Undergraduate Handbook

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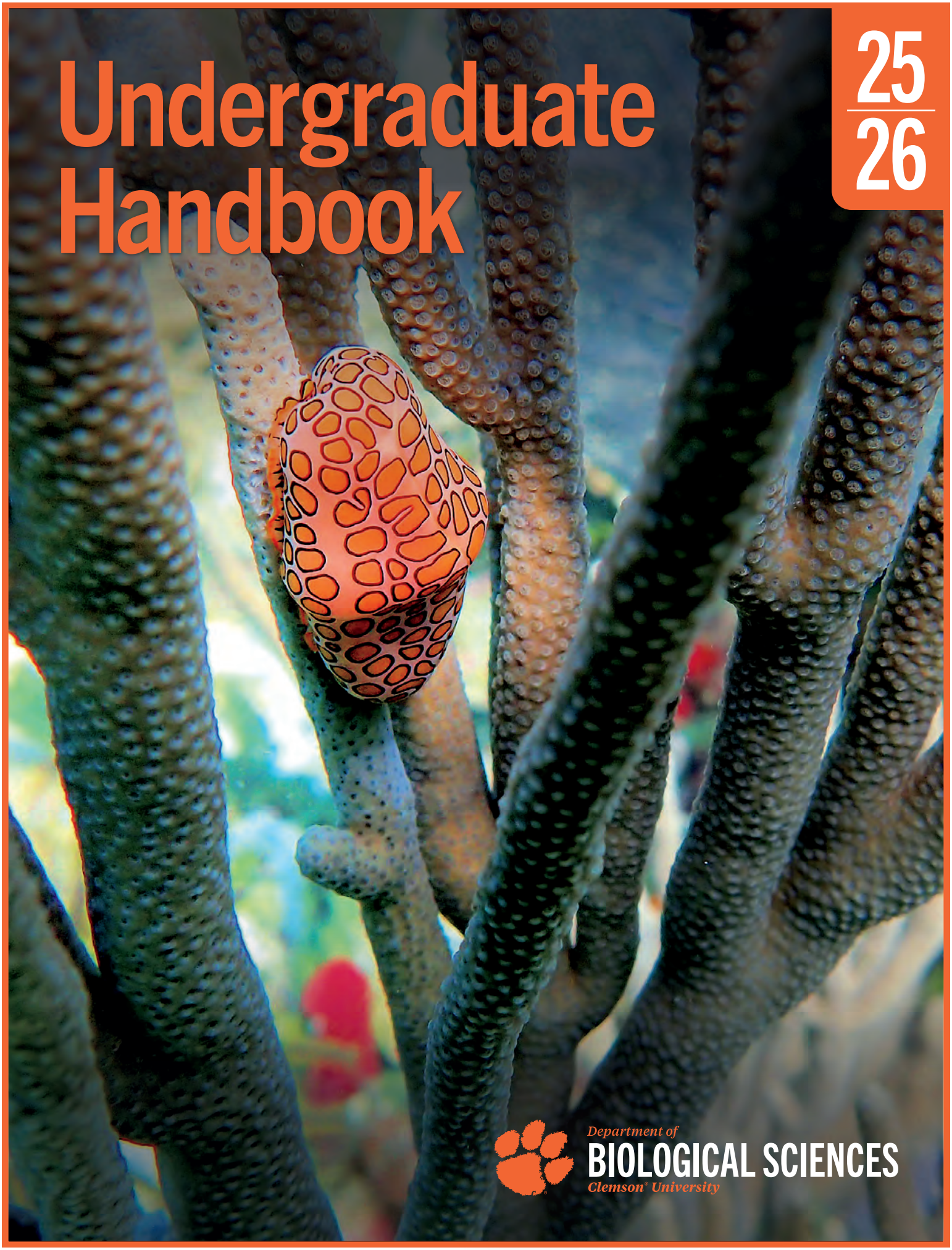

Department of
BIOLOGICAL SCIENCES
Clemson University

Cover Photo courtesy of Tokea “Kea” Payton Ph.D. '24.

Cover image was taken with an Olympus TG-6 camera at a reef site regularly surveyed during my dissertation research in the Florida Keys National Marine Sanctuary. While my study focused on marine invertebrates colonizing marine debris, I often documented and observed native invertebrates found on natural substrates. Pictured here is a *Cyphoma gibbosum* (flamingo tongue), a soft-coral-feeding corallivorous snail typically found on gorgonians such as the sea rod shown.

CONTENTS:

CONTACT INFORMATION

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Advisor	G. Fridley	124 Long Hall	gfridle	656-3830
Advisor	J. Gannon	151 Long Hall	jfganno	656-0838
Advisor	J. Sturman	143 Long Hall	jennafb	656-2416
Special Programs				
Health Professions Advising	H. Williams	102 Long Hall	harolyw	656-4154
MUSC Accelerated Pathways	H. Williams	102 Long Hall	harolyw	656-4154
Pre-Vet. Med.	J. Jones	140 P&A	jerylj	656-2142
Pre-Law	T. Garrison	106 Strode Tower	tagarri	324-4404

Students interested in health profession or veterinary medicine graduate programs should choose a major as soon as possible after entering Clemson and must do so by the end of the first year. Professional School advisors will continue to provide information, advice and help, relative to admission requirements for the appropriate professional school, but students should receive their academic advising within their chosen major to ensure that all Clemson requirements for graduation are met.

Double Major – Science Teaching	J. Garland	105B Gantt Circle	jgarlan	656-3180
Study Abroad Liaison	C. McGill	111 Long Hall	jmcgil2	656-9857
Honors College Liaison	K. Whitehead	150 Long Hall	kwhiteh	
CU Records/Registration Enrolled Student Services		104 Sikes Hall	esstranscripts	656-4146
Center for Career and Professional Development		Hendrix Student Center, 3rd floor	career-L	656-6000

A NOTE TO ALL MAJORS: Please keep this handbook for reference throughout your college career at Clemson University. Requirements may change in the future, but you will only be responsible for those in effect at the time of your entrance – either as a first-year or transfer or as returning student if you leave school for one or more semesters. We have attempted, in this unofficial publication, to be as accurate as possible, but typographical errors or errors of omission are possible. Requirements and courses are officially listed in the Clemson University Undergraduate Announcements 2024-2025, (Clemson University Catalog System)

FACULTY DIRECTORY

Faculty	Office	E-mail (@clemson.edu)
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Jason Fridley	339 Long Hall	JFRIDLE
Vincent Gallicchio	122 Long Hall	VSGALL
Julia George	231 Long Hall	JGEORG4
Chandler Goldman	332B Long Hall	CHGOLDM
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April South	308 Jordan Hall	AHALL34
Lesly Temesvari	255B LSF	LTEMESV
Matthew Turnbull	327 Jordan Hall	TURNBUL
Tzuen-Rong Tzeng	149A LSF	TZUENRT
Peter van den Hurk	237 Long Hall	PVDHURK
Karin Van der Burg	136 Long Hall	KARINV
Yanzhang Wei	055B LSF	YWEI
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Kristi Whitehead	350 Long Hall	KWHITEH
Kelly Willemssens	148 Long Hall	KWILLEM
Casey Youngflesh	206 Long Hall	CYOUNGF

CAREER OPPORTUNITIES

The Biological Sciences and Microbiology curricula have sufficient flexibility to enable the major to obtain coursework relevant to their future. The programs are designed to expose the student to a wide variety of biological areas. Furthermore, the background obtained by Biological Sciences and Microbiology majors enables them to better understand and relate to the modern world with its complex problems, many of which are biological in nature.

Job opportunities exist in both the academic and non-academic communities. Many Biological Sciences and Microbiology majors are employed by industry, environmental engineering and consulting firms, or city, state, and federal agencies. For biologists and microbiologists who enter graduate school and obtain advanced degrees, jobs are available to teach in colleges and universities, as well as research and management opportunities in government and industry.

Career opportunities in biology are exciting and often adventurous. Jobs with universities, state and federal government agencies, the military and private businesses often include a chance to travel and explore exotic regions of the world.

A variety of career objectives is outlined in an American Institute of Biological Sciences publication entitled "Careers in The Biological Sciences." This information is available on-line at Biology Careers. Additional career information for microbiology majors is available at Microbiology Careers

Employment. In the Southeast, jobs are available at agencies such as the Energy Research and Development Administration's (ERDA) Savannah River Ecology Lab at Aiken, SC (SREL), Oak Ridge National Laboratory (TN), Tennessee Valley Authority in Tennessee and North Carolina, Yerkes Primate Center in Atlanta, the Environmental Protection Agency, U.S. Department of Agriculture, Centers for Disease Control and Prevention in Atlanta, GA, Bureau of Sport Fisheries and Wildlife, and many zoos and zoological parks, to list only a few. A more extensive list of potential job opportunities for biologists is as follows: Technician (laboratory/field) in a research laboratory at a University, U.S. Forest Service, industries dependent upon microbiology (e.g., food, fermentation, public health, pharmaceuticals, environmental consulting), Home Land Security, National Park Service, State Park Service, Environmental Protection Agency, both state and federal levels, State Public Health Department (e.g., SC DHEC), sales with a pharmaceutical biotech, or chemical company, underwriter for an insurance company, field/laboratory researcher for a large company/industry that has the potential for pollution of the environment (e.g., Duke Power, Dow Chemical Co., DHEC), genetic counseling, law enforcement (e.g., use of genetics background for DNA finger-printing), scientific illustrator, writer/editor for a popular science publication (e.g., Discover magazine), assistant to an Editor for a scientific journal (e.g., Science), environmental consulting firms, eco-tourism (in tropical countries as a naturalist), Disney World/Land, botanical gardens (e.g., Callaway Gardens), museums (e.g., Smithsonian Institution), zoos (e.g., Riverbanks Zoo in Columbia, SC), optometry, chiropractics, and forensics.

Graduate Programs. In addition to job opportunities immediately upon graduation, the Biological Sciences and Microbiology degrees prepare students for admission into a wide variety of graduate programs in biology, botany, microbiology, and zoology. With a careful selection of courses in allied fields or an emphasis area, a student can prepare for more specialized programs in areas such as cancer biology; regenerative medicine; molecular, cell and developmental biology; bioengineering; bioinformatics; environmental toxicology, plant biology; ecology, conservation biology; evolutionary biology; biomechanics; marine biology; wildlife biology and others. The student's advisor can suggest courses relevant to the student's particular interests and objectives. Upon focusing on an area of study, the student is advised to check the requirements for specific graduate programs at various institutions that he/she might like to attend.

Professional Programs. Doctors, physician assistants, pharmacists, physical therapists and veterinarians are biologists. Some of these health care professionals work directly with patients, while others are involved in the rapidly advancing frontiers of medical research. In both cases, a degree in Biological Sciences or Microbiology is excellent preparation for professional school in the health sciences. In fact, Biological Sciences is one of the most popular majors at Clemson University for students with an interest in human medicine and health care and is one of two majors most selected by students wishing to apply for admission into a school of veterinary medicine.

As an additional aid to students in exploring possible career opportunities available to biologists, a number of informational websites are listed on the next page.

WEBSITES

Careers in Biology – The Society for Integrative and Comparative Biology – Integrative and Comparative Biology

Links to Sites with General Career Information – Links to Many Specific Career Descriptions

Careers in the Biological Sciences – American Institute of Biological Sciences

What to Do with a Biology Degree – Careers

Careers in Microbiology – Microbe World

Careers in Microbiology – American Society for Microbiology

National Academy of Science Career Page – Careers in Science and Engineering

Careernet – links to jobs and career related websites – Careers

Environmental Career Opportunities – The Brubach Corporation, Publishers

Environmental Careers

Science – Career Development Center for Postdocs and Junior Faculty –Life-Science Careers

American Association for the Advancement of Science – Science Careers

Clemson University Center for Career and Professional Development – Careers

INTRODUCTION TO THE CURRICULA

BIOLOGICAL SCIENCES

Biology encompasses the broad spectrum of the modern life sciences, including the study of all aspects of life from the structure and function of the whole organism down to the subcellular levels and up through the interactions of organisms to the integrated existence of life on the entire planet. Descriptive, structural, functional, and evolutionary questions are explored through the hierarchy of the organization of life. Applications of current advances to the health and well-being of humans and society, to nature and the continuation of earth as a balanced ecosystem, and to an appreciation of the place of natural science in our cultural heritage receive emphasis. Majors in Biological Sciences receive classroom, laboratory, and field training in biology with an emphasis on chemistry, mathematics, and physics as necessary tools.

Students are encouraged to undertake research projects with faculty, and students enrolled in the honors program are required to do so with the result being an honors thesis. Research may be performed through individually mentored projects with any faculty conducting biological research regardless of their department. In addition, our department offers a series of creative inquiry (team research) projects each semester. Students are also encouraged to have experience away from Clemson. These experiences might include study abroad programs, internships, or participation in an REU (Research Experience for Undergraduates) program sponsored by the National Science Foundation at many universities.

B.A. Biological Sciences. The Bachelor of Arts in Biological Sciences provides a strong foundation in biology and is ideal for students desiring a liberal education emphasizing an interdisciplinary approach to a thorough understanding of the life sciences. Example careers include the fields of health care, law, policy or secondary science teaching (grades 9-12).

B.S. Biological Sciences. The Bachelor of Science in Biological Sciences is a more comprehensive science degree and prepares students for graduate study in any of the life science areas (such as agricultural sciences, biochemistry, botany, cell and molecular biology, conservation, ecology and environmental science, entomology, forestry, genetics, industrial and regulatory biology, microbiology, morphology, physiology, wildlife biology, and zoology; for the health professions (medicine, dentistry, etc.), veterinary medicine; and for science teaching. This degree offers the opportunity to explore areas of biology and delve deeper into biological questions of interest. A variety of **focus areas** allow students to compete coursework relevant to their career interests.

See page 28 for a comparison of the BIOL B.S. and BIOL B.A. degrees.

DOUBLE MAJOR IN BIOLOGICAL SCIENCES AND SCIENCE TEACHING

To receive a double major in Biological Sciences and Science Teaching, a Change of Academic Program form must be completed to declare both majors. To achieve a double major, the appropriate plan of study listed under Science Teaching must be followed and all major requirements from both programs must be satisfied. The double major prepares students for teaching science on the secondary level (grades 9-12) and graduate work in the respective content field. To be recommended for licensure, students must earn a grade of C or higher in all required science content and education courses.

MICROBIOLOGY

The Microbiology major provides a thorough training in basic microbiological skills. Further, students receive instruction in mathematics, physics, chemistry, and biochemistry, all essential to the training of a modern microbiologist. Students can prepare for a variety of careers through a wide choice of electives. Microbiology graduates may enter graduate school in microbiology, biochemistry, bioengineering, or related disciplines; they may enter medical or dental schools or pursue careers in one of the many industries or public service departments dependent upon microbiology. Some of these are the fermentation and drug industries, medical and public health microbiology, various food industries, and agriculture.

B.S. Microbiology. Microbiology deals with the study of bacteria, viruses, yeasts, filamentous fungi, protozoa, and unicellular algae. Microbiologists seek to describe these organisms in terms of their structures, functions, and processes of reproduction, growth, and death at both the cellular and molecular levels. They are also concerned with their ecology, particularly regarding their pathological effects on humans, and with their economic importance.

B.S. Microbiology - Biomedicine Concentration. The Microbiology curriculum with a Biomedicine Concentration is recommended for students planning postgraduate programs. This concentration is especially suited for students interested in the study of infectious disease and allows students to take more courses related to human health and disease.

Both the standard MICR and the Biomedicine Concentration curricula are excellent courses of study for graduate or professional school. Both require courses in genetics, cell biology, calculus, physics, chemistry including organic, and biochemistry. Both also require microbial diversity and ecology, microbial genetics and bacterial physiology as recommended by the American Society for Microbiology. The standard degree requires a course from a select list in each of the areas of the following areas: (1) biomedicine, (2) environmental microbiology, (3) food safety, industrial and technology, and (4) virology.

See page 29 for a comparison of the MICR B.S. and MICR B.S. - BIOM degrees.

CURRICULA, CHECKLISTS, AND FOCUS AREAS WORKSHEETS

Each curriculum and checklist of courses begin on page 8. Worksheets for focus areas in conservation biology, marine biology, environmental toxicology, neurobiology, pre-medicine, pre-dental, pharmacy, pre-rehabilitation sciences, pre-veterinary medicine, and medical and pharmaceutical sales are on pages 10 -19. **Focus Areas do not represent a degree granting program**. The focus area worksheets list commonly required and recommended courses for each focus area. Please note that entrance requirements for graduate and professional schools vary by institution and should be verified individually.

UNDECLARED MAJOR - COLLEGE OF SCIENCE: PREPROFESSIONAL HEALTH STUDIES

The College of Science Preprofessional Health Studies Undeclared Major is a major, but it is not a degree-granting program. It offers a structured advising program that provides students with the necessary support and strategies to investigate and compare academic disciplines within the College of Science to provide students the opportunity to further explore science majors before making an informed decision about the degree programs they pursue.

The College of Science Preprofessional Health Studies Undeclared Major curriculum provides undecided students the opportunity to explore majors while completing General Education courses alongside prerequisites for their desired health career until they decide on a degree-granting major appropriate to their career goals. Clemson University offers a variety of degree-granting majors ideally suited for students interested in pursuing careers in medicine, dentistry, pharmacy, physical therapy, and more. Keep in mind, some majors are highly competitive, and it is advantageous for students to enroll in a major as soon as possible. For more information on choosing a degree-granting major visit clemson.edu/degrees.

Students interested in attending a health professional school (medical, dental, pharmacy, physical therapy, occupational therapy, physician's assistant, etc.) should choose a potential major to follow while accommodating

the prerequisite coursework of their professional school of interest. Professional health schools typically avoid having long lists of required undergraduate courses in order to allow students a wide latitude for developing individualized programs of study. These schools are not as concerned about a student's major as they are about academic performance in the curriculum the student selects. Performance becomes critical as competition increases for the limited number of places available in professional schools. Students choosing this route apply to a professional school at the conclusion of their third year at Clemson. 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.

The College of Science Preprofessional Health Studies Undeclared Major curriculum offers 90 credits of general education requirements and typical prerequisites for entry into Accelerated Pathways, such as the Medical University of South Carolina or Presbyterian College. Upon completion of the necessary prerequisites, students are eligible to apply to an Accelerated program, 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 health professional school are eligible to apply for the Bachelor of Science in Preprofessional Studies for an August graduation at the earliest (see the Preprofessional Studies section under Graduation Requirements). 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 College of Science Preprofessional Health Studies Undeclared Major are enrolled in a degree-seeking program.

More information regarding Accelerated Pathways can be found at https://www.clemson.edu/science/academics/hpa/.

Students interested in pursuing a competitive entry major are advised to identify a parallel plan to pursue alongside the admissions process. Students interested in pursuing Bachelor of Arts degrees are advised to begin their modern language requirement immediately. First-year students are advised to complete their South Carolina REACH Act Requirement.

To ensure that students graduate in a timely manner, they are strongly advised to declare a major in a degree-granting program by the end of their first year or once they have completed all General Education requirements. At that point, majors typically have specific classes that are recommended or required, and the number of crossover courses applicable to multiple majors begins to decline.

Students who meet academic eligibility requirements may transfer into the College of Science Preprofessional Health Studies Undeclared Major only if they have completed 45 or fewer total credit hours. In addition to credits completed at Clemson University, total credit hours include credit hours transferred from another institution, dual enrollment, Advanced Placement (AP), International Baccalaureate (IB), and credit by exam.

See page 30-31 for the curriculum and checklist of courses, respectively.

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 (see the Preprofessional Health Studies section under Graduation Requirements). 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 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 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 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 the students choose. Performance becomes critical as competition increases for the limited number of places available in pharmacy schools.

See page 32-33 for the curriculum and checklist of courses, respectively.

B. S. BIOLOGICAL SCIENCES 2025/2026

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 1010 Frontiers in Biol. I	1(1,0)	BIOL 1110 Prin. of Biol. II[1]	4(3,3)
BIOL 1100 Prin. of Biol. I[1]	4(3,3)	CH 1020 General Chemistry	4(3,3)
CH 1010 General Chemistry	4(3,3)	ENGL 1030 Composition and Rhetoric	3(3,1)
MATH 1060 Calculus of One Var. I	4(4,0)	Mathematical Sciences Requirement[3]	3
Oral Communication Requirement[2].	3		14
	16		

SOPHOMORE YEAR

CH 2230 Organic Chemistry[4]	3(3,0)	BCHM 3050 Essential Elements of Bioch[7]	3(3,0)
CH 2270 Organic Chemistry Lab[4]	1(0,3)	Arts and Humanities (Literature) Req.[2]	3
GEN 3000 Fundamental Genetics[5]	3(3,0)	Global Challenges Course Requirement[2]	3
Organismal Diversity Requirement[6]	4	Major Requirement[4,8]	4
Elective[7]	3	Social Science Requirement[2]	3
	14		16

JUNIOR YEAR

BIOL 3350 Evolutionary Biology	3(3,0)	PHYS 2080 General Physics II[12]	3(3,0)
BIOL 4610 Cell Biology	3(3,0)	PHYS 2100 General Physics II Lab[12]	1(0,2)
PHYS 2070 General Physics I[9]	3(3,0)	Arts and Humanities (Non-Lit) Req.[2]	3
PHYS 2090 General Physics Lab I[9]	1(0,3)	Functional Biol. Requirement[13]	3
Advanced Lab Requirement[10]	2	Major Requirement[8]	5
Ecology Requirement[11]	3		15
	15		

SENIOR YEAR

BIOL 4930 Senior Seminar or		Major Requirement[8]	6
MICR 4930 Senior Seminar	3(3,0)	Elective	9
Major Requirement[8]	6		15
Social Science Requirement[2]	3		
Elective	3		
	15		

Total Semester Hours = 120

[1] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/BIOL 1050 may substitute for BIOL 1100, and BIOL 1040/BIOL 1060 may substitute for BIOL 1110.

[2] General Education Requirements. The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology. Three of these credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section.

[3] MATH 1080, STAT 2300, or other approved coursework. See advisor. Medical/dental schools have different mathematics requirements. Statistics will be useful in either graduate study or professional school.

[4] CH 2010 and CH 2020 may be substituted. Most professional health sciences schools require two semesters of organic chemistry with laboratory, CH 2230/CH 2270 and CH 2240/CH 2280.

[5] GEN 3020 may be substituted.

[6] At least one lecture and associated laboratory selected from BIOL 3010, BIOL 3020/BIOL 3060, BIOL 3030/BIOL 3070, BIOL 3040/BIOL 3080, BIOL 3200, BIOL 4060/BIOL 4070, BIOL 4250/BIOL 4260.

[7] BCHM 3010 may be substituted.

[8] Twenty-one credit hours from 3000-level or MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4720, or WFB 4770.MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4720, or WFB 4770. **Selections must include at least three laboratory courses**. Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[9] PHYS 1220/PHYS 1240 may be substituted.

[10] At least one course selected from BIOL 4020, BIOL 4030, BIOL 4090, BIOL 4110, BIOL 4240, BIOL 4280, BIOL 4330, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4500, BIOL 4570, BIOL 4600, BIOL 4620, BIOL 4710, BIOL 4760, or BIOL 4820.

[11] At least one course selected from BIOL 4100, BIOL 4410, BIOL 4420, BIOL 4430, BIOL 4460, BIOL 4480, BIOL 4490, BIOL 4700, MICR 4030, or MICR 4040.

[12] PHYS 2210/PHYS 2230 may be substituted.

[13] At least one course selected from BIOL 4040, BIOL 4080, BIOL 4200, BIOL 4210, BIOL 4400, BIOL 4530, BIOL 4590, BIOL 4750, BIOL 4800, BIOL 4830, BIOL 4840, MICR 4140 or MICR 4170.

2025/2026 B.S. BIOLOGICAL SCIENCES CURRICULUM

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**_Grade**
BIOL 1010	1(1,0)	_____	_____
BIOL 1100/1101	4(3,3) [1]	_____	_____
BIOL 1110/1111	4(3,3) [1]	_____	_____
BIOL 3350	3(3,0)	_____	_____
BIOL 4610	3(3,0)	_____	_____
BIOL 4930 **OR** MICR 4930	3(3,0) [2]	_____	_____
Organismal Diversity Requirement **(4 cr.)** BIOL 3010/3011, 3020/3060, 3030/3070, 3040/3080, 3200/3201, 4060/4070, **OR** 4250/4260		_____	_____
Ecology **(3 cr.)** BIOL 4100, 4410, 4420, 4430, 4460, 4480, 4490, 4700, MICR 4030, **OR** 4040		_____	_____
Functional Biology Requirement **(3 cr.)** BIOL 4040, 4080, 4200, 4210, 4400, 4530**,** 4590, 4750, 4800, 4830, 4840, MICR 4140, **OR** MICR 4170		_____	_____
Advanced Lab Requirement **(2 cr.)** [3]			
_____		_____	_____
Major Requirement: (21 cr.) [4]			
Laboratory Course req. _____		_____	_____
Laboratory Course req. _____		_____	_____
*Laboratory Course req.*_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
Required Science Courses (33 cr.)			
BCHM 3050	3(3,0)	_____	_____
CH 1010/1011	4(3,3)	_____	_____
CH 1020/1021	4(3,3)	_____	_____
CH 2230, 2270 **OR** CH 2010, CH 2020	3(3,0) **&** 1(0,3) [5]	_____	_____
GEN 3000	3(3,0)	_____	_____
MATH 1060	4(4,0)	_____	_____
MATH 1080 **OR** STAT 2300	4(4,0) 3(3,0) [6]	_____	_____
PHYS 2070, 2090	3(3,0) **&** 1(0,2) [7]	_____	_____
PHYS 2080, 2100	3(3,0) **&** 1(0,2) [7]	_____	_____
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)	_____	_____
Arts & Humanities – Literature	3(3,0) [8]	_____	_____
Arts & Humanities – Non-Literature	3(3,0) [8]	_____	_____
Oral Communication	3(3,0) [8]	_____	_____
Social Sciences			
_____	3(3,0) [8,9]	_____	_____
_____	3(3,0) [8,9]	_____	_____

[1] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIOL 4090, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. **Selections must include at least three laboratory courses not used to satisfy other requirements.**

BIOL 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970

CH 2280

MICR 3060, 4070, 4130, 4500, 4510

WFB 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[5] Most medical, dental, and veterinary medicine schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280, rather than a one semester survey of organic chemistry (CH 2010/2020)

[6] Statistics will be useful in both graduate school and professional school.

[7] Students may choose to take physics with calculus, PHYS 1220, 1240 (MATH 1060 pre-req.) & PHYS 2210, 2230 (MATH 1080 pre-req).

[8] See General Education Requirements.

[9] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[10] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

Other Courses	**SEM/Yr**	**Grade**
CU 1000 _____	____	____
GLCH _____	____	____
SC REACH [10] _____	____	____
Electives (15 cr.)		
_____	_____	_____
_____	_____	____
_____	_____	____
_____	_____	____
_____	_____	____
_____	_____	____

Total Semester Hours = 120

2025/2026 B.S. BIOLOGICAL SCIENCES CONSERVATION BIOLOGY FOCUS AREA

Recommended Courses. Worksheets are not for a degree-granting program.

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**_Grade**
BIOL 1010	1(1,0)	_____	_____
BIOL 1100/1101	4(3,3) [1]	_____	_____
BIOL 1110/1111	4(3,3) [1]	_____	_____
BIOL 3350	3(3,0)	_____	_____
BIOL 4610	3(3,0)	_____	_____
BIOL 4930 **OR** MICR 4930	3(3,0) [2]	_____	_____
Organismal Diversity Requirement **(4 cr.)**			
BIOL 3010/3011, 3020/3060, 3030/3070, 4060/4070, **OR** 4250/4260		_____	_____
Ecology **(3 cr.)**			
BIOL 4410 Ecology **OR** BIOL 4430 Freshwater Ecology	3(3,0)	_____	____
Functional Biology Requirement **(3 cr.)**			
BIOL 4040 Plant Physiology **OR** BIOL 4750 Comparative Physiology	3(3,0)	_____	_____
Advanced Lab Requirement (2 cr.) [3]			
BIOL 4450/4451 Ecology Laboratory **OR** BIOL 4440/4441 Freshwater Ecology Lab	2(1,2)	_____	_____
Major Requirement: (21 cr.) [4]			
Laboratory Course req. BIOL 3080	1(0,3)	_____	_____
Laboratory Course req. BIOL 4131	0(0,3)	_____	_____
Laboratory Course req. BIOL 4710	2(1,2)	_____	_____
BIOL 3040 Biology of Plants	3(3,0)	_____	_____
BIOL (WFB) 3130 Conserv. Biol.	3(3,0)	_____	_____
BIOL (ENR) 4130 Restoration Ecol.	3(2,3)	_____	_____
BIOL 4460 Plant Ecology	3(3,0)	_____	_____
BIOL 4700 Behavioral Ecology	3(3,0)	_____	_____
BIOL (WFB) 4640 Mammalogy	4(3,3)	_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
Required Science Courses (33 cr.)			
BCHM 3050	3(3,0)	_____	_____
CH 1010/1011	4(3,3)	_____	_____
CH 1020/1021	4(3,3)	_____	_____
CH 2230, 2270 **OR** CH 2010, CH 2020	3(3,0) **&** 1(0,3) [5]	_____	_____
GEN 3000	3(3,0)	_____	_____
MATH 1060	4(4,0)	_____	_____
STAT 2300	3(3,0) [6]	_____	_____
PHYS 2070, 2090	3(3,0) **&** 1(0,2) [7]	_____	_____
PHYS 2080, 2100	3(3,0) **&** 1(0,2) [7]	_____	_____
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)	_____	_____
Arts & Humanities – Literature	3(3,0) [8]	_____	_____
Arts & Humanities – Non-Literature	3(3,0) [8]	_____	
Oral Communication	3(3,0) [8]	_____	_____
Social Sciences			
SOC 2010 Intro to Sociology	3(3,0) [8,9]	_____	_____
_____	3(3,0) [8,9]	_____	_____

[1] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIOL 4090, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. **Selections must include at least three laboratory courses not used to satisfy other requirements.**

BIOL 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970

CH 2280

MICR 3060, 4070, 4130, 4500, 4510

WFB 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[5] Most medical, dental, and veterinary medicine schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280, rather than a one semester survey of organic chemistry (CH 2010/2020)

[6] Statistics will be useful in both graduate school and professional school.

[7] Students may choose to take physics with calculus, PHYS 1220, 1240 (MATH 1060 pre-req.) & PHYS 2210, 2230 (MATH 1080 pre-req).

[8] See General Education Requirements.

[9] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[10] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

Other Courses	**SEM/Yr**	**Grade**
CU 1000 _____	____	____
GLCH _____	____	____
SC REACH [10] _____	____	____

Electives (15 cr.)

STAT 3300 Stat Meth II 3(3,0)	_____	_____
_____	____	____
_____	____	____
_____	____	____
_____	____	____
_____	____	____

Total Semester Hours = 120

2025/2026 B.S. BIOLOGICAL ENVIRONMENTAL SCIENCES TOXICOLOGY FOCUS AREA

Recommended Courses. Worksheets are not for a degree-granting program

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**_Grade**
BIOL 1010	1(1,0)	_____	_____
BIOL 1100/1101	4(3,3) [1]	_____	_____
BIOL 1110/1111	4(3,3) [1]	_____	_____
BIOL 3350	3(3,0)	_____	_____
BIOL 4610	3(3,0)	_____	_____
BIOL 4930 OR MICR 4930	3(3,0) [2]	_____	_____
Organismal Diversity Requirement **(4 cr.)**			
BIOL 3010/3011, 3030/3070, 3040/3080, 3200/3201, 4060/4070, **OR** 4250/4260		_____	_____
Ecology **(3 cr.)**			
BIOL 4100, 4410, 4420, 4430, 4460, 4700, MICR 4030, **OR** 4040		_____	_____
Functional Biology Requirement **(3 cr.)** [3]			
BIOL 4040, 4080, 4200, 4210, 4400, 4530, 4590, 4750, 4800, 4830, 4840, MICR 4140 **OR** 4170		_____	_____
Advanced Lab Requirement **(2 cr.)** [3]			
_____		_____	_____
Major Requirement: (21 cr.) [4]			
Laboratory Course req. _____		_____	_____
Laboratory Course req. _____		_____	_____
*Laboratory Course req.*_____		_____	_____
BIOL 3110 General Toxicology	3(3,0)	_____	_____
ETOX 4300 Toxicology	3(3,0)	_____	_____
ETOX 4370 Ecotoxicology	3(3,0)	_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
Required Science Courses (33 cr.)			
BCHM 3050	3(3,0)	_____	_____
CH 1010/1011	4(3,3)	_____	_____
CH 1020/1021	4(3,3)	_____	_____
CH 2230, 2270 **OR** CH 2010, CH 2020	3(3,0) **&** 1(0,3) [5]	_____	_____
GEN 3000	3(3,0)	_____	_____
MATH 1060	4(4,0)	_____	_____
MATH 1080 **OR** STAT 2300	4(4,0) 3(3,0) [6]	_____	_____
PHYS 2070, 2090	3(3,0) **&** 1(0,2) [7]	_____	_____
PHYS 2080, 2100	3(3,0) **&** 1(0,2) [7]	_____	_____
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)	_____	_____
ENGL 3150 **OR** 3140	3(3,0)	_____	_____
Arts & Humanities – Literature	3(3,0) [8]	_____	_____
Arts & Humanities – Non-Literature	3(3,0) [8]	_____	_____
Oral Communication Requirement	3(3,0) [8]	_____	_____
Social Sciences			
_____	3(3,0) [8,9]	_____	_____
_____	3(3,0) [8,9]	_____	_____

[1] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIOL 4090, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. **Selections must include at least three laboratory courses not used to satisfy other requirements.**

BIOL 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970

CH 2280

MICR 3060, 4070, 4130, 4500, 4510

WFB 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[5] Most medical, dental, and veterinary medicine schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280, rather than a one semester survey of organic chemistry (CH 2010/2020)

[6] Statistics will be useful in both graduate school and professional school.

