The School of Computing allows students to count up to nine hours of graduate credit (6000- and 8000-level courses) toward both the bachelor's and master's degrees. Students participating in this program must have a minimum grade-point average 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
- CPSC 1010 Computer Science I
- ENGL 1030 Accelerated Composition
- MATH 1060 Calculus of One Variable I
- Natural Science Requirement

15
Second Semester
- CPSC 1020 Computer Science II
- MATH 1080 Calculus of One Variable II
- Arts and Humanities (Non-Lit.) Requirement
- Natural Science Requirement

15

Sophomore Year
First Semester
- CPSC 2150 Software Development Foundations
- CPSC 2910 Seminar in Professional Issues I
- CPSC 2120 Algorithms and Data Structures
- Elective

16
Second Semester
- CPSC 2070 Discrete Structures for Computing
- CPSC 2310 Intro. to Computer Organization
- CPSC 2910 Seminar in Professional Issues I
- STAT 3090 Introductory Business Statistics

15

Junior Year
First Semester
- CPSC 3300 Computer Systems Organization
- CPSC 3600 Networks and Network Program.
- CPSC 3720 Intro. to Software Engineering
- MATH 3110 Linear Algebra
- Social Science Requirement

15
Second Semester
- CPSC 3220 Introduction to Operating Systems
- CPSC 3500 Foundations of Computer Science
- CPSC 3620 Distributed and Cluster Computing
- Arts and Humanities Requirement or Social Science Requirement
- Social Science Requirement

15
Senior Year
First Semester
- CPSC 3520 Programming Languages
- Computer Science Requirement
- Writing Requirement
- Elective

15
Second Semester
- CPSC 4910 Seminar in Professional Issues II
- Arts and Humanities Requirement or Social Science Requirement
- Computer Science Requirement
- Elective

15
122 Total Semester Hours

Sophomore Year
First Semester
- Elective
- Arts and Humanities (Non-Lit.) Requirement
- Oral Communication Requirement

16
Second Semester
- CPSC 2150 Software Development Foundations
- CPSC 2310 Intro. to Computer Organization
- CPSC 2910 Seminar in Professional Issues I
- Foreign Language Requirement
- Natural Science Requirement

15

Junior Year
First Semester
- Computer Science Requirement
- Mathematical Sciences Requirement
- Minor Requirement
- Natural Science Requirement

15
Second Semester
- Computer Science Requirement
- Minor Requirement
- Social Science Requirement
- Writing Requirement

15

Senior Year
First Semester
- Computer Science Requirement
- Departmental Humanities Requirement
- Minor Requirement
- Social Science Requirement

15
Second Semester
- CPSC 4910 Seminar in Professional Issues II
- Computer Science Requirement
- Fine Arts Requirement
- Minor Requirement
- Elective

15
121 Total Semester Hours

1Select the MATH 1060/1080 sequence. Students who select the MATH 1060/1080 sequence have satisfied the elective credits in the freshman year. Students interested in computer graphics should select the MATH 1060/1080 sequence.

Four semesters (through 2020) in the same modern foreign language are required.

4General Education Requirements.

1One course of: COMM 1500, 2500, HONS 2230; or the cluster of courses AS 3090, 3100, 4090, 4100; or ML 1010, 1020.

MATH 2060 and 3020, or STAT 2300 and 3300 may be substituted.

4Select from courses in BIOL, BCHM, CH, GEOL, MICR, PHYS, or ENSP 2000.

See General Education Requirements.

2Select courses in AAH, ANTH, ART, CHIN, COMM, DANC, EAS, ECON, ENGL, FR, GEOG, GER, HIST, HUM, ITAL, JAPN, MUSC, PA, PAS, PHIL, POSC, PSYC, REL, RUSS, SOC, SPAN, THEA, WS.

6See General Education Cross-Cultural Awareness and Science Education Requirement.

5Select either the MATH 1020/2070, 1060/2070, or 1060/1080 sequence. Students who select the MATH 1060/1080 sequence have satisfied the elective credits in the freshman year. Students interested in computer graphics should select the MATH 1060/1080 sequence.

Four semesters (through 2020) in the same modern foreign language are required.

4General Education Requirements.

1One course of: COMM 1500, 2500, HONS 2230; or the cluster of courses AS 3090, 3100, 4090, 4100; or ML 1010, 1020.

