Junior Year
First Semester
3 - CH 3130 Quantitative Analysis
1 - CH 3170 Quantitative Analysis Lab.
3 - CH 3310 Physical Chemistry
3 - Arts and Humanities Requirement[1] *or*
   3 - Social Science Requirement[1]
3 - Minor Requirement
3 - Modern Language Requirement[2]
16

Second Semester
3 - CH 3320 Physical Chemistry
3 - ENGL 3140 Technical Writing
3 - Arts and Humanities (Literature) Requirement[1]
3 - Minor Requirement
3 - Modern Language Requirement[2]
15

Senior Year
First Semester
3 - Arts and Humanities Requirement[1] *or*
   3 - Social Science Requirement[1]
3 - Chemistry Requirement[3]
3 - Minor Requirement
6 - Elective
15

Second Semester
3 - CH 4500 Chemistry Capstone
3 - Arts and Humanities Requirement[1] *or*
   3 - Social Science Requirement[1]
3 - Chemistry Requirement[3]
6 - Minor Requirement
15

123 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]Students must complete through 2020 in a modern language. See Modern Languages Requirement at Clemson University statement on page 27.

[3]Select from BCHM 3010, 3050, 4060, 4230, CH 3390, 3400, 3600, 3990, 4000, 4010, 4020, 4030, 4040, 4110, 4120, 4130, 4140, 4210, 4250, 4270, 4350, 4360, 4430, 4400, 4710, 4990, CHE 3070, EES 4110, 4850, ETOX 4210, 4300, FDSC 4010, 4020, 4030, GEOL 3180, MSE 4020, 4150, PHYS 4520, 4810

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
4 - MATH 1060 Calculus of One Variable I
3 - Arts and Humanities Requirement[1] *or*
   3 - Social Science Requirement[1]
4 - Technical Requirement[2]
15

Second Semester
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
4 - MATH 1080 Calculus of One Variable II
3 - PHYS 1220 Physics with Calculus I
1 - PHYS 1240 Physics Laboratory I
15

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
3 - Arts and Humanities Requirement[1] *or*
   3 - Social Science Requirement[1]
15

Second Semester
3 - CH 1520 Chemistry Communication
3 - CH 2050 Introduction to Inorganic Chemistry
3 - CH 2240 Organic Chemistry
1 - CH 2280 Organic Chemistry Lab.
3 - Advanced MATH Requirement[3]
3 - Arts and Humanities (Literature) Req.[1]
16

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.
1 - CH 3410 Introduction to Research
3 - Inorganic Chemistry Requirement[4]
3 - Elective
16

Second Semester
3 - CH 3320 Physical Chemistry
1 - CH 3400 Physical Chemistry Lab.
3 - CH 3600 Chemical Biology [5]
3 - CH 4110 Instrumental Analysis
2 - CH 4120 Instrumental Analysis Lab.
3 - Elective
15

Senior Year
First Semester
3 - CH 4430 Research Problems
3 - Arts and Humanities Requirement[1] *or*
   3 - Social Science Requirement[1]
3 - Chemistry Requirement[6]
6 - Elective
15

Second Semester
2 - CH 4030 Advanced Synthetic Techniques
3 - CH 4440 Research Problems
3 - CH 4500 Chemistry Capstone
3 - Chemistry Requirement[6]
3 - Elective
14

121 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]Select BIOL 1100, CPSC 1010, GEOL 1010/1030, or ENGR 1050/1060/1070/1080

[3]MATH 2080, 3020 or 3110

[4]CH 4010 or 4020

[5]BCHM 3050 may be substituted for CH 3600.

[6]Select from BCHM 3010, 3050, 4060, 4230, CH 3990, 4000, 4010, 4040, 4130, 4140, 4210, 4250, 4270, 4350, 4360, 4430, 4400, 4710, 4990, CHE 3070, EES 4110, 4850, ETOX 4210, 4300, FDSC 4010, 4020, 4030, GEOL 3180, MSE 4020, 4150, PHYS 4520, 4810

GENETICS
Bachelor of Science
Genetics is the study of heredity. Genetics research takes many forms, from the study of heredity at the level of individual molecules to study at the level of cells and chromosomes, individuals, or populations. To comprehend current genetic information and to make future contributions to our molecular understanding of life processes, students must obtain a broad background in biology and a firm foundation in chemistry and mathematics. This is the basis of the genetics curriculum.

A degree in Genetics is a strong preparation for many careers. The degree provides an excellent foundation for medical, veterinary, or pharmacy school, as well as graduate research in any discipline related to biology, including bioinformatics, forensic technology, and genetic counseling. Because of the increasing emphasis on genetics in everyday life, a Bachelor of Science in Genetics can also be a direct path to a career in the emerging biotechnology industries (pharmaceuticals, agricultural technologies, biomimetic minerals) in research, sales, or business operations. Combined with a law degree, a genetics bachelor of science is a good background for a career as a patent attorney.