[7] Students may choose to take physics with calculus, PHYS 1220, 1240 (MATH 1060 pre-req.) & PHYS 2210, 2230 (MATH 1080 pre-req).

[8] See General Education Requirements.

[9] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[10] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

Other Courses	**SEM/Yr**	**Grade**
CU 1000_____	____	____
GLCH _____	____	____
SC REACH [10] _____	____	____

Electives (15 cr.)		
CH 3130 Quant. Analysis 3(3,0)	_____	____
CH 3150 Quant. Anal Lab 2(0,6)	_____	____
CH 4130 Aqueous Sys **OR** ETOX 4210 Envir. Sys 3(3,0)	_____	____
_____	____	____
_____	____	____
_____	____	____

Total Semester Hours = 120

2025/2026 B.S. BIOLOGICAL SCIENCES MARINE BIOLOGY FOCUS AREA

Recommended Courses. Worksheets are not for a degree-granting program

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**_Grade**
BIOL 1010	1(1,0)	_____	_____
BIOL 1100/1101	4(3,3) [1]	_____	_____
BIOL 1110/1111	4(3,3) [1]	_____	_____
BIOL 3350	3(3,0)	_____	_____
BIOL 4610	3(3,0)	_____	_____
BIOL 4930 **OR** MICR 4930	3(3,0) [2]	_____	_____
Organismal Diversity Requirement **(4 cr.)**			
BIOL 3020/3060 Invertebrate Biol.	4(3,3)	_____	_____
Ecology **(3 cr.)**			
BIOL 4480 Marine Ecology	3(3,0)	_____	_____
Functional Biology Requirement **(3 cr.)**			
BIOL 4750 Comparative Physiology	3(3,0)	_____	_____
Advanced Lab Requirement **(2 cr.)** [3]		_____	_____
BIOL 4440/4441 Freshwater Ecol. Lab	2(1,2)	_____	_____
Major Requirement: (21 cr.) [4]			
Laboratory Course req. BIOL 3070	1(0,3)	_____	_____
Laboratory Course req. BIOL 4771	0(0,3)	_____	_____
Laboratory Course req. BIOL 4710	2(1,2)	_____	_____
BIOL 3030 Vertebrate Biology	3(3,0)	_____	_____
BIOL 4430 Freshwater Ecology	3(3,0)	_____	_____
BIOL 4700 Behavioral Ecology	3(3,0)	_____	_____
BIOL (WFB) 3130 Conservation Biol.	3(3,0)	_____	_____
BIOL (WFB) 4770/4771 Ichthyology	3(2,3)	_____	_____
Marine Biology	3(3,0)	_____	_____
_____		_____	_____
Required Science Courses (33 cr.)			
BCHM 3050	3(3,0)	_____	_____
CH 1010/1011	4(3,3)	_____	_____
CH 1020/1021	4(3,3)	_____	_____
CH 2230, 2270 **OR** CH 2010, CH 2020	3(3,0) **&** 1(0,3) [5]	_____	_____
GEN 3000	3(3,0)	_____	_____
MATH 1060	4(4,0)	_____	_____
STAT 2300	3(3,0) [6]		
PHYS 2070, 2090	3(3,0) **&** 1(0,2) [7]	_____	_____
PHYS 2080, 2100	3(3,0) **&** 1(0,2) [7]	_____	_____
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)	_____	_____
Arts & Humanities – Literature	3(3,0) [8]	_____	_____
Arts & Humanities – Non-Literature	3(3,0) [8]	_____	_____
Oral Communication	3(3,0) [8]	_____	_____
Social Sciences			
_____	3(3,0) [8,9]	_____	_____
_____	3(3,0) [8,9]	_____	_____

[1] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIOL 4090, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. **Selections must include at least three laboratory courses not used to satisfy other requirements.**

BIOL 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970

CH 2280

MICR 3060, 4070, 4130, 4500, 4510

WFB 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[5] Most medical, dental, and veterinary medicine schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280, rather than a one semester survey of organic chemistry (CH 2010/2020)

[6] Statistics will be useful in both graduate school and professional school.

[7] Students may choose to take physics with calculus, PHYS 1220, 1240 (MATH 1060 pre-req.) & PHYS 2210, 2230 (MATH 1080 pre-req).

[8] See General Education Requirements.

[9] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[10] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

Other Courses		**SEM/Yr**	**Grade**
CU 1000	_____	____	____
GLCH	_____	____	____
SC REACH [10]	_____	____	____
Electives (15 cr.)			
STAT 3300 Stat Meth II	3(3,0)	____	____
_____		____	____
_____		____	____
_____		____	____
_____		____	____

Total Semester Hours = 120

2025/2026 B.S. BIOLOGICAL SCIENCES MEDICAL & PHARMACEUTICAL SALES FOCUS AREA

Recommended Courses. Worksheets are not for a degree-granting program

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**Grade**
BIOL 1010	1(1,0)	_____	_____
BIOL 1100/1101	4(3,3) [1]	_____	_____
BIOL 1110/1111	4(3,3) [1]	_____	_____
BIOL 3350	3(3,0)	_____	_____
BIOL 4610	3(3,0)	_____	_____
BIOL 4930 **OR** MICR 4930	3(3,0) [2]	_____	
Organismal Diversity Requirement **(4 cr.)**			
BIOL 3030/3070 Vertebrate Biology	4(3,3)	_____	_____
Ecology **(3 cr.)**			
BIOL 4700 Behavioral Ecology	3(3,0)	_____	_____
Functional Biology Requirement **(3 cr.)**			
BIOL 4750 Comparative Physiology	3(3,0)	_____	_____
Advanced Lab Requirement **(2 cr.)** [3]			
BIOL 4760/4761 Comp Phys. Lab	2(1,2)	_____	_____
Major Requirement: (21 cr.) [4]			
Laboratory Course req. BIOL 3151	0(0,3)	_____	_____
Laboratory Course req. BIOL 3161	0(0,3)	_____	_____
Laboratory Course req. MICR 3060	1(0,3)	_____	_____
BIOL 3110 General Toxicology	3(3,0)	_____	_____
BIOL 3150 Funct. Human Anatomy	4(3,3)	_____	_____
BIOL 3160 Human Physiology	4(3,3)	_____	_____
BIOL 3400 Medical Botany	3(3,0)	_____	_____
BIOL 4200 Neurobiology	3(3,0)	_____	_____
BIOL 4300 Toxicology	3(3,0)	_____	_____
BIOL 4800 Vertebrate Endocrin.	3(3,0)	_____	_____
MICR 3050 General Microbiology	3(3,0)	_____	_____
Required Science Courses (33 cr.)			
BCHM 3050	3(3,0)	_____	_____
CH 1010/1011	4(3,3)	_____	_____
CH 1020/1021	4(3,3)	_____	_____
CH 2230, 2270 **OR** CH 2010, CH 2020	3(3,0) **&** 1(0,3) [5]	_____	_____
GEN 3000	3(3,0)	_____	_____
MATH 1060	4(4,0)	_____	_____
MATH 1080 **OR** STAT 2300	4(4,0) 3(3,0) [6]	_____	_____
PHYS 2070, 2090	3(3,0) **&** 1(0,2) [7]	_____	_____
PHYS 2080, 2100	3(3,0) **&** 1(0,2) [7]	_____	_____
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)	_____	_____
Arts & Humanities – Literature	3(3,0) [8]	_____	_____
Arts & Humanities – Non-Literature	3(3,0) [8]	_____	_____
Oral Communication	3(3,0) [8]	_____	_____
Social Sciences			
PSYC 2010 Psychology	3(3,0) [8,9]	_____	_____
SOC 2010 Sociology	3(3,0) [8,9]	_____	_____
Electives (15 cr.)			
ECON 2110 Prin. of Microeconomics	3(3,0)	_____	_____
MKT 3010 Principles of Marketing	3(3,0)	_____	_____
_____		_____	_____
_____		_____	_____

[1] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIOL 4090, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. **Selections must include at least three laboratory courses not used to satisfy other requirements.**

- **BIOL** 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970
- **CH** 2280
- **MICR** 3060, 4070, 4130, 4500, 4510
- **WFB** 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[5] Most medical, dental, and veterinary medicine schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280, rather than a one semester survey of organic chemistry (CH 2010/2020)

[6] Statistics will be useful in both graduate school and professional school.

[7] Students may choose to take physics with calculus, PHYS 1220, 1240 (MATH 1060 pre-req.) & PHYS 2210, 2230 (MATH 1080 pre-req).

[8] See General Education Requirements.

[9] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[10] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

Other Courses		**SEM/Yr**	**Grade**
CU 1000	_____	____	____
GLCH	_____	____	____
SC REACH [10]	_____	____	____

Electives Cont'd

MKT 3010 Prin. of Market. (3)	_____	_____
MKT 4200 Prof. Selling (3)	_____	_____
CH 4250 Medicinal Chem. (3)	_____	_____
PHIL 3460 Biomed. Ethics (3)	_____	_____
SOC 3970 Substance Abuse (3)	_____	_____
GEN 2500 Medical Term (2)	_____	_____
_____	_____	_____

Total Semester Hours = 120

2025/2026 B.S. BIOLOGICAL SCIENCES NEUROBIOLOGY FOCUS AREA

Recommended Courses. Worksheets are not for a degree-granting program

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**_Grade**
BIOL 1010	1(1,0)	_____	_____
BIOL 1100/1101	4(3,3) [1]	_____	_____
BIOL 1110/1111	4(3,3) [1]	_____	_____
BIOL 3350	3(3,0)	_____	_____
BIOL 4610	3(3,0)	_____	_____
BIOL 4930 **OR** MICR 4930	3(3,0) [2]	_____	_____
Organismal Diversity Requirement **(4 cr.)**			
BIOL 3030/3070 Vertebrate Biol.	4(3,3)	_____	_____
Ecology **(3 cr.)**			
BIOL 4700 Behavioral Ecology	3(3,0)	_____	_____
Functional Biology Requirement **(3 cr.)**			
BIOL 4750 Comparative Phys.	3(3,0)	_____	_____
Advanced Lab Requirement **(2 cr.)** [3]			
_____		_____	_____
Major Requirement: (21 cr.) [4]			
Laboratory Course req BIOL 3151	0(0,3)	_____	_____
Laboratory Course req BIOL 3161	0(0,3)	_____	_____
Laboratory Course req. CH 2280	1(0,3)	_____	_____
BIOL 4200 Neurobiology	3(3,0)	_____	_____
BIOL 4210 Neurobiology of Disease	3(3,0)	_____	_____
BIOL 3150 Funct. Human Anatomy	4(3,3)	_____	_____
BIOL 3160 Human Physiology	4(3,3)	_____	_____
BIOL 4800 Vertebrate Endocrinology	3(3,0)	_____	_____
CH 2240 Organic Chemistry	3(3,0)	_____	_____
_____		_____	_____
_____		_____	_____
Required Science Courses (33 cr.)			
BCHM 3050	3(3,0)	_____	_____
CH 1010/1011	4(3,3)	_____	_____
CH 2020/2021	4(3,3)	_____	_____
CH 2230, 2270 **OR** CH 2010, CH 2020	3(3,0) **&** 1(0,3) [5]	_____	_____
GEN 3000	3(3,0)	_____	_____
MATH 1060	4(4,0)	_____	_____
MATH 1080 **OR** STAT 2300	4(4,0) / 3(3,0) [6]	_____	_____
PHYS 2070, 2090	3(3,0) **&** 1(0,2) [7]	_____	_____
PHYS 2080, 2100	3(3,0) **&** 1(0,2) [7]	_____	_____
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)	_____	_____
Arts & Humanities – Literature	3(3,0) [8]	_____	_____
Arts & Humanities – Non-Literature	3(3,0) [8]	_____	_____
Oral Communication	3(3,0) [8]	_____	_____
Social Sciences			
PSYC 2010 Psychology	3(3,0) [8,9]	_____	_____
_____	3(3,0) [8,9]	_____	_____

[1] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIOL 4090, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. **Selections must include at least three laboratory courses not used to satisfy other requirements.**

- **BIOL** 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970
- **CH** 2280
- **MICR** 3060, 4070, 4130, 4500, 4510
- **WFB** 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[5] Most medical, dental, and veterinary medicine schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280, rather than a one semester survey of organic chemistry (CH 2010/2020)

[6] Statistics will be useful in both graduate school and professional school.

[7] Students may choose to take physics with calculus, PHYS 1220, 1240 (MATH 1060 pre-req.) & PHYS 2210, 2230 (MATH 1080 pre-req).

[8] See General Education Requirements.

[9] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[10] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

Other Courses	**SEM/Yr**	**Grade**
CU 1000 _____	____	____
GLCH _____	____	____
SC REACH [10] _____	____	____
Electives (15 cr.)		
PSYC 3240 Physio Psych (3)	_____	_____
PSYC 3330 Cogn Psych (3)	_____	_____
SOC 3940 Soc Mental Ill. (3)	_____	_____
_____	_____	_____
_____	_____	_____

Total Semester Hours = 120

2025/2026 B.S. BIOLOGICAL SCIENCES PRE-DENTAL FOCUS AREA

Required†† and Strongly Recommended† Courses. Worksheets are not for a degree-granting program

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**Grade**
BIOL 1010	1(1,0)	_____	_____
BIOL 1100/1101††	4(3,3) [1]	_____	_____
BIOL 1110/1111††	4(3,3) [1]	_____	_____
BIOL 3350	3(3,0)	_____	_____
BIOL 4610	3(3,0)	_____	_____
BIOL 4930 **OR** MICR 4930	3(3,0) [2]	_____	_____
Organismal Diversity Requirement **(4 cr.)**			
BIOL 3010/3011, 3020/3060, 3030/3070, 3040/3080, 3200/3201, 4060/4070, **OR** 4250/4260		_____	_____
Ecology **(3 cr.)**			
BIOL 4100, 4410, 4420, 4430, 4460, 4480, 4700, MICR 4030, **OR** 4040		_____	_____
Functional Biology Requirement **(3 cr.)**			
BIOL 4040, 4080, 4200, 4210, 4400, 4530, 4590, 4750, 4800, 4830, 4840, MICR 4140 **OR** 4170		_____	_____
Advanced Lab Requirement **(2 cr.)** [3]			
_____		_____	_____
Major Requirement: (21 cr.) [4, 5]			
Laboratory Course req. BIOL 3151	0(0,3)	_____	_____
Laboratory Course req. BIOL 3161	0(0,3)	_____	_____
Laboratory Course req. MICR 3060	1(0,3)	_____	_____
BIOL 3150/3151† Human Anatomy	4(3,3)	_____	_____
BIOL 3160/3161† Human Phys.	4(3,3)	_____	_____
CH 2240, 2280†† Org. CH	3(3,0) & 1(0,3)	_____	_____
MICR 3050† Microbiology	3(3,0)	_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
Required Science Courses (33 cr.)			
BCHM 3050†	3(3,0)	_____	_____
CH 1010/1011††	4(3,3)	_____	_____
CH 1020/1021††	4(3,3)	_____	_____
CH 2230, 2270††	3(3,0) & 1(0,3) [6]	_____	_____
GEN 3000†	3(3,0)	_____	_____
MATH 1060	4(4,0)	_____	_____
STAT 2300†	3(3,0) [7]	_____	_____
PHYS 2070, 2090††	3(3,0) & 1(0,2) [8]	_____	_____
PHYS 2080, 2100††	3(3,0) & 1(0,2) [8]	_____	_____
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)	_____	_____
Arts & Humanities – Literature	3(3,0) [9]	_____	_____
Arts & Humanities – Non-Literature	3(3,0) [9]	_____	_____
Oral Communication	3(3,0) [9]	_____	_____
Social Sciences			
PSYC 2010†† Psychology	3(3,0) [10]	_____	_____
SOC 2010†† Sociology	3(3,0) [10]	_____	_____
Electives (15 cr.) [11]			
GEN 2500† Medical Terminology	2(2,0)	_____	_____
PHIL 1030† Introduction to Ethics	3(3,0)	_____	_____
_____		_____	_____
_____		_____	_____

Total Semester Hours = 120

[1] BIOL 1100/1101 and 1110/1111 are strongly recommended. However, BIOL 1030/1050 may substitute for BIOL 1100/1101 and BIOL 1040/1060 may substitute for BIOL1110/1111.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000 from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. Selections must include at least three laboratory courses from the list below **not used to satisfy other requirement**

BIOL 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970
CH 2280
MICR 3060, 4070, 4130, 4500, 4510
WFB 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[5] **In addition to challenging coursework, applicants should look for opportunities to demonstrate a range of competencies.** Applicants are encouraged to complete experiences providing clinical exposure to inform their decision to enter dentistry. These experiences, ideally, should be attained through participation in a formal Clemson internship (or similar) supervised course and independent student planning. The latter would demonstrate a personal commitment to explore this career path.

[6] Most dental schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280, rather than a one semester survey of organic chemistry (CH 2010/2020).

[7] **The Dental Admission Test (DAT) mathematics topics include** algebra (equations and expressions, inequalities, exponential notation, absolute value, ratios and proportions, and graphical analysis); data analysis, interpretation, and sufficiency; quantitative comparison; and probability and statistics.

[8] Students may choose to take physics with calculus, PHYS 1220, 1240 (MATH 1060 pre-req.) & PHYS 2210, 2230 (MATH 1080 pre-req).

[9] See General Education Requirements.

[10] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[11] **Basic business courses are recommended** due to the fact that many dentists choose to pursue private practice.

[12] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

★ **Note.** Entrance requirements vary by institution and should be verified individually.

Other Courses	**SEM/Yr**	**Grade**
CU 1000_____	_____	_____
GLCH _____	_____	_____
SC REACH [12] _____	_____	_____

2025/2026 B.S. BIOLOGICAL SCIENCES PRE-MEDICINE FOCUS AREA

Required†† and Strongly Recommended† Courses. Worksheets are not for a degree-granting program.

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**Grade**
BIOL 1010	1(1,0)		
BIOL 1100/1101††	4(3,3) [1]		
BIOL 1110/1111††	4(3,3) [1]		
BIOL 3350	3(3,0)		
BIOL 4610† Cell Biology	3(3,0)		
BIOL 4930 **OR** MICR 4930	3(3,0) [2]		
Organismal Diversity Requirement **(4 cr.)** BIOL 3010/3011, 3020/3060, 3030/3070, 3040/3080, 3200/3201, 4060/4070, **OR** 4250/4260			
Ecology **(3 cr.)** BIOL 4100, 4410, 4420, 4430, 4460, 4480, 4700, MICR 4030, **OR** 4040			
Functional Biology Requirement **(3 cr.)** BIOL 4040, 4080, 4200, 4210, 4400, 4530, 4590, 4750, 4800, 4830, 4840, MICR 4140 **OR** 4170			
Advanced Lab Requirement **(2 cr.)** [3]			
_____			
Major Requirement: (21 cr.) [4,5]			
Laboratory Course req. BIOL 3151	0(0,3)		
Laboratory Course req. BIOL 3161	0(0,3)		
Laboratory Course req. MICR 3060	1(0,3)		
BIOL 3150/3151† Human Anatomy	4(3,3)		
BIOL 3160/3161† Human Physiology	4(3,3)		
CH 2240, 2280†† Org. CH	3(3,0) & 1(0,3)		
MICR 3050† Microbiology	3(3.0)		
MICR 4140 Basic Immunology	3(3.0)		
_____			
_____			
Required Science Courses (33 cr.)			
BCHM 3050††	3(3,0)		
CH 1010/1011††	4(3,3)		
CH 1020/1021††	4(3,3)		
CH 2230, 2270††	3(3,0) & 1(0,3) [6]		
GEN 3000†	3(3,0)		
MATH 1060†	4(4,0)		
MATH 1080 OR	4(4,0) [7]		
STAT 2300/2301†	3(3,0) [7]		
PHYS 2070, 2090††	3(3,0) & 1(0,2) [8]		
PHYS 2080, 2100††	3(3,0) & 1(0,2) [8]		
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)		
Arts & Humanities – Literature	3(3,0) [9]		
Arts & Humanities – Non-Literature	3(3,0) [9]		
Oral Communication	3(3,0) [9]		
Social Sciences			
PSYC 2010†† Intro to Psychology	3(3,0)[9]		
SOC 2010†† Intro to Sociology	3(3,0)[9]		
Electives (15 cr.) [4]			
GEN 2500† Medical Terminology	2(2,0)		
OR HLTH 2600† Med. Term. & Com.	3(3,0)		
PHIL 1030† Introduction to Ethics	3(3,0)		
PSYC 3400† Lifespan Development	3(3,0)		
PSYC 3830† Abnormal Psychology	3(3,0)		

[1] BIOL 1100/1101 and 1110/1111 are strongly recommended. However, BIOL 1030/1050 may substitute for BIOL 1100/1101 and BIOL 1040/1060 may substitute for BIOL1110/1111.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. Selections must include at least three laboratory courses. Selections must include at least three laboratory courses from the list below **not used to satisfy other requirements.**

- **BIOL** 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970
- **CH** 2280
- **MICR** 3060, 4070, 4130, 4500, 4510
- **WFB** 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[5] Medical schools utilize a holistic review process on applicants that allows for the assessment of an applicant's capabilities while balancing experience, attributes, and academic metrics. Therefore, students must prepare for medical school in multiple ways beyond academics. Competitive applicants will often have experience volunteering or working in a healthcare setting, participating in laboratory research, job shadowing, holding leadership positions, tutoring or studying abroad.

[6] Most medical schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280, rather than a one semester survey of organic chemistry (CH 2010/2020)

[7] Calculus is not a prerequisite for the MCAT, but it is sometimes required for specific medical schools, so check with your prospective schools for their required coursework. Most pre-medicine students take STAT 2300/2301 instead of MATH 1080.

[8] Students may choose to take physics with calculus, PHYS 1220, 1240 & PHYS 2210, 2230 (MATH 1080 pre-req).

[9] See General Education Requirements.

[10] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology

[11] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

★ **Note.** Entrance requirements vary by institution and should be verified individually.

Other Courses		**SEM/Yr**	**Grade**
CU 1000	_____		
GLCH	_____		
SC REACH [11]			

Total Semester Hours = 120

2025/2026 B.S. BIOLOGICAL SCIENCES PRE-PHARMACY FOCUS AREA

Required†† and Strongly Recommended† Courses. Worksheets are not for a degree-granting program.

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**Grade**
BIOL 1010	1(1,0)		
BIOL 1100/1101††	4(3,3) [1]		
BIOL 1110/1111††	4(3,3) [1]		
BIOL 3350	3(3,0)		
BIOL 4610	3(3,0)		
BIOL 4930 **OR** MICR 4930	3(3,0) [2]		
Organismal Diversity Requirement **(4 cr.)** BIOL 3010/3011, 3020/3060, 3030/3070, 3040/3080, 3200/3201, 4060/4070, **OR** 4250/4260			
Ecology **(3 cr.)** BIOL 4100, 4410, 4420, 4430, 4460, 4700, MICR 4030, **OR** 4040			
Functional Biology Requirement **(3 cr.)** BIOL 4040, 4080, 4200, 4210, 4400, 4530, 4590, 4750, 4800, 4830, 4840, MICR 4140 **OR** 4170			
Advanced Lab Requirement **(2 cr.)** [3]			
Major Requirement: (21 cr.) [4]			
Laboratory Course req. BIOL 3151	0(0,3)		
Laboratory Course req. CH 2280	1(0,3)		
Laboratory Course req. MICR 3060	1(0,3)		
BIOL 3150/3151†† Human Anatomy	4(3,3)		
BIOL 3160/3161†† Human Physiology	4(3,3)		
CH 2240 †† Organic Chemistry	3(3,0)		
MICR 3050†† Microbiology	3(3,0)		
Required Science Courses (33 cr.)			
BCHM 3050	3(3,0)		
CH 1010/1011††	4(3,3)		
CH 1020/1021††	4(3,3)		
CH 2230, 2270††	3(3,0) & 1(0,3)		
GEN 3000	3(3,0)		
MATH 1060††	4(4,0)		
STAT 2300††	3(3,0) [5]		
PHYS 2070, 2090††	3(3,0) & 1(0,2) [6]		
PHYS 2080, 2100††	3(3,0) & 1(0,2) [6]		
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)		
Arts & Humanities – Literature	3(3,0) [7]		
Arts & Humanities – Non-Literature	3(3,0) [7]		
Oral Communication	3(3,0) [7]		
Social Sciences			
PSYC 2010†† Intro to Psychology	3(3,0) [8]		
SOC 2010†† Sociology	3(3,0) [8]		
Electives (15 cr.)			
ECON 2000 OR 2110 OR 2120††	3(3,0)		
PHIL 1030† Introduction to Ethics	3(3,0)		

Total Semester Hours = 120

[1] BIOL 1100/1101 and 1110/1111 are strongly recommended. However, BIOL 1030/1050 may substitute for BIOL 1100/1101 and BIOL 1040/1060 may substitute for BIOL1110/1111.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030 BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. Selections must include at least three laboratory courses. Selections must include at least three laboratory courses from the list below **not used to satisfy other requirements.**

BIOL 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970
CH 2280
MICR 3060, 4070, 4130, 4500, 4510
WFB 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

All applicants are encouraged, but not required, to complete experiences providing clinical exposure to inform their decision to enter pharmacy. These experiences, ideally, should be attained through participation in a Clemson course and/or independent planning. The latter would demonstrate a personal commitment to explore this career path.

[5] Pharmacy schools have specific prerequisite MATH course requirements. The Pharmacy College Admission Test (PCAT) mathematics topics include basic math, algebra, probability & statistics, pre-calculus, and calculus.

[6] Students may choose to take physics with calculus, PHYS 1220, 1240 & PHYS 2210, 2230 (MATH 1080 pre-req).

[7] See General Education Requirements.

[8] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[9] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

★ **Note.** Entrance requirements vary by institution and should be verified individually. The PCAT is required or highly recommended by most pharmacy schools.

Other Courses	**SEM/Yr**	**Grade**
CU 1000		
GLCH		
SC REACH [9]		

2025/2026 B.S. BIOLOGICAL SCIENCES PRE-REHABILITATION SCIENCES FOCUS AREA

Occupational Therapy (OT), Physical Therapy (PT), Speech Disorders, and Physician Assistant (PA)

Required†† and Strongly Recommended† Courses. Worksheets are not for a degree-granting program.

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**_Grade**
BIOL 1010	1(1,0)	_____	_____
BIOL 1100/1101††	4(3,3) [1]	_____	_____
BIOL 1110/1111††	4(3,3) [1]	_____	_____
BIOL 3350	3(3,0)	_____	_____
BIOL 4610	3(3,0)	_____	_____
BIOL 4930 **OR** MICR 4930	3(3,0) [2]	_____	_____
Organismal Diversity Requirement **(4 cr.)**			
BIOL 3010/3011, 3020/3060, 3030/3070, 3040/3080, 3200/3201, 4060/4070, **OR** 4250/4260		_____	_____
Ecology **(3 cr.)**			
BIOL 4100, 4410, 4420, 4430, 4460, 4700, MICR 4030, **OR** 4040		_____	_____
Functional Biology Requirement **(3 cr.)**			
BIOL 4040, 4080, 4200, 4210, 4400, 4530, 4590, 4750, 4800, 4830, 4840, MICR 4140 **OR** 4170		_____	_____
Advanced Lab Requirement **(2 cr.)** [3]			
_____		_____	_____
Major Requirement: (21 cr.) [4]			
Laboratory Course req. BIOL 3151	0(0,3)	_____	_____
Laboratory Course req. BIOL 3161	0(0,3)	_____	_____
Laboratory Course req. MICR 3060	1(0,3)	_____	_____
BIOL 3150†† Human Anatomy	4(3,3)	_____	_____
BIOL 3160†† Human Physiology	4(3,3)	_____	_____
BIOL 4780 Exercise Physiology	3(3,0)	_____	_____
CH 2240/2280†† Org. Chem II (PA)	4(3,3)	_____	_____
MICR 3050† Microbiology (PA)	3(3,0)	_____	_____
_____		_____	_____
_____		_____	_____
Required Science Courses (33 cr.)			
BCHM 3050 † (PA School)	3**(3,0)**	_____	_____
CH 1010/1011††	4(3,3)	_____	_____
CH 1020/1021††	4(3,3)	_____	_____
CH 2230, 2270 **OR** CH 2010, CH 2020	3(3,0) **&** 1(0,3) [5]	_____	_____
GEN 3000† (PA School)	3(3,0)	_____	_____
MATH 1060†† (PA School)	4(4,0) [6]	_____	_____
PHYS 2070, 2090††	3(3,0) & 1(0,2) [7]	_____	_____
PHYS 2080, 2100††	3(3,0) & 1(0,2) [7]	_____	_____
STAT 2300††	3(3,0) [6]	_____	_____
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)	_____	_____
Arts & Humanities – Literature	3(3,0) [8]	_____	_____
Arts & Humanities – Non-Literature	3(3,0) [8]	_____	_____
Oral Communication	3(3,0) [8]	_____	_____
Social Sciences			
PSYC 2010†† Psychology	3(3,0)	_____	_____
SOC 2010†† Sociology (PA)	3(3,0)	_____	_____

Total Semester Hours = 120

[1] BIOL 1100/1101 and 1110/1111 are strongly recommended. However, BIOL 1030/1050 may substitute for BIOL 1100/1101 and BIOL 1040/1060 may substitute for BIOL1110/1111.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIO 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. Selections must include at least three laboratory courses. Selections must include at least three laboratory courses from the list below **not used to satisfy other requirements.**

BIOL 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970
CH 2280
MICR 3060, 4070, 4130, 4500, 4510
WFB 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

MICR 3050/3060 and CH 2240/2280 are required for most PA programs. Any combination of BIOL or MICR 3940, 4910, 4920, 4940, and 4950 may not exceed eight credits.

★ Students applying to professional schools that require BIOL 4780 Exercise Physiology should note this course **is offered spring semester, odd numbered years only** ar **has prerequisites of both anatomy & physiology.**

[5] **Most PA programs require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280.**

[6] The GRE Math section only tests basic math. The math content includes algebra, geometry, statistics, exponents, probability, fractions, ratios, and data interpretation.

[7] Students may choose to take physics with calculus, PHYS 1220, 1240 & PHYS 2210, 2230 (MATH 1080 pre-req).

[7] See General Education Requirements.

[9] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

[10] **These hours should be used to satisfy specific prerequisite requirements for your professional school program**. For example, some PT and OT schools require exercise physiology, medical terminology, sociology, abnormal psychology, and/or lifespan development courses. **ECON 2000 or 2110 or 2120 is recommended for PA programs**.

Many PA programs require or recommend direct patient care hours and a course in Medical Terminology

★ **Note.** Entrance requirements vary by institution and should be verified individually.

Other Courses	**SEM/Yr**	**Grade**
CU 1000 _____	_____	_____
GLCH _____	_____	_____
SC REACH [9] _____	_____	_____
Electives (15 cr.) [10]		
GEN 2050† Med Term (2)	_____	_____
PHIL 1030† Intro to Ethics (3)	_____	_____
PSYC 3400† Lifespan Dev (3)	_____	_____
PSYC 3830† Abnorm. Psych (3)	____	_____

2025/2026 B.S. BIOLOGICAL SCIENCES PRE-VETERINARY MEDICINE FOCUS AREA

Required†† and Strongly Recommended† Courses. Worksheets are not for a degree-granting program.