Second Semester
Select from courses in BIOL, BCHM, CH, GEOL, MICR, PHYS, or ENSP 2000. At least one course must include a laboratory and satisfy the Natural Science General Education Requirement.

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 average of 2.0 or higher.

Freshman Year
First Semester
- CPSC 1010 Computer Science I
- ENGL 1030 Accelerated Composition
- MATH 1020 Intro. to Mathemat. Analysis or MATH 1060 Calculus of One Variable I
- Foreign Language Requirement
- Elective

15
Second Semester
- CPSC 1020 Computer Science II
- MATH 2070 Multivariable Calculus or MATH 1080 Calculus of One Variable II
- Arts and Humanities (Non-Lit.) Req.
- Foreign Language Requirement
- Elective

15

Sophomore Year
First Semester
- CPSC 2070 Discrete Structures for Computing
- CPSC 2120 Algorithms and Data Structures
- Arts and Humanities (Literature) Requirement
- Foreign Language Requirement
- Oral Communication Requirement

16
Second Semester
- CPSC 2150 Software Development Foundations
- CPSC 2310 Intro. to Computer Organization
- CPSC 2910 Seminar in Professional Issues I
- Foreign Language Requirement
- Natural Science Requirement

15

Junior Year
First Semester
- Computer Science Requirement
- Mathematical Sciences Requirement
- Minor Requirement
- Natural Science Requirement

15
Second Semester
- Computer Science Requirement
- Minor Requirement
- Social Science Requirement
- Writing Requirement

15

Senior Year
First Semester
- Computer Science Requirement
- Departmental Humanities Requirement
- Minor Requirement
- Social Science Requirement

15
Second Semester
- CPSC 4910 Seminar in Professional Issues II
- Computer Science Requirement
- Fine Arts Requirement
- Minor Requirement
- Elective

15
121 Total Semester Hours

4CPSC 1020 Computer Science II
- MATH 2070 Multivariable Calculus or MATH 1080 Calculus of One Variable II
- Arts and Humanities (Non-Lit.) Req.
- Foreign Language Requirement
- Elective

15

Sophomore Year
First Semester
- CPSC 2070 Discrete Structures for Computing
- CPSC 2120 Algorithms and Data Structures
- Arts and Humanities (Literature) Requirement
- Foreign Language Requirement
- Oral Communication Requirement

16
Second Semester
- CPSC 2150 Software Development Foundations
- CPSC 2310 Intro. to Computer Organization
- CPSC 2910 Seminar in Professional Issues I
- Foreign Language Requirement
- Natural Science Requirement

15

Junior Year
First Semester
- Computer Science Requirement
- Mathematical Sciences Requirement
- Minor Requirement
- Natural Science Requirement

15
Second Semester
- Computer Science Requirement
- Minor Requirement
- Social Science Requirement
- Writing Requirement

15

Senior Year
First Semester
- Computer Science Requirement
- Departmental Humanities Requirement
- Minor Requirement
- Social Science Requirement

15
Second Semester
- CPSC 4910 Seminar in Professional Issues II
- Computer Science Requirement
- Fine Arts Requirement
- Minor Requirement
- Elective

15
121 Total Semester Hours

4CPSC 1020 Computer Science II
- MATH 2070 Multivariable Calculus or MATH 1080 Calculus of One Variable II
- Arts and Humanities (Non-Lit.) Req.
- Foreign Language Requirement
- Elective

15

Sophomore Year
First Semester
- CPSC 2070 Discrete Structures for Computing
- CPSC 2120 Algorithms and Data Structures
- Arts and Humanities (Literature) Requirement
- Foreign Language Requirement
- Oral Communication Requirement

16
Second Semester
- CPSC 2150 Software Development Foundations
- CPSC 2310 Intro. to Computer Organization
- CPSC 2910 Seminar in Professional Issues I
- Foreign Language Requirement
- Natural Science Requirement

15

Junior Year
First Semester
- Computer Science Requirement
- Mathematical Sciences Requirement
- Minor Requirement
- Natural Science Requirement

15
Second Semester
- Computer Science Requirement
- Minor Requirement
- Social Science Requirement
- Writing Requirement

15

Senior Year
First Semester
- Computer Science Requirement
- Departmental Humanities Requirement
- Minor Requirement
- Social Science Requirement

15
Second Semester
- CPSC 4910 Seminar in Professional Issues II
- Computer Science Requirement
- Fine Arts Requirement
- Minor Requirement
- Elective

