# 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, Physics, and Polymer and Fiber Chemistry. The Bachelor of Arts is offered in Chemistry, Computer Science, Geology, Mathematical Sciences, and Physics.

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

## Bachelor of Science Curricula

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

## Bachelor of Arts Curricula

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

Students have a large degree of flexibility and responsibility in selecting a minor from those listed on page 106. Courses for these minors are to be selected in consultation with the appropriate department.

# 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 101 General Chemistry
1 - CH 141 Chemistry Orientation
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Arts and Humanities Requirement[1] *or*
3 - Social Science Requirement[1]
15

**Second Semester**
4 - CH 102 General Chemistry
2 - CH 152 Chemistry Communication I
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
3 - Arts and Humanities Requirement[1] *or*
3 - Social Science Requirement[1]
16

### Sophomore Year

**First Semester**
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
1 - PHYS 223 Physics Lab. II
4 - Foreign Language Requirement[2]
16

**Second Semester**
3 - CH 205 Introduction to Inorganic Chemistry
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
4 - MTHSC 208 Intro. to Ordinary Diff. Equations
3 - PHYS 222 Physics with Calculus III
1 - PHYS 224 Physics Lab. III
15

### Junior Year

**First Semester**
3 - BIOCH 301 Molecular Biochemistry *or*
3 - BIOCH 305 Essential Elements of Bioch.
3 - CH 313 Quantitative Analysis
2 - CH 315 Quantitative Analysis Lab.
3 - CH 331 Physical Chemistry
1 - CH 339 Physical Chemistry Lab.
3 - ENGL 314 Technical Writing
15

**Second Semester**
3 - CH 332 Physical Chemistry
1 - CH 340 Physical Chemistry Lab.
3 - CH 411 Instrumental Analysis
2 - CH 412 Instrumental Analysis Lab.
3 - Arts and Humanities (Literature) Requirement[1]
3 - Elective
15

### Senior Year

**First Semester**
3 - CH 402 Inorganic Chemistry
2 - CH 403 Advanced Synthetic Techniques
3 - CH 443 Research Problems
3 - Arts and Humanities Requirement[1] *or*
3 - Social Science Requirement[1]
3 - Chemistry Requirement[3]
14

**Second Semester**
3 - CH 444 Research Problems
3 - CH 450 Chemistry Capstone
1 - CH 452 Chemistry Communication II
3 - Arts and Humanities Requirement[1] *or*
3 - Social Science Requirement[1]
3 - Chemistry Requirement[3]
3 - Elective
16

122 Total Semester Hours

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

[2]One semester (through 102) in any modern foreign language is required.

[3]See advisor.

# CHEMISTRY

## Bachelor of Arts

### Freshman Year

**First Semester**
4 - CH 101 General Chemistry
1 - CH 141 Chemistry Orientation
3 - ENGL 103 Accelerated Composition
4 - MTHSC 106 Calculus of One Variable I
3 - Arts and Humanities Requirement[1] *or*
3 - Social Science Requirement[1]
15

**Second Semester**
4 - CH 102 General Chemistry
2 - CH 152 Chemistry Communication I
4 - MTHSC 108 Calculus of One Variable II
3 - PHYS 122 Physics with Calculus I
3 - Arts and Humanities Requirement[1] *or*
3 - Social Science Requirement[1]
16

### Sophomore Year

**First Semester**
3 - CH 223 Organic Chemistry
1 - CH 227 Organic Chemistry Lab.
4 - MTHSC 206 Calculus of Several Variables
3 - PHYS 221 Physics with Calculus II
4 - Foreign Language Requirement[2]
15

**Second Semester**
3 - CH 205 Introduction to Inorganic Chemistry
3 - CH 224 Organic Chemistry
1 - CH 228 Organic Chemistry Lab.
6 - Arts and Humanities Requirement[1] *or*
6 - Social Science Requirement[1]
4 - Foreign Language Requirement[2]
17

### Junior Year

**First Semester**
3 - CH 313 Quantitative Analysis
1 - CH 317 Quantitative Analysis Lab.
3 - Arts and Humanities Requirement[1] *or*
3 - Social Science Requirement[1]
3 - Arts and Humanities (Literature) Requirement[1]
3 - Foreign Language Requirement[2]
3 - Minor Requirement
16

**Second Semester**
3 - CH 331 Physical Chemistry
3 - ENGL 314 Technical Writing
3 - Arts and Humanities Requirement[1] *or*
3 - Social Science Requirement[1]
3 - Foreign Language Requirement[2]
3 - Minor Requirement
15

### Senior Year

**First Semester**
3 - CH 332 Physical Chemistry
3 - Chemistry Requirement[3]
3 - Minor Requirement
6 - Elective
15

**Second Semester**
3 - CH 450 Chemistry Capstone
1 - CH 452 Chemistry Communication II
3 - Chemistry Requirement[3]
6 - Minor Requirement
13

122 Total Semester Hours

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

[2]Four semesters (through 202) of the same modern foreign language are required.