BIOL Core Requirement: (31 cr.)		**SEM/Yr**	**Grade**
BIOL 1010	1(1,0)		
BIOL 1100/1101††	4(3,3) [1]		
BIOL 1110/1111††	4(3,3) [1]		
BIOL 3350	3(3,0)		
BIOL 4610	3(3,0)		
BIOL 4930 **OR** MICR 4930	3(3,0) [2]		
Organismal Diversity Requirement **(4 cr.)** BIOL 3010/3011, 3020/3060, 3030/3070, 3040/3080, 3200/3201, 4060/4070, **OR** 4250/4260			
Ecology **(3 cr.)** BIOL 4410, 4420, 4430, 4460, 4700, MICR 4030, **OR** 4040			
Functional Biology Requirement **(3 cr.)** BIOL 4040, 4080, 4200, 4210, 4400, 4530, 4590, 4750, 4800, 4830, 4840, MICR 4140 **OR** 4170			
Advanced Lab Requirement **(2 cr.)** [3]			
Major Requirement: (21 cr.) [4, 5]			
Laboratory Course req. MICR 3051	0(0,3)		
Laboratory Course req. CH 2280	1(0,3)		
Laboratory Course req. MICR 3060	1(0,3)		
CH 2240†† Organic Chemistry II	4(3,3)		
MICR 3050† Microbiology	4(3,3)		
Required Science Courses (33 cr.)			
BCHM 3050††	3(3,0)		
CH 1010/1011††	4(3,3)		
CH 1020/1021††	4(3,3)		
CH 2230, 2270 ††	3(3,0) & 1(0,3) [6]		
GEN 3000†	3(3,0)		
MATH 1060††	4(4,0)		
STAT 2300††	3(3,0) [7]		
PHYS 2070, 2090††	3(3,0) & 1(0,2) [8]		
PHYS 2080, 2100††	3(3,0) & 1(0,2) [8]		
Required Non-Science Courses (21 cr.)			
ENGL 1030/1031	3(3,1)		
Arts & Humanities – Literature	3(3,0) [9]		
Arts & Humanities – Non-Literature	3(3,0) [9]		
Oral Communication	3(3,0) [9]		
Social Sciences PSYC 2010† Intro to Psychology	3(3,0)		
	3(3,0) [9]		
Electives (15 cr.) [5,10]			
AVS 3010†† Anatomy & Physiology	4(3,3)		
AVS 3700†† Animal Nutrition	3(3,0)		
GEN 2500† Medical Terminology **OR** HLTH 2600† Med Term & Comm	2(2,0) / 3(3,0)		
PHIL 1030† Introduction to Ethics	3(3,0)		

Total Semester Hours = 120

[1] BIOL 1100/1101 and 1110/1111 are strongly recommended. However, BIOL 1030/1050 may substitute for BIOL 1100/1101 and BIOL 1040/1060 may substitute for BIOL1110/1111.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] One course selected from BIOL 4020, BIOL 4030, BIOL 4440, BIOL 4450, BIOL 4470, BIOL 4620, BIOL 4710.

[4] Twenty-one credit hours from 3000-level or higher BIOL, ETOX, or MICR courses (except MICR 3000) or from CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4680, WFB 4720, or WFB 4770. Selections must include at least three laboratory courses. Selections must include at least three laboratory courses from the list below **not used to satisfy other requirements.**

BIOL 3010, 3060, 3070, 3080, 3150, 3160, 4000, 4020, 4030, 4070, 4130, 4150, 4260, 4440, 4450, 4470, 4490, 4540, 4620, 4640, 4690, 4710, 4740, 4890, 4900, 4970
CH 2280
MICR 3060, 4070, 4130, 4500, 4510
WFB 4680, 4720, 4770

Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940 and MICR 4950 may not exceed eight credits.

[5] In addition to challenging coursework, applicants should look for opportunities to demonstrate a range of competencies. To gain experience, applicants should consider interning or volunteering at a veterinary hospital or clinic to gain practical experience in the veterinary medicine. The applicant must demonstrate the ability to work successfully with others toward a common goal. A significant experience requiring teamwork is therefore expected during the applicant's academic and/or extracurricular activities and should be documented in the application.

[6] Most veterinary medicine schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280, rather than a one semester survey of organic chemistry (CH 2010/2020).

[7] The GRE Math section only tests basic math. The math content includes algebra, geometry, statistics, exponents, probability, fractions, ratios, and data interpretation.

[8] Students may choose to take physics with calculus, PHYS 1220, 1240 & PHYS 2210, 2230 (MATH 1080 pre-req).

[9] See General Education Requirements.

[10] Total of 15 semester hours of any combination of the humanities, social/behavioral sciences and fine arts courses.

[11] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

★ **Note.** Entrance requirements vary by institution and should be verified individually.

Other Courses	**SEM/Yr**	**Grade**
CU 1000		
GLCH		
SC REACH [11]		
Electives Cont'd		

B.A. BIOLOGICAL SCIENCES 2025/2026

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 1010 Frontiers in Biol. I[1]	1(1,0)	BIOL 1110 Prin. of Biol. II[2]	4(3,3)
BIOL 1100 Prin. of Biol. I[2]	4(3,3)	CH 1020 General Chemistry	4(3,3)
CH 1010 General Chemistry	4(3,3)	ENGL 1030 Composition and Rhetoric	3(3,1)
MATH 1060 Calculus of One Var. I	4(4,0)	Mathematical Sciences Requirement[4]	3
Oral Communication Requirement[3]	3		14
	16		

SOPHOMORE YEAR

CH 2230 Organic Chemistry[5]	3(3,0)	BCHM 3050 Essential Elements of Bioch.[8]	3(3,0)
CH 2270 Organic Chemistry Lab[5]	1(0,3)	Major Requirement[5,9]	4
GEN 3000 Fundamental Genetics[6]	3(3,0)	Modern Language Requirement[7]	4
Global Challenges Course Requirement[3]	3	Organismal Diversity Requirement[10]	4
Modern Language Requirement[7]	4		15
Elective	3		
	17		

JUNIOR YEAR

BIOL 3350 Evolutionary Biology	3(3,0)	Arts and Humanities (Non-Lit) Req.[3]	3
BIOL 4610 Cell Biology	3(3,0)	Ecology Requirement[12]	3
Minor Requirement[11]	3	Minor Requirement[11]	6
Modern Language Requirement[7]	3	Modern Language Requirement[7]	3
Social Science Requirement[3]	3		15
	15		

SENIOR YEAR

BIOL 4930 Senior Seminar **or**		PHYS 2080 General Physics II[15]	3(3,0)
MICR 4930 Senior Seminar	3(3,0)	PHYS 2100 General Physics II Lab[15]	1(0,2)
PHYS 2070 General Physics I[13]	3(3,0)	Arts and Humanities (Literature) Req.[3]	3
PHYS 2090 General Physics I Lab[13]	1(0,2)	Minor Requirement[12]	6
Functional Biology Requirement[14]	3		13
Social Science Requirement[3]	3		
Elective	2		
	15		

Total Semester Hours = 120

[1] Students seeking a double major in Science Teaching and Biological Sciences should refer to the Science Teaching: Teaching Area - Biological Sciences, BA program.

[2] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/BIOL 1050 may substitute for BIOL 1100, and BIOL 1040/BIOL 1060 may substitute for BIOL 1110.

[3] See General Education Requirements. The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology. Three of these credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section.

[4] MATH 1080, STAT 2300, or other approved coursework. See advisor. Medical and dental schools have different mathematics requirements. Statistics will be useful in either graduate study or professional school.

[5] CH 2010 and CH 2020 may be substituted. Most professional health sciences schools require two semesters of organic chemistry with laboratory, CH 2230/CH 2270 and CH 2240/CH 2280.

[6] GEN 3020 may be substituted.

[7] Students must complete through 2020 in a modern language. See Modern Languages Requirement at Clemson University statement in Academic Regulations.

[8] BCHM 3010 may be substituted.

[9] Four credit hours must be selected from BIOL, ETOX or MICR courses at the 3000 level or above (except MICR 3000) or CH 2240/CH 2280, ENR 4130, WFB 3130, WFB 4720, or WFB 4770.

[10] At least one lecture and associated laboratory selected from BIOL 3010, BIOL 3020/BIOL 3060, BIOL 3030/BIOL 3070, BIOL 3040/BIOL 3080, BIOL 3200, BIOL 4060/BIOL 4070, BIOL 4250/BIOL 4260.

[11] See Minors.

[12] At least one course selected from BIOL 4100, BIOL 4410, BIOL 4420, BIOL 4430, BIOL 4460, BIOL 4480, BIOL 4490, BIOL 4700, MICR 4030, or MICR 4040.

[13] PHYS 1220/PHYS 1240 may be substituted.

[14] At least one course selected from BIOL 3160, BIOL 4040, BIOL 4080, BIOL 4200, BIOL 4210, BIOL 4400, BIOL 4530, BIOL 4590, BIOL 4750, BIOL 4800, BIOL 4830, BIOL 4840, MICR 4140 or MICR 4170.

[15] PHYS 2210/PHYS 2230 may be substituted.

2025/2026 B.A. BIOLOGICAL SCIENCES CURRICULUM

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**Grade**
BIOL 1010	1(1,0) [1]		
BIOL 1100/1101	4(3,3) [2]		
BIOL 1110/1111	4(3,3) [2]		
BIOL 3350	3(3,0)		
BIOL 4610	3(3,0)		
BIOL 4930 **OR** MICR 4930	3(3,0) [3,4]		
Organismal Diversity Requirement **(4 cr.)**			
BIOL 3010/3011, 3020/3060, 3030/3070, 3040/3080, 3200/3201, 4060/4070, **OR** 4250/4260			
Ecology **(3 cr.)**			
BIOL 4100, 4410, 4420, 4430, 4460, 4480, 4700, MICR 4030, **OR** 4040			
Functional Biology Requirement **(3 cr.)**			
BIOL 3160/3161, 4040, 4080, 4200, 4210, 4400, 4530, 4590, 4750, 4800, 4830, 4840, MICR 4140 **OR** 4170			
Major Requirement: (4 cr.) [5]			
_____			
_____			
Required Science Courses (33 cr.)			
BCHM 3050 (**OR** 3010)	3(3,0)		
CH 1010/1011	4(3,3)		
CH 1020/1021	4(3,3)		
CH 2230, 2270 **OR** CH 2010, CH 2020	3(3,0) **&** 1(0,3) [6]		
GEN 3000 (**OR** 3020)	3(3,0)		
MATH 1060	4(4,0)		
MATH 1080 **OR** STAT 2300	4(4,0) / 3(3,0) [7]		
PHYS 2070, 2090	3(3,0) **&** 1(0,2) [8]		
PHYS 2080, 2100	3(3,0) **&** 1(0,2) [8]		
Required Non-Science Courses (35 cr.)			
ENGL 1030/1031	3(3,1)		
Arts & Humanities – Literature	3(3,0) [9]		
Arts & Humanities – Non-Literature	3(3,0) [9]		
Modern Language	4(3,1) [10]		
Modern Language	4(3,1) [10]		
Modern Language	3(3,0) [10]		
Modern Language	3(3,0) [10]		
Oral Communication	3(3,0) [9]		
Social Sciences			
_____	3(3,0) [9,11]		
_____	3(3,0) [9,11]		
Minor Courses (15 cr.) [12]			
_____			
_____			
_____			
_____			
_____			
_____			

[1] Students seeking a double major in Science Teaching and Biological Sciences should refer to the Science Teaching: Teaching Area - Biological Sciences, BA program.

[2] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100/1101 and BIOL 1040/1060 may substitute for BIOL1110/1111.

[3] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[4] Students seeking a double major in Science Teaching/Biological Sciences should substitute EDSC 4570 for BIOL 4930 or MICR 4930.

[5] Four credit hours must be selected from BIOL or MICR courses at the 3000 level or above (except MICR 3000) or CH 2240/CH 2280, ETOX 4300, ETOX 4370, WFB 4680, WFB 4720, or WFB 4770. Students seeking a double major in Science Teaching/Biological Sciences should substitute EDSC 4470 for the Major Requirement.

[6] Most medical, dental, and veterinary medicine schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280.

[7] Statistics will be useful in both graduate school and professional school.

[8] Students may choose to take physics with calculus, PHYS 1220, 1240 (MATH 1060 pre-req) & PHYS 2210, 2230 (MATH 1080 pre-req).

[9] See General Education Requirements.

[10] Students must complete through 2020 in a modern language. See Modern Languages Requirement at Clemson University statement in Academic Regulations.

[11] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[12] Minors as listed 2025-2026 Undergraduate Catalog.

[13] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

Other Courses	**SEM/Yr**	**Grade**
CU 1000_____	____	____
GLCH _____	____	____
SC REACH[14] _____	____	____
Electives (5 cr.)		
_____	_____	____
_____	_____	____

Students seeking a double major in Science Teaching/Biological Sciences should substitute the following courses:

1. ED 1050 for BIOL 1010
2. EDSC 4470 for the Major Requirement
3. EDSC 4570 for BIOL 4930 or MICR 4930

Total Semester Hours = 120

B.A. BIOLOGICAL SCIENCES & B.A. SCIENCE TEACHING: BIOLOGICAL SCIENCES 2025/2026

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 1030 General Biology I **and**	3(3,0)	BIOL 1040 General Biology II **and**	3(3,0)
BIOL 1050 General Biology Laboratory I	1(0,3)	BIOL 1060 General Biology Laboratory II	1(0,3)
or		*or*	
BIOL 1100 Principles of Biology I	4(3,3)	BIOL 1110 Principles of Biology II	4(3,3)
CH 1010 General Chemistry	4(3,3)	CH 1020 General Chemistry	4(3,3)
ENGL 1030 Composition and Rhetoric	3(3,0)	ED 1050 Orientation to Education	2(2,0)
MATH 1060 Calculus of One Variable I	4(4,0)	Arts and Humanities (Literature) Requirement[2]	3
Modern Language Requirement[1]	3	Modern Language Requirement[1]	3
	18		16

SOPHOMORE YEAR

CH 2010 Survey of Organic Chemistry	3(3,0)	BCHM 3010 Molecular Biochemistry	3(3,0)
CH 2020 Survey of Organic Chem. Lab	1(0,3)	*or*	
or		BCHM 3050 Essential Elements of Biochemistry	3(3,0)
CH 2230 Organic Chemistry	3(3,0)	ED 3010 Principles of American Education	3(3,0)
Ch 2270 Organic Chemistry Laboratory	1(0,3)	EDF 3020 Educational Psychology	3(3,0)
GEOL 1010 Physical Geology	3(3,0)	PHYS 2080 General Physics II	3(3,0)
GEOL 1030 Physical Geology Laboratory	1(0,3)	PHYS 2100 General Physics II Lab.	1(0,2)
PHYS 2070 General Physics I	3(3,0)	Organismal Diversity Requirement[4]	4
PHYS 2090 General Physics I Lab.	1(0,2)		17
Ecology Requirement[3]	3		
Social Science Requirement[2]	3		
	18		

JUNIOR YEAR

BIOL 4610 Cell Biology	3(3,0)	BIOL (EDSC) 4820 Laboratory Tech. for Teaching Sci.	3(1,6)
EDLT 4800 Foundations of Adolescent Literacy	3(3,0)	EDF 3350 Adolescent Growth & Development	3(3,0)
EDSC 3270 Practicum in Secondary Science	3(3,0)	GEN 3000 Fundamental Genetics	3(3,0)
EDSP 3700 Introduction to Special Education	3(3,0)	*or*	
Social Science Requirement[2]	3	GEN 3020 Molecular and General Genetics	3(3,0)
	15	Functional Biology Requirement[5]	3
		Oral Communications Requirement[2]	3
			15

SENIOR YEAR

BIOL 3350 Evolutionary Biology	3(3,0)	EDSC 4470 Teaching Intern. in Sec. Sci.[7]	9(0,27)
EDSC 4270 Teaching Secondary Science[6]	3(2,2)	EDSC 4570 Sec. Science Capstone Sem.[7]	3(2,3)
EDLT 4980 Secondary Content Area Reading[6]	3(2,2)		12
Arts and Humanities (Non-Lit.) Requirement[2]	3		
Global Challenges Requirement[2]	3		
	15		

Total Semester Hours = 126

1 Students must complete through 2020 in a modern language. See Modern Languages Requirement at Clemson University statement in Academic Regulations.

2 See General Education Requirements. Three of these credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section.

3 Select at least one course from BIOL 4410, BIOL 4420, BIOL 4430, BIOL 4460, or BIOL 4700.

4 One lecture and associated laboratory must be selected from BIOL 3010; BIOL 3020/BIOL 3060; BIOL 3030/BIOL 3070; BIOL 3040/BIOL 3080; BIOL 3200; BIOL 4060/BIOL 4070; or BIOL 4250/BIOL 4260.

5 Select at least one course from BIOL 3160, BIOL 4040, BIOL 4080, BIOL 4590, BIOL 4750, or BIOL 4800..

6 To be taken the semester prior to EDSC 4470 and EDSC 4570. EDSC 4270 and EDLT 4980 must be taken concurrently.

7 Students completing the coursework for the Teacher Certification Emphasis Area must complete the above coursework and meet all requirements for enrollment in professional courses, apply for directed teaching/teaching internship, and meet all requirements for recommendation for initial licensure as stated in the Undergraduate Catalog under Teacher Education Programs. The following courses must be taken the spring semester of the senior year: EDSC 4470 - Teaching Internship in Secondary Science 9 Credits and EDSC 4570 - Secondary Science Capstone Seminar 3 Credits

NOTE: A grade of *C* or higher is required in the following courses: BCHM 3010, BCHM 3050, BIOL 1030/BIOL 1050 or BIOL 1100, BIOL 1040/BIOL 1060 or BIOL 1110, BIOL 3350, BIOL 4610, BIOL 4820, CH 1010, CH 1020, ED 1050, ED 3010, ED 3200, EDF 3020, EDF 3350, EDLT 4800, EDLT 4980, EDSC 3270, EDSC 4270, EDSC 4570, EDSC 4820, EDSP 3700, GEN 3000 or GEN 3020, MATH 1060, PHYS 1220/PHYS 1240 or PHYS 2070/PHYS 2090 or PHYS 2080/PHYS 2100 or PHYS 2210/PHYS 2230.

2025/2026 B.A. BIOLOGICAL SCIENCES & SCIENCE TEACHING: BIOLOGICAL SCIENCES

BIOL Core Requirement: (29 cr.)		**SEM/Yr**	**_Grade**
BIOL 1030/1050 **OR**	3(3,0) **&** 1(0,3)	_____	_____
BIOL 1100/1101	4(3,3)	_____	_____
BIOL 1040/1060 **OR**	3(3,0) **&** 1(0,3)	_____	_____
BIOL 1110/1111	4(3,3)	_____	_____
BIOL 3350	3(3,0)	_____	_____
BIOL 4610	3(3,0)	_____	_____
BIOL (EDSC) 4820	3(1,6)	_____	_____
Organismal Diversity Requirement **(4 cr.)**			
BIOL 3010/3011, 3020/3060, 3030/3070, 3040/3080, 3200/3201, 4060/4070 **OR** 4250/4260		_____	_____
Ecology **(3 cr.)**			
BIOL 4410, 4420, 4430, 4460, **OR** 4700		_____	_____
Functional Biology Requirement **(3 cr.)**			
BIOL 3160, 4040, 4080, 4590, 4750, **OR** 4800		_____	_____
Required Science Courses (33 cr.)			
BCHM 3010 **OR**	3(3,0)	_____	_____
BCHM 3050	3(3,0)	_____	_____
CH 1010/1011	4(3,3)	_____	_____
CH 1020/1021	4(3,3)	_____	_____
CH 2010, 2020 **OR**	3(3,0) **&** 1(0,3) [1]	_____	_____
CH 2270, 2290	3(3,0) **&** 1(0,3) [1]	_____	_____
GEN 3000 **OR**	(3,0)	_____	_____
GEN 3020	3(3,0)	_____	_____
GEOL 1010 Physical Geology	3(3,0)	_____	_____
GEOL 1030 Physical Geology Lab	1(0,3)	_____	_____
MATH 1060	4(4,0)	_____	_____
PHYS 2070, 2090	3(3,0) **&** 1(0,2) [2]	_____	_____
PHYS 2080, 2100	3(3,0) **&** 1(0,2) [2]	_____	_____
Req. Non-Science Courses (27 cr.)			
ENGL 1030/1031	3(3,1)	_____	_____
(Modern Language)	4(3,1) [3]	_____	_____
(Modern Language)	4(3,1) [3]	_____	_____
Modern Language	3(3,0) [3]	_____	_____
Modern Language	3(3,0) [3]	_____	_____
Arts & Humanities – Literature	3(3,0) [4]	_____	_____
Arts & Humanities – Non-Literature	3(3,0) [4]	_____	_____
Oral Communication Requirement	3(3,0) [4]	_____	____
Social Science Requirement (6 cr.) [4,5]			
_____	3(3,0)	_____	_____
_____	3(3,0)	_____	_____
Education Courses (38 cr.)			
ED 1050	2(2,0)	_____	_____
ED 3010	3(3,0)	_____	_____
EDF 3020	3(3,0)	_____	_____
EDF 3350	3(3,0)	_____	_____
EDLT 4800	3(3,0)	_____	_____
EDLT 4980	3(2,2) [6]	_____	_____
EDSC 3270	3(3,0)	_____	_____
EDSC 4270	3(2,2) [6]	_____	_____
EDSC 4470	9(0,27) [7]	_____	_____
EDSC 4570	3(2,3) [7]	_____	_____
EDSP 3700	3(3,0)	_____	_____

Total Semester Hours = 126

[1] Most medical, dental, and veterinary medicine schools require two semesters of organic chemistry with laboratory, CH 2230/2270 and 2240/2280.

[2] Students may choose to take physics with calculus, PHYS 1220, 1240 (MATH 1060 pre-req) & PHYS 2210, 2230 (MATH 1080 pre-req).

[3] Two semesters (through 2020) in any modern language. See Modern Languages Requirement at Clemson University statement in Academic Regulations.

[4] See General Education Requirements.

[5] Three of these credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section.

[6] To be taken the semester prior to EDSC 4470 and 4570. EDSC 4270 and EDLT 4980 must be taken concurrently.

[7] EDSC 4470 and EDSC 4570 must be taken concurrently. Students completing the coursework for the Teacher Certification Emphasis Area must complete the above coursework and meet all requirements for enrollment in professional courses, apply for directed teaching/teaching internship, and meet all requirements for recommendation for initial licensure as stated in the Undergraduate Catalog under Teacher Education Programs. Must be taken the spring semester of the senior year.

Other Courses	**SEM/Yr**	**Grade**
CU1000 _____	_____	_____
GLCH _____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Students seeking a double major in Science Teaching/Biological Sciences should substitute the following courses:

1. ED 1050 for BIOL 1010
2. EDSC 4470 for the Major Requirement
3. EDSC 4570 for BIOL 4930 or MICR 4930

B. S. MICROBIOLOGY 2025/2026[a]

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 1010 Frontiers in Biol. I	1(1,0)	BIOL 1110 Prin. of Biol. II[1]	4(3,3)
BIOL 1100 Prin. of Biol. I[1]	4(3,3)	CH 1020 General Chemistry	4(3,3)
CH 1010 General Chemistry	4(3,3)	ENGL 1030 Composition and Rhetoric	3(3,1)
MATH 1060 Calculus of One Var. I	4(4,0)	Mathematical Sciences Requirement[3]	3
Oral Communication Requirement[2]….	3		14
	16		

SOPHOMORE YEAR

CH 2230 Organic Chemistry	3(3,0)	BCHM 3050 Essential Elements of Bioch[6]	3(3,0)
CH 2270 Organic Chemistry Lab	1(0,3)	CH 2240 Organic Chemistry	3(3,0)
MICR 3050 General Microbiology[4]	3(3,0)	CH 2280 Organic Chemistry Lab	1(0,3)
MICR 3060 General Microbiology Lab[4]	1(0,3)	GEN 3000 Fundamental Genetics[7]	3(3,0)
Social Science Requirement[2] ….	3	**MICR 3070 Microbial Diversity**	**4(3,3)**
Elective[5]	3	Elective[5]	2
	14		16

JUNIOR YEAR

MICR 4040 Microbial Ecology	**3(3,0)**	**MICR 4120 Bacterial Physiology**	**3(3,0)**
PHYS 2070 General Physics I[5,8]	3(3,0)	**MICR 4500 Advanced Micro Lab I**	**2(1,2)**
PHYS 2090 General Physics Lab I[5,8]	1(0,3)	Global Challenges Course Requirement[2,5]	3
Arts and Humanities (Literature) Req.[2]	3	Microbiology Requirement[9]	3
Microbiology Requirement[9]	6	Social Science Requirement[2]	3
	16		14

SENIOR YEAR

BIOL 4610 Cell Biology	3(3,0)	BIOL 4930 Senior Seminar **or**	
BIOL 4620 Cell Biology Lab	2(1,2)	MICR 4930 Senior Seminar	3(3,0)
MICR 4150 Microbial Genetics	**3(3,0)**	Microbiology Requirement[9]	3
MICR 4510 Advanced Micro Lab II	**2(1,2)**	Elective[5]	8
Arts and Humanities (Non-Literature) Req.[2]	3		14
Virology Requirement[10]	3		
	16		

Total Semester Hours = 120

[a] Bolded courses must be taken in the sequence listed above to ensure a punctual graduation.

[1] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/BIOL 1050 may substitute for BIOL 1100, and BIOL 1040/BIOL 1060 may substitute for BIOL 1110.

[2] See General Education Requirements. The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology. Three of these credits must also satisfy the South Carolina REACH Act. See the South Carolina REACH Act Requirement in the Academic Regulations section.

[3] MATH 1080 or STAT 2300 or other approved coursework. See advisor. Medical and dental schools have different mathematics requirements. Statistics will be useful in either graduate study or professional school.

[4] Enroll in the section of this course specifically for microbiology majors.

[5] Students planning to apply to medical/dental schools should take PHYS 2080 and PHYS 2100 during the second semester of the junior year, and complete the Global Challenges Requirement in the sophomore year.

[6] BCHM 3010 may be substituted.

[7] GEN 3020 may be substituted.

[8] PHYS 1220/PHYS 1240 may be substituted.

[9] See advisor. Minimum of 12 credits is required. At least one course must be selected from each of the following fields:
Biomedicine: BIOL 4190, BIOL 4200, BIOL 4560, BIOL 4670, BIOL 4840, BIOL 4890, HLTH 3800, MICR 4000, MICR 4050, MICR 4110, MICR 4140, MICR 4170, MICR 4180, MICR 4240
Environmental: BIOL 4250, MICR 4020, MICR 4030, MICR 4100
Food Safety, Industrial, and Technology: BCHM 4400, BIOL 4030, BIOL 4870, MICR 4070, MICR 4130
Remaining credits can be satisfied by any 4000 MICR course, any of the above listed courses or any of the following BIOL 3150, BIOL 3160, BIOL 3940, BIOL 4910, BIOL 4940, MICR 3940

[10] Select BIOL 4540 or MICR 4160.

2025/2026 B.S. MICROBIOLOGY CURRICULUM

MICR Core Requirement: (32 cr.)		**SEM/Yr**	**Grade**
BIOL 1010	1(1,0)		
BIOL 1100/1101	4(3,3) [1]		
BIOL 1110/1111	4(3,3) [1]		
MICR 3050/3051 (Fall, SO)	4(3,3)		
MICR 3070/3071 (Sp., SO)	4(3,3)		
MICR 4040 (Fall, JR)	3(3,0)		
MICR 4120 (Sp., JR)	3(3,0)		
MICR 4150 (Fall, SR)	3(3,0)		
MICR 4500/4501 (Sp., JR)	2(1,2)		
MICR 4510/4511 (Fall, SR)	2(1,2)		
MICR or BIOL 4930 (Sp., SR)	3(3,0) [2]		
MICR Requirement (12 cr.) [3]			
_____			
_____			
_____			
_____			
_____			
_____			
_____			
Virology Requirement (3 cr.) [4]			
_____			
Required Science Courses (38 cr.)			
BCHM 3050 **OR** 3010	3(3,0)		
BIOL 4340/4341 **or** BIOL 4620	2(1,2)		
BIOL 4610	3(3,0)		
CH 1010/1011	4(3,3)		
CH 1020/1021	4(3,3)		
CH 2230, 2270	3(3,0) **&** 1(0,3)		
CH 2240, 2280	3(3,0) **&** 1(0,3)		
GEN 3000	3(3,0)		
MATH 1060	4(4,0)		
MATH 1080	4(4,0)		
OR STAT 2300	3(3,0) [5]		
PHYS 2070, 2090	3(3,0), 1(0,2) [6,7]		
Required Non-Science Courses (18 cr.)			
ENGL 1030/1031	3(3,1)		
Arts and Humanities – Literature	3(3,0) [8]		
Arts & Humanities – Non-Lit	3(3,0) [8]		
Oral Communication	3(3,0) [8]		
Social Sciences			
_____	3(3,0) [8,9]		
_____	3(3,0) [8,9]		
Electives (13 cr.)			
_____			
_____			
_____			
_____			
_____			
_____			

[1] BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] See advisor. Minimum of 12 credits is required. At least one course must be selected from each of the following fields:
Biomedicine: BIOL 4190, 4200, 4560, 4670, 4840, 4890, HLTH 3800, MICR 4000, 4050, 4110, 4140, 4170, 4180, 4190, 4240
Environmental: BIOL 4250, MICR 4020, 4030, 4100
Food Safety, Industrial, and Technology: BCHM 4400, BIOL 4030, 4870, MICR 4070, 4130.
Remaining credits can be satisfied by any 4000-level MICR course, any of the above listed courses, or any of the following: BIOL 3150, 3160, 3940, 4910, 4940, MICR3940

[4] BIOL 4540 **OR** MICR 4160

[5] Statistics will be useful in both graduate school and professional school.

[6] PHYS 1220, 1240 (MATH 1060 pre-req.) may be substituted.

[7] Students planning on applying to medical/dental schools should take PHYS 2080/2100 or 2210/2230 (MATH 1080 pre-req.) during the second semester junior year.

[8] See General Education Requirements.

[9] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[10] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

Other Courses		**SEM/Yr**	**Grade**
CU 1000	_____	____	____
GLCH	_____	____	____
SC REACH [10]	_____	____	____

Total Semester Hours = 120

B. S. MICROBIOLOGY 2025/2026
BIOMEDICINE CONCENTRATION[a]

FRESHMAN YEAR

First Semester		Second Semester	
BIOL 1010 Frontiers in Biol. I	1(1,0)	BIOL 1110 Prin. of Biol. II[1]	4(3,3)
BIOL 1100 Prin. of Biol. I[1]	4(3,3)	CH 1020 General Chemistry	4(3,3)
CH 1010 General Chemistry	4(3,3)	ENGL 1030 Composition and Rhetoric	3(3,1)
MATH 1060 Calculus of One Var. I	4(4,0)	Mathematical Sciences Requirement[3]	3
Oral Communication Requirement[2]….	3		14
	16		

SOPHOMORE YEAR

CH 2230 Organic Chemistry	3(3,0)	BCHM 3050 Essential Elements of Bioch[5]	3(3,0)
CH 2270 Organic Chemistry Lab	1(0,3)	CH 2240 Organic Chemistry	3(3,0)
MICR 3050 General Microbiology[4]	3(3,0)	CH 2280 Organic Chemistry Lab	1(0,3)
MICR 3060 General Microbiology Lab[4]	1(0,3)	GEN 3000 Fundamental Genetics[6]	3(3,0)
Social Science Requirement[2] ….	3	**MICR 3070 Microbial Diversity**	**4(3,3)**
Elective	3	Social Science Requirement[2] ….	3
	14		17

JUNIOR YEAR

BIOL 4610 Cell Biology	3(3,0)	**MICR 4120 Bacterial Physiology**	**3(3,0)**
BIOL 4620 Cell Biology Lab	2(1,2)	**MICR 4140 Basic Immunology**	**3(3,0)**
MICR 4040 Microbial Ecology	**3(3,0)**	**MICR 4500 Advanced Micro Lab I**	**2(1,2)**
PHYS 2070 General Physics I[7]	3(3,0)	PHYS 2080 General Physics II[9]	3(3,0)
PHYS 2090 General Physics Lab I[7]	1(0,3)	PHYS 2100 General Physics II Lab[9]	1(0,2)
Biomedicine Requirement[8]	3	Global Challenges Course Requirement[2]	3
	15		15

SENIOR YEAR

MICR 4150 Microbial Genetics	**3(3,0)**	BIOL 4930 Senior Seminar **or**	
MICR 4160 Introductory Virology	**3(3,0)**	MICR (BIOL) 4930 Senior Seminar	3(3,0)
MICR 4510 Advanced Micro Lab II	**2(1,2)**	Arts and Humanities (Non-Lit) Req.[2]	3
Arts and Humanities (Literature) Req.[2]	3	Biomedicine Requirement[8]	3
Biomedicine Requirement[8]	3	Pathogenic Requirement[10]	3
	14	Elective	3
			15

Total Semester Hours = 120

[a] Bolded courses must be taken in the sequence listed above to ensure a punctual graduation.