15
121 Total Semester Hours

4CPSC 1020 Computer Science II
- MATH 2070 Multivariable Calculus or MATH 1080 Calculus of One Variable II
- Arts and Humanities (Non-Lit.) Req.
- Foreign Language Requirement
- Elective

15
GEOL 3910 Research Methods I
2 - GEOL 3920 Introduction to Research II
4 - GEOL 4910 Research Synthesis I
4 - Geology Requirement4
3 - Quantative Science Requirement3
3 - STEM Requirement2
13
Second Semester
3 - GEOL 4920 Research Synthesis II
4 - Geology Requirement4
6 - STEM Requirement2
13
Senior Year
First Semester
3 - Accounts and Humanities (Non-Lit.) Requirement1
3 - Social Science Requirement2
17
Sophomore Year
First Semester
4 - GEOL 2010 General Chemistry
3 - ENGL 1030 Accelerated Composition
3 - GEOL 1010 Physical Geology
1 - GEOL 1030 Physical Geology Lab.
4 - MATH 1060 Calculus of One Variable I
15
Second Semester
4 - CH 1020 General Chemistry
3 - GEOL 1120 Earth Resources
4 - MATH 1080 Calculus of One Variable II
3 - Arts and Humanities (Non-Lit.) Requirement1
3 - Social Science Requirement2
17
ENVIRONMENTAL SCIENCE CONCENTRATION
Freshman Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
3 - GEOL 1010 Physical Geology
1 - GEOL 1030 Physical Geology Lab.
4 - MATH 1060 Calculus of One Variable I
15
Second Semester
4 - GEOL 2020 Earth History
1 - GEOL 2920 Introduction to Research II
3 - Quantative Science Requirement3
7 - STEM Requirement2
15
Junior Year
First Semester
4 - GEOL 3020 Structural Geology
2 - GEOL 3910 Research Methods I
3 - Quantative Science Requirement3
3 - STEM Requirement2
12
Second Semester
2 - GEOL 3920 Research Methods II
7 - Geology Requirement4
3 - STEM Requirement2
12
Summer
6 - Field Experience5
120 Total Semester Hours
1See General Education Requirements. Three of these credit hours must also satisfy the Cross-Cultural Awareness Requirement.
2Twenty-eight credit hours selected from department approved list. No more than 14 hours below the 3000 level and no more than 8 hours above the 2000 level. Courses may not be used to satisfy any other requirement.
3Select from department approved list. Courses may not be used to satisfy any other requirement.
4Fifteen credit hours. Select from GEOL 3110, 3180, 4050, 4090, 4150, 4210, or (CE) 4820. Only excess hours may be used to satisfy STEM requirement hours.
5GEOL 4750, or other six credit summer geology field camp, or a combination of GEOL 2750 plus a three credit field course in geology or other approved discipline. Students desiring to become registered professional geologists should take six- credit summer field camp in geology/hydrogeology.
Second Semester
4 - CH 1020 General Chemistry
3 - GEOL 1120 Earth Resources
4 - MATH 1080 Calculus of One Variable II
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Social Science Requirement
17

Sophomore Year
First Semester
3 - BIOL 1030 General Biology I
1 - BIOL 1050 General Biology Lab. I
1 - ENSP 2000 Intro. to Environmental Science
3 - GEOL 2050 Mineralogy and Intro. Petrology
1 - GEOL 2070 Mineral. and Intro. Petrology Lab.
1 - GEOL 2910 Introduction to Research I
3 - Arts and Humanities (Literature) Requirement
4 - MATH 2060 or a combination of GEOL 2750 plus a three credit hour field course in geology, ecology or other approved discipline. Students desiring to become registered professional geologists should take a six credit hour summer field camp in geology/hydrogeology.