[3]See advisor.

## COMPUTER INFORMATION SYSTEMS

### Bachelor of Science

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

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

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

### Freshman Year

**First Semester**
4 - CP SC 101 Computer Science I
3 - ENGL 103 Accelerated Composition
3 - MTHSC 102 Intro. to Mathemat. Analysis[1] *and*
1 - Elective[1] *or*
4 - MTHSC 106 Calculus of One Variable I[1]
4 - Natural Science Requirement[2]
15

**Second Semester**
4 - CP SC 102 Computer Science II
3 - MTHSC 207 Multivariable Calculus[1] *and*
1 - Elective[1] *or*
4 - MTHSC 108 Calculus of One Variable II[1]
3 - Arts and Humanities (Non-Lit.) Requirement[3]
3 - Natural Science Requirement[2]
3 - Social Science Requirement[3]
17

### Sophomore Year

**First Semester**
3 - CP SC 207 Discrete Structures for Computing
4 - CP SC 212 Algorithms and Data Structures
3 - Arts and Humanities (Literature) Requirement[3]
3 - Oral Communication Requirement[3]
3 - Social Science Requirement[3]
16

**Second Semester**
3 - CP SC 215 Software Development Foundations
4 - CP SC 231 Intro. to Computer Organization
1 - CP SC 291 Seminar in Professional Issues I
3 - MGT 201 Principles of Management
3 - Probability and Statistics Requirement[4]
14

### Junior Year

**First Semester**
3 - ACCT 201 Financial Accounting Concepts
3 - CP SC 322 Introduction to Operating Systems
3 - CP SC 372 Introduction to Software Engineering
3 - MTHSC 311 Linear Algebra
3 - Writing Requirement[5]
15

**Second Semester**
3 - ACCT 202 Managerial Accounting Concepts
3 - CP SC 360 Networks and Network Program.
3 - CP SC 371 Systems Analysis *or*
3 - MGT 452 Systems Analysis and Design
3 - ECON 211 Principles of Microeconomics
3 - Computer Science Requirement[6]
15

### Senior Year

**First Semester**
3 - CP SC 420 Computer Security Principles *or*
3 - CP SC 424 System Admin. and Security
3 - CP SC 462 Database Management Systems
3 - CP SC 491 Seminar in Professional Issues II
3 - Business Requirement[7]
3 - Computer Science Requirement[6]
15

**Second Semester**
3 - MGT 312 Decision Models for Management
3 - MKT 301 Principles of Marketing
3 - Business Requirement[7]
3 - Computer Science Requirement[6]
3 - Information Systems Requirement[8]
15

122 Total Semester Hours

[1]Select either the MTHSC 102/207 or 106/108 sequence. Students who select the 106/108 sequence will have satisfied the two elective credits in the freshman year.

[2]Select from courses in BIOL, BIOCH, BIOSC, CH, GEOL, MICRO, PHYS; or EN SP 200. At least one course must include a laboratory and satisfy the Natural Science General Education Requirement.

[3]See General Education Requirements.

[4]MTHSC 301, 302, or 309.

[5]Select from School-approved list.

[6]Select from 300-level or higher CP SC courses. No more than six credits of CP SC 481 may be used.

[7]Select from MGT 390, 400, FIN 306.

[8]Select from MGT 452, 454, 455, 456, or 400-level CP SC courses. CP SC 481 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 CP SC course applied to the degree.
2. A grade of C or better must be earned in all prerequisite courses (including CP SC and MTHSC courses) before enrolling in the next CP SC course.

## COMPUTER SCIENCE

### Bachelor of Science

The Computer Science program is oriented toward design, implementation, and application of software systems to solve information processing problems. Emphasis areas outside computer science allow students to tailor the program to their individual needs and interests. This program is more technically oriented than the Computer Information Systems curriculum. It prepares students for employment in the computer software field or for continued study toward an advanced degree in computer science. This program is accredited by the Computing Accreditation Commission (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 ratio 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 (600- and 800-level courses) toward both the bachelor's and master's degrees. Students participating in this program must have a minimum grade-point ratio of 3.4 and be admitted to the Graduate School prior to registering for graduate courses. Details of the suggested curriculum and program information are available from the Department.