1 BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/BIOL 1050 may substitute for BIOL 1100, and BIOL 1040/BIOL 1060 may substitute for BIOL 1110.

2 See General Education Requirements. The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology. Three of these credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section.

3 MATH 1080 or STAT 2300 or other approved coursework. See advisor. Medical/dental schools have different mathematics requirements. Statistics will be useful in either graduate study or professional school.

4 Enroll in section for microbiology majors.

5 BCHM 3010 may be substituted.

6 GEN 3020 may be substituted.

7 PHYS 1220/PHYS 1240 may be substituted.

8 See advisor. See advisor. A minimum of nine credits selected from: BCHM 4320, BCHM 4400, BIOL 3150, BIOL 3160, BIOL 3940, BIOL 4030, BIOL 4190, BIOL 4200, BIOL 4250, BIOL 4340, BIOL 4560, BIOL 4670, BIOL 4840, BIOL 4890, BIOL 4910, BIOL 4940, BIOL 4950, HLTH 3800, MICR 3940, MICR 4000, MICR 4050, MICR 4170, MICR 4910, MICR 4940, or MICR 4950.Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940, and MICR 4950 may not exceed six credits.

9 PHYS 2210/PHYS 2230 may be substituted.

10 Select MICR 4110 or MICR 4180.

2025/2026 B.S. MICROBIOLOGY - BIOMEDICINE CONCENTRATION CURRICULUM

MICR Core Requirement: (38 cr.)		**SEM/Yr**	**Grade**
BIOL 1010	1(1,0)		
BIOL 1100/1101	4(3,3) [1]		
BIOL 1110/1111	4(3,3) [1]		
MICR 3050/3051 (Fall, SO)	4(3,3)		
MICR 3070/3071 (Sp., SO)	4(3,3)		
MICR 4040 (Fall, JR)	3(3,0)		
MICR 4120 (Sp., JR)	3(3,0)		
MICR 4140 (Fall, SR)	3(3,0)		
MICR 4150 (Fall, SR)	3(3,0)		
MICR 4160 (Fall, SR)	3(3,0)		
MICR 4500/4501 (Sp., JR)	2(1,2)		
MICR 4510/4511 (Fall, SR)	2(1,2)		
MICR 4930 (or BIOL 4930)	3(3,0) [2]		
Biomedicine Requirement (9 cr.) [3]			
_____			
_____			
_____			
Pathogenic Requirement (3 cr.) [4]			
_____			
Required Science Courses (42 cr.)			
BCHM 3050 **OR** 3010	3(3,0)		
BIOL 4610	3(3,0)		
BIOL 4620	2(1,2)		
CH 1010/1011	4(3,3)		
CH 1020/1021	4(3,3)		
CH 2230, 2270	3(3,0) **&** 1(0,3)		
CH 2240, 2280	3(3,0) **&** 1(0,3)		
GEN 3000	3(3,0) [5]		
MATH 1060	4(4,0)		
MATH 1080	4(4,0)		
OR STAT 2300	3(3,0) [6]		
PHYS 2070, 2090	3(3,0), 1(0,2) [7]		
PHYS 2080, 2100	3(3,0), 1(0,2) [8]		
Required Non-Science Courses (18 cr.)			
ENGL 1030/1031	3(3,1)		
Arts & Humanities – Literature	3(3,0) [9]		
Arts & Humanities – Non-Lit	3(3,0) [9]		
Oral Communication Req.	3(3,0) [9]		
Social Sciences			
_____	3(3,0) [9,10]		
_____	3(3,0) [9,10]		
Electives (6 cr.)			
_____			
_____			
_____			
_____			
_____			

[1] BIOL 1100 and BIOL 1110 are strongly recommended; however, BIOL 1030/1050 may substitute for BIOL 1100 and BIOL 1040/1060 may substitute for BIOL 1110.

[2] BIOL/MICR 4930 fulfills the upper-level Global Challenges requirement.

[3] See advisor. Minimum 9 hours required. BCHM 4320, 4400, BIOL 3150, 3160, 3940, 4030, 4190, 4200, 4250, 4340, 4560, 4670, 4840, 4890, 4910, 4940, 4950, HLTH 3800, MICR 3940, 4000, 4050, 4170, 4190, 4910, 4940 or 4950. Any combination of BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4940, BIOL 4950, MICR 3940, MICR 4910, MICR 4920, MICR 4940, and MICR 4950 may not exceed six credits.

[4] MICR 4110 or MICR 4180

[5] GEN 3020 may be substituted

[6] Statistics will be useful in both graduate school and professional school.

[7] PHYS 1220, 1240 (MATH 1060 pre-req.) may be substituted.

[8] PHYS 2210, 2230 (MATH 1080 pre-req) may be substituted.

[9] See General Education Requirements.

[10] The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[11] HIST 1010, HIST 3110, POSC 1010, or POSC 1030

Other Courses		**SEM/Yr**	**Grade**
CU 1000	_____	____	____
GLCH	_____	____	____
SC REACH[11]	_____	____	____

Total Semester Hours = 120

B.S. BIOSC and B.A. BIOSC Degrees Compared

B.S. BIOLOGICAL SCIENCES

BIOL Core Requirement: (29 cr.)
BIOL 1010 (1 cr.)
BIOL 1100/1101 (4 cr.)
BIOL 1110/1111 (4 cr.)
BIOL 3350 (3 cr.)
BIOL 4610 (3 cr.)
BIOL 4930 **OR** MICR 4930 (2 cr.)
Organismal Diversity Requirement (4 cr.)
Ecology Requirement (3 cr.)
Functional Biology Requirement (3 cr.)
Advanced Lab Requirement (2 cr.)

Major Requirement: (21 cr.)
Including 3 Laboratory Courses

Required Science Courses (33 cr.)
BCHM 3050 (3 cr.)
CH 1010/1011 (4 cr.)
CH 1020/1021 (4 cr.)
CH 2230, 2270 (3 cr.) **&** (1 cr.)
OR CH 2010, CH 2020 (3 cr.) **&** (1 cr.)
GEN 3000 (3 cr.)
MATH 1060 (4 cr.)
MATH 1080 (4 cr.)
OR STAT 2300 (3 cr.)
PHYS 2070, 2090 (3 cr.) **&** (1 cr.)
PHYS 2080, 2100 (3 cr.) **&** (1 cr.)

Required Non-Science Courses (21 cr.)
ENGL 1030/1031 (3 cr.)
Arts & Humanities – Literature (3 cr.)
Arts & Humanities – Non-Literature (3 cr.)
Oral Communication (3 cr.)
Social Sciences (6 cr.)
SC REACH Act

Global Challenge Courses (6 cr.)

Electives (10 cr.)

Total Semester Hours = 120

B.A. BIOLOGICAL SCIENCES

BIOL Core Requirement: (27 cr.)
BIOL 1010 (1 cr.)
BIOL 1100/1101 (4 cr.)
BIOL 1110/1111 (4 cr.)
BIOL 3350 (3 cr.)
BIOL 4610 (3 cr.)
BIOL 4930 **OR** MICR 4930 (2 cr.)
Organismal Diversity Requirement (4 cr.)
Ecology Requirement (3 cr.)
Functional Biology Requirement (3 cr.)

Major Requirement: (4 cr.)

Required Science Courses (33 cr.)
BCHM 3050 (3 cr.)
CH 1010/1011 (4 cr.)
CH 1020/1021 (4 cr.)
CH 2230, 2270 (3 cr.) **&** (1 cr.)
OR CH 2010, CH 2020 (3 cr.) **&** (1 cr.)
GEN 3000 (3 cr.)
MATH 1060 (4 cr.)
MATH 1080 (4 cr.) **OR**
OR STAT 2300 (3 cr.)
PHYS 2070, 2090 (3 cr.) **&** (1 cr.)
PHYS 2080, 2100 (3 cr.) **&** (1 cr.)

Required Non-Science Courses (35 cr.)
ENGL 1030/1031 (3 cr.)
Arts & Humanities – Literature (3 cr.)
Arts & Humanities – Non-Literature (3 cr.)
Modern Language (4 cr.)
Modern Language (4 cr.)
Modern Language (3 cr.)
Modern Language (3 cr.)
Oral Communication (3 cr.)
Social Sciences (6 cr.)
SC REACH Act

Minor Courses (15 cr.)

Global Challenge Courses (6 cr.)

Total Semester Hours = 120

B.S. MICR and B.S. MICR - BIOMEDICINE Degrees Compared

B.S. MICROBIOLOGY	**B.S. MICROBIOLOGY - BIOMEDICINE**
MICR Core Requirement (32 cr.)	**MICR Core Requirement (38 cr.)**
BIOL 1010 (1 cr.)	BIOL 1010 (1 cr.)
BIOL 1100 (4 cr.)	BIOL 1100 (4 cr.)
BIOL 1110 (4 cr.)	BIOL 1110 (4 cr.)
MICR 3050 (4 cr.)	MICR 3050 (4 cr.)
MICR 3070 (4 cr.)	MICR 3070 (4 cr.)
MICR 4040 (3 cr.)	MICR 4040 (3 cr.)
MICR 4120 (3 cr.)	MICR 4120 (3 cr.)
MICR 4150 (3 cr.)	MICR 4140 (3 cr.)
MICR 4500 (2 cr.)	MICR 4150 (3 cr.)
MICR 4510 (2 cr.)	MICR 4160 (3 cr.)
MICR (BIOL) 4930 (2 cr.)	MICR 4500 (2 cr.)
	MICR 4510 (2 cr.)
	MICR (BIOL) 4930 (2 cr.)
Microbiology Requirement (12 cr.)	**Biomedicine Requirement (9 cr.)**
Virology Requirement (3 cr.)	**Pathogenic Requirement (3 cr.)**
Req. Science Courses (38 cr.)	**Req. Science Courses (42 cr.)**
BCHM 3050 (3 cr.)	BCHM 3050 (3 cr.)
BIOL 4610 (3 cr.)	BIOL 4610 (3 cr.)
BIOL 4620 (2 cr.)	BIOL 4620 (2 cr.)
CH 1010 (4 cr.)	CH 1010 (4 cr.)
CH 1020 (4 cr.)	CH 1020 (4 cr.)
CH 2230 (3 cr.) **&** CH 2270 (1 cr.)	CH 2230 (3 cr.) **&** CH 2270 (1 cr.)
CH 2240 (3 cr.) **&** CH 2280 (1 cr.)	CH 2240 (3 cr.) **&** CH 2280 (1 cr.)
GEN 3000 (3 cr.)	GEN 3000 (3 cr.)
MATH 1060 (4 cr.)	MATH 1060 (4 cr.)
MATH 1080 (4 cr.)	MATH 1080 (4 cr.)
OR STAT 2300 (3 cr.)	**OR** STAT 2300
PHYS 2070 (3 cr.), 2090 (1 cr.)	PHYS 2070 (3 cr.), 2090 (1 cr.)
	PHYS 2080 (3 cr.), 2100 (1 cr.)
Req. Non-Science Courses (21 cr.)	**Req. Non-Science Courses (21 cr.)**
ENGL 1030, 1031 (3 cr.)	ENGL 1030, 1031 (3 cr.)
Arts & Humanities – Literature (3 cr.)	Arts & Humanities – Literature (3 cr.)
Arts & Humanities – Non-Literature (3 cr.)	Arts & Humanities – Non-Literature (3 cr.)
Oral Communication (3 cr.)	Oral Communication (3 cr.)
Social Sciences (6 cr.)	Social Sciences (6 cr.)
SC REACH Act	SC REACH Act
Global Challenge Courses (6 cr.)	**Global Challenge Courses (6 cr.)**
Electives (8 cr.)	**Electives (1 cr.)**
Total Semester Hours = 120	**Total Semester Hours = 120**

UNDECLARED MAJOR - COLLEGE OF SCIENCE: PREPROFESSIONAL HEALTH STUDIES

FIRST YEAR

First Semester		Second Semester	
MATH 1060 Calculus of One Var. I	4(4,0)	ENGL 1030 Composition and Rhetoric	3(3,1)
Math or Science with Lab Requirement[1]	4	Math or Science with Lab Requirement[1]	11
Natural Science with Lab Requirement[2]	4	Elective	1
Oral Communication Requirement[3]	3		15
	15		

SECOND YEAR

Math or Science with Lab Requirement[1]	12	Math or Science with Lab Requirement[1]	12
Social Science Requirement[3]	3	Social Science Requirement[3]	3
	15		15

THIRD YEAR

Arts and Humanities (Non-Lit.) Req[3]	3	Arts and Humanities (Lit.) Req[3]	3
Exploratory Coursework Major Interest[4]	6-8	Exploratory Coursework Major Interest[4]	6-8
Global Challenges Requirement[3]	3	Global Challenges Requirement[3]	3
Elective	1-3	Elective	1-3
	15		15

Total Semester Hours = 90

[1] Students are advised to identify an intended degree when choosing their mathematics or science requirements. Students interested in careers in health professions typically complete the following courses: BIOL 1030/BIOL 1050 and BIOL 1040/BIOL 1060 (BIOL 1100 and BIOL 1110 may be substituted), CH 1010 and CH 1020, PHYS 2070/PHYS 2090 and PHYS 2080/PHYS 2100 (PHYS 1220/PHYS 1240 and PHYS 2210/PHYS 2230 may be substituted). Additional advanced coursework may include: BCHM 3050 (BCHM 3010 may be substituted), BIOL 2220 and BIOL 2230 (BIOL 3150 and BIOL 3160 may be substituted), BIOL 4610, CH 2230/CH 2270 and CH 2240/CH 2280, and MICR 3050/MICR 3060. Students interested in careers in health professions are encouraged to consult with Health Professions Advising. See advisor for intended major math requirements. Health professional schools have different mathematics requirements. Statistics (STAT 2300) will be useful in either graduate study or professional school.

[2] See General Education Requirements. Students are advised to identify an intended degree when choosing their Natural Science with Lab Requirement. Students interested in careers in health professions are encouraged to take a course in Biology, Chemistry, and Physics. Typically BIOL 1030/BIOL 1050 and BIOL 1040/BIOL 1060 are chosen; however BIOL 1100 and BIOL 1110 may be substituted. Students should take CH 1010 and CH 1020 to complete the Chemistry requirements. PHYS 2070/PHYS 2090 and PHYS 2080/PHYS 2100 are typically chosen; however, PHYS 1220/PHYS 1240 and PHYS 2210/PHYS 2230 may be substituted.

[3] See General Education Requirements. Three of these credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section. The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

[4] Students are advised to identify a parallel degree plan when choosing courses to satisfy the Exploratory Coursework for Major of Interest requirement. Typically, only students intending to apply for the Accelerated Pathways programs such as MUSC and Presbyterian College remain in the College of Science Preprofessional Health Studies Undeclared Major through their junior year. Students are encouraged to apply to an Accelerated Pathway program in the fall semester of their junior year. Only students who have gained acceptance to an accredited health professional school are allowed to remain in College of Science Preprofessional Health Studies Undeclared Major beyond the fall semester of their junior year. Students who are denied admissions must declare their parallel degree major by the start of the spring semester. Students are encouraged to consult with Health Professions Advising, as well as the individual professional schools to which they hope to apply, in order to identify the appropriate coursework. Qualifying courses include prerequisites needed for upper-level coursework for the exploratory major. Courses such as Leisure Skills (LS) courses, FIN 2010 and FIN 2020, and MATH 1030, MATH 1040, MATH 1050, or MATH 1990 do not satisfy this requirement..

NOTE: To ensure that students graduate in a timely manner, they are strongly advised to declare a degree-granting program by the end of their first year or once they have completed General Education requirements. At that point, majors typically have specific classes they recommend or require, and the number of crossover courses that are applicable to multiple majors begins to decline. Students changing majors in their junior year may be required to complete additional semesters to complete graduation requirements.

UNDECLARED MAJOR - COLLEGE OF SCIENCE: PREPROFESSIONAL HEALTH STUDIES

Core Requirements: (59 cr.)		**SEM/Yr**	**_Grade**
Math or Science with Lab Requirement[1] (39 cr.)			
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
Natural Science with Lab Requirement[2] (4 cr.)			
_____		_____	_____
Exploratory Coursework Major Interest[3] (16 cr.)			
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
_____		_____	_____
Required Science Courses (4 cr.)			
MATH 1060	4(4,0)	_____	_____
Required Non-Science Courses (24 cr.)			
Arts & Humanities – Literature[4]	3(3,0)	_____	_____
Arts & Humanities – Non-Literature[4]	3(3,0)	_____	_____
ENGL 1030/1031	3(3,1)	_____	_____
Global Challenge[4]			
_____	3(3,0)	_____	_____
_____	3(3,0)	_____	_____
Oral Communication[4]			
_____	3(3/0)	_____	_____
Social Sciences[4]			
_____	3(3,0)	_____	_____
_____	3(3,0)	_____	_____
CU 1000_____		_____	_____
Electives (3 cr.)			
_____		_____	_____
_____		_____	_____

Total Semester Hours = 90

NOTE: To ensure that students graduate in a timely manner, they are strongly advised to declare a degree-granting program by the end of their first year or once they have completed General Education requirements. At that point, majors typically have specific classes they recommend or require, and the number of crossover courses that are applicable to multiple majors begins to decline. Students changing majors in their junior year may be required to complete additional semesters to complete graduation requirements.

[1]Students are advised to identify an intended degree when choosing their mathematics or science requirements. Students interested in careers in health professions typically complete the following courses: BIOL 1030/BIOL 1050 and BIOL 1040/BIOL 1060 (BIOL 1100 and BIOL 1110 may be substituted), CH 1010 and CH 1020, PHYS 2070/PHYS 2090 and PHYS 2080/PHYS 2100 (PHYS 1220/PHYS 1240 and PHYS 2210/PHYS 2230 may be substituted). Additional advanced coursework may include: BCHM 3050 (BCHM 3010 may be substituted), BIOL 2220 and BIOL 2230 (BIOL 3150 and BIOL 3160 may be substituted), BIOL 4610, CH 2230/CH 2270 and CH 2240/CH 2280, and MICR 3050/MICR 3060. Students interested in careers in health professions are encouraged to consult with Health Professions Advising. See advisor for intended major math requirements. Health professional schools have different mathematics requirements. Statistics (STAT 2300) will be useful in either graduate study or professional school.

[2]See General Education Requirements. Students are advised to identify an intended degree when choosing their Natural Science with Lab Requirement. Students interested in careers in health professions are encouraged to take a course in Biology, Chemistry, and Physics. Typically BIOL 1030/BIOL 1050 and BIOL 1040/BIOL 1060 are chosen; however BIOL 1100 and BIOL 1110 may be substituted. Students should take CH 1010 and CH 1020 to complete the Chemistry requirements. PHYS 2070/PHYS 2090 and PHYS 2080/PHYS 2100 are typically chosen; however, PHYS 1220/PHYS 1240 and PHYS 2210/PHYS 2230 may be substituted.

[3]Students are advised to identify a parallel degree plan when choosing courses to satisfy the Exploratory Coursework for Major of Interest requirement. Typically, only students intending to apply for the Accelerated Pathways programs such as MUSC and Presbyterian College remain in the College of Science Preprofessional Health Studies Undeclared Major through their junior year. Students are encouraged to apply to an Accelerated Pathway program in the fall semester of their junior year. Only students who have gained acceptance to an accredited health professional school are allowed to remain in College of Science Preprofessional Health Studies Undeclared Major beyond the fall semester of their junior year. Students who are denied admissions must declare their parallel degree major by the start of the spring semester. Students are encouraged to consult with Health Professions Advising, as well as the individual professional schools to which they hope to apply, in order to identify the appropriate coursework. Qualifying courses include prerequisites needed for upper-level coursework for the exploratory major. Courses such as Leisure Skills (LS) courses, FIN 2010 and FIN 2020, and MATH 1030, MATH 1040, MATH 1050, or MATH 1990 do not satisfy this requirement.

[4]See General Education Requirements. Three of these credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section. The Medical Colleges Admissions Test (MCAT) includes questions on psychology and sociology.

PREPROFESSIONAL STUDIES: PREPHARMACY, NON-DEGREE

FIRST YEAR

First Semester		Second Semester	
BIOL 1030 General Biology I[1]	3(3,0)	BIOL 1040 General Biology II[1]	3(3,0)
BIOL 1050 General Biology I Laboratory I[1]	1(0,3)	BIOL 1060 General Biology Laboratory II[1]	1(0,3)
CH 1010 General Chemistry	4(3,3)	CH 1020 General Chemistry	4(3,3)
MATH 1060 Calculus of One Var. I	4(4,0)	ENGL 1030 Composition and Rhetoric	3(3,1)
PSYC 2010 Introduction to Psychology	3(3,0)	STAT 2300 Statistical Methods I	3(2,2)
	15	Elective[2]	3
			17

SECOND YEAR

BIOL 2220 Human Anatomy and Physio I[3]	4(3,3)	BIOL 2230 Human Anatomy and Physio II[3]	4(3,3)
CH 2230 Organic Chemistry	3(3,0)	CH 2240 Organic Chemistry	3(3,0)
CH 2270 Organic Chemistry Lab	1(0,3)	CH 2280 Organic Chemistry Lab	1(0,3)
PHYS 2070 General Physics I	3(3,0)	COMM 1500/1501 Intro to Human Comm or	3(2,1)
PHYS 2090 General Physics Lab I	1(0,3)	COMM 2500/2501 Public Speaking or	3(2,1)
Arts and Humanities (Non-Lit) Req.[4]	3	HON 2230 Studies in Comm	3(3,0)
	15	PHYS 2080 General Physics II	3(3,0)
		PHYS 2100 General Physics Lab II	1(0,3)
			15

THIRD YEAR

See Footnote [5]

MICR 3050 General Microbiology	3(3,0)	Global Challenges Course Requirement[4]	3
MICR 3060 General Microbiology Lab	1(0,3)	Elective	9
Arts and Humanities (Literature) Req.[4]	3		12
Global Challenges Course Requirement[4]	3		
Social Science-Requirement[6]	3		
Elective[2]	3		
	16	**Total Semester Hours = 90**	

[1] Pharmacy programs require BIOL 1030/BIOL 1050 and BIOL 1040/BIOL 1060. However, BIOL 1100 and BIOL 1110 may be substituted.

[2] Three of these credits must also satisfy the South Carolina REACH Act Requirement. See the South Carolina REACH Act Requirement in the Academic Regulations section.

[3] BIOL 3150 and BIOL 3160 may be substituted for BIOL 2220 and BIOL 2230.

[4] See General Education Requirements.

[5] Students planning to receive the Bachelor of Science in Preprofessional Studies degree are required to complete a year at an accredited pharmacy school.

[6] See General Education Requirements. Some pharmacy programs encourage students to take an economics course. Students are encouraged to consult a Health Professions advisor and to verify the requirements of any school(s) of interest.

2025/2026 PREPROFESSIONAL STUDIES: PREPHARMACY, NON-DEGREE

BIOL Core Requirement: (20 cr.)		**SEM/Yr**	**_Grade**
BIOL 1030 [1]	3(3,0)	_____	_____
BIOL 1050 [1]	1(0,3)	_____	_____
BIOL 1040 [1]	3(3,0)	_____	_____
BIOL 1060 [1]	1(0,3)	_____	_____
BIOL 2220 [2]	4(3,1)	_____	_____
BIOL 2230 [2]	4(3,1)	_____	_____
MICR 3050	3(3,0)	_____	_____
MICR 3060	1(0,3)	_____	_____
Required Science Courses (31 cr.)			
CH 1010/1011	4(3,3)	_____	_____
CH 1020/1021	4(3,3)	_____	_____
CH 2230, 2270	3(3,0) & 1(0,3)		
CH 2040, 2280	3(3,0) & 1(0,3)	_____	_____
MATH 1060	4(4,0)	_____	_____
PHYS 2070, 2090	3(3,0) & 1(0,2)	_____	_____
PHYS 2080, 2100	3(3,0) & 1(0,2)	_____	_____
STAT 2300	3(3,0)	_____	_____
Required Non-Science Courses (24 cr.)			
Arts & Humanities – Literature [3]	3(3,0)	_____	_____
Arts & Humanities – Non-Literature [3]	3(3,0)	_____	_____
ENGL 1030/1031	3(3,1)	_____	_____
Global Challenge [3]			
_____	3(3,0)	_____	_____
_____	3(3,0)	_____	_____
Oral Communication [3]			
_____	3(2/1) or 3(3/0)	_____	_____ SC
Social Sciences [4]			
PSYC 2010	3(3,0)	_____	_____
_____	3(3,0)	_____	_____

[1] Pharmacy programs require BIOL 1030/BIOL 1050 and BIOL 1040/BIOL 1060. However, BIOL 1100 and BIOL 1110 may be substituted.

[2] BIOL 3150 and BIOL 3160 may be substituted for BIOL 2220 and BIOL 2230.

[3] See General Education Requirements.

[4] See General Education Requirements. Some pharmacy programs encourage students to take an economics course. Students are encouraged to consult a Health Professions advisor and to verify the requirements of any school(s) of interest. Select ECON 2000, ECON 2110 or ECON 2120.

[5] Three of these credits must also satisfy the South Carolina REACH Act Requirement. Select HIST HIST 3110, POSC 1010, or POSC 1030

Other Courses	**SEM/Yr**	**Grade**
CU 1000 _____	____	____
Electives (15 cr.) [5]		
_____	_____	_____
_____	_____	____
_____	_____	____
_____	_____	____
_____	_____	____
_____	_____	____

Total Semester Hours = 120

CLEMSON UNIVERSITY HONORS COLLEGE

Honors College Director of Advising and Student Development: Londan M. Charley londanm@clemson.edu

Honors Student Handbook

Departmental Liaison to the Honors College: Kristi Whitehead kwhiteh@clemson.edu

Honors College - Advising Form: Page 36.

Purpose

The main purpose of General Honors is to broaden the student's intellectual perspectives. To this end, students are encouraged to take honors courses in as many different areas of study as possible.

Honors students are eligible to pursue both **General Honors** and **Departmental Honors**. Both programs provide opportunities for Honors students to interact with one another and with Clemson's top faculty members. Most of the courses students will take for General Honors are 1000-2000 level courses that satisfy the university's Crossings (General Education) requirements or serve as introductory courses in a student's major.

It is permissible for 3000-4000 level courses to be taken for General Honors; however, 1000- and 2000-level honors courses may not be applied toward the requirements of Departmental Honors, nor may a 3000-4000 level course count for both General Honors and Departmental Honors. Typically, students take most of their General Honors courses during the first and second years, although many students enroll in General Honors courses as juniors and seniors. Honors courses can be counted towards either General Honors or Departmental Honors **but not for both** General and Departmental Honors. Students should follow the Honors College Student Handbook that corresponds to their academic catalog year as recorded by the university. Find the Handbook for your academic catalog year.

Admission to the Honors College is by online application (Honors College). Current Clemson University non-honors students can apply to join the Honors College in the fall or spring semester if they have a cumulative grade point average of 3.50 or higher by the end of the semester in which they apply.

General Honors. Students are encouraged to take honors courses in many different areas of study. Most of the courses you will take for General Honors are 1000-2000 level courses that satisfy the university's General Education requirements or serve as introductory courses in your major. Typically, students take most of their General Honors courses during the freshman and sophomore years, although many students enroll in General Honors courses as juniors and seniors.

Members of the Honors Program are required to take and complete at least one honors course (HON) each fall and spring semester. To be awarded the Certificate of Achievement in General Honors, the following requirements must be satisfied:

1) Completion of a minimum of 18 credit hours from three or more subjects (e.g., ENGL, MATH), at least 3 credit hours of which must be HON-prefixed courses (e.g., HON 1900).
2) A cumulative GPR of 3.40 or higher on all coursework taken at Clemson (non-honors as well as honors courses.
3) A grade of A or B in all courses taken to fulfill the requirements of General Honors.
4) Completion of all university requirements for graduation.

How do you know if the course is an honors course? The title of the course should have (HON) in the title of the course, for example, ENGL 1030 (HON) and in the online *Undergraduate Announcements* have "Includes Honors sections" just before the list of prerequisites,

Departmental Honors. The purpose of Departmental Honors is to provide Honors students a unique opportunity to do advanced, in-depth study and research within an academic discipline. Normally, Departmental Honors is completed during your junior and senior years. Honors courses can be counted towards either General Honors or Departmental Honors but **not for both General and Departmental Honors**.

To be considered for any Departmental Honors program as a current Honors student, you must have a cumulative GPA of 3.40 or higher and the approval of the department in which you will complete Departmental Honors.

To graduate with Departmental Honors in either Biological Sciences or Microbiology**,** the student must complete at least 12 hours of designated honors courses with a minimum grade of B in each course. Included in the required 12 semester hours will be 6 hours of independent research, BIOL 4910 (HON) or MICR 4910 (HON) taken under a single research advisor for six consecutive hours and BIOL 4980 Thesis in Biological Sciences (HON) or MICR 4980

Thesis in Microbiology (HON), taken the semester the thesis is written and presented. A grade of Pass is required to receive Departmental Honors.

An additional 5 credit hours of Honors course work are required in BIOL or MICR at the 3000 level or higher. **Contract Honors courses are excluded**. Honors courses in other departments require the pre-approval of the Department's Honors Liaison.

Research results from BIOL 4910 (HON) or MICR 4910 (HON) are submitted as a thesis written in a style appropriate for publication and presented in two open seminar forums: (1) at a national, regional, or local meeting and (2) at the Department of Biological Sciences Undergraduate Research Symposium. Student theses are approved and submitted by the research faculty mentor to the Department's Honors Liaison. Students are expected to choose and arrange to work with a faculty research advisor prior to registering for the first semester of BIOL 4910 (HON) or MICR 4910 (HON).

Honors courses count towards either General Honors or Departmental but not for both General and Departmental Honors.

Honors Contracts. On a limited basis, students may earn honors credit for a 3000- or 4000-level course by means of an Honors Contract (in exceptional cases contracts for 2000-level classes may be approved). The purpose of such contracts is to enable students to experience the educational enrichment that typifies honors courses, and to explore topics in greater depth than is normally possible in a regular undergraduate course. Honors contract policies and procedures can be found on the Honors Courses and Seminars website.

Honors Graduation Forms: *Honors Candidacy Form* and *Honors Distinction Verification Form*

The Honors College **requires all** graduating honors students (active or presently inactive), who have *successfully* completed honors requirements for the distinctions below, to fill out the Honors Candidacy Form and the Honors Distinction Verification Form. The Honors distinctions are:

- General Honors
- Departmental honors
- Interdisciplinary Honors
- General Honors and Departmental Honors
- General Honors and Interdisciplinary Honors

Do not be late in submitting your **two** forms. Failure to do so may result in your not receiving your certificate (and medallion if you have completed (at the minimum) Departmental Honors or Interdisciplinary Honors) before graduation. It may also prevent your diploma/transcript from reflecting your honors credit as well.

If you are graduating with Honors. You need to complete the following forms:

The Honors College requires all graduating Honors students (active or presently inactive), who have **successfully** completed Honors requirements for the distinctions below, to complete the Honors Distinction Verification Form during the semester of their anticipated graduation. The form will open for May 2025 graduates on **January 3, 2025**.

Honors distinctions are:

- General Honors
- Departmental Honors
- Interdisciplinary Honors
- General Honors and Departmental Honors
- General Honors and Interdisciplinary Honors

This form should be completed no later than the Clemson University Graduation Application deadline for the semester of graduation.

Do not be late in submitting your **Honors Distinction Form**. Failure to do so may result in your not receiving your certificate and medallion before graduation. It may also prevent your diploma/transcript from reflecting your Honors credit as well.

Honors College - Advising Forms

General Honors

To be awarded the Certificate of Achievement in General Honors, the following requirements must be satisfied.