HYDROGEOLOGY CONCENTRATION

Freshman Year
First Semester
4 - CH 1020 General Chemistry
3 - ENGL 1030 Accelerated Composition
3 - GEOL 1010 Physical Geology
1 - GEOL 1030 Physical Geology Lab.
1 - MATH 1060 Calculus of One Variable I
12
Second Semester
4 - CH 1020 General Chemistry
3 - GEOL 1120 Earth Resources
4 - MATH 1080 Calculus of One Variable II
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Social Science Requirement
17

Second Semester
3 - BIOL 1040 General Biology II
1 - BIOL 1060 General Biology Lab. II
3 - CH 2010 Survey of Organic Chemistry or
3 - CH 2230 Organic Chemistry
4 - GEOL 2020 Earth History
1 - GEOL 2920 Introduction to Research II
3 - PHYS 1220 Physics with Calculus I
15

Junior Year
First Semester
3 - GEOL 3000 Environmental Geology
4 - GEOL 3020 Structural Geology
2 - GEOL 3910 Research Methods I
4 - GEOL 4150 Analysis of Geological Processes
13
Second Semester
3 - GEOL 3180 Introduction to Geochemistry
2 - GEOL 3920 Research Methods II
3 - GEOL 4210 GIS Applications in Geology
3 - MATH 3020 Statistics for Science and Engr. or
3 - STAT 2300 Statistical Methods I
4 - Environmental Science Requirement
1
Summer
6 - Field Experience

Senior Year
First Semester
3 - ENSP 4000 Studies in Environmental Science
3 - GEOL (CE) 4820 Groundwater and Contaminant Transport
3 - GEOL 4910 Research Synthesis I
3 - Social Science Requirement
12
Second Semester
3 - GEOL 4920 Research Synthesis II
10 - Environmental Science Requirement
13
121 Total Semester Hours

Second Semester
3 - EES 4010 Environmental Engineering
4 - GEOL 4050 Surficial Processes
4 - GEOL 4090 Subsurface Methods
3 - GEOL 4920 Research Synthesis II
14
121 Total Semester Hours

Mathematical Sciences
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 requiring a strong mathematical background. In addition to the basic courses that 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 used. These are Abstract Mathematics, Actuarial Science/Financial Mathematics, Applied and Computational Mathematics, Biology, Computer Science, Operations Research/Management Science, and Statistics.

In addition to the overall goal of preparing students to cope with a variety of mathematical problems, the curriculum seeks to provide an adequate background for students who plan to pursue graduate study or positions in business, industry, or government. Students electing the Biology Concentration will have the necessary preparation for entering medical school. More information about the degree program can be found at www.clemson.edu/ces/departments/math.

All mathematical sciences majors are required to complete a capstone experience that 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 up to 12 graduate credits to both undergraduate and graduate program requirements. Students are encouraged to obtain the specific requirements for pursuing the combined degree from the Department of Mathematical Sciences www.clemson.edu/ces/departments/math as early as possible in their undergraduate program. Enrollment guidelines and procedures can be found under Academic Regulations in this catalog.
Bachelor of Science
Freshman Year
First Semester
3 - ENGL 1030 Accelerated Composition
4 - MATH 1060 Calculus of One Variable I
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Foreign Language Requirement
3 - Social Science Requirement
12
Second Semester
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
4 - MATH 2060 Calculus of Several Variables
3 - Elective
3 - Mathematical Sciences Requirement
1 - MATH 2500 Intro. to Mathematical Sciences
4 - MATH 3190 Introduction to Proof
3 - Cross-Cultural Awareness Requirement
3 - Social Science Requirement
15
Sophomore Year
First Semester
4 - MATH 2060 Calculus of Several Variables
1 - MATH 2500 Intro. to Mathematical Sciences
3 - MATH 3190 Introduction to Proof
3 - MATH 3600 Intermediate Math. Computing
4 - Natural Science Requirement
3 - Arts and Humanities (Literature) Requirement
4 - MATH 3020 Statistics for Science and Engr.
3 - Oral Communication Requirement
3 - Science and Tech. in Society Requirement
15
Second Semester
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - MATH 3020 Statistics for Science and Engr.
3 - MATH 3110 Linear Algebra
3 - Arts and Humanities (Literature) Requirement
4 - Natural Science Requirement
17
Junior Year
First Semester
3 - MATH 4000 Theory of Probability
3 - MATH 4400 Linear Programming
3 - MATH 4530 Advanced Calculus I
3 - Advanced Writing Requirement
3 - Technical Requirement
15
Second Semester
3 - MATH 4120 Introduction to Modern Algebra
3 - MATH 4540 Advanced Calculus II
3 - Emphasis Area Requirement
3 - Technical Requirement
3 - Elective
15
Senior Year
First Semester
3 - Capstone Experience
6 - Emphasis Area Requirement
3 - Oral Communication Requirement
3 - Science and Tech. in Society Requirement
15
Second Semester
1 - MATH 4920 Professional Development
3 - Capstone Experience
3 - Emphasis Area Requirement
3 - Mathematical Sciences Requirement
3 - Elective
122 Total Semester Hours

