BIOMEDICINE
CONCENTRATION
The Biomedicine curriculum with a Biomedicine Concentration is recommended for students planning to apply to medical/dental schools. It is especially suited for students interested in the study of infectious disease.

Freshman Year
First Semester
1 - BIOL 1010 Frontiers in Biology I
5 - BIOL 1100 Principles of Biology I
4 - CH 1010 General Chemistry
4 - MATH 1060 Calculus of One Variable I
3 - Oral Communication Requirement

Second Semester
5 - BIOL 1110 Principles of Biology II
4 - CH 1020 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
3 - Mathematical Sciences Requirement

Sophomore Year
First Semester
3 - CH 2230 Organic Chemistry
1 - CH 2270 Organic Chemistry Lab.
3 - ENGL 3150 Scientific Writing and Comm.
3 - Arts and Humanities (Literature) Requirement
3 - Social Science Requirement
3 - Elective

Second Semester
3 - BCHM 3010 May be substituted.
3 - BCHM 4400, BIOL 3150, 3160, 3940, 4910, 4940, or 4950.
3 - BCHM 3020 or STAT 2300 or other approved coursework.

Junior Year
First Semester
3 - BIOL 4610 Cell Biology
2 - BIOL 4620 Cell Biology Lab.
3 - MICR 4010 Microbial Diversity and Ecology
3 - PHYS 2070 General Physics I
1 - PHYS 2090 General Physics I Lab.
3 - Biomedicine Requirement

Second Semester
3 - MICR 4120 Bacterial Physiology
2 - MICR 4500 Advanced Micro Lab I
3 - PHYS 2080 General Physics II
1 - PHYS 2100 General Physics II Lab.
3 - Social Science Requirement
3 - Elective

Senior Year
First Semester
3 - MICR 4140 Basic Immunology
3 - MICR 4145 Microbial Genetics
3 - MICR 4160 Introductory Virology
3 - MICR 4510 Advanced Micro Lab II
3 - Biomedicine Requirement

Second Semester
2 - BIOL 4930 Senior Seminar or
2 - MICR 4930 Senior Seminar
3 - MICR 4190 Pathogenic Bacteriology
3 - MICR 4170 Cancer and Aging
2 - MICR 4520 Advanced Micro Lab III
3 - Biomedicine Requirement
3 - Elective
16
125 Total Semester Hours

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

Bachelor of Arts

Double Major in Physics/Science Teaching—Physics

Sophomore Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
4 - MATH 1060 Calculus of One Variable I
3 - PHYS 1220 Physics with Calculus I
1 - PHYS 1240 Physics Lab. I

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

Junior Year
First Semester
3 - PHYS 3100 Intro. to Ordinary Diff. Equations
3 - PHYS 3110 Intro. to Meth. of Theoretical Phys.
4 - Modern Language Requirement
3 - Oral Communication Requirement

Second Semester
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2220 Physics with Calculus III
2 - PHYS 3000 Introduction to Research
3 - PHYS 3250 Experimental Physics I
4 - Modern Language Requirement

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

120 Total Semester Hours
*See General Education Requirements. Three of these credit hours must also satisfy the Science and Technology in Society Requirement.

Sophomore Year
First Semester
3 - PHYS 2210 Physics with Calculus II
4 - MATH 1080 Calculus of One Variable II
4 - CH 1020 General Chemistry
Second Semester
1 - PHYS 1240 Physics Lab I
3 - PHYS 1220 Physics with Calculus I
3 - ENGL 1030 Composition and Rhetoric
4 - CH 1010 General Chemistry
15

Bachelor of Science
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 Composition and Rhetoric
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

Second Semester
120 Total Semester Hours
*See General Education Requirements. Three of these credit hours must also satisfy the Science and Technology in Society Requirement.

Sophomore Year
First Semester
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2220 Physics with Calculus III
2 - PHYS 3000 Introduction to Research
3 - PHYS 3250 Experimental Physics I
4 - Modern Language Requirement
16

Second Semester
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - PHYS 3110 Intro. to Meth. of Theoretical Phys.
3 - PHYS 3260 Experimental Physics II
4 - Modern Language Requirement
14

Junior Year
First Semester
3 - PHYS 3120 Methods to Theoretical Physics II
3 - PHYS 3150 Intro. to Computational Physics
3 - PHYS 3210 Mechanics I
3 - Emphasis Area Requirement
3 - Oral Communication Requirement
15

Second Semester
3 - PHYS 3220 Mechanics II
3 - PHYS 4650 Thermodynamics and Statistical Mechanics
3 - Emphasis Area Requirement
3 - Physics Writing Requirement
3 - Science Requirement
15

Senior Year
First Semester
3 - PHYS 4010 Senior Thesis
3 - PHYS 4410 Electromagnetics I
3 - PHYS 4550 Quantum Physics I
3 - Arts and Humanities (Literature) Requirement
3 - Emphasis Area Requirement
15

Second Semester
3 - HIST 1720 The West and the World I or 3 - HIST 1730 The West and the World II
3 - PHYS 4420 Electromagnetics II
3 - PHYS 4560 Quantum Physics II
3 - Emphasis Area Requirement
3 - Social Science Requirement
15

120 Total Semester Hours
*See General Education Requirements. Three of these credit hours must also satisfy the Science and Technology in Society Requirement.