1) Completion of a minimum of 18 credit hours from three or more subjects **(**e.g., ENGL, MATH), at least 3 credit hours of which must be HON-prefixed courses (e.g., HON 1900).
2) A cumulative GPR of 3.40 or higher on all coursework taken at Clemson (non-honors as well as honors courses).
3) A grade of A or B in all courses taken to fulfill the requirements of General Honors.
4) Completion of all university requirements for graduation.

Course	Number	Grade	Course	Number	Grade
_____	_____	____	_____	_____	_____
_____	_____	____	_____	_____	_____
_____	_____	____	_____	_____	_____

Departmental Honors

Departmental Honors requirements vary from major to major so please refer to the honors handbook on the Honors Website for exact requirements. **Honors courses count towards either General Honors or Departmental but not for both General and Departmental Honors**.

To graduate with Departmental Honors in Biological Sciences or Departmental Honors in Microbiology, the student must complete at least 12 hours of designated honors courses with a minimum grade of B in each course. Included in the required 12 semester hours will be 6 hours of independent research, BIOL 4910 (HON) or MICR 4910 (HON), taken under a single research advisor for six consequent semester hours and BIOL 4980 (HON) Thesis in Biological Sciences or MICR 4980 (HON) Thesis in Microbiology taken the semester the thesis is written and presented. A grade of Pass is required to receive Departmental Honors. **Research results will be written in a style appropriate for publication and presented in two open seminar forums: 1) at a national, regional, or local meeting and 2) at the Department of Biological Sciences Undergraduate Research Symposium.** Students are expected to choose and arrange to work with a faculty research advisor prior to registering for the first semester of BIOL 4910 (HON) or MICR 4910 (HON).

Departmental Honors in: _____

Course	Number	Grade	Course	Number	Grade
_____	_____	____	_____	_____	_____
_____	_____	____	_____	_____	_____
_____	_____	____	_____	_____	_____

RESIDENTS IN SCIENCE AND ENGINEERING (RISE)

RISE exists to support **first-year** STEM students. At this time, RISE supports majors in the College of Engineering, Computing and Applied Sciences and well as the College of Science, and students who have selected Pre-professional Health as a chosen discipline. Eligible majors/disciplines include – General Engineering, Bioengineering, Biosystems Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Environmental Engineering, Industrial Engineering, Materials Science and Engineering, and Mechanical Engineering; Computer Science, and Computer Information Systems; Geology; Biological Sciences, Microbiology, Biochemistry, Chemistry, Genetics, Mathematical Sciences, and Physics; Preprofessional Health Studies, Prepharmacy, and Pre-rehabilitation Sciences, and Geology. If you have a specific question about a major/discipline, please email clemsonrise@clemson.edu

The RISE program is designed to ease student's transition to college by promoting academic success, encouraging professional development, and providing opportunities to become engaged students. RISE incorporates a number of features seen in other living-learning communities including academic support through in-hall tutoring services five nights a week, grouped courses with other RISE students, behind the scenes industry tours, and increased opportunities for social interaction. Students apply to the RISE program by selecting RISE as your first choice on your housing application. Honors students are eligible to participate in RISE as a first-time freshman. A student may select another RISE freshman as a roommate. Please refer to the University Housing & Dining website for sign-up information (Housing).

MINORS

A minor consists of at least 15 semester credits, with no fewer than nine credits at the 3000 level or higher. A student cannot major and minor in the same field or acquire a minor that is not allowed by the degree program. In programs that require a minor, courses may not be used to fulfill both the major and minor requirements. Courses used to fulfill general education requirements, however, may be counted toward the minor. Courses that count towards a student's major, but are outside the major's course rubric, may also be used to fulfill minor requirements. Students are encouraged to contact the department offering the minor for advising. **Note**: **Some courses in the minors have prerequisite courses.** Students should select a minor and take any prerequisites as early as possible in their academic careers. Clemson University offers 90+ minors. Minors popular with BIOL and MICR majors last year are as follows:

Psychology (18 credits)
A minor in Psychology requires PSYC 2010 and 15 credits from 3000- or 4000-level psychology courses. At least nine credits from courses other than PSYC 4970 and PSYC 4980 must be taken.

Business Administration (21 credits)
A minor in Business Administration requires ACCT 2010, ECON 2110, ECON 2120, FIN 3060, LAW 3220, MGT 2010 and MKT 3010. Please note that ECON 2120 requires ECON 2110 as a prerequisite. Also, FIN 3060 has prerequisites of ACCT 2010 and a statistics course. See FIN 3060 course description for courses that currently fulfill the statistics requirement. Additionally, these statistics courses may have prerequisites of their own. MKT 3010 requires one of ECON 2000, ECON 2110, ECON 2120 or any 2000-level AGRB class as a prerequisite..

Spanish Studies (29 credits)
A minor in Spanish Studies requires 15 credits of 3000- and 4000-level SPAN courses, including at least one 4000-level literature course (select from SPAN 4010, SPAN 4030, SPAN 4040, SPAN 4050, SPAN 4060, SPAN 4070, SPAN 4220, and SPAN 4990). SPAN 4380 and SPAN 4390 may not be used to satisfy requirements for the Spanish Studies minor.

Microbiology (16 credits minimum) – For Biological Sciences majors
A minor in Microbiology requires at least 16 credits as follows: Required courses: MICR 3050 and MICR 3060; and either BCHM 3010 or BCHM 3050 . At least three credits from each of the following three sections: Section I: Basic Biology of Microorganisms MICR 4040, MICR 4120, MICR 4140, MICR 4150. Section II: Pathogenic Microbiology MICR 4000, MICR 4110, MICR 4160, MICR 4180, BIOL 4560/MICR 4560. Section III: Applied and Environmental Microbiology BIOL 4250, MICR 4020, MICR 4030, MICR 4050, MICR 4070, MICR 4100, MICR 4130, MICR 4910, MICR 4940, MICR 4950

Biological Sciences (20 credits minimum) – For Microbiology majors
A minor in Biological Sciences requires either BIOL 1030/BIOL 1050 or BIOL 1100; and either BIOL 1040/BIOL1060 or BIOL 1110; plus 12 additional credits selected from BIOL courses at the 3000 level or above, BCHM 3010, BCHM 3050, GEN 3000 or GEN 3020, or MICR 3050. Only four credits of BCHM 3010, BCHM 3050, BIOL 3940, BIOL 4910, BIOL 4920, BIOL 4930, BIOL 4940, BIOL 4950, BIOL 4980, GEN 3000, GEN 3020, and/or MICR 3050/MICR 3060 may count toward the minor.

CREATIVE INQUIRY & UNDERGRADUATE RESEARCH

Creative Inquiry (team-based) and Undergraduate Research (individual-based) include all intensive, discovery-oriented approaches to learning. Emphasis is placed on providing an experience that will be meaningful to undergraduate students by promoting reasoning and critical thinking skills, ethical judgement, and communication skills as well as a deep understanding of the methods of scientific research. Students take on problems that spring from their own curiosity, from a professor's challenge or from the pressing needs of the world around them. Team-based and Individual-based investigations are mentored by a faculty mentor and may span more than one semester. Students take ownership of their projects and take the risks necessary to solve problems and get answers. Topics are boundless. Students often find themselves presenting their work at national conferences, fielding questions from professionals. This invaluable experience produces exceptional graduates. Our Creative Inquiry and Undergraduate Research participants develop critical thinking skills, learn to solve problems, and hone their communication and presentation skills.

BIOL and MICR Creative Inquiry Courses:

BIOL 3940 Selected Topics in Creative Inquiry I 1-3 (1-3*)* Disciplinary and multidisciplinary group research projects develop the student's ability to discover, analyze, and evaluate data. Includes Honors sections. May be repeated for a maximum of 24 credits. Preq: Consent of instructor.

BIOL (MICR) 4940 Selected Topics in Creative Inquiry II 2-3 (1-3) Disciplinary and multidisciplinary group research projects with the goal of developing the students' ability to discover, analyze, and evaluate data. Includes Honors sections. May also be offered as MICR 4940. May be repeated for a maximum of 24 credits. Preq: Consent of instructor. Coreq: BIOL 4941.

BIOL (MICR) 4941 Selected Topics in Creative Inquiry II Laboratory 0 (3-6) Non-credit laboratory to accompany BIOL 4940. May also be offered as MICR 4941. *Coreq:* BIOL 4940.

MICR 3940 Selected Topics in Creative Inquiry I 2-3 (2-3*)* Disciplinary and multidisciplinary group research projects with the goal of developing the students' ability to discover, analyze, and evaluate data. May be repeated for a maximum of 24 credits. Preq*:* Consent of instructor.

MICR (BIOL) 4940 Selected Topics in Creative Inquiry II 2-3 (1*)* Disciplinary and multidisciplinary group research projects with the goal of developing the students' ability to discover, analyze, and evaluate data. Includes Honors sections. May also be offered as BIOL 4940. May be repeated for a maximum of 24 credits. Preq: Consent of instructor. Coreq: MICR 4941.

MICR (BIOL) 4941 Selected Topics in Creative Inquiry II Laboratory 0 (3-6) Non-credit laboratory to accompany MICR 4940. May also be offered as BIOL 4941. Coreq*:* MICR 4940.

BIOL and MICR Undergraduate Research Courses:

BIOL 4910 Special Problems in Biological Sciences 1-4 (3-12*)* Mentored research problems introduce undergraduate students to the planning and execution of research and the presentation of research findings. **Departmental honors students** must take six continuous credits under a single research advisor over two or three semesters, must write an honors thesis, and must make a public presentation of their research. Includes Honors sections. May be repeated for a maximum of 24 credits. Preq: Consent of instructor.

MICR 4910 Undergraduate Research in Microbiology 1-4 (3-12) Individually mentored research problems in various areas of microbiology that introduce undergraduate students to the planning and execution of research experimentation and the presentation of research findings. Includes **Departmental honors students** must take six continuous credits under a single research advisor over two or three semesters, must write an honors thesis, and must make a public presentation of their research. Honors sections. May be repeated for a maximum of 24 credits with consent of instructor. Preq: Consent of instructor.

INTERNSHIPS

Internships are a good way to learn about a career, make contacts, and gain experience in biology. Some internships may provide opportunities to do an original research project — a very rewarding experience that will show you how science works and get you thinking about graduate school. Internships may be either paid or unpaid. The student must have actual work duties, not just be observing or shadowing.

BIOL and MICR Internship Courses

BIOL 4920 Internship for Biological Sciences 0-4 (3-12) Preplanned internship at an advisor-approved facility to give students learning opportunities beyond their classroom experiences. Students submit a Student Internship Contract and a one-page study plan before the internship and a comprehensive report within one week of the end of the internship. May be repeated for a maximum of six credits. To be taken Pass/no Pass only. Preq: Consent of instructor.

MICR 4920 Internship for Microbiology 0-4 (3-12) Preplanned internship at an advisor-approved facility to give students learning opportunities beyond their classroom experiences. Students submit a Student Internship Contract and a two-page study plan before the internship and a comprehensive report within one week of the end of the internship. May be repeated for a maximum of six credits. To be taken Pass/Fail only. Preq: Consent of instructor.

Student Internship Contracts are available from Ms. Carla Brewer (cjdunca@clemson.edu)

Internship Instructor: Dr. Jeremy Tzeng.

Procedure

1. Locate an internship and identify a mentor at the place of employment.
2. Fill out a Student Internship Contract that acts as a contract between the employer mentor and the student.
3. Student Internship Contract signed by both the student and the mentor.
4. Return contract to Ms. Carla Brewer, 127 Long Hall, 656-0854, cjdunca@clemson.edu
5. Have the Student Internship Contract approved by Dr. Tzeng
6. Complete the internship.
7. File a final report and submit to Ms. Carla Brewer; cjdunca@clemson.edu
8. Have the mentor send a letter or e-mail to Ms. Brewer evaluating the student.
9. Dr. Tzeng reviews the submitted documents and assigns a pass/fail grade.

Credits: Credit at the rate of 1 credit for 45 hours of employment.

Summer Enrollment: If the internship is performed during the summer and the student wants academic credit, the student must register for BIOL 4920 or MICR 4920 and pay for the credit hours desired (one for each 45 hours of work, up to four). If the student wants to avoid tuition costs, the student should register for zero credits or BIOL 4920 or MICR 4920. This will allow tracking of the student and will *not* require a tuition payment. But it also means that the student will not get academic credit for the internship.

Internship Web Sites: A listing of internships available to students interested in obtaining valuable field and/or laboratory experience - the best way to spend your summer! Paid and volunteer opportunities are presented.

Clemson University Center for Career and Professional Development – Internship Programs

Alaska State Parks Volunteer Program – Volunteer Internship Positions

Ceiba Foundation for Tropical Conservation – Volunteer

Internships in Microbiology – Co-op/Internships

Internships through the Nature Conservancy Paid and Volunteer Positions

Medical University of South Carolina (MUSC) Internships

National Institutes of Health Summer Internship Program for Biomedical Research Biomedical Research (SIP)

National Science Foundation Research Experiences for Undergraduates - REU – lists hundreds of summer programs. REU

National Wildlife Federation Internships Internships, Fellowships, & Volunteer Opportunities

Smithsonian's National Museum of Natural History Research Training Program – Internships

Walt Disney College Program – Internships

SERVICE LEARNING

Students gain teaching experience by serving as undergraduate teaching assistants in laboratories that are offered by the Department of Biological Sciences or students learn to prepare and assist in laboratories offered to middle and high school students by the Life Sciences Outreach Center.

BIOL 4950 Service Learning in Biology 2-4 (1) Combines service and academic learning while helping pre-college or college students learn about the fundamental aspects of science. The course provides the science and laboratory experience as students learn to prepare and participate in supervised laboratory teaching for pre-college or college students. May be repeated for six credits Preq: Consent of instructor. Coreq: BIOL 4951.

BIOL 4951 Service Learning in Biology Laboratory 0 (3-9) Non-credit laboratory to accompany BIOL 4950. *Coreq:* BIOL 4950.

MICR 4950 Service Learning in Biology 2-4 (1) Combines service and academic learning while helping pre-college or college students learn about the fundamental aspects of science. Provides lecture and laboratory experiences as students learn to prepare and participate in supervised laboratory teaching for pre-college or college students. May be repeated for a maximum of six credits. Preq: Consent of instructor. Coreq: MICR 4951.

MICR 4951 Service Learning in Biology Laboratory 0 (3-9) Non-credit laboratory to accompany MICR 4950. Coreq*:* MICR 4950.

CLEMSON STUDY ABROAD PROGRAMS

Through the Pam Hendrix Center for Education Abroad at Clemson, students may choose from a variety of programs to enhance their academic career. Programs are offered throughout the year for varying durations and include opportunities to study abroad, participate in internships abroad, and conduct research abroad, among others. Education abroad opportunities exist for students of all academic disciplines at Clemson. Students can participate in faculty-directed programs, approved third-party provider programs, or exchange programs, all of which offer students the opportunity to earn coursework credit as part of the experience. All students participating in academic education abroad experiences maintain their Clemson University enrollment during the term abroad and pay a study abroad fee.

Students interested in pursuing an education abroad experience are encouraged to start planning early. General application deadlines are October 1 for spring programs and March 1 for fall, academic year, and summer programs.

Interested students should contact the Pam Hendrix Center for Education Abroad to explore opportunities. Additional information is available by emailing abroad@clemson.edu.

SPECIALTY COURSES

BIOL 4880 Health Professions Practicum 3 (3) A summer study abroad opportunity for students who have decided to pursue a career in medicine, dentistry, or rehabilitation sciences. This course provides students with direct, hands-on experience working with health professionals. May be repeated for a maximum of six credits, but only if different topics are covered. Preq: Consent of instructor. For more information contact Dr. Vincent Gallicchio at vsgall@clemson.edu.

Check the Registration Information web page below for course availability, the registration process, and associated costs, e.g., travel, accommodations, food, study abroad fee, and/or local transportation: Information

Dental Missions in Panama is offered during Summer Minimester A and Health Missions to Costa Rica is offered during Summer Minimesters B, C, and D.

BIOL 4890 Clinical Applications & Medical Practice 3 (2,1) Explores the various fields, specialties, and subspecialties in medicine. Provides students with the opportunity to shadow physicians in a hospital and/or office setting and to discuss current issues and advances in medicine with practicing physicians and other health care professionals. Preq: Consent of instructor. Coreq: BIOL 4891. This course is intended for sophomores and juniors.

Applications for these programs are available in February and September for the fall and spring respectively. Submit application and one page essay about why you are interested in medicine, career goals, and benefits of the course to Ms. Carla Brewer, 127 Long Hall, 656-0854, cjdunca@clemson.edu. For more information contact Dr. Vincent Gallicchio at vsgall@clemson.edu

CLASS OF 1956 ACADEMIC SUCCESS CENTER

The Academic Success Center (ASC) supports undergraduate student success by delivering a diverse array of services designed to foster the skills and mindset students need to enhance their learning and achieve their educational goals.

Through the delivery of its programs, the ASC strives to enhance student learning and development, meet the needs of students, and promote student success, continued enrollment, and timely graduation. ASC programs include:

- Peer-Assisted Learning (PAL) - PAL is offered for historically difficult courses and provides students the opportunity to engage in peer-based learning sessions facilitated by trained upper-class PAL leaders who have already successfully completed the course.
- Tutoring - Course-specific tutoring is delivered on a drop-in basis and allows students to meet with trained upper-class tutors who can assist them with questions about course content and provide helpful learning and study strategies.
- Success Strategy workshops - Workshops on a variety of topics are presented throughout the academic year. Participating in workshops gives students the opportunity to learn new strategies and approaches that can enhance their learning and academic success.
- Academic coaching - Academic coaching is available by appointment and provides students the opportunity to meet with a coach on an ongoing basis to enhance their study and learning behaviors and self-management and life skills.
- Cross-college advising - Cross-college advising is available by appointment and provides exploratory/undeclared students and students in transition with guidance to develop an individualized academic plan compatible with their educational and career goals, and that facilitates intentional academic decision making and planning, successful completion of degree requirements, and timely graduation.
- Success Matters (academic recovery program) - The Success Matters program offers intentional and timely outreach and support to undergraduate students on academic probation to assist them with developing a plan for returning to good academic standing and make them aware of the academic success resources available to them.

CENTER FOR CAREER AND PROFESSIONAL DEVELOPMENT

The Michelin® Career Center, in the Center for Career and Professional Development, assists undergraduate and graduate students in selecting appropriate fields of study, furthering their education, learning effective job searching strategies, and making connections with employers.

Career counselors are available to meet one-on-one with students to explore career or educational options, devise résumés and cover letters, hone interviewing techniques, conduct searches for internships and full-time jobs, and ready themselves for interviewing with employers. In addition, students may utilize ClemsonJobLink, the Career Center's on-line recruiting system, to view part-time jobs, internships, and full-time job postings and to sign up for on-campus interviews.

Experiential learning opportunities are designed to provide students with an experience in which they are required to be active and intentional learners. The goal is for students to transfer their knowledge and experiences from the classroom and apply them in work environments outside the classroom. The Center's Internship Program is geared to bringing students and employers together to facilitate an academically viable and mutually beneficial work experience. This program offers on-campus, off-campus, and international internship options. Students may participate in either part-time or full-time internships.

The Center's goal is to empower students with the skills and tools to find part-time jobs and internships while in school, as well as full-time jobs following graduation. More than 6,000 employers use the Center to connect with students through job postings, on campus interviews, information sessions and career events via our on-line recruiting system ClemsonJobLink. The Center hosts several events throughout the year to further connect students and employers, including an all-majors career fair each spring and fall, and several fairs for specific fields such as education and construction.

Other information can be obtained from the Career Center's website at career.clemson.edu or by calling 864-656-6000.

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS)

CAPS provides individual, group, couples, and family counseling to enhance the mental wellbeing of students. CAPS places a strong emphasis on assisting students with increasing self-understanding and equipping them with effective coping skills. To accommodate time constraints, CAPS offers Therapy Assistance Online treatments that also include

self-enroll, self-help. A strong group therapy program provides the option to be challenged and grow while receiving and providing support. Psychiatric services are also available. Services are confidential.

Students seeking services should call CAPS reception at 864-656-2451 during business hours (8 a.m. - 4:30 p.m.) Counselors are available to conduct a brief phone screening to determine the best way to serve the student's needs. During this phone screening, students in need of assessment for services can be scheduled for an intake appointment. Students complete basic forms before engaging with a counselor to understand the presenting concern and the student's expectations for treatment. Based on this collaboration, the counselor makes a recommendation(s) for treatment that best meets the student's needs. This may range from a single session to skills-building workshops, online treatments, or individual counseling. Group therapy is often the optimal form of intervention given that many of the issues students encounter occur in social settings. The group therapy setting challenges and supports students' growth in a setting similar to where the issues occur. CAPS offers several therapy groups, both general and for specific themes, as well as several options for skills-building workshops. Family and couples counseling is also provided. CAPS operates on a brief-therapy model as an outpatient center; students in need of extensive services will be referred to an outside provider. To learn more, visit clemson.edu/caps.

In case of emergency, assistance and consultation are available by calling CAPS at 864-656-2451 (after hours, select option 2 from the menu).

STUDENT ACCESSIBILITY SERVICES (SAS)

Student Accessibility Services (SAS) coordinates the provision of reasonable accommodations for students with disabilities, including physical, mental health, attention, and learning disabilities. Accommodations are individualized, confidential, and flexible based on the nature of the disability and the academic environment in which the barrier occurs. Clemson University is committed to equal access for all students and maintains compliance with Section 504 of the Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act, as amended in 2008 (ADAA).

Students are encouraged to consult with the SAS office as early as possible, preferably prior to the first day of classes for the semester, to secure necessary accommodations. SAS may require supplemental documentation from a medical or educational professional to determine eligibility and appropriate accommodations. For additional information or to schedule an appointment, contact us at 864-656-6848 or studentaccess@lists.clemson.edu. More information is available on our website: http://www.clemson.edu/academics/studentaccess/.

ACADEMIC FORGIVENESS POLICY (AF)

The Academic Forgiveness Policy (AFP) allows an enrolled student seeking a Clemson University degree, with first term of enrollment fall 2013 through ***spring*** 2019 to eliminate from the GPA calculation up to three courses in which a D or F was earned. Students with first term of enrollment ***summer*** 2019 or after can eliminate a maximum of two courses. Further information on specific questions related to the use of Academic Forgiveness can be found at https://www.clemson.edu/registrar/student-menu/student-records/academic-forgiveness.html.

Academic Forgiveness can improve a student's GPA while reducing their earned credit hours, so students must be aware of all consequences before requesting that a grade be forgiven. Students are encouraged to speak with the Office of Student Financial Aid if they have questions about how Academic Forgiveness may affect their scholarship eligibility. If students are seeking to regain a scholarship for an upcoming academic year, they must invoke the AFP before the first day of class of the fall semester. For financial aid purposes, courses repeated under this policy resulting in duplicate credit do not count for satisfactory academic progress.

The following conditions apply:

- The AFP shall apply only to courses taken at Clemson University.
- The AFP may not be applied to a course taken on a Pass/No Pass basis.
- Courses taken prior to fall semester 2003 may not be considered for academic forgiveness.
- ***Students with a first term of enrollment beginning summer 2019 may apply academic forgiveness to a particular course only once.***
- The AFP may not be applied to any course in which the student was previously found in violation of the academic integrity policy.
- Once applied, academic forgiveness cannot be reversed.
- D or F grades in required courses may be eliminated from the GPA before the course is repeated.
- A forgiven course cannot be used to satisfy any prerequisite.
- Course substitutions are not permitted in situations where Academic Forgiveness has been previously applied.

- Any course used to meet a graduation requirement must be repeated satisfactorily at Clemson University. Both grades will remain on the transcript, degree progress report and other official documents.
- Students must contact their academic advisor to discuss academic forgiveness prior to submitting the request for approval.
- Students cannot receive transfer credit for the same course that received academic forgiveness.

Students may not invoke the AFP after they have graduated. After graduation, students may repeat coursework, but both grades will be calculated in the grade-point average.

***After spring term 2022, all students will follow the revised Academic Forgiveness Policy, regardless of their first term of enrollment. Applicable AFP requests for the three-course version of this policy will be accepted for review no later than August 16, 2022. There will be no exceptions to this deadline.**

To utilize the AFP, the student should complete a request located in iROAR >Student Self-Service > Student Records > Request Academic Forgiveness.

Additional information is available in the FAQ. Direct questions regarding submitted forms to Enrolled Student Services, 864-656-2174.

FINANCIAL AID INFORMATION

The Financial Aid Office at Clemson University administers and/or coordinates various types of undergraduate financial aid, which includes scholarships, loans, grants, and student part-time employment. Students may apply after October 1 for financial assistance for the next academic year. Financial aid requests, based on financial need, must be supported by a processed Free Application for Federal Student Aid (FAFSA) and renewed annually. No application is required for the LIFE Scholarship. Information regarding financial aid programs at Clemson University is available at www.clemson.edu/finaid or from the Office of Student Financial Aid, G-01 Sikes Hall, Box 345123, Clemson, SC 29634-5123.

STATE OF SOUTH CAROLINA SCHOLARSHIPS PROGRAMS

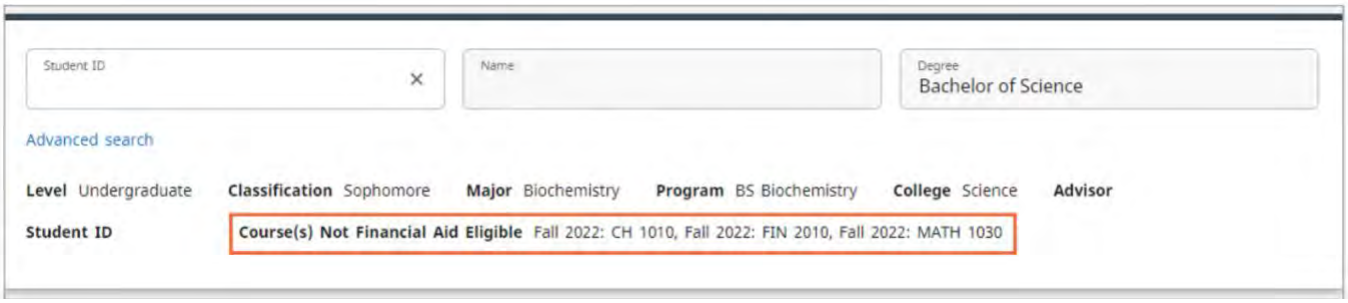
- PALMETTO FELLOWS Scholarship Program. Palmetto Fellows.
- LIFE (Legislative Incentives for Future Excellence) Scholarships. LIFE Scholarship
- HOPE Scholarship Program. HOPE Scholarship Program.
- Enhanced LIFE Scholarship and Palmetto Fellows Scholarships. Enhanced Scholarships
- Summer Disbursements of State Scholarships. Summer Disbursements
- Scholarships and Academic Forgiveness Policy Academic Forgiveness Policy

COURSE PROGRAM OF STUDY (CPoS)

United States Department of Education regulations require that students receiving federal student aid (i.e.: Pell Grant, Direct Loans and Work Study) be enrolled in courses that are applicable toward their degree.

Students enrolled in coursework not applicable toward their degree requirements could see their financial aid package prorated or cancelled. To remain eligible and receive the full financial aid package, students must be enrolled in a minimum of 12 credit hours within their degree program each semester.

Each semester, once students are registered for courses, they may review their degree audit in Degree Works (iROAR > Student Self-Service > Degree Works under the Student Records heading) to see if there are courses that do not satisfy degree requirements.



WHAT YOU NEED TO KNOW AND DO BEFORE WITHDRAWING FROM A CLASS

Before withdrawing from any class, do the following, in this order:

1. If you have scholarships or loans, go to Financial Aid in G-01 Sikes, (864) 656-1831, finaid@clemson.edu
   - Ask about the conditions of your scholarships or loans.
   - Get the facts in writing.
   - Write down the name of the person you speak with there.

2. Make an appointment to see your academic advisor in person.

3. Your academic advisor will:
   - Ask your reasons for wanting to withdraw from the class.
   - Discuss the pros and cons of withdrawing (including):
     a) Implications for your GPA (keeping vs. dropping the class)
     b) Academic forgiveness policy
     c) Medical insurance implications (you need to research this)
     d) Car insurance implications (you need to research this)
   - Map out a course plan for subsequent semesters (including the possibility of attending summer school)
   - Direct you to Financial Aid (G-01 Sikes) if you have not been there yet.

SENIOR ENROLLMENT IN GRADUATE COURSES

Enrollment of Clemson University seniors in any graduate course is subject to approval by the department offering the course and the Graduate School. This approval is required prior to registration. GS6 approval forms are available from the Graduate School Office in E-106 Martin Hall or at GS6.

The total course workload for the semester must not exceed 18 hours, and the cumulative graduate credits earned by seniors shall not exceed 12 semester hours.

The credits and quality points associated with senior enrollment in graduate courses will be part of the undergraduate record. Graduate courses that are not satisfying undergraduate requirements cannot be used to meet enrollment requirements for financial aid.

Seniors with 3.4 or higher grade-point averages are eligible for participation in the combined bachelor's/master's plan (see "Combined Bachelor's/Master's Pl") Academic Regulations.

Seniors with 3.0 or higher grade-point averages are eligible to request enrollment in graduate level courses to meet requirements for the bachelor's degree. Courses used for this purpose cannot be counted later towards an advanced degree. However, if a student is taking graduate level courses and are subsequently admitted to the graduate school, they may request that the graduate level courses be included as a part of their graduate program. Courses cannot be taken at the 6000 level if their 4000-level counterparts are required for the undergraduate degree in the same academic major as the proposed graduate degree (Academic Regulations).

SOUTH CAROLINA REACH ACT GRADUATION REQUIREMENT

The South Carolina REACH Act applies to all new first year undergraduate students who enter the University during summer 2021 or afterward and to all new transfer undergraduate students who enter the University spring 2022 or afterward (unless they enrolled at any higher education institution as a degree seeking undergraduate student prior to fall 2021). Successful completion of coursework in compliance with the South Carolina REACH Act is required for graduation.

To satisfy this graduation requirement, all students must pass one course that has been approved as meeting the South Carolina REACH Act requirement. A current list of Clemson courses that meet the requirement is below. Students may select any course that meets the requirement, regardless of catalog year. This course may count as a requirement in any part of the program of study, including the major, minor, general education or as a free elective.

- HIST 1010 - History of the United States to 1877 3 Credits (3 Contact Hours)
- HIST 3110 - African American History to 1877 3 Credits (3 Contact Hours
- POSC 1010 - American National Government 3 Credits (3 Contact Hours)
- POSC 1030 - Introduction to Political Theory 3 Credits (3 Contact Hours)

**NOTE: HIST 3110 - Reach Act credit awarded only if taken beginning Fall 2025 or later (3 Cr)*

Please note: While additional courses may be approved that satisfy this requirement, including courses taken elsewhere that transfer as HIST 1010, POSC 1010, and POSC 1030, it is highly unlikely that such courses will incorporate a complete set of required reading to satisfy the law. In other words, unless it is an official South Carolina REACH Act course completed at another public South Carolina college or university, the prospect of gaining approval for a course other than the Clemson courses listed above is unlikely.

Exceptions: Students who have passed an AP, IB, or dual enrollment course in United States government or history have (already) satisfied the South Carolina REACH Act graduation requirement. These students may select elective credits to complete the total required credits for their major if needed. Also note that any associated testing for purposes of gaining AP or IB college credits is irrelevant to South Carolina REACH Act compliance.

CHANGE OF ACADEMIC PROGRAM

Enrolled students who wish to change their academic program and who meet the academic eligibility requirements must submit an Undergraduate Change of Program in the Student Records tab in iROAR. The request must be approved by both the current and new academic departments.

Students wishing to change majors should talk with an advisor in both departments. Students should gain the acceptance of the new academic program prior to disengaging from the current one. Many academic departments have established one or more conditions, such as a minimum grade-point average requirement, an application process, etc. that must be satisfied before approving a student Request to Change Academic Program. Any college or department that seeks an exception to this policy must have the approval of Academic Council.

Students are usually put into the curriculum year in force at the time of the academic program change.

NOTE: There are guidelines and restrictions by college for changing academic programs. Students should reference Change of Academic Program Guidelines by College.

CERTIFICATES

A certificate consists of a minimum of nine credits.

Advanced Manufacturing Certificate
Agricultural Education Teacher Certificate
American Sign Language - English Educational Interpreting Certificate
Automotive Engineering Certificate
Beef Cow-Calf Management Certificate
Business Anthropology and Human Behavior Certificate
Global Health in Low Resource Countries Certificate
Nonprofit Leadership Certificate
Orthopaedic Medical Device Product Specialist Certificate
Power Systems Engineering Certificate
Public Health Certificate
Renewable Energy Certificate
Sales Certificate
Sales Engineering Certificate
Six Sigma Certificate
Thomas F. Chapman Leadership Certificate
Wilbur O. and Ann Powers College of Business Leadership Certificate

GRADUATION REQUIREMENTS

A candidate for an undergraduate degree is a student who has submitted a completed diploma application by the deadline prescribed in the University calendar for a particular graduation date. Candidates who do not apply by the deadline will be subject to a late fee.