Freshman Year
First Semester
5 - BIOL 1100 Principles of Biology I
4 - CH 1010 General Chemistry
1 - GEN 1030 Careers in Biochem. and Genetics
4 - MATH 1060 Calculus of One Variable I
14

Second Semester
5 - BIOL 1110 Principles of Biology II
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
4 - MATH 1080 Calculus of One Variable II
16

Sophomore Year

First Semester
3 - CH 2230 Organic Chemistry
1 - CH 2270 Organic Chemistry Lab.
3 - COMM 1500 Intro. to Human Comm. *or*
   3 - COMM 2500 Public Speaking
3 - GEN 3020 Molecular and General Genetics
3 - PHYS 1220 Physics with Calculus I[1]
1 - PHYS 1240 Physics Lab. I[1]
14

Second Semester
3 - BCHM 3010 Molecular Biochemistry
3 - CH 2240 Organic Chemistry
1 - CH 2280 Organic Chemistry Lab.
2 - GEN 3040 Molecular Biology Lab.
3 - STAT 2300 Statistical Methods I
3 - Arts and Humanities (Literature) Requirement[2]
3 - Social Science Requirement[2]
18

Junior Year

First Semester
3 - GEN 4200 Molecular Genetics and Gene Reg.
2 - GEN 4210 Molecular Genetics and Gene
   Regulation Lab.
3 - GEN (BCHM) 4400 Bioinformatics
3 - Science Requirement[3]
3 - Social Science Requirement[2]
14

Second Semester
3 - BIOL 4610 Cell Biology
3 - GEN 4100 Population and Quantitative Gen.
2 - GEN 4110 Population and Quantitative Gen. Lab.
3 - PHIL 3260 Science and Values
3 - Genetics Requirement[4]
3 - Elective[5]
17

Senior Year

First Semester
3 - GEN 4500 Comparative Genetics
3 - Genetics Requirement[4]
3 - Science Requirement[3]
6 - Elective[5]
15

Second Semester
2 - GEN 4930 Senior Seminar
3 - Genetics Requirement[4]
3 - Science Requirement[3]
6 - Elective[5]
14

122 Total Semester Hours

[1]Medical, veterinary, and graduate school requirements often include two semesters of physics with calculus and the physics laboratory. Students are encouraged to check requirements for admission to professional postgraduate programs.

[2]See General Education Requirements. Three of the Social Science Requirement credit hours must also satisfy the Cross-Cultural Awareness Requirement.

[3]BIOL 2220, 2230, PHYS 2080, 2100, 2210, 2230, or any courses at 3000 level or above in BCHM, BIOE, BIOL, CH, GEN, MATH, MICR, PHYS, and STAT. Other courses must be approved by advisor. A maximum of nine credit hours from undergraduate research courses (4910, creative inquiry or similar courses) may be used towards the combined science and genetics requirements.

[4]AVS 4700, BCHM 4310, 4320, 4330, 4340, 4360, 4430, 4910, BIOL 3350, 4400, 4500, (PLPA) 4540, 4560, 4570, GEN 4700, 4910, MICR 3050, 4150, 4170, PES 4050.

[5]Two semesters of a modern language are strongly recommended. See Modern Languages Requirement at Clemson University statement on page 27.

Notes:
1. A student is allowed to enroll in science and mathematics courses only when all prerequisites have been passed with a grade of C or better.
2. A minimum grade of C is required in all science and mathematics courses. No student may exceed a maximum of two attempts, excluding a *W*, to complete successfully any science or mathematics course.

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 Arts

Freshman Year
First Semester
4 - MATH 1060 Calculus of One Variable I
3 - Modern Language Requirement[1]
6 - Social Science Requirement[2]
1 - Elective
14

Second Semester
3 - ENGL 1030 Composition and Rhetoric
4 - MATH 1080 Calculus of One Variable II
3 - Computer Science Requirement[3]
3 - Modern Language Requirement[1]
3 - Science and Technology in Society Req.[4]
16

Sophomore Year
First Semester
4 - MATH 2060 Calculus of Several Variables
1 - MATH 2500 Intro. to Mathematical Sciences
3 - MATH 3600 Intermed. Math. Computing *or*
   3 - EDSC 4370 Technology in Sec. Math.
3 - Arts and Humanities (Literature) Requirement[4]
3 - Cross-Cultural Awareness Requirement[4]
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[4]
3 - Minor Requirement[5] *or*
   3 - Second Major Requirement
16

Junior Year
First Semester
3 - MATH 3190 Introduction to Proof
3 - Advanced Writing Requirement[6]
3 - Math Science Requirement[7]
4 - Natural Science Requirement[4]
3 - Elective
16

Second Semester
3 - COMM 2500 Public Speaking
3 - MATH 4120 Introduction to Modern Algebra
3 - Minor Requirement[5] *or*
   3 - Second Major Requirement
4 - Natural Science Requirement[4]
3 - Elective
16

Senior Year
First Semester
3 - MATH 4530 Advanced Calculus I
3 - Capstone Experience[8]
3 - Minor Requirement[5] *or*
   3 - Second Major Requirement
3 - Math Science Requirement[7]
3 - Elective
15