BIOLOGY CONCENTRATION
Freshman Year
First Semester
5 - BIOL 1100 Principles of Biology I
3 - ENGL 1030 Accelerated Composition
4 - MATH 1060 Calculus of One Variable I
3 - Foreign Language Requirement
15
Second Semester
5 - BIOL 1110 Principles of Biology II
4 - MATH 1080 Calculus of One Variable II
3 - Computer Science Requirement
3 - Social Science Requirement
15
Sophomore Year
First Semester
4 - CH 2280 Organic Chemistry Lab.
3 - CH 2270 Organic Chemistry Lab.
1 - CH 2290 Organic Chemistry Lab.
3 - MATH 3190 Introduction to Proof
3 - MATH 3600 Intermediate Math. Computing
3 - Advanced Writing Requirement
3 - Arts and Humanities (Literature) Requirement
16
Second Semester
3 - CH 2240 Organic Chemistry
1 - CH 2280 Organic Chemistry Lab.
1 - MATH 3020 Statistics for Science and Engr.
3 - MATH 4400 Linear Programming
3 - Mathematical Sciences Requirement
3 - Oral Communications Requirement
16
Senior Year
First Semester
3 - MATH 4000 Theory of Probability
3 - MATH 4530 Advanced Calculus I
3 - Animal or Plant Diversity Requirement
3 - Capstone Experience
3 - Social Science Requirement
15
Second Semester
3 - MATH 4120 Introduction to Modern Algebra
3 - MATH 4540 Advanced Calculus II
1 - MATH 4920 Professional Development
3 - Biological Sciences Requirement
3 - Capstone Experience
13
121 Total Semester Hours

Sophomore Year
First Semester
4 - MATH 2060 Calculus of Several Variables
1 - MATH 2500 Intro, to Mathematical Sciences
3 - MATH 3600 Interned, Math. Computing or
3 - EDSC 4370 Technology in Sec. Math.
3 - Arts and Humanities (Literature) Requirement
3 - Cross-Cultural Awareness Requirement
14
Second Semester
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - MATH 3020 Statistics for Science and Engr.
3 - MATH 3110 Linear Algebra
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Minor Requirement or
3 - Second Major Requirement
16
Junior Year
First Semester
3 - MATH 3190 Introduction to Proof
4 - Advanced Writing Requirement
3 - Math Science Requirement
4 - Natural Science Requirement
3 - Elective
16
Second Semester
3 - COMM 2500 Public Speaking
3 - MATH 4120 Introduction to Modern Algebra
3 - Minor Requirement or
3 - Second Major Requirement
4 - Natural Science Requirement
3 - Elective
16
Senior Year
First Semester
3 - MATH 4530 Advanced Calculus I
3 - Arts and Humanities Requirement or
3 - Education Requirement
3 - Capstone Experience
3 - Minor Requirement or
3 - Second Major Requirement
3 - Math Science Requirement
15
Second Semester
1 - MATH 4920 Professional Development or
1 - EDF 4250 Instructional Tech. Strategies
3 - Capstone Experience
3 - Math Science Requirement
6 - Minor Requirement or
6 - Second Major Requirement
2 - Elective
15
122 Total Semester Hours