A student may specify up to two completed majors, two minors, and if applicable, two concentration/emphasis areas per degree when applying for graduation. Second (double) majors and additional fields of study (i.e., minors, emphasis areas or areas of concentration) will not be retroactively added to a student's record once the degree is conferred.

The faculty of major programs may allow for courses to be double counted as major and minor requirements. Regardless

of whether a minor, concentration, or emphasis area is required, courses may not be used to fulfill a second minor, concentration, or emphasis area.

Even though a course may satisfy two requirements, the credits will only count once toward total hours.

Only candidates who have completed all graduation requirements are permitted to participate in the graduation ceremony.

RESIDENCE REQUIREMENT

To qualify for an undergraduate degree, a student **must complete** through instruction from Clemson a minimum of **37 of the last 43 credits** presented for the degree. A waiver may be obtained for approved study abroad experiences through the Undergraduate Studies Office, 864-656-3022.

CLUBS AND SOCIETIES

You may request to join a student organization from their page on Tiger Quest. We also suggest showing interest by messaging their leadership and requesting to attend a meeting. Some organizations may recruit new members only at the beginning of the year, but many are happy to welcome new members any time during the year! If you see a page without a "Join" button, it means that the page belongs to a campus department, like the Center for Student Leadership & Engagement or Gantt Multicultural Center. You can join any of their public events and email the leaders in the roster to see how to get involved with the department as well.

Tiger Prowl is an annual involvement fair open to all Clemson University students. Tiger Prowl helps students explore new ways to get involved with the over 500 registered undergraduate and graduate student organizations. Organizations range from athletics and sports, sororities and fraternities, service organizations, academic organizations and much more. Make plans to experience the wonder of Tiger Prowl to find a student organization or volunteering opportunity in the community, or by tabling with your student organization.

Alpha Epsilon Delta: Students with medical and health-care interests
Alpha Epsilon Delta (AED) is a premedical honor society dedicated to preparing and exposing interested students to medicine and other health-care disciplines. The mission of the Society is to encourage and recognize excellence in premedical scholarship; to stimulate an appreciation of the importance of premedical education; to promote communication between medical and premedical students and educators; to provide a forum for students with common interests; and to use its resources to benefit health organizations, charities, and the community. The Clemson Chapter of AED hosts meetings throughout the year with physicians and dentists, Kaplan Test Drives, trips to Medical, Dental, Optometry, and other Professional Schools, and is committed to serving the community through various service projects. Contact Information: clemsonaed@gmail.com.

American Medical Student Association:
The American Medical Student Association (AMSA), with a half-century history of medical student activism, is the oldest and largest independent association of physicians-in-training in the United States. Today, AMSA is a student-governed, national organization committed to representing the concerns of physicians-in-training. AMSA members are medical students, premedical students, interns, residents and practicing physicians. Founded in 1950, AMSA continues its commitment to improving medical training and the nation's health. As a part of Clemson's premedical AMSA chapter, you will join a committee and work on a year-long healthcare-related project to engage the chapter, campus, and community. Contact Information: clemsonamsa@gmail.com

βββ Biological Sciences Honor Society, Pi Theta Chapter
Beta Beta Beta (Tri-Beta) is an honorary society for undergraduate and graduate students who are interested in improving the understanding and appreciation of study in biological sciences. In addition, the organization is committed to service and to increasing knowledge through scientific research opportunities. The application to join this organization goes out in the spring semester and is open to those with junior standing based on credit hours. In our chapter, Beta Beta Beta members are involved in tutoring local elementary schools, Relay for Life, and being ambassadors to future Clemson students interested in fields of science. Contact Information: tribetaclemson@gmail.com. Faculty Advisor, Dr. Tamara McNutt-Scott (tmcnutt@clemson.edu)

Clemson Pre-Dental Club
The Pre-Dental Club serves as an outlet for undergraduate students interested in pursuing a career in dental medicine. It provides students with numerous opportunities to further their knowledge of the field of dentistry and the expectations associated with acceptance into dental school. The Pre-Dental Club also strives to be active in the community and give back through volunteer service and philanthropic support. The purpose of the organization

shall be to establish a community of students interested in the field of Dentistry that will facilitate relationships and provide a support network. Contact Information: clemsonpredental@gmail.com.

Clemson Pre-Optometry Club

The Clemson Pre-Optometry Club is committed to assisting our members in achieving their professional goal of becoming an optometrist. We offer optometry school admission information, OAT prep help, and professional workshops. Our club engages with the community through shadowing opportunities with local optometrists, local optometric service activities including Servants for Sight, eye glass collections, and service trips with Volunteer Optometric Services to Humanity. Contact information: clemsonpreoptometryclub@gmail.com.

Clemson PrePharmacy Club:

Clemson PrePharmacy Club is an organization devoted to guiding students towards a profession in pharmacy. The mission of the club is to promote educational importance, encourage dedication to a pharmaceutical discipline, stimulate contact between undergraduate students and professionals, and bind those with similar interests. The Clemson PrePharmacy Club hosts monthly meetings with quest speakers. Contact information: npanosi@g.clemson.edu.

Clemson Pre-Veterinary Club

The Pre-Vet Club is a professional undergraduate club for students of any major who aspire to attend vet school after Clemson! It is a great way to become involved in the AVS community at Clemson and to meet peers with similar interests and goals. Our club usually holds meetings every other week, on Tuesday evenings at 7 PM. We host a variety of speakers including admissions officers from a range of veterinary schools, current vet students, local veterinarians and veterinarians from a variety of concentrations including zoological and exotic medicine and equine medicine. We also hold suture and radiology clinics, fundraisers like Rent-A-Puppy, social events like Goat Yoga, and we plan a spring trip! Follow our Instagram for meeting reminders and updates @clemson_prevetclub. Contact information: 129 Poole Agricultural Center, Clemson, SC 29634

Clemson University Microbiological Society:

The Clemson University Microbiological Society is an organization designed for undergraduate students with an interest in microbiology. You don't have to be a microbiology major to join! The organization offers students a discounted membership to the American Society of Microbiology as well as the opportunity to make connections in the Microbiology department at Clemson. Meetings consist of presentations from professors and other microbiology professionals. We go on field trips regularly and previous field trip locations include Thomas Creek Brewery, Mushroom Mountain, and Chateau Elan. **Membership**: Open to all CU students and faculty. Contact Information: Dr. Harry Kurtz hkurtz@clemson.edu

Paws for PA

Paws for PA is a resource for undergraduate students pursuing a career as a physician assistant. This club will provide opportunities for networking with other students. Students will be able to expand their knowledge on opportunities available in the medical field as a physician assistant. This club will provide information on prerequisite and patient care hour requirements for various graduate programs. We hope to build a community of students that is eager to become the next generation of health care professionals. Contact Information: cupaws4pa@gmail.com

GRADUATE AND PROFESSIONAL SCHOOLS

I. Graduate School

The Biological Sciences and Microbiology curricula are designed for students whose career goals require advanced study in basic biological disciplines. The core requirements of the Biological Sciences B.S. and B.A degrees in conjunction with appropriate optional major courses can provide an excellent preparation for advanced study in botany, cell biology, ecology, evolutionary biology, genetics, immunology, marine biology, or zoology. Similarly, the B.S. degrees in Microbiology can provide excellent preparation for advanced study in cell and molecular biology, immunology, and all areas of microbiology.

Your advisor will be the best source of advice about graduate school. Graduate programs typically require from 2 to 5 years of post-graduate study and lead to the M.S. (Master of Science) or Ph.D. (Doctor of Philosophy). Most schools have admission requirements that include a baccalaureate degree (B.A. or B.S.), the Graduate Record Examination (GRE), transcripts, letters of recommendation, and a letter of intent. Enrollment in BIOL or MICR 4910 (Special Problems) with a faculty member whose research is in the field of the student's intended research is recommended.

II. Professional School. Students interested in health profession or veterinary medicine graduate programs should choose a major as soon as possible after entering Clemson and must do so by the end of the first year. Professional school advisors will continue to provide information, advice, and help, relative to admission requirements for the appropriate professional school, but students should receive their academic advising within their chosen major to ensure that all Clemson requirements for graduation are met.

Most **Medical and Dental Schools** have identical basic course requirements; however, entrance requirements vary by institution and should be verified individually These basic course requirements may be included in the Biological Science B.S. and B.A. curricula as:

2 semesters of English	ENGL 1030 plus any 2000 or 3000 English course
2 semesters of Math	MATH 1060 & STAT 2300
2 semesters of Biology	BIOL 1100 & 1110 (recommended) or BIOL 1030/1050 & 1040/1060
2 semesters of Physics	PHYS 2070/2090 & 2080/2100
4 semesters of Chemistry	CH 1010 & 1020, CH 2230/2270 & 2240/2280
2 semesters Behavioral Sciences	PSYC 2010 & SOC 2010

The Biological Sciences B.S. and B.A. curricula require the addition of CH 2240/2280.

Major courses of value to Medical or Dental School applicants:

Introductory Genetics	GEN 3000/3020
General Biochemistry	BCHM 3050/3010
Functional Human Anatomy	BIOL 3150
Human Physiology	BIOL 3160
Basic Immunology	MICR (BIOL) 4140

Other major requirement courses to consider include:

Vertebrate Biology	BIOL 3030/3070
Neurobiology	BIOL 4200
Developmental Biology	BIOL 4400
Principles of Hematology	BIOL 4670
Stem Cell Biology	BIOL 4830
Epidemiology	HLTH 3800
General Microbiology	MICR 3050
Public Health Microbiology	MICR 4000
Pathogenic Bacteriology	MICR 4110
Cancer and Aging	MICR 4170

Psychology courses to consider include the following:

Developmental Psychology	PSYC 3400
Physiological Psychology	PSYC 3240
Abnormal Psychology	PSYC 3830

Excerpts from South Carolina Medical Schools
Medical University of South Carolina (Columbia) - Preference is given to applicants who have completed four years of college and earned a baccalaureate degree. There are no specific course requirements but the MCAT is required and students who wish to do well on the examination should consider studying college courses in introductory biology, chemistry, physics, and organic chemistry prior to taking the MCAT. Students are advised to construct courses of study that are intellectually interesting and challenging for them individually. Any education that engenders curiosity and enthusiasm for learning is desirable.

University of South Carolina School of Medicine - Members of the Admissions Committee recognize that they are selecting future physicians. The admissions process is therefore an effort to select applicants who possess the individual characteristics required for both the study and the practice of medicine. Two semesters of English, Math, Introductory Biology, Behavioral Sciences, Chemistry, Physics and Organic Chemistry are required as is the MCAT. All science courses must include laboratory. For most students, a strong preparation in the natural sciences is the best basis for the study and understanding of medical sciences. For this reason, the Admissions Committee recommends that students take more than the minimum requirements in the natural science.

Questions regarding requirements of, preparation for, and admission into medical and dental school are at Health Professions Advising

Pre-Pharmacy Declared major. For students who want to receive a baccalaureate degree before applying to a college of pharmacy, the Biological Sciences B.S. and B.A. can fulfill the requirements for pharmacy school. Frequently Asked Questions regarding requirements of, preparation for, and admission into pharmacy school is at: Health Professions Advising

Pre-Pharmacy Undeclared major. The three-year Pre-pharmacy program requires 72-90 credit hours, depending on the pharmacy school of interest. Students in this program typically apply to a college of pharmacy upon completion of their second year. Upon completion of the program and one year at an accredited pharmacy school, students may be eligible to apply for the Bachelor of Science in Pre-professional Studies. The professional institution awards the degree in Pharmacy. It is important for students to work closely with their advisor, as there are variations in courses required by the pharmacy schools. For financial aid purposes, students in the Pre-pharmacy program are considered enrolled in a degree-seeking program. See page 32-33 for the curriculum and checklist of courses, respectively. Frequently Asked Questions regarding requirements of, preparation for, and admission into pharmacy school is at: Health Professions Advising

Pre-Rehabilitation Sciences. Pre-rehabilitation Sciences includes concentrations in ***occupational therapy***, ***physical therapy***, ***communication sciences and disorders***, ***physician assistant*** and other allied health areas. Most programs require a baccalaureate degree that may be in any area if the prerequisites courses are included in the degree program. In addition, students must apply to a professional school for acceptance into its program. Information regarding requirements and admission into rehabilitation sciences programs are at Health Professions Advising

Accelerated Pathways to MUSC Professional Health Degree Programs. Clemson undergraduate students may apply for admission into one of the nine-health related graduate programs at the Medical University of South Carolina (MUSC). These programs include medicine, dentistry, pharmacy, physical therapy, and public health. Students would matriculate to MUSC after 3 or 4 years at Clemson and earn a Bachelor of Science degree in Pre-Professional Studies from Clemson after completing their first year at MUSC. Information regarding requirements and admission into MUSC Accelerated Pathways are at Health Professions Advising

Accelerated Pathways to MUSC Professional Health Degrees (3 years at CU + 4 years at MUSC) Program purpose and description: Clemson and MUSC have developed the *Accelerated Pathway to Medical School, Dental School, Pharmacy* programs aimed at reducing students' overall educational cost from undergraduate education through professional school while retaining the most talented students in South Carolina. Clemson students, meeting all program requirements, may apply for admittance to MUSC's doctorate in medicine (MD), dental medicine (DMD), Pharmacy (PharmD), or Physical Therapy (DPT) degree after completing 90 semester hours of undergraduate education at Clemson. Admission to the MD, DMD, PharmD, or DPT program is not guaranteed; admissions decisions will be made solely by MUSC. If admitted into the MD, DMD, PharmD or DPT program, Clemson accelerated students are held to the standards and progress guidelines as all other students in the MD, DMD, PharmD, or DPT program. After successful completion of the first year of medical, dental, pharmacy, or physical therapy school (as defined by MUSC's academic standards), Clemson University

will award the student an earned baccalaureate degree subject to students satisfying all applicable requirements outlined in the Clemson University Undergraduate Announcements and completion of the formal application for graduation.

Medical School Student Eligibility Requirements (3 years at CU + 4 years at MUSC):

a. Clemson students must take the Medical College Admissions Test (MCAT) prior to June 30 following completion of the sophomore year (for Early Decision applicants) or prior to July 30 following their sophomore year (for Regular Admission applicants).
b. The current minimum score accepted by MUSC on the MCAT is 508 (which may change annually, but the standard is that the score falls in the top quartile).
c. Student's unadjusted GPA at the time of application to medical school must be ≥ 3.5.
d. Students must complete a minimum of 90 semester credit hours at Clemson (not including any AP credits, IB credits or transfer credits) prior to matriculating at MUSC.
e. All Clemson general education requirements must be completed prior to matriculating at MUSC.
f. It is recommended, but not required, that students complete two semesters of the following courses prior to applying to MUSC: general biology, general chemistry, organic chemistry, and physics.
g. Other suggested courses that are valuable in preparing for the MD curriculum are anatomy, biochemistry, cell biology, embryology, genetics, and physiology. The following courses are also suggested to support preparation for the MCAT: two semesters of introductory biology, introductory physics, general chemistry, organic chemistry, biochemistry, sociology, and psychology.
h. All applicants are expected to complete significant experiences providing clinical exposure to inform their decision to enter medicine. These experiences, ideally, should be attained through participation in a formal Clemson internship (or similar) supervised course and independent student planning. The latter would demonstrate a personal commitment to explore this career path.

Dental School Student Eligibility Requirements (3 years at CU + 4 years at MUSC):

a. Clemson students must take the Dental Admissions Test (DAT) following completion of the sophomore year.
b. The current MUSC recommended score accepted on the DAT is 20/20. Students are encouraged to repeat the DAT if their initial score is less than 20/20. MUSC's DMD admissions committee will consider the highest total DAT score submitted. There is no penalty or negative connotation associated with multiple DAT attempts.
c. Student's unadjusted GPA at the time of application to medical school must be ≥ 3.5.
d. Students must complete a minimum of 90 semester credit hours at Clemson (not including any AP credits, IB credits or transfer credits) prior to matriculating at MUSC.
e. All Clemson general education requirements must be completed prior to matriculating at MUSC. In addition, the College of Dental Medicine requires two semesters of the following courses: General Chemistry, Organic Chemistry, Physics, Biology, English, Mathematics, and Science Electives. These courses may concurrently meet Clemson's General Education requirements as set forth in the applicable Clemson University Undergraduate Announcements. It is the student's responsibility to verify that he/she has met Clemson general education requirements and College of Dental Medicine course requirements.
f. *Suggested courses:* Courses that are valuable in preparing for the DMD curriculum are anatomy, biochemistry, cell biology, embryology, microbiology, genetics, and physiology. Courses in the following areas are also suggested to support preparation: finance and accounting, sociology, and psychology.
g. All applicants are encouraged by the College of Dental Medicine to complete experiences providing clinical exposure to inform their decision to enter dentistry. These experiences, ideally, should be attained through participation in a formal Clemson internship (or similar) supervised course and independent student planning. The latter would demonstrate a personal commitment to explore this career path.

Physical Therapy Student Eligibility Requirements (3 years at CU + 3 years at MUSC):

a. Clemson students must take the Graduate Record Examination (GRE)following completion of their sophomore year.
b. There is no minimum score on the GRE, but competitive scores on each section are the 60th percentile. Students are encouraged to repeat the GRE if a section score is below the 60th percentile. MUSC's DPT admissions committee will consider the highest GRE score submitted for each section. There is no penalty or negative connotation associated with multiple GRE attempts.
c. Student's unadjusted GPA at the time of application, and until matriculation if accepted into the DPT program, must be ≥ 3.0. The average GPA for students accepted into the program is 3.6 on a 4.0 scale.

d. Students must complete a minimum of 90 semester credit hours at Clemson (not including any AP credits, IB credits or transfer credits) prior to matriculating at MUSC.
e. *Required courses*: All General Education requirements must be completed prior to matriculating at MUSC. In addition, students should complete two semesters of the following courses: Chemistry for science majors, Physics for science majors, and Biology for science majors. Also, a minimum of one semester course each of Human Anatomy, Human Physiology, General Psychology, Abnormal Psychology, and Statistics is required.
f. The DPT program requires a minimum of 40 hours of observation with a licensed physical therapist. These experiences may be attained through participation in a formal Clemson internship (or similar), volunteer, or work experience.

Pre-Veterinary Medicine Requirements for Biological Sciences Majors. Pre-Veterinary Medicine Advisor: Dr. Jeryl Jones, jerly@clemson.edu, 140 P&A, 656-2142 and Dr. Glenn Birrenkott, gbrrnkt@clemson.edu, 134 P&AS, 656-4019.

Residents of South Carolina can apply for contract seats at the University of Georgia (29), Mississippi State University (10), and Tuskegee University (7). In addition to these contract seats, students can apply at-large to any veterinary school in the United States. Below are links to the minimum requirements for a South Carolina resident to be accepted to the three veterinary schools with contract seats.

University of Georgia (Course Requirements)

Mississippi State University (Entrance Requirements)

Tuskegee University (Course Requirements)
Frequently Asked Questions regarding requirements of, preparation for, and admission into veterinary school is at: Health Professions Advising

Clemson University's College of Veterinary Medicine will be the first in South Carolina. Upon accreditation, the College of Veterinary Medicine will leverage the University's existing animal health programs and infrastructure to create a veterinary medicine workforce to fill a statewide shortage of veterinarians. Clemson University College of Veterinary Medicine plans to enroll the first students in **Fall 2026** with the first class of veterinarians graduating in 2030.

BIOLOGICAL SCIENCES FACULTY / RESEARCH EMPHASIS / OFFICE
(Email addresses are on Page 3)

John G. Abercrombie (M.S., Clemson University)
Senior Lecturer of Biological Sciences
The biology of bacteriocin jensenin P, an antimicrobial peptide produced by P. jensenii that inhibits the growth of an organism known to cause acne.

Virginia Abernathy (PhD, Australian National University)
Lecturer of Biological Sciences
Study of the coevolutionary interactions between avian brood parasites and their hosts.

J. Antonio Baeza (Ph.D., University of Louisiana at Lafayette)
Associate Professor of Biological Sciences
Invertebrate biology. Sexual selection. Adaptive value of breeding systems.

Lisa J. Bain (Ph.D., North Carolina State University)
Professor of Biological Sciences
Environmental pathobiology; Cellular toxicology; Biochemical and molecular toxicology; Resistance mechanisms; Aquatic toxicology.

William S. Baldwin (Ph.D., North Carolina State University)
Professor of Biological Sciences
Endocrinology/mammalian physiology; Toxicant-induced alterations in gene expression; Endocrine disruption.

Robert E. Ballard (Ph.D., University of Iowa)
Lecturer of Biological Sciences
Speciation in flowering plants; science outreach.

Sharon Bewick (Ph.D., Princeton University)
Assistant Professor of Biological Sciences
Theoretical population, community and disease ecology of systems ranging from tropical forests to vector-borne pathogens and the human microbiome.

Richard W. Blob (Ph.D., University of Chicago)
Alumni Professor of Biological Sciences, Bioengineering
Biomechanics and the evolution of animal function; animal locomotion; comparative vertebrate anatomy, physiology, and functional morphology; herpetology; vertebrate paleontology.

Barbara Campbell (Ph.D., Cornell University)
Professor of Biological Sciences
The function and structure of microbial communities at the molecular level.

Min Cao (Ph.D., Cornell University)
Associate Professor of Biological Sciences
Bacteria, host, and inter-kingdom communication.

Susan C. Chapman (Ph.D., King's College University of London)
Associate Professor of Biological Sciences
Embryonic development and organogenesis. Mechanisms of tissue specification, morphogenesis and patterning of specific regional identity during vertebrate head development.

Michael J. Childress (Ph.D., Florida State University)
Associate Professor of Biological Sciences
Behavioral ecology of marine invertebrates, marine ecology and population biology of lobsters, crabs and crayfish. Modeling and ecological statistics. Mechanisms of individual recognition, dominance hierarchy formation and behavioral syndromes.

John R. Cummings (M.S., Bowling Green State University)
Principal Lecturer of Biological Sciences
Factors affecting barn owl populations, biology laboratory education, and curriculum design.

Subham Dasgupta (PhD, State University of New York (SUNY), Stony Brook, NY)
Assistant Professor of Biological Sciences
Molecular mechanisms of developmental toxicity of environmental chemicals using zebrafish as a model. Focusing on 1) epigenetic regulators of developmental effects; 2) how dietary factors modulate developmental outcomes; 3) high-content in vivo screening.

Aimee Deconinck (PhD, University of North Carolina at Chapel Hill)
Lecturer of Biological Sciences
How DNA in the mitochondria and DNA in the nucleus need to be able to communicate for animals to withstand low oxygen conditions.

Sourabh Dhingra (Ph.D. Northern Illinois University)
Assistant Professor of Biological Sciences
Molecular mechanisms governing drug response and pathogenesis in eukaryotic pathogenic mold Aspergillus fumigatus; *role of non-coding RNAs (ncRNAs) in pathobiology of Aspergillus fumigatus*.

Zhicheng Dou (Ph.D., University of Southern Mississippi)
Associate Professor of Biological Sciences
Mechanisms understanding of how Toxoplasma gondii host cellular macromolecular nutrients and digest them to support its intracellular replication.

Lorena Endara (Ph.D., University of Florida)
Herbarium Curator, Bob and Betsy Campbell Museum of Natural History/ Lecturer of Biological Sciences
Plant systematics with emphasis in selected neotropical orchid groups. Character evolution. Herbarium curation.

Nora R. Espinoza (Ph.D., University of Chicago)
Senior Lecturer of Biological Sciences
Evolution of animal form and function; comparative biomechanics, animal locomotion; evolution of bone; evolution of development of the musculoskeletal system of vertebrates.

David M. Feliciano (Ph.D., State University of New York, Buffalo)
Associate Professor of Biological Sciences
Cell and molecular biology. Neurobiology. Brain development.

Jason Fridley (PhD, University of North Carolina at Chapel Hill)
Professor of Biological Sciences
Plant and ecosystem ecology, including comparative ecophysiology of native and invasive species, global change impacts on vegetation, biogeography, and quantitative methods.

Vincent S. Gallicchio (Ph.D., New York University)
Professor of Biological Sciences
Research interests include 1) experimental drug therapeutics for AIDS and cancer, with a focus on compounds that inhibit ribonucleotide reductase and antioxidants derived from natural food products and 2) the non-psychiatric clinical uses of lithium.

Julia George (Ph.D., Rockefeller University)
Associate Professor of Biological Sciences
Neurobiology and neurogenomics in songbirds, modeling effects of prenatal experience on development and cognition

Chandler Goldman (Ph.D., The Medical College of Georgia)
Lecturer of Biological Sciences
Microtubule-based transport of mRNA within and between cells and its importance in organism development. Epigenetics and the role of 3D genome structure in conditional gene expression within pathogenic fungi.

Mark Jones (Ph.D., University of Georgia)
Lecturer of Biological Sciences
Microbiology, Host-Microbe interactions

Tafadzwa Kaisa (Ph.D., State University of New York)
Senior Lecturer of Biological Sciences
Nematode taxonomy and morphology; insect and nematode ultrastructure; insect-nematode interactions.

Matthew H. Koski (Ph.D., University of Pittsburgh)
Assistant Professor of Biological Sciences
Evolutionary ecology of plants with a focus on floral coloration and mating systems; abiotic drivers of floral diversity; plant-pollinator interactions; responses to global change; influence of biogeography and evolutionary history on reproductive diversity.

Harry Kurtz (Ph.D., University of Idaho)
Visiting Associate Professor of Biological Sciences
Microbial ecosystems in the deserts of southeastern Utah; to develop management tools for use by the Bureau of Land Management and the National Park service for maintenance and care of parks and monuments. Stabilization of coastal dunes in SC.

Qing Liu (PhD, University of Wisconsin Milwaukee)
Assistant Professor of Biological Sciences
Mechanisms underlying gene regulation and metabolism, and mechanisms of heart dysfunction due to exposure to toxicants/pharmaceuticals.

Antonino Malacrino' (Ph.D., University of Palermo, Italy)
Assistant Professor of Biological Sciences
Microbiomes; host-microbiome interactions; plant-microbe-insect interactions; role of microbiomes in host ecology and evolution; metagenomics.

Cassandra May (Ph.D., The Ohio State University)
Lecturer of Biological Sciences
Innovative teaching strategies for biology education. Mechanisms regulating fish population dynamics.

V. Christine M. Minor (M.S., Iowa State University)
Principal Lecturer of Biological Sciences
Pedagogical innovations in science education with an emphasis on non-majors Biology Laboratory curriculum development for general biology.

David Moulton (Ph.D., University of British Columbia)
Lecturer of Biological Sciences
Fish ecology and conservation (salmonids, sciaenids, tunas, reef fishes). Habitat use, movement and migration, tagging and tracking, responses to stressors, gene expression, infection.

Megan Novak (Ph.D., Clemson University)
Lecturer of Biological Sciences
Ecology with a focus on animal dispersal, population demographics, and population genetics.

Karolina Pajerowska-Mukhtar (PhD, Max-Planck Institute for Plant Breeding Research)
Chair/Head Professor of Biological Sciences
Molecular plant biology with a focus on the molecular mechanisms of cellular stress responses and translational regulation.

Christopher L. Parkinson (Ph.D., University of Louisville)
Professor of Biological Sciences; Forestry and Environmental Conservation
Evolution, molecular evolution, phylogenetics, systematics and taxonomy of venomous snakes and other vertebrates

Kara E. Powder (Ph.D., Washington University in St. Louis)
Assistant Professor of Biological Sciences
Genomic and developmental basis of craniofacial evolution in cichlid fishes

Samantha A. Price (Ph.D., University of Virginia)
Assistant Professor of Biological Sciences
Biodiversity and macroevolution. Evolution of vertebrate form and functional diversity. Paleontology. Phylogenetic and computational approaches.

Kaustubha Qanungo (Ph.D., Indian Institute of Technology, Kharagpur
Lecturer of Biological Sciences
RNA virus Molecular Biology and Bioinformatics, Evidence based pedagogy development

Nathan Redding (Ph.D., Clemson University)
Senior Lecturer of Biological Sciences
Molecular and structural responses of host plants during infection with plant parasitic

Charles D. Rice (Ph.D., College of William and Mary)
Professor of Biological Sciences & Environmental Toxicology
Comparative immunobiology, disease resistance and susceptibility, marine biology, and environmental

Vincent Richards (Ph.D., NOVA Southeastern University)
Associate Professor of Biological Sciences
Comparative genomics of pathogenic bacteria evolution and adaptation to specific hosts.

Kylie Rock (Ph.D., North Carolina State University)
Assistant Professor Biological Sciences
Molecular consequences of exposure to environmental contaminants on the processes of implantation and placentation; long-term consequences of exposure on maternal and offspring health.

Emily Rosowski (Ph.D., Massachusetts Institute of Technology)
Assistant Professor of Biological Sciences
Host-pathogen interactions in larval zebrafish; Identification of innate immune mechanisms that target fungal pathogens.

Anna Seekatz (Ph.D. University of Maryland School of Medicine)
Assistant Professor of Biological Sciences
Interactions between infectious diseases and the gut microbiome; fecal microbiota transplantation; Clostridioides (Clostridium) difficile; beneficial microbes of the gut; 16S rRNA gene-based assays, metagenomics, genomics.

April South (Ph.D., University of South Carolina)
Senior Lecturer of Biological Sciences
Social interactions and social networking in groups of captive animals such as flamingos, penguins, and horses, among others.

Lesly A. Temesvari (Ph.D., University of Windsor)
Associate Chair, Alumni Professor of Biological Sciences
Molecular and cellular mechanisms that govern the biogenesis and function of endosomes and lysosomes; cellular and molecular biological approaches used to investigate the role of several small molecular weight Rab GTPases in endosomal and lysosomal membrane and protein trafficking and in pathogenicity of the protozial parasite, Entamoeba histolytica.

Matthew W. Turnbull (Ph.D., University of Kentucky)
Associate Professor of Plant and Environmental Sciences; Biological Sciences
Insect cell biology and immunology. Mutualistic viruses of parasitoid wasps. Role of inexins and gap junctions in insect immune systems.

Tzuen-Rong Tzeng (Ph.D., Clemson University)
Professor of Biological Sciences
Evaluation of nanoparticle compositions for their ability to neutralize microbial pathogens. Evaluation of phytochemical compounds for antimicrobial and anti-tumor activities.

Peter van den Hurk (Ph.D., College of William & Mary)
Associate Professor of Biological Sciences
Toxicology of environmental pollutants in aquatic ecosystems; detoxification enzymes; fish models as pollution indicators.

Karin Van der Burg
Assistant Professor of Biological Sciences
Genetic and physiological mechanisms of fitness optimization in different seasons.

Yanzhang Wei (Ph.D., Ohio University)
Professor of Biological Sciences
Dendritic cell mediated cancer immunotherapy; cancer gene therapy; novel approaches for targeted cancer therapy

Donna R. Weinbrenner (Ph.D., Clemson University)
Senior Lecturer of Biological Sciences

Kristi Whitehead (Ph.D., Michigan State University)
Principal Lecturer of Biological Sciences
How interactions between humans and their gastrointestinal tract microbes contribute to health and disease.

Kelly A. Willemssens (Ph.D., University of Nebraska)
Lecturer of Biological Sciences
Behavioral ecology, population ecology, and habitat assessments with emphasis on evolutionary adaptations and conservation efforts. Focus on insect extremophiles with implications for climate change Scientific communication geared toward the public.

Casey Youngflesh (PhD, Stony Brook University)
Assistant Professor Biological Sciences
Quantitative ecology, population biology, biodiversity, avian ecology, global change

DESCRIPTION OF FREQUENTLY SCHEDULED CURRICULA COURSES

BCHM 3010 Molecular Biochemistry 3 (3) Introduces the nature, production, and replication of biological structure at the molecular level and its relation to function. Credit toward a degree will be given for only one of BCHM 3010 or BCHM 3050. Includes Honors sections. Preq: BIOL 1100 with a C or better. Preq or concurrent enrollment: CH 2230 with C or better.

BCHM 3050 Essential Elements of Biochemistry 3 (3) Introduction to structure, synthesis, metabolism, and function of biomolecules in living organisms. Credit toward a degree will be given for only one of BCHM 3010 or BCHM 3050. Includes Honors sections. Preq: BIOE 1010 or BIOL 1030 or BIOL 1100. Preq or concurrent enrollment: CH 2010 or CH 2230.