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

Freshman Year
First Semester
4 - CH 1010 General Chemistry
3 - ENGL 1030 Composition and Rhetoric
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
5 - BIOL 1100 Principles of Biology
4 - MATH 2060 Calculus of Several Variables
3 - PHYS 2220 Physics with Calculus III
2 - PHYS 3000 Introduction to Research
3 - PHYS 3250 Experimental Physics I
17

Second Semester
4 - MATH 2080 Intro. to Ordinary Diff. Equations
3 - PHYS 3110 Intro. to Meth. of Theoretical Phys.
3 - PHYS 3260 Experimental Physics II or 3 - Science Requirement
4 - Biophysics Requirement
14

Junior Year
First Semester
3 - PHYS 3120 Methods of Theoretical Physics II
3 - PHYS 3150 Intro. to Computational Physics
3 - PHYS 3210 Mechanics I
3 - Emphasis Area Requirement
3 - Biophysics Requirement
16

Second Semester
3 - PHYS 3220 Mechanics II
3 - PHYS 4650 Thermodynamics and Statistical Mechanics
3 - Biophysics Requirement
4 - Modern Language Requirement
4 - Oral Communication Requirement
16

*ENGL 3040, 3120, 3140, 3150, 3450, 3460, 3480, ML 4020, or THEA (ENGL) 3470

Any 2000–4000 level science course
Senior Year
First Semester
- PHYS 4410 Electromagnetics I
- PHYS 4550 Quantum Physics I
- Arts and Humanities (Literature) Requirement
- Biophysics Requirement
- Physics Writing Requirement
15

Second Semester
- HIST 1720 The West and the World I or
- HIST 1730 The West and the World II
- PHYS 4420 Electromagnetics II
- PHYS 4560 Quantum Physics II
- Biophysics Requirement
- Social Science Requirement
15
123 Total Semester Hours

*See General Education Requirements. Three of these credit hours must also satisfy the Science and Technology in Society Requirement.

**Select from AVS 4140, 4800, ENR 4130 ENT 4000, 4150, 4160, 4690, ETOX 4300, GEN 4050, MICR 4140, PLPH 3400, WFBI 3130, 4690, or any 2000–4000-level course in ASTR, BCHM, BICL, CH, GEOL, PHYS (except PHYS 2000, 2070, 2080, 2090, 2100)

**Select six credits from any 2000–4000 level BICL course (except BICL 2000, 2030); and ten additional credits from AVS 4140, 4800, BCHM 3010, 4300, 4320, 4400, 4450, BIOE 2030, 3020, 3200, 3700, BICL, 4040, 4100, 2050, 2060, 2100, 2200, 2220, 2350, any 3000–4000-level BICL course, CH 2230, 2240, 3310, 3320, 4040, 4110, 4120, 4270, 4350, EES 4020, 4100, 4110, 4580, ENT 3020, 4000, 4150, 4360, 4690, ENR 4130, ETOX 4300, GEN 3020, 3030, 4050, 4100, 4110, 4500, 4700, HORT 4650, MICR 1050, 4110, 4140, 4150, 4610, 4710, 4790, MATH 3020, 4020, 4340, 4350, 4530, 4540, PHYS 3260, 4110, 4710, 4730, PLPH 3460, STAT 3360, WFB 3130, 4690

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

**ENGL 3040, 3120, 3140, 3150, 3450, 3460, 3480, ML 4020, or THEA (ENGL) 3470

INTERDISCIPLINARY EMPHASIS AREA

Students who select the Bachelor of Science degree in Physics with an interdisciplinary emphasis supplement their study of physics with core courses in complementary fields of study. This emphasis area is an excellent option for students preparing for direct entry into the job market or for medical, law or business school. Depending on a student’s academic goals, it may also be a good option for students preparing for graduate school or for those pursuing both a major and minor or a double major.

Because students choosing the interdisciplinary emphasis have a wide variety of academic and career goals, and because the interdisciplinary emphasis requirements cannot be tracked via Clemson’s degree audit system, detailed departmental advising is vital. Students, in consultation with their advisor, must select a technical or professional emphasis area subject to departmental approval no later than the end of the second semester of their sophomore year.