MATHEMATICAL SCIENCES
Bachelor of Arts
Freshman Year
First Semester
3 - ENGL 1030 Accelerated Composition
4 - MATH 1060 Calculus of One Variable I
3 - Foreign Language Requirement
3 - Social Science Requirement
1 - Elective
14
Second Semester
4 - MATH 1080 Calculus of One Variable II
4 - Computer Science Requirement
3 - Foreign Language Requirement
3 - Science and Technology in Society Req.
3 - Social Science Requirement
16
Sophomore Year
First Semester
4 - MATH 2060 Calculus of Several Variables
1 - MATH 2500 Intro, to Mathematical Sciences
3 - MATH 3600 Interned, Math. Computing or
3 - EDSC 4370 Technology in Sec. Math.
3 - Arts and Humanities (Literature) Requirement
3 - Cross-Cultural Awareness Requirement
14
Second Semester
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - MATH 3020 Statistics for Science and Engr.
3 - MATH 3110 Linear Algebra
3 - Arts and Humanities (Non-Lit.) Requirement
3 - Minor Requirement or
3 - Second Major Requirement
16
Junior Year
First Semester
3 - MATH 3190 Introduction to Proof
4 - Advanced Writing Requirement
3 - Math Science Requirement
4 - Natural Science Requirement
3 - Elective
16
Second Semester
3 - COMM 2500 Public Speaking
3 - MATH 4120 Introduction to Modern Algebra
3 - Minor Requirement or
3 - Second Major Requirement
4 - Natural Science Requirement
3 - Elective
16
Senior Year
First Semester
3 - MATH 4530 Advanced Calculus I
3 - Arts and Humanities Requirement or
3 - Education Requirement
3 - Capstone Experience
3 - Minor Requirement or
3 - Second Major Requirement
3 - Math Science Requirement
15
Second Semester
1 - MATH 4920 Professional Development or
1 - EDF 4250 Instructional Tech. Strategies
3 - Capstone Experience
3 - Math Science Requirement
6 - Minor Requirement or
6 - Second Major Requirement
2 - Elective
15
122 Total Semester Hours

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 to 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.

Freshman Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Accelerated Composition
4 - MATH 1060 Calculus of One Variable I
3 - PHYS 1220 Physics with Calculus I
1 - PHYS 1240 Physics Lab I
15
Second Semester
4 - CH 1020 General Chemistry
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 2210 Physics with Calculus II
1 - PHYS 2230 Physics Lab II
3 - Arts and Humanities (Non-Lit.) Requirement
15
Sophomore Year
First Semester
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2220 Physics with Calculus III
1 - PHYS 3000 Introduction to Research
3 - PHYS 3250 Experimental Physics I
4 - Foreign Language Requirement
15
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.
Junior Year
First Semester
3 - PHYS 3150 Intro. to Computational Physics
3 - PHYS 3210 Mechanics I
3 - Foreign Language Requirement ²
3 - Minor Requirement ³
3 - Physics Writing Requirement ¹
15

Second Semester
3 - PHYS 3220 Mechanics II
3 - PHYS 4650 Thermodynamics and Statistical Mechanics
3 - Foreign Language Requirement ²
3 - Minor Requirement ³
3 - Social Science Requirement ¹
15

Senior Year
First Semester
3 - PHYS 4410 Electromagnetics I
3 - PHYS 4550 Quantum Physics I
6 - Minor Requirement ³
3 - Physics Requirement ¹
15

Second Semester
3 - HIST 1720 The West and the World I or
   3 - HIST 1730 The West and the World II
3 - Arts and Humanities (Literature) Requirement ¹
3 - Minor Requirement ³
3 - Physics Requirement ¹
3 - Elective
15

120 Total Semester Hours
²See General Education Requirements. Three of these credit hours must also satisfy the Science and Technology in Society Requirement.
²Four semesters (through 2020) in the same modern foreign language are required.
²ENGL 3040, 3120, 3140, 3150, 3160, 3450, 3460, 3480 ML 4020, or THEA (ENGL) 3470.
³See advisor.
⁴Any 3000 or 4000 level physics course
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
Architecture
Art
Athletic Leadership
Biochemistry
Biological Sciences
Business Administration
Chemistry
Cluster
Communication Studies
Computer Science—not open to Computer Information Systems majors
Crop and Soil Environmental Science
Digital Production Arts
East Asian Studies
Economics
Education
English
Entomology
Entrepreneurship
Environmental Science and Policy
Equine Industry
Film Studies
Financial Management
Food Science
Forest Products
Forest Resource Management
Genetics
Geography
Geology
Global Politics
Great Works
History
Horticulture
Human Resource Management
International Engineering and Science
Legal Studies
Management
Management Information Systems
Mathematical Sciences
Microbiology
Military Leadership
Modern Languages
Music
Natural Resource Economics
Nonprofit Leadership
Packaging Science
Pan African Studies
Park and Protected Area Management
Philosophy
Physics
Plant Pathology
Political Science
Psychology
Public Policy
Recreational Therapy
Religion
Russian Area Studies
Science and Technology in Society
Screenwriting
Sociology
Spanish-American Area Studies
Sustainability
Theatre
Travel and Tourism
Turfgrass
Urban Forestry
Wildlife and Fisheries Biology
Women’s Studies
Writing

See pages 39-42 for details.