BCHM 4320 Biochemistry of Metabolism 3 (3) Study of the central pathway of carbohydrate, lipid, and nucleotide metabolism. Emphasizes bioenergetics, limiting reactions, and the regulation and integration of the metabolic pathways. Includes Honors sections. Preq: BCHM 3010 with a grade of C or higher.

BCHM (GEN) 4400 Bioinformatics 3 (3) Theory and application of computational technology to analysis of the genome, transcriptome, and proteome. Includes Honors sections. May also be offered as GEN 4400. Preq: BCHM 3010 or BCHM 3050 or GEN 3000 or GEN 3020, with C or better.

BIOL 1010 Frontiers in Biology 1 (1) Introduces Biological Sciences majors to the Biological Sciences Advising Center, curricula, pre-professional health advisors, University career services, and the department's faculty. Preq or concurrent enrollment: BIOL 1030 and BIOL 1050; or BIOL 1100..

BIOL 1030 General Biology I 3 (3) First in a two-semester sequence. Includes an evolutionary approach to cells, cellular activities, genetics, and animal diversity emphasizing the processes of science. Credit toward a degree will be given for BIOL 1030 or BIOL 1100 only. Includes Honors sections.

BIOL 1040 General Biology II 3 (3) Continuation of BIOL 1030 for allied science majors [science and life science majors (nursing, animal and veterinary sciences, nutrition, agriculture, etc.) OTHER than biological sciences, microbiology, biochemistry, and genetics] or those students interested in medicine. Includes an evolutionary approach to human anatomy and physiology, plant diversity, morphology, and physiology and principles of ecology. Credit toward a degree will be given for BIOL 1040 or BIOL 1110 only. Includes Honors sections. Preq: BIOL 1030 and BIOL 1050; or BIOL 1100.

BIOL 1050 General Biology Laboratory I 1 (3) Laboratory to accompany BIOL 1030 for allied science majors [science and life science majors (nursing, animal and veterinary sciences, nutrition, agriculture, etc.) OTHER than biological sciences, microbiology, biochemistry, and genetics] or those students interested in medicine. Emphasizes developing laboratory techniques, becoming familiar with biological instrumentation, and performing investigations and interpreting results in the areas of biochemistry, cell biology, and molecular biology. Preq or concurrent enrollment: BIOL 1030.

BIOL 1060 General Biology Laboratory II 1 (3) Laboratory to accompany BIOL 1040 for allied science majors [science and life science majors (nursing, animal and veterinary sciences, nutrition, agriculture, etc.) OTHER than biological sciences, microbiology, biochemistry, and genetics] or those students interested in medicine. Emphasizes developing laboratory techniques, becoming familiar with biological instrumentation, and performing investigations and interpreting results in the areas of organismal structure, physiology, and ecology. Preq or concurrent enrollment: BIOL 1040.

BIOL 1100 Principles of Biology I 4 (3) Introductory course designed for students majoring in biological disciplines (biological science, microbiology, genetics, and biochemistry) and those students with strong interests in medicine. Emphasizes a modern research-focused approach to explanations of structure, composition, dynamics, interactions, and evolution of cells and organisms. High school chemistry is recommended. Credit toward a degree will be given for BIOL 1100 or BIOL 1030 only. Includes Honors sections. Coreq: BIOL 1101.

BIOL 1101 Principles of Biology I Laboratory 0 (3) Non-credit laboratory to accompany BIOL 1100. Focus is on the process and outcomes of biological inquiry. Students employ scientific methodology in a laboratory environment as well as critical analysis of biological problems in a small group context at a depth suitable for majors in the biological disciplines. Coreq: BIOL 1100.

BIOL 1110 Principles of Biology II 4 (3) Continuation of BIOL 1100 for students majoring in biological disciplines (biological science, microbiology, genetics, and biochemistry) and those students with strong interests in medicine. Emphasizes a modern research-focused approach to explanations of plants and animals as functional organisms and the principles of ecology. Credit toward a degree will be given for BIOL 1110 or BIOL 1040 only. Includes Honors sections. Preq: BIOL 1100. Coreq: BIOL 1111.

BIOL 1111 Principles of Biology II Laboratory 0 (3) Non-credit laboratory to accompany BIOL 1110. Focus is on the process and outcomes of biological inquiry. Students employ scientific methodology in a laboratory environment as well as critical analysis of biological problems in a small group context at a depth suitable for majors in the biological disciplines. Coreq: BIOL 1110.

BIOL 2000 Biology in the News 3 (3) For non-science majors. Students examine current topics of biology appearing in newspapers and other current media. Uses a problem-based learning approach, with students working as teams and individually on areas of interest identified by the class. Students are expected to have completed the General education natural science requirement prior to enrolling in this course. Preq: ENGL 1030.

BIOL 2210 Therapeutic Applications of Human Anatomy and Physiology3 (3). A survey of human anatomy and physiology (systems approach), incorporating foundational human anatomy and physiology principles and language, including organ systems, anatomical features, and integration of the concept of maintaining homeostasis and failures of homeostasis: the basic mechanisms of disease/pathologies. Preq: BIOL 1030 and BIOL 1050; or BIOL 1100; and CH 1010 or CH 1050.

BIOL 2220 Human Anatomy and Physiology I 4 (3) Basic introductory course in integrated human anatomy and physiology covering cells and tissues; integumentary, skeletal, muscular, and nervous systems; sensory organs. Physiology is stressed. Structured for nursing and other health-related curricula. Preq: BIOL 1030 and BIOL 1050; or BIOL 1100; and CH 1010 or CH 1050. Coreq: BIOL 2221.

BIOL 2221 Human Anatomy and Physiology I Laboratory 0 (2) Non-credit laboratory to accompany BIOL 2220. Coreq: BIOL 2220.

BIOL 2230 Human Anatomy and Physiology II 4 (3) Continuation of BIOL 2220 covering endocrine, reproductive, cardiovascular, lymphatic, respiratory, urinary, and digestive systems; fluid and electrolyte balance. Physiology is stressed. Preq: BIOL 2220. Coreq: BIOL 2231.

BIOL 2231 Human Anatomy and Physiology II Laboratory 0 (2) Non-credit laboratory to accompany BIOL 2230. Coreq: BIOL 2230.

BIOL 3000 - Dinosaurs to Birds 3 (3) Introduction to paleontology, evolution and development, focusing on the transition of therapod dinosaurs to extant birds. Topics include the evolution of avian dinosaurs, the Cretaceous-Paleogene boundary, bird radiation, morphological adaptions, diversity, the inner bird, lifestyle and ecology. Material covers principles in paleontology, preservation and identification of fossils, historical contributions, and modern experimental methods to aid student understanding of important concepts. Preq: BIOL 1030/BIOL 1050 and BIOL 1040/BIOL 1060; or BIOL 1100.

BIOL (ENT) 3010 Insect Biology and Diversity 4 (3) Introduction to the study of insects, with emphasis on their structure, function, ecology, and behavior. Identification of commonly encountered species is highlighted. Relationships between insect and human populations are discussed. Control technologies are introduced, with emphasis on environmentally responsible tactics. Offered fall semester only. May also be offered as ENT 3010. Coreq: BIOL 3011.

BIOL (ENT) 3011 Insect Biology and Diversity Laboratory 0 (3) Non-credit laboratory to accompany BIOL 3010. May also be offered as ENT 3011. Coreq: BIOL 3010.

BIOL 3020 Invertebrate Biology 3 (3) In-depth survey and comparison of free-living invertebrate animals emphasizing functional anatomy, development, and evolutionary relationships. Includes Honors sections. Preq: Introductory two-semester biology sequence with laboratory. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Preq or concurrent enrollment: BIOL 3060.

BIOL 3030 Vertebrate Biology 3 (3) Comprehensive survey of vertebrate animals, including their taxonomy, morphology, evolution, and selected aspects of the natural history and behavior. Includes Honors sections. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110.

BIOL 3040 Biology of Plants 3 (3) Survey of the major groups of plants, their biology, diversity, and evolution. Includes Honors sections. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: BIOL 3080.

BIOL 3060 Invertebrate Biology Laboratory 1 (3) Survey and comparison of the biology of living invertebrates, examples of which are drawn primarily from the southeastern coast of the United States. Preq: Introductory two-semester biology sequence with laboratory. Preq or concurrent enrollment: BIOL 3020.

BIOL 3070 Vertebrate Biology Laboratory 1 (3) Comparative and phylogenetic study of the gross morphology of vertebrates. Preq or concurrent enrollment: BIOL 3030.

BIOL 3080 Biology of Plants Practicum 1 (3) Laboratory exercises that explore the major groups of plants, their biology, diversity, and evolution. Coreq: BIOL 3040.

BIOL 3110 Introduction to Toxicology 3 (3) This course provides a first introduction to the field of toxicology and covers the basic concepts of toxicology, followed by typical examples of toxicological issues in medical and pharmaceutical fields, food toxicology and pesticides, occupational exposures, natural toxins, environmental toxicology, and risk assessment. Special attention is given to the interactions between the science of toxicology and societal implications. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Preq or concurrent enrollment: CH 2010 or CH 2230.

BIOL (WFB) 3130 Conservation Biology 3 (3) Study of the biological bases for the conservation of flora, fauna, and habitats. Biological factors that influence the decision-making process are also addressed. May also be offered as WFB 3130. Preq: BIOL 1030 and BIOL 1040 and BIOL 1050 and BIOL 1060; or BIOL 1100 and BIOL 1110.

BIOL 3150 Functional Human Anatomy 4 (3) Introduction to the anatomical structures associated with all organ systems found in the human body at both the gross and microscopic level. Basic physiology is integrated to assist with understanding the function of the anatomical systems. Preq: BIOE 1010; or BIOL 1030 and BIOL 1050; or BIOL 1100; and junior standing. Coreq: BIOL 3151.

BIOL 3151 Functional Human Anatomy Laboratory 0 (3) Non-credit laboratory to accompany BIOL 3150. Coreq: BIOL 3150.

BIOL 3160 Human Physiology 4 (3) Study of the functional processes associated with the various organ systems in the human body. Students develop a basic understanding of the important and fundamental concepts in human physiology and how organ systems maintain homeostasis. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110; and CH 1020; and junior standing. Coreq: BIOL 3161.

BIOL 3161 Human Physiology Laboratory 0 (3) Non-credit laboratory to accompany BIOL 3160. Coreq: BIOL 3160.

BIOL 3200 Field Botany 4 (2) Introductory study of the taxonomy, ecology, and evolution of plants in their natural environment with an emphasis on identification and characteristics of representative species and plant communities in the Carolinas. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: BIOL 3201.

BIOL 3201 Field Botany Laboratory 0 (4) Non-credit laboratory to accompany BIOL 3200. Coreq: BIOL 3200.

BIOL 3350 Evolutionary Biology 3 (3) Introduction to basic concepts and underlying principles of modern evolutionary biology. Topics include a historical overview of evolutionary theories, elementary population genetics, principles of adaptation, speciation, systematics and phylogenetic inference, fossil record, biogeography, molecular evolution, and human evolution. Includes Honors sections. Preq: GEN 3000 or GEN 3020.

BIOL (PES) 3400 Medical Botany 3 (3) Study of use of compounds of plant and fungal origin as poisons, hallucinogens, and pharmaceuticals. May also be offered as PES 3400. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110; and CH 1020.

BIOL (ANTH) 3510 Biological Anthropology 3 (3) Study of humans as biological organisms. Examines human evolution, primate social behavior, human physiological variations and disease resistance, and human skeletal anatomy and forensics. May also be offered as ANTH 3510. Preq: ANTH 2010; or BIOL 1030 and BIOL 1050; or BIOL 1040 and BIOL 1060; or BIOL 1100.

BIOL (ANTH) 3530 Forensic Anthropology 3 (3) Introduction to forensic anthropology, the science that utilizes methods from skeletal biology and archaeology as tools in human identification in a medico-legal context. May also be offered as ANTH 3530. Preq: Junior standing.

BIOL 3940 Selected Topics in Creative Inquiry I 1-3 (1-3) Disciplinary and multidisciplinary group research projects develop the student's ability to discover, analyze, and evaluate data. Includes Honors sections. May be repeated for a maximum of 24 credits. Preq: Consent of instructor.

BIOL (ENT) 4000 Insect Morphology 4 (3) Study of insect structure in relation to function and of the variation of form in insects. Includes Honors sections. ENT 4000. Preq: ENT 3010. Coreq: BIOL 4001.

BIOL (ENT) 4001 Insect Morphology Laboratory 0 (3) Non-credit laboratory to accompany BIOL 4000. May also be offered as ENT 4001. Coreq: BIOL 4000.

BIOL 4020 Plant Physiology Laboratory 1 (3) Laboratory exercises and experiments designed to indicate the relations and processes which pertain to maintenance, growth, and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products, and liberation of energy. May also be offered as PES 4020. Preq or concurrent enrollment: BIOL 4040 or PES 4040.

BIOL 4030 Introduction to Applied Genomics 3 (3) Emphasizes the practical application of bioinformatic/genomic skills to solve biological problems. The course includes an introduction to the Linux operating system, the bash command line environment, principles of next-generation sequencing, genome assembly, gene prediction, annotation, databases, gene/genome clustering, recombination detection, phylogenomics, transcriptomics, and metagenomics. Preq: BIOL 1030 or BIOL 1100.

BIOL 4040 Plant Physiology 3 (3) Relations and processes pertaining to maintenance, growth, and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products and liberation of energy. Includes Honors sections. May also be offered as PES 4040. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110; and CH 1020.

BIOL 4060 Introductory Plant Taxonomy 3 (3) Introduction to the basic principles and concepts of plant systematics with emphasis on the plants of South Carolina. Includes Honors sections. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: BIOL 4070.

BIOL 4070 Plant Taxonomy Laboratory 1 (3) Introduction to basic techniques of plant taxonomy with laboratory and field emphasis on the flora of South Carolina. Coreq: BIOL 4060.

BIOL 4080 Comparative Vertebrate Morphology 3 (3) Phylogeny and diversity of vertebrates and study of their comparative morphology, leading to an understanding of the relationships and functioning of living organisms. Includes Honors sections. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: BIOL 4090.

BIOL 4090 - Comparative Vertebrate Morphology Laboratory 2 (5) Comparative anatomy of representative vertebrates; methods used in preparing specimens for study and display. Includes Honors sections. Coreq: BIOL 4080.

BIOL (ENR) 4130 Restoration Ecology 3 (3) Applies ecological principles to the restoration of disturbed terrestrial, wetland, and aquatic ecosystems. Includes the restoration of soils and waterways, of flora and fauna, and of natural ecological processes such as plant succession and nutrient cycling. May also be offered as ENR 4130. Preq: BIOL 3130 or BIOL 4410 or WFB 3130. Coreq: BIOL 4131.

BIOL (ENR) 4131 Restoration Ecology Laboratory 0 (3) Non-credit laboratory to accompany BIOL 4130. May also be offered as ENR 4131. Coreq: BIOL 4130.

BIOL (AVS, MICR) 4140 Basic Immunology 3 (3) Introduction to the immune system of vertebrate animals, with an emphasis on structure, function, regulation, and cellular and molecular mechanisms of immune responses. Includes Honors sections. May also be offered as AVS 4140 or MICR 4140. Preq: BIOL 4610 and MICR 3050.

BIOL (ENT) 4150 Insect Taxonomy 3 (1) Identification of the principal families of the major orders of adult insects. Laboratory work consists of intensive practice of such identification. Lecture material deals with theoretical discussion of taxonomic features observed in the laboratory. May also be offered as ENT 4150. Preq: ENT 3010. Coreq: BIOL 4151.

BIOL (ENT) 4151 Insect Taxonomy Laboratory 0 (6) Non-credit laboratory to accompany BIOL 4150. May also be offered as ENT 4151. Coreq: BIOL 4150.

BIOL 4170 Marine Biology 3 (3) Survey of the organisms that live in the sea and their adaptations to the marine environment. Emphasizes characteristics of marine habitats, organisms, and the ecosystems. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110.

BIOL 4190 Molecular Medicine (3) (3) Introduction to various areas of molecular medicine. Examines the latest research and developments in molecular medicine. Designed for students interested in medicine and biomedical research. Includes Honors sections. Preq: BCHM 3010 or BCHM 3050 or MICR 3050, with a grade of *C* or higher.

BIOL 4200 Neurobiology 3 (3) Broad background in neurobiology. Topics include neuroanatomical structure-function; conduction in the neuron; neurite growth and development; neuromuscular junction; chemistry, physiology, and pharmacology of specific neurotransmitters and receptors; visual process; axoplasmic transport; hypothalamic-pituitary regulation; theories of behavior; theories of learning and memory. Includes Honors sections. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Preq or concurrent enrollment: BIOL 4610.

BIOL 4210 Neurobiology of Disease Diseases of the nervous system provide unprecedented insight into how the nervous system functions under physiological as well as pathophysiological conditions. This course provides students unprecedented insight into how the brain functions by examining processes related to normal physiological states and how processes go awry in a wide range of diseases and disorders of the nervous system. Neurobiology of Disease integrates the underlying principles of development, organization, and behaviors of cells with pathophysiological states. Preq: BIOL 1040 and BIOL 1060, or BIOL 1110; and BCHM 3010 or BCHM 3050.

BIOL (PLPA) 4250 Introductory Mycology 3 (3) Introduction to the biology of all the groups of fungi and some related organisms, with considerations of the taxonomy, morphology, development, physiology, and ecology of representative forms. May also be offered as PLPA 4250. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110.

BIOL (PLPA) 4260 Mycology Practicum 2 (1) Application of the principles of mycological techniques, microscopic study of fungi. Examples from all major groups of fungi are included. May also be offered as PLPA 4260. Preq or concurrent enrollment: BIOL 4250 or PLPA 4250. Coreq: BIOL 4261.

BIOL (PLPA) 4261 Mycology Practicum Laboratory 0 (2) Non-credit laboratory to accompany BIOL 4260. May also be offered as PLPA 4261. Coreq: BIOL 4260.

BIOL (ETOX) 4300 Toxicology 3 (3) Basic principles of toxicology, including quantitation of toxicity, toxicokinetics, biochemical action of poisons, and environmental toxicology, are studied. Acute and chronic effects of various classes of poisons (e.g., pesticides, drugs, metals, and industrial pollutants) are discussed in relation to typical routes of exposure and regulatory testing methods May also be offered as ETOX 4300. Preq: BCHM 3010 or BCHM 3050 or CH 3600.

BIOL (ENT) 4360 Insect Behavior 3 (2) Fundamentals of insect behavior in an evolutionary and ecological perspective. Laboratory emphasizes generation and testing of hypotheses and observation, description, and quantification of insect behavior. May also be offered as ENT 4360. Preq: ENT 3010. Coreq: BIOL 4361.

BIOL (ENT) 4361 Insect Behavior Laboratory 0 (3) Non-credit laboratory to accompany BIOL 4360. May also be offered as ENT 4361. Coreq: BIOL 4360.

BIOL (ETOX) 4370 – Ecotoxicology 3 (3) Study of the effects of stressors on the ecosystem. Explores the integrative relationships that comprise the field of ecotoxicology in a hierarchical format that focuses on the various levels of ecological organization. May also be offered as ETOX 4370. Preq: BIOL 3110 or ETOX 4300.

BIOL 4400 Developmental Animal Biology 3 (3) Events and mechanisms responsible for the development of multicellular animals. Gametogenesis, fertilization, embryonic development, cellular differentiation, morphogenesis, larval forms and metamorphosis, asexual reproduction, regeneration, malignancy, and aging are analyzed in terms of fundamental concepts and control processes. Includes Honors sections. Preq: BIOL 1040 or BIOL 1110; and GEN 3000 or GEN 3020.

BIOL 4410 Ecology 3 (3) Study of basic ecological principles underlying the relationships between organisms and their biotic and abiotic environments. Includes physiological, population, and community ecology, with applications of each to human ecological concerns. Includes Honors sections. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110.

BIOL 4420 Biogeography 3 (3) Study of patterns of distribution of plants and animals in space and time. Includes Honors sections Preq: BIOL 3020 or BIOL 3030 or BIOL 3040.

BIOL 4430 Freshwater Ecology 3 (3) Study of basic ecological principles and concepts as they apply to freshwater environments: rivers and streams, wetlands, lakes and ponds, and reservoirs. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110.

BIOL 4440 Freshwater Ecology Laboratory (Lecture Portion) 2 (1) Laboratory-based course providing a synthesis of major components of freshwater ecosystems. Activities are hypothesis driven and relate to each other to form an overall synthesis of the field. Hands-on experience allows engagement in creative inquiry. Preq or concurrent enrollment: BIOL 4430. Coreq: BIOL 4441.

BIOL 4441 Freshwater Ecology Laboratory 0 (2) Non-credit laboratory to accompany BIOL 4440. Coreq: BIOL 4440.

BIOL 4450 Ecology Laboratory (Lecture Portion) 2 (1) Modern and classical approaches to the study of ecological problems discussed in BIOL 4410. Students are introduced to field, laboratory and computer-based analyses of plant and animal populations and communities. Includes Honors sections. Preq or concurrent enrollment: BIOL 4410. Coreq: BIOL 4451.

BIOL 4451 Ecology Laboratory 0 (2) Non-credit laboratory to accompany BIOL 4450. Coreq: BIOL 4450.

BIOL 4460 Plant Ecology 3 (3) Ecology of plants in relation to their biotic and abiotic environments. Individual organisms, populations, and communities are considered with an emphasis on seed plants in terrestrial environments. Includes Honors sections. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110.

BIOL 4470 Plant Ecology Laboratory (Lecture Portion) 2 (1) Experimental and observational approach to addressing principles discussed in BIOL 4460. Students are introduced to field and laboratory methods involving individual organisms, populations, and communities. Includes Honors sections. Preq or concurrent enrollment: BIOL 4460. Coreq: BIOL 4471.

BIOL 4471 Plant Ecology Laboratory 0 (2) Non-credit laboratory to accompany BIOL 4470. Coreq: BIOL 4470.

BIOL 4480 Marine Ecology 3 (3) Study of ecological principles underlying the relationships of marine organisms to their ocean environment. Includes physiological, behavioral, population, and community ecology with applications to conservation and sustainability of marine resources. Includes Honors sections. Preq: BIOL 1040 or BIOL 1110.

BIOL 4490 Field Ecology (4) (3) Contact Hours) Introduces students to the practice of field ecology in terrestrial, aquatic, and/or marine habitats. Emphasis is placed on field techniques, organism adaptations, regional conservation issues, and effects of human disturbance. May be repeated for a maximum of eight credits, but only if different topics are covered. Preq: Consent of instructor. Coreq: BIOL 4491.

BIOL 4491 Field Ecology Laboratory (0) (3) Non-credit laboratory to accompany BIOL 4490. Coreq: BIOL 4490.

BIOL (ANTH) 4510 Biological Variation in Human Populations 3 (3) Provides an in-depth discussion of the most influential topics in human skeletal biology. Course explores the history and ethical dilemmas of the field and examines how biological anthropologists use skeletons to reconstruct patterns of diet, disease, demography, and physical activity in human populations. May also be offered as ANTH 4510. Preq: ANTH 2010.

BIOL 4530 Integrative Organismal Biology 3 (3) In describing the integrated physiological functioning of individuals, evolutionary and comparative approaches are emphasized to provide a more complete understanding of how biological systems work, spanning a diverse range of invertebrate and vertebrate taxa in both terrestrial and aquatic environments. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110.

BIOL (PLPA) 4540 Plant Virology 4 (3) Study of plant viruses: their morphology, biochemistry, purification, and transmission; symptoms resulting from virus infection; virus vector relationships. serological and nucleic acid hybridization procedures. Diagnosis of viral diseases and the identification of causal agents. replication of plant viruses,

the interaction between viral host and plant genome. Control of plant viral diseases. May also be offered as PLPA 4540. Preq: BCHM 3010 or BCHM 3050 or MICR 3050. Coreq: BIOL 4541.

BIOL 4541 Plant Virology Laboratory 0 (3) Non-credit laboratory to accompany May also be offered as PLPA 4540. Preq: BCHM 3010 or BCHM 3050 or MICR 3050. Coreq: BIOL 4541.

BIOL (ANTH) 4550 Field Studies in Biological Anthropology 1-6 (1-6) Students participate in field study experiences related to biological anthropology. The focus of the field studies is on practical aspects of human skeletal biology, paleoanthropology, primate behavior, or other related field study. Students are trained in data collection methods and analysis utilized within biological anthropology. May also be offered as ANTH 4550. May be repeated for a maximum of six credits. Preq: Junior standing.

BIOL (MICR) 4560 Medical and Veterinary Parasitology 3 (3) Introduction to parasitism in the animal kingdom. Emphasizes basic and applied principles related to economically and medically important diseases. Classical and experimental approaches to the study of parasitism are examined in reference to protozoa, helminths, and arthropods. Includes Honors sections. May also be offered as MICR 4560. Preq: BIOL 1040 and BIOL 1060: or BIOL 1110.

BIOL 4610 Cell Biology 3 (3) In-depth analysis of how and where intracellular and extracellular molecules control general and specific cellular functions such as gene expression, secretion, motility, signaling, cell-cycle control and differentiation. Taught and graded at a level where students are expected to infer from and integrate cellular events. Includes Honors sections. Preq: BCHM 3010 or BCHM 3050 or BCHM 4060.

BIOL 4620 Cell Biology Laboratory (Lecture Portion) 2 (1) Laboratory to accompany BIOL 4610. Focuses on molecular and microscopic analysis of eukaryotic cells. Preq or concurrent enrollment: BIOL 4610. Coreq: BIOL 4621.

BIOL 4621 Cell Biology Laboratory 0 (2) Non-credit laboratory to accompany BIOL 4620. Coreq: BIOL 4620.

BIOL (WFB) 4640 Mammalogy 4 (3) Origin, evolution, distribution, structure, and function of mammals, with laboratory emphasis on the mammals of the Southeast. May be offered as WFB WFB 4640. Preq: BIOL 3030. Coreq: BIOL 4641.

BIOL 4641 Mammalogy Laboratory 0 (3) Non-credit laboratory to accompany BIOL 4640. May also be offered as WFB 4641. Coreq: BIOL 4640.

BIOL (ANTH) 4660 Evolution of Human Behavior 3 (3) Familiarizes students with the evolutionary basis of human behavior. Examines topics such as altruism, cooperation, mating systems, parental investment, and social systems using diverse examples, from hunter-gatherer to technological societies May also be offered as ANTH 4660. Preq: ANTH 3510 or BIOL 3350 or BIOL 3510 or BIOL 4700.

BIOL 4670 Principles of Hematology 3 (3) Basic hematological principles as they relate to normal blood cell production, as well as in abnormal conditions that result in diseases of the hematological system. Clinical practice, ethics and controversies in hematology are discussed. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110.

BIOL (WFB) 4680 Herpetology 4 (3) Physiology, functional morphology, ecology, evolution, biomechanics and current literature of amphibians and reptiles. Laboratory study examines morphology and identification of world families and United States genera, as well as southeastern species. Field trips are required. May also be offered as WFB 4680. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: BIOL 4681.

BIOL (WFB) 4681 Herpetology Laboratory 0 (3) Non-credit laboratory to accompany BIOL 4680. May also be offered as WFB 4681. Coreq: BIOL 4680.

BIOL 4690 (ENT) Aquatic Insects 3 (1) Identification, life history, habitats, and interrelationships of aquatic insects; techniques of qualitative field collecting; important literature and research workers. Includes Honors sections. May also be offered as ENT 4690 or WFB 4690. Preq: Sophomore standing. Coreq: BIOL 4691.

BIOL (ENT) 4691 Aquatic Insects Laboratory 0 (6) Non-credit laboratory to accompany BIOL 4690. May also be offered as ENT 4691 or WFB 4691. Coreq: BIOL 4690.

BIOL 4700 Behavioral Ecology 3 (3) Historical and modern developments in animal behavior emphasizing the evolutionary and ecological determinants of behavior. A synthesis of ethology and comparative psychology. Includes Honors sections. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110.

BIOL 4710 Behavioral Ecology Laboratory (Lecture Portion) 2 (1) Laboratory exercises that explore the behavior of animals. emphasizes behavioral observation and analysis and presentation of findings in a report format. Includes a semester-long independent research project. Preq or concurrent enrollment: BIOL 4700. Coreq: BIOL 4711.

BIOL 4711, Behavioral Ecology Laboratory 0 (2) Non-credit laboratory to accompany BIOL 4710. Coreq: BIOL 4710.

BIOL (WFB) 4720 Ornithology (4) (3) Biology of birds: their origin and diversification, adaptations, phylogeny, classification, structure and function, behavior, ecology, and biogeography. Field identification is emphasized, and field trips are required. May also be offered as WFB 4720. Preq: BIOL 1040 and BIOL 1060; of BIOL 1110. Coreq: BIOL 4721.

BIOL (WFB) 4721 Ornithology Laboratory (0) (3) Non-credit laboratory to accompany BIOL 4720. May also be offered as WFB 4721. Coreq: BIOL 4720.

BIOL (ANTH) 4740 Primatology 4 (3) Biology of nonhuman primates, including their evolution, taxonomy, physiology, life history, behavioral ecology, and conservation. Three field trips are required, during which students conduct behavioral observations and later analyze their data and present it in report format. May also be offered as ANTH 4740. Preq: ANTH 3510 or BIOL 3510 or BIOL 3350 or BIOL 4700. Coreq: BIOL 4741.

BIOL 4741 Primatology Laboratory 0 (3) Non-credit laboratory to accompany BIOL 4740. May also be offered as ANTH 4741. Coreq: BIOL 4740.

BIOL 4750 Comparative Physiology 3 (3) Physiological systems of invertebrates and vertebrates emphasizing environmental adaptation. Physiological principles as they relate to metabolism, thermoregulation, osmoregulation, respiration, and neural and integrative physiology. Includes Honors sections. Preq: CH 1020; and either BIOL 1110 or both BIOL 1040 and BIOL 1060.

BIOL 4760 Comparative Physiology Laboratory (Lecture Portion) 2 (1) Modern classical experimental methods are used to demonstrate fundamental physiological principles discussed in BIOL 4750. Introduces students to computer-aided data acquisition and manipulation as well as computer simulations of physiological function. Includes Honors sections. Preq or concurrent enrollment: BIOL 4750. Coreq: BIOL 4761.

BIOL 4761 Comparative Physiology Laboratory 0 (2) Non-credit laboratory to accompany BIOL 4760. Coreq: BIOL 4760.

BIOL (WFB) 4770 Ichthyology 3 (2) Systematics, life history, distribution, ecology, and current literature of fish. Laboratory study of morphology and identification of U.S. genera, as well as all southeastern species. Field trips are required. May also be offered as WFB 4770. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: BIOL 4771.

BIOL (WFB) 4771 Ichthyology Laboratory 0 (3) Non-credit laboratory to accompany BIOL 4770. May also be offered as WFB 4771. Coreq: BIOL 4770.

BIOL 4780 Exercise Physiology 3 (3) Introduction to the physiology of exercise. Focuses on the function and adaptations of body systems in response to exercise. Structured primarily for students interested in Pre-rehabilitation Sciences. Preq: BIOL 2220 and BIOL 2230; or BIOL 3150 and BIOL 3160.

BIOL (AVS) 4800 Vertebrate Endocrinology 3 (3) Introduction to the basic principles of neuro-endocrine integration and homeostatic maintenance in vertebrates. Comparative morphology and physiology of various endocrine tissues and hormone chemistry and modes of action are considered. May also be offered as AVS 4800. Preq: BCHM 3010 or BCHM 3050.

BIOL (EDSC) 4820 Laboratory Techniques for Teaching Science 3 (1) Focuses on basic lab skills needed to plan, prepare, and conduct inquiry-based laboratories and to familiarize pre-service teachers with a variety of scientific equipment and their methodologies. Topics include ways to integrate technology into the classroom, lab safety, and the development of inquiry-based classroom activities May also be offered as EDSC 4820. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: BIOL 4821.

BIOL 4821 Laboratory Techniques for Teaching Science 0 (6) Non-credit laboratory to accompany BIOL 4820. May also be offered as EDSC 4821. Coreq: BIOL 4820.

BIOL 4830 Stem Cell Biology 3 (3) Stem cells are the focus of intense interest because of their utility for treating human diseases. This course will provide a broad treatment of the biology of stem cells and assess their current therapeutic capacity in clinical medicine. Preq: BIOL 4610.