Additionally, all potential prerequisite courses for a minor should be completed in the student’s first or second year. For additional information, please visit http://physics.clemson.edu.

Note: Student transcripts record a Bachelor of Science in Physics; the interdisciplinary emphasis area is not included on transcripts.

Freshman Year
First Semester
- CH 1020 General Chemistry
- ENGL 1030 Composition and Rhetoric
- MATH 1060 Calculus of One Variable I
- PHYS 1220 Physics with Calculus I
- PHYS 1240 Physics Lab I
15

Second Semester
- CH 1020 General Chemistry
- MATH 1060 Calculus of One Variable II
- PHYS 2210 Physics with Calculus II
- PHYS 2230 Physics Lab II
- Arts and Humanities (Non-Lit.) Requirement
15

Sophomore Year
First Semester
- MATH 2060 Calculus of Several Variables
- PHYS 2220 Physics with Calculus III
- PHYS 3000 Introduction to Research
- PHYS 3250 Experimental Physics I
- Emphasis Area Requirement
15

Second Semester
- MATH 2080 Intro to Ordinary Diff. Equations
- PHYS 3110 Intro to Meth. of Theoretical Phys.
- PHYS 3260 Experimental Physics II
- Emphasis Area Requirement
- Physics Writing Requirement
16

Junior Year
First Semester
- PHYS 3150 Intro. to Computational Physics
- PHYS 3210 Mechanics I
- Emphasis Area Requirement
- Modern Language Requirement
- Oral Communication Requirement
16

Second Semester
- PHYS 3220 Mechanics II
- PHYS 4650 Thermodynamics and Statistical Mechanics
- Emphasis Area Requirement
- Modern Language Requirement
- Science Requirement
16

Senior Year
First Semester
- PHYS 4010 Senior Thesis
- PHYS 4410 Electromagnetics I
- PHYS 4550 Quantum Physics I
- Arts and Humanities (Literature) Requirement
- Emphasis Area Requirement
15

Second Semester
- HIST 1720 The West and the World I or
- HIST 1730 The West and the World II
- Emphasis Area Requirement
- Social Science Requirement
12
120 Total Semester Hours

Other introductory courses, such as CPSC 1010 or 1020, may be chosen with departmental approval.

See General Education Requirements. Three of these credit hours must also satisfy the Science and Technology in Society Requirement.

See advisor. Twenty-one credit hours, with at least nine at the 3000-4000 level, are required. Courses and emphasis area must be approved by the department. Note: Requirements for a minor may be satisfied with these courses. Emphasis area and courses of study must be approved by the end of sophomore year.

**ENGL 3040, 3120, 3140, 3150, 3450, 3460, 3480, ML 4020, or THEA (ENGL) 3470

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

Any 2000–4000-level science course in ASTR, BIOL, CH, ENSF, GEOL, PHYS, or STS. Other science courses require departmental approval.

*Students may select an approved synthesis or capstone course or directed research in their emphasis area. Students in the honors program must complete a senior thesis in physics.

Combined Bachelor’s/Master’s Plan

Under this plan, students may reduce the time necessary to earn both degrees by applying graduate credits to both undergraduate and graduate program requirements. Both BS/MS (Master of Science) and BS/MA (Master of Arts in Teaching) plans are available.

Students are encouraged to obtain the specific requirements for pursuing the combined degree from the Department of Physics and Astronomy (www.physics.clemson.edu) as early as possible in their undergraduate program. Enrollment guidelines and procedures can be found under Academic Regulations in this catalog.

PREPROFESSIONAL STUDIES—PREPHARMACY

Non-degree

The Prepharmacy program requires 90 credits of general education requirements and typical prerequisites for PharmD programs. Upon completion of the necessary prerequisites, students will be eligible to apply to a school of pharmacy, typically at the conclusion of their second year at Clemson. Students who complete the 90-credit program at Clemson and a full year of coursework at an accredited school of pharmacy are eligible to apply for the Bachelor of Science in Preprofessional Studies for an August graduation at the earliest. The degree in Pharmacy is not awarded by Clemson. It is important for students to work closely with their advisor, as there are variations in courses required by pharmacy schools. For financial aid purposes, students in the Prepharmacy program are considered to be enrolled in a degree-seeking program.

Alternatively, students may also choose to enroll in a content-specific major while accommodating the prerequisite coursework of their particular pharmacy schools of interest. In this case, students would apply to a school of pharmacy at the conclusion of their third year at Clemson. Pharmacy schools typically specify only a few required courses to allow latitude for developing individualized undergraduate programs of study. Interested students are encouraged to consult with Health Professions advising, as well as the individual schools to which they hope to apply in order to identify the appropriate coursework. These schools are not as concerned about a student’s major as they are about academic performance in whichever curriculum