BIOL 4880 Health Professions Practicum 3 (3). A study abroad opportunity for students who have decided to pursue a career in medicine, dentistry, or rehabilitation sciences. This course provides students with direct, hands-on experience working with health professionals. May be repeated for a maximum of six credits, but only if different topics are covered. Preq: Consent of instructor.

BIOL 4890 Clinical Applications and Medical Practice 3 (2) Explores the various fields, specialties, and subspecialties in medicine. Provides students with the opportunity to shadow physicians in a hospital and/or office setting and to discuss current issues and advances in medicine with practicing physicians and other health care professionals. Preq: Consent of instructor. Coreq: BIOL 4891.

BIOL 4891 Clinical Applications and Medical Practices Laboratory 0 (2) Non-credit laboratory to accompany BIOL 4890. Coreq: BIOL 4890.

BIOL 4900 - Research Experience for Visiting Undergraduates 0 (30) REU students carry out ten weeks of mentored research under the direction of faculty in the life sciences and participate in professional development workshops to develop their research careers. Products include a poster presentation, a written report, a research talk and a one-minute video. To be taken Pass/No Pass only. Preq: Acceptance into the Biological Sciences NSF-REU program.

BIOL 4910 Undergraduate Research in Biological Sciences 1-4 (3-12) Mentored research problems introduce undergraduate students to the planning and execution of research and the presentation of research findings. Departmental honors students must take at least six credits under a single research advisor over two semesters, must write an honors thesis, and must make a public presentation of their research. Includes Honors sections. May be repeated for a maximum of 24 credits. Preq: Consent of instructor

BIOL 4920 Internship in Biological Sciences 0-4 (3-12) Preplanned internship at an advisor- approved facility to give students learning opportunities beyond their classroom experiences. Students submit a student Internship Contract and a study plan before the internship and a comprehensive report within one week of the end of the internship. To be taken Pass/no Pass only. May be repeated for a maximum of six credits. Preq: Consent of instructor.

BIOL 4930 Senior Seminar 3 (3) Capstone course engaging students in analysis and discussion of publications from the technical and non-technical literature in biological sciences and from current topics of biology appearing in other media. Emphasis is placed on ethical issues that arise as a result of biological research. Credit toward a degree will be given for only one of BIOL 4930 or MICR 4930. This course is not open to students who have received credit for MICR 4930. This course is not open to students who have received credit for MICR 4930. Preq: Senior standing; and one of COMM 1500 or COMM 2500 or ENGL 3140 or ENGL 3150; and one of BIOL 3350 or BIOL 4610.

BIOL (MICR) 4940 Selected Topics in Creative Inquiry II 2-3 (1) Disciplinary and multidisciplinary group research projects with the goal of developing the students' ability to discover, analyze, and evaluate data. Includes Honors sections. May also be offered as MICR 4940. May be repeated for a maximum of 24 credits. Preq: Consent of instructor. Coreq: BIOL 4941.

BIOL 4941 Selected Topics in Creative Inquiry II Laboratory 0 (3-6) Non-credit laboratory to accompany BIOL 4940. May also be offered as MICR 4941. Coreq: BIOL 4940.

BIOL 4950 Service Learning in Biology 2-4 (1-2) Combines service and academic learning while helping pre-college or college students learn about the fundamental aspects of science. Provides lecture and laboratory experiences as students learn to prepare and participate in supervised laboratory teaching for pre-college or college students. May be repeated for a maximum of six credits. Preq: Consent of instructor. Coreq: BIOL 4951.

BIOL 4951 Service Learning in Biology Laboratory 0 (3-9) Non-credit laboratory to accompany BIOL 4950. Coreq: BIOL 4950.

BIOL 4960 Selected Topics 1-4 (1-4) Lecture coverage of selected topics in cellular and developmental biology, ecology, behavior, evolutionary biology, molecular biology, physiology, systematics, and other topics in the biological sciences. May be repeated for a maximum of nine credits, but only if different topics are covered. Preq: Consent of instructor.

BIOL 4970 Special Topics Laboratory 1-3 (2-9) Specialized laboratory experiences in cellular and developmental biology, ecology, behavior, evolutionary biology, molecular biology, physiology, systematics, and other topics of interest in the biological sciences. May be repeated for a maximum of nine credits, but only if different topics are covered. Preq: Consent of instructor.

BIOL 4980 Thesis in Biological Sciences 1 (1) This course provides students guidance and instruction on the preparation of a research thesis and oral presentation completed independently by the student. This course also serves as a required course for students completing Departmental Honors in Biological Sciences. Includes Honors sections. To be taken Pass/No Pass only. Preq: Six credits of BIOL 4910.

CH 1010 General Chemistry 4 (3) Introduction to the elementary concepts of chemistry through classroom and laboratory experience. Emphasizes chemical reactions and the use of symbolic representation, the mole concept and its applications and molecular structure. Credit toward a degree will be given for only one of CH 1010 and CH 1050. Includes Honors sections. Coreq: CH 1011.

CH 1011 General Chemistry Laboratory 0 (3) Non-credit laboratory to accompany CH 1010. Coreq: CH 1010.

CH 1020 General Chemistry 4 (3) Continuation of CH 101 treating solutions, rates of reactions, chemical equilibrium, electrochemistry, chemistry of selected elements, and an introduction to organic chemistry. Credit toward a degree will be given for only one of CH 1020 or CH 1060. Includes Honors sections. Preq: CH 1010 with a C or better. Coreq: CH 1021.

CH 1021 General Chemistry Laboratory 0 (3) Non-credit laboratory to accompany CH 1020. Coreq: CH 1020.

CH 2010 Survey of Organic Chemistry 3 (3) Introduction to organic chemistry emphasizing nomenclature, classes of organic compounds, and chemistry of functional groups. For students needing one-semester course in organic chemistry. Credit toward a degree will be given for only one of CH 2010 or CH 2230. Preq: CH 1020.

CH 2020 Survey of Organic Chemistry Laboratory 1 (3) Laboratory emphasizing standard techniques of organic laboratory analysis with the synthesis and characterization of organic molecules discussed in CH 2010. Credit will be given for only one of CH 2020 or CH 2270. Preq: CH 1020. Preq or concurrent enrollment: CH 2010.

CH 2230 Organic Chemistry 3 (3) Introductory course in the principles of organic chemistry and the derivation of these principles from a study of the properties, preparations, and interrelationships of the important classes of organic compounds. Credit toward a degree will be given for only one of CH 2010 or CH 2230. Preq: CH 1020.

CH 2240 Organic Chemistry 3 (3) Continuation of CH 2230. Preq: CH 2230.

CH 2270 Organic Chemistry Laboratory 1 (3) Synthesis and properties of typical examples of the classes of organic compounds. Credit toward a degree will be given for only one of CH 2020 or CH 2270 or CH 2290. Preq or concurrent enrollment: CH 2230.

CH 2280 Organic Chemistry Laboratory 1 (3) Continuation of CH 2270. Preq: CH 2270. Preq or concurrent enrollment: CH 2240.

CH 3130 - Quantitative Analysis 3 (3) Fundamental principles of volumetric, gravimetric, and certain elementary instrumental chemical analyses. Preq or concurrent enrollment: CH 3150 or CH 3170.

CH 3150 - Quantitative Analysis Laboratory 2 (6) Laboratory techniques of volumetric, gravimetric, and elementary instrumental chemical analyses. Credit toward a degree will be given for only one of CH 3150 or CH 3170. Preq or concurrent enrollment: CH 3130.

CH 4130 Chemistry of Aqueous Systems 3 (3) Study of chemical equilibria in aqueous systems, especially natural waters; acids and bases, dissolved CO_2, precipitation and dissolution, oxidation-reduction, adsorption, etc. Includes Honors sections. Preq: CH 1020 or CH 1060.

COMM 1500 Introduction to Speech Communication 3 (2) Overview of theoretical approaches to the study of communication, including the theory and practice of interpersonal/small group/intercultural/public communication. Includes a laboratory. COMM 1501.

COMM 1501 Introduction to Human Communication Laboratory 0 (2) Non-credit laboratory to accompany COMM 1500. Coreq: COMM 1500.

COMM 2500 Public Speaking 3 (3) Practical instruction in public speaking; practice in the preparation, delivery, and criticism of short speeches. Develops an understanding and knowledge of the process of communication. Includes a laboratory. Includes Honors sections. Coreq: COMM 2501.

COMM 2501 Public Speaking Laboratory 0 (1) Non-credit laboratory to accompany COMM 2500. Coreq: COMM 2500.

ED 1050 Orientation to Education 2 (2) Introduction to teaching addresses basic program requirements, SoE Conceptual Framework, state evaluation system, the nature of the diverse and multicultural classroom, standards and practices of professional conduct and requirements in teaching. A field experience involving tutoring in a P-12 classroom is required. Coreq: ED 1051.

ED 1051 Orientation to Education Laboratory 0 (1) Non-credit laboratory to accompany ED 1050. Coreq: ED 1050.

ED 3010 Principles of American Education 3 (3) Study of the legal basis, historical development, characteristics, and functions of educational institutions in the United States. Includes Honors sections. Preq: Sophomore standing and a 2.0 minimum grade-point average.

EDF 3020 Educational Psychology 3 (3) Introduction to classroom use of objectives, motivation theories, learning theories, tests and measurements, classroom management, and knowledge of exceptional learners. Includes Honors sections. Preq: Sophomore standing and a 2.0 minimum grade-point average.

EDF 3350 Adolescent Growth and Development 3 (3) Introduction to lifespan development. Emphasizes the physical, social, emotional, and cognitive characteristics of the 10- to 18-year-old and the educational implications of those developmental characteristics. Includes Honors sections. Preq: Sophomore standing and a 2.0 minimum grade-point average.

EDLT 4800 Foundations in Adolescent Literacy 3 (3) Provides key theoretical and evidence-based foundations for instruction in adolescent literacy. Investigates historical and current theories of literacy by exploring how adolescents use literacy, including digital literacies, to construct, communicate and critique knowledge. This course meets Read to Succeed South Carolina state requirements. Preq: Secondary Education major and admission to the Professional Level.

EDLT 4980 Content Area Reading and Writing for Middle and Secondary Teachers 3 (2) Designed for pre-service teachers who are involved with field experiences prior to student teaching full time. Prepares content area teachers to teach the reading skills necessary for effective teaching of content area material. Designed to meet Read to Succeed state requirements. Preq: EDLT 4800 and admission to professional level. Coreq: EDLT 4981.

EDLT 4981 Secondary Content Area Reading Laboratory 0 (2) Non-credit laboratory to accompany EDLT 4980. Coreq: EDLT 4980.

EDSC 3270 Practicum in Secondary Science 3(2) Pre-service secondary science teachers gain both content and pedagogical knowledge by observing and reflecting upon the classroom practices of selected in-service high school science teachers. Coreq: EDSC 3271.

EDSC 3271 Practicum in Secondary Science Laboratory 0 (3) Non-credit laboratory to accompany EDSC 3270. Coreq: EDSC 3270.

EDSC 4270 Teaching Secondary Science 3 (2) Development of instructional practices and materials for teaching secondary school science (biological, earth, and physical sciences); familiarization with secondary science curriculum materials; includes field experiences in local schools. Taught fall semester only. Preq: Second semester Junior standing, admission to the professional level, ED 1050 and ED 3010 and EDF 3020 and EDF 3350; at least 18 hours of science coursework and a minimum grade-point average of 2.75. Preq or concurrent enrollment: EDLT 4980. Coreq: EDSC 4271.

EDSC 4271 Teaching Secondary Science Laboratory 0 (2) Non-credit laboratory to accompany EDSC 4270. Coreq: EDSC 4270.

EDSC 4470 Teaching Internship in Secondary Science 9 (27) Supervised teaching internship in assigned secondary public school science classroom. Meets part of requirement for South Carolina science teaching certification. Taught spring semester only. Preq: EDSC 4270. Coreq: EDSC 4570.

EDSC 4570 Secondary Science Capstone Seminar 3 (2) Capstone seminar accompanying supervised high school science teaching internship. Satisfies part of requirement for South Carolina secondary science certification. Offered spring semester only. Preq: EDSC 4270. Coreq: EDSC 4470 and EDSC 4571.

EDSC 4571 Secondary Science Capstone Seminar Laboratory 0 (3) Non-credit laboratory to accompany EDSC 4570. Coreq: EDSC 4570.

EDSP 3700 Introduction to Special Education 3 (3) Survey of students with disabilities and with gifts/talents. Individuals with Disabilities Education Act is emphasized, including general educator's role in serving students with special needs. Characteristics, assessment, and effective instructional procedures for students of varying exceptionalities are addressed. Students must have a minimum grade-point average of 2.0 to enroll in this course. Includes Honors sections.

ENGL 1030 Accelerated Composition 3 (3) Training in composing correct and effective expository and argumentative essays, including writing documented essays. Includes Honors sections. Coreq: ENGL 1031.

ENGL 1031 Accelerated Composition Laboratory 0 (1) Non-credit laboratory to accompany ENGL 1030. Coreq: ENGL 1030.

ETOX (BIOL) 4300 Toxicology 3 (3) Basic principles of toxicology, including quantitation of toxicity, toxicokinetics, biochemical action of poisons, and environmental toxicology, are studied. Acute and chronic effects of various classes of poisons (e.g., pesticides, drugs, metals, and industrial pollutants) are discussed in relation to typical routes of exposure and regulatory testing methods. May also be offered as BIOL 4300. Preq: BCHM 3010 or BCHM 3050 or CH 3600.

ETOX (BIOL) 4370 Ecotoxicology 3 (3) Study of the effects of stressors on the ecosystem. Explores the integrative relationships that comprise the field of ecotoxicology in a hierarchical format that focuses on the various levels of ecological organization. May also be offered as May also be offered as BIOL 4370. Preq: BIOL 3110 or ETOX 4300.

ETOX (GEOL, PES) 4850 Environmental Soil Chemistry 3 (3) Study of soil chemical processes (sorption, desorption, ion exchange, precipitation, dissolution, and redox reactions) of nutrients and inorganic and organic contaminants in soils and organic matter. Chemical complex equilibria and adsorption phenomena at the solid (soil, sediment, and mineral) water interface are emphasized. May also be offered as GEOL 4850 or PES 4850. Preq: CH 1020 or PES 2020.

GEN 2500 - Medical Terminology 2 (2) Fundamentals of common medical terminology and concepts, especially those of basic science, biology, anatomy, physiology, and medicine.

GEN 3000 Fundamental Genetics 3 (3) Introductory course covering fundamental principles of genetics in prokaryotes and eukaryotes. Emphasis is given to Mendelian genetics, physical and chemical basis of heredity, and population genetics. Credit for a degree will be given for only one of GEN 3000 or GEN 3020. Preq: BIOL 1030 or BIOL 1100.

GEN 3020 Molecular and General Genetics 3 (3) Rapidly paced course covering Mendelian and molecular genetics, with introductory coverage of quantitative and population genetics. Emphasis is on the molecular basis of heredity and gene expression in prokaryotes and eukaryotes and modern genetic technology. Credit for a degree will be given for only one of GEN 3000 or GEN 3020. Includes Honors sections. Preq: BIOL 1100 with C or better.

HLTH 2600 Medical Terminology and Communication 3 (3) Skills in building, analyzing, defining, pronouncing, and spelling medical terms related to the human body are developed and applied through electronic communication. Preq: Junior standing.

HLTH 3800 Epidemiology 3 (3) Introduces epidemiological principles and methods used in the study of the origin, distribution, and control of disease. Health majors are given enrollment priority. Preq: STAT 2300 or STAT 3090; and at least one 2000-level HLTH course.

MATH 1030 Elementary Functions (4) (3) Gateway course for MATH 1060. Comprehensive treatment of functions and analytic geometry with applications including polynomial, rational, algebraic, exponential, logarithmic, and trigonometric

functions. Not open to students who have received credit for MATH 1050. Preq: Any MATH or STAT course, or a score of 540 or higher on the SAT Math section, or a score of 21 or higher on the ACT Math section, or a score of 50 or higher on the Clemson Mathematics Placement Test (CMPT). Coreq: MATH 1031.

MATH 1031 Elementary Functions Laboratory (0) (2) Non-credit laboratory to accompany MATH 1030. Coreq: MATH 1030.

MATH 1040 Precalculus and Introductory Differential Calculus 4 (4) Relevant precalculus and algebra review, limits, continuity and introduction to differential calculus. The combination of MATH 1040 and MATH 1070 covers the same calculus material as MATH 1060. MATH 1040 alone cannot be substituted for any calculus course. Not open to students who have received credit for MATH 1060. To be taken Pass/No Pass only. Preq: Any MATH or STAT course, or a score of 640 or higher on the SAT Math section, or a score of 27 or higher on the ACT Math section, or a score of 65 or higher on the Clemson Mathematics Placement Test (CMPT).

MATH 1050 Precalculus 5 (4,) Extensive treatment of topics chosen to prepare students for the study of calculus. Special emphasis is given to polynomial, rational, exponential, logarithmic, and trigonometric functions, and their graphs, as well as basic and analytic trigonometry. Students who have received credit for any other mathematical sciences course will not be allowed to enroll in or receive credit for MATH 1050. To be taken Pass/No Pass only. Coreq: MATH 1051.

MATH 1051 Precalculus Laboratory 0 (2) Non-credit laboratory to accompany MATH 1050. Coreq: MATH 1050..

MATH 1060 Calculus of One Variable I 4 (4) Topics include analytic geometry, introduction to derivatives, computation and application of derivatives, integrals, exponential, and logarithm functions. Includes Honors sections. Preq: A score of 680 or higher on the SAT Math section, or a score of 29 or higher on the ACT Math section, or a score of 80 or higher on the Clemson Mathematics Placement Test (CMPT).

MATH 1070 Differential and Integral Calculus 4 (4) Continuation of MATH 1040. Successful completion of MATH 1040 and MATH 1070 is equivalent to the completion of MATH 1060. Continuation of differential calculus and an introduction to integral calculus. Not open to students who have received credit for MATH 1060. Preq: MATH 1040.

MATH 1080 Calculus of One Variable II 4 (4) Topics include transcendental functions, applications of integration, integration techniques, indeterminate forms, improper integrals, parametric equations, polar coordinates, and infinite series. Includes Honors sections. Preq: MATH 1060 with a C or better or MATH 1070 with a C or better.

MICR 2050 Introductory Microbiology 4 (3) Basic concepts of microbiology, introduced through classroom and laboratory experiences. Emphasizes practical applications in various areas of importance to man. Recommended for students not majoring in a biological science. Not open to Microbiology majors. Preq: CH 1010; and both BIOL 1030 and BIOL 1050, or BIOL 1100. Coreq: MICR 2051.

MICR 2051 Introductory Microbiology Laboratory 0 (3) Non-credit laboratory to accompany MICR 2050. Coreq: MICR 2050.

MICR 3050 General Microbiology 3 (3) Morphology, physiology, classification, distribution, and cultivation of microorganisms. Preq: Sophomore standing and CH 1010 and CH 1020; BIOL 1030 and BIOL 1050, or BIOL 1100; and one of the following: BE 2100, or BIOL 1040 and BIOL 1060, or BIOL 1110, or EES 2020. Coreq: MICR 3060.

MICR 3060 General Microbiology Laboratory 1 (3) This course covers general microbiology laboratory techniques. Preq: Sophomore standing and CH 1010 and CH 1020; BIOL 1030 and BIOL 1050, or BIOL 1100; and one of the following: BE 2100, BIOL 1040 and BIOL 1060, or BIOL 1110, or EES 2020. Coreq: MICR 3050.

MICR 3070 Microbial Diversity 4 (3) A writing-intensive survey of microbial diversity, including types of diversity, methods for assessing diversity, and mechanisms and impacts of microbial evolution. Skill development is focused on reading and analyzing primary literature and communicating scientific information. Preq: MICR 3050 with a C or higher. Coreq: MICR 3071.

MICR 3071 Microbial Diversity Laboratory 0 (3) Non-credit laboratory to accompany MICR 3070. Coreq: MICR 3070.

MICR 3940 Selected Topics in Creative Inquiry I 1-3 (1) Disciplinary and multidisciplinary group research projects with the goal of developing the student's ability to discover, analyze, and evaluate data. Includes Honors sections. May be repeated for a maximum of 24 credits. Preq: Consent of instructor.

MICR 4000 Public Health Microbiology 3 (3) Epidemiology of transmissible diseases including pathogenic characteristics of the infectious organism, modes of transmission, mechanism of infection, diagnostic aids, effective treatments, immunizing procedures, and methods of preventing infection. Includes Honors sections. Preq: MICR 3050 with a C or higher.

MICR 4020 Environmental Microbiology 3 (3) Discussion of microorganisms in air, terrestrial, and aquatic environments and how they are used for environmental restoration activities. topics include the nature of biofilms, interactions of microbes with inorganic and organic constituents, processes to implement bioremediation in surface/subsurface environments, and treatment of solid, liquid, and gaseous waste streams. Preq: MICR 3050 and MICR 4040; and either CH 2010 or both CH 2230 and CH 2270.

MICR 4040 Microbial Ecology 3 (3) The study of microbial interactions and adaptations in a wide range of environmental conditions and habitats at the individual, population, community, and ecosystem levels. Preq: CH 2010 and CH 2020; or CH 2230 and CH 2270; and MICR 3050 with a grade of *C* or higher.

MICR 4050 Advanced Microbial Ecology of Humans 3 (3) Investigation of the complex ecological relationships between microbes and their human hosts, including investigation of the normal microbial community in various body systems, factors that change the microbiota, and the role of the microbiota in normal development, health, and disease of the host. Preq: MICR 3050 with a C or higher.

MICR 4070 Food and Dairy Microbiology 4 (3) Physical-chemical factors limiting survival and growth of microorganisms during processing and manufacturing of food and dairy products. Standard methods for enumerating and identifying indicator bacteria, yeasts, molds, and microbes producing food and food-borne illness. Starter cultures, fungal toxins, microbial cell injury and standards for food and dairy products. Includes Honors sections. Preq: MICR 3050 with a C or higher; and one of BCHM 3050 or CH 2010 or CH 2230. Coreq: MICR 4071.

MICR 4071 Food and Dairy Microbiology Laboratory 0 (3) Non-credit laboratory to accompany MICR 4070. Coreq: MICR 4070.

MICR 4110 Pathogenic Bacteriology 3 (3) Study of pathogenic bacteria and their virulence mechanisms. Emphasizes host-microbe interactions, responses to infection and treatment, and research strategies for various topics of bacterial pathogenesis. Includes Honors sections. Preq: MICR 3050 and MICR 4120 and MICR 4140.

MICR 4120 Bacterial Physiology 3 (3) Consideration of the cytology, physiology, metabolism, and genetics of bacteria. Includes studies of growth and death, reproduction and mutation, nutrition and metabolic pathways, regulatory mechanisms, and effects of environment. Includes Honors sections. Preq: CH 2240; and MICR 3050 with a C or higher; and either BCHM 3010 or BCHM 3050.

MICR 4130 Industrial Microbiology 3 (2) Microbial aspects of large-scale processes for the production of foods, antibiotics, enzymes, fine chemicals, and beverages. Topics include strain selection, culture maintenance, biosynthetic pathways, continuous cultivation, and production of single cell protein. Includes Honors sections. Coreq: MICR 4131.

MICR 4131 Industrial Microbiology Laboratory 0 (3) Non-credit laboratory to accompany MICR 4130. Coreq: MICR 4130.

MICR (AVS, BIOL) 4140 Basic Immunology 3 (3) Introduction to the immune system of vertebrate animals, with an emphasis on structure, function, regulation, and cellular and molecular mechanisms of immune responses. May also be offered as AVS 4140 or BIOL 4140. Preq: BIOL 4610 and MICR 3050.

MICR 4150 Microbial Genetics 3 (3) Investigates the molecular basis of microbial lives. Topics include essential genes involved in DNA, RNA, and protein metabolism; mutations and genome evolution; global gene regulation; and genetic analysis, using both forward and reverse genetics. Includes Honors sections. Preq: MICR 3050 with a grade of *C* or higher; and MICR 4120; and BCHM 3010 or BCHM 3050; and GEN 3000 or GEN 3020. Non-Microbiology majors are eligible to enroll without credit for MICR 4120 but must request a registration override from the instructor.

MICR 4160 Introductory Virology 3 (3) Introduction to the field of virology, including animal, bacterial, and plant viruses. topics include nomenclature and classification, biochemical and biophysical characteristics, mechanisms of replication, chemotherapy, and techniques for isolation, assay, and purification. Includes Honors sections. Preq: MICR 3050 with a C or higher; and either BCHM 3010 or BCHM 3050. Preq or concurrent enrollment: BIOL 4610.

MICR 4170 Cancer Biology 3 (3) Discusses alterations that occur at molecular, cellular and tissue levels during cell transformation. Topics include the cell division cycle, signal transduction pathways, oncogenes and tumor suppressors, cell death, and cancer therapies. Includes Honors sections. Preq: MICR 3050 with a C or higher and BIOL 4610; and either BCHM 3010 or BCHM 3050.

MICR 4180 Pathogenic Eukaryotes 3 (3) The course focuses on molecular mechanisms associated with disease initiation, disease progression, virulence mechanisms, host-pathogen interactions, diagnosis, and treatments of eukaryotic pathogens. The course primarily uses research articles to keep up with latest research in these fields. MICR 3050 with a grade of *C* or better. Preq or concurrent enrollment: BIOL 4610.

MICR 4500 Advanced Microbiology Laboratory I 2 (1) Application of knowledge and techniques learned in the Introductory Microbiology Lab with new topics on microbial ecology, diversity, and physiology. Experiments in soil, marine and environmental microbiology will be conducted. Preq: MICR 4040. Coreq: MICR 4501.

MICR 4501 Advanced Microbiology Laboratory I Laboratory 0 (3) Non-credit laboratory to accompany MICR 4500. Coreq: MICR 4500.

MICR 4510 Advanced Microbiology Laboratory II 2 (1) Application of knowledge and techniques learned in the Advanced Microbiology Lab I with new topics in microbial cell biology and microbial genetics. Preq: MICR 4120 and MICR 4500. Coreq: MICR 4511.

MICR 4511 Advanced Microbiology Laboratory II Laboratory 0 (3) Non-credit laboratory to accompany MICR 4510. Coreq: MICR 4510.

MICR 4910 Undergraduate Research in Microbiology 1-4 (3-12) Individually mentored research problems in various areas of microbiology that introduce undergraduate students to the planning and execution of research experimentation and the presentation of research findings. Includes Honors sections. Departmental honors students must take at least six hours under a single research advisor over two semesters, must write an honors thesis, and must make a public presentation of their research. May be repeated for a maximum of 24 credits with consent of instructor. Preq: Consent of instructor.

MICR 4920 Internship in Microbiology 0-4 (3-12) Preplanned internship at an advisor-approved facility to give students learning opportunities beyond their classroom experiences. Students submit a Student Internship Contract and a study plan before the internship and a comprehensive report within one week of the end of the internship. To be taken Pass/no Pass only. May be repeated for a maximum of six credits. Preq: Consent of instructor.

MICR 4930 Senior Seminar 2 (3) Capstone course engaging students in analysis and discussion of publications from the technical and non-technical literature in biological sciences and from current topics of biology appearing in other media. Emphasis is placed on ethical issues that arise as a result of biological research. Credit toward a degree will be given for only one of BIOL 4930 or MICR 4930. This course is not open to students who have received credit for BIOL 4930. Preq: Senior standing; and COMM 1500 or COMM 2500; and MICR 3070.

MICR 4940 Selected Topics in Creative Inquiry II 2-3 (1) Disciplinary and multidisciplinary group research projects with the goal of developing the student's ability to discover, analyze, and evaluate data. Includes Honors sections. May also be offered as BIOL 4940. May be repeated for a maximum of 24 credits. Preq: Consent of instructor. Coreq: MICR 4941.

MICR 4941 Selected Topics in Creative Inquiry II Laboratory 0 (3-6) Non-credit laboratory to accompany MICR 4940. May also be offered as BIOL 4941. Coreq: MICR 4940.

MICR 4950 Service Learning in Biology 2-4 (1) Combines service and academic learning while helping pre-college or college students learn about the fundamental aspects of science. Provides lecture and laboratory experiences as students learn to prepare and participate in supervised laboratory teaching for pre-college or college students. May be repeated for a maximum of six credits. Preq: Consent of instructor. Coreq: MICR 4951.

MICR 4951 Service Learning in Biology Laboratory 0 (3-9) Non-credit laboratory to accompany MICR 4950. Coreq: MICR 4950.

MICR 4980 Thesis in Microbiology 1 (1) This course provides students guidance and instruction on the preparation of a research thesis and oral presentation to be completed independently by the student. This course also serves as a required course for students completing Departmental Honors in Microbiology. Includes Honors sections. To be taken Pass/No Pass only. Preq: Six credits of MICR 4910.

PHYS 1220 Physics with Calculus I 3 (3) First of three courses in a calculus-based physics sequence. Topics include vectors, laws of motion, conservation principles, rotational motion, oscillations, and gravitation. Credit for a degree will be given for only one of PHYS 1220, PHYS 2000, or PHYS 2070. Includes Honors sections. Preq or concurrent enrollment: MATH 1060 or MATH 1070 or MATH 1080 or MATH 2060 or MATH 2080.

PHYS 2070 General Physics I 3 (3) Introductory course for students who are not majoring in physical science or engineering. Covers such topics as mechanics, waves, fluids, and thermal physics. Credit for a degree will be given for only one of PHYS 1220, PHYS 2000, or PHYS 2070. Preq: MATH 1020 or MATH 1040 or MATH 1050 or MATH 1060 or MATH 1070 or score of 620 or higher on the SAT Math section or a score of 26 or higher on the ACT Math section or a score of 60 or higher on the Clemson Mathematics Placement Test. (CMPT).

PHYS 2080 General Physics II 3 (3) Continuation of PHYS 2070. Covers such topics as electricity, magnetism, electromagnetic waves, optics, and modern physics. Credit for a degree will be given for only one of PHYS 2080 or PHYS 2210. Preq: PHYS 2070.

PHYS 2090 General Physics I Laboratory 1 (2) Introductory laboratory course for students who are not majoring in physical science or engineering. Covers such topics as mechanics, waves, fluids, and heat. Credit for a degree will be given for only one of PHYS 1240 or PHYS 2090. Preq or concurrent enrollment: PHYS 2070.

PHYS 2100 General Physics II Laboratory 1 (2) Covers such topics as electricity, magnetism, electromagnetic waves, optics, and modern physics. Credit for a degree will be given for only one of PHYS 2230 or PHYS 2100. Preq: PHYS 2070 and PHYS 2090. Preq or concurrent enrollment: PHYS 2080.

PHYS 2210 Physics with Calculus II 3 (3) Continuation of PHYS 1220. Topics include thermodynamics, kinetic theory of gases, electric and magnetic fields, electric currents and circuits, and motions of charged particles in fields. Credit for a degree will be given for only one of PHYS 2080 or PHYS 2210. Includes Honors sections. Preq: PHYS 1220. Preq or concurrent enrollment: MATH 1080 or MATH 1110.

PHYS 2230 Physics Laboratory II 1 (3) Experiments in heat and thermodynamics, electrostatics, circuits, and magnetism. Computers are used in statistical treatment of data. Credit for a degree will be given for only one of PHYS 2230 or PHYS 2100. Preq or concurrent enrollment: MATH 1080 or MATH 1110; and PHYS 2210.

PSYC 2010 Introduction to Psychology 3 (3) Introduction to the study of behavior. Analysis of the biological bases of behavior, learning, thinking, motivation, perception, human development, social behavior, and the application of basic principles to more complex phenomena such as education, personal adjustment, and interpersonal relations. Includes Honors sections.

PSYC 3400 Lifespan Developmental Psychology 3(3) Survey of current theory and research concerned with the psychological aspects of human growth and development across the entire lifespan. Major topics include developmental methods, physical maturation, cognition, socialization, personality, psycholinguistics, intelligence, learning, behavior problems, and exceptionality. Includes Honors sections. Preq: PSYC 2010.

PSYC 3830 Abnormal Psychology 3 (3) Introduction to the diagnosis and treatment of mental illnesses. Uses current diagnostic standards for mental disorders as a framework for understanding the symptoms, causes, and treatments of the most observed maladaptive behaviors. Includes Honors sections. Preq: PSYC 2010.

STAT 2300 Statistical Methods I 3 (2) Basic concepts and methods of statistical inference; organization and presentation of data, elementary probability, measures of central tendency and variation, tests of significance, sampling, simple linear regression, and correlation. Stresses the role of statistics in interpreting research and the general application of the methods. Statistical microcomputer software is used. Not open to students who have received credit for MATH 3020 or STAT 3090. Includes Honors sections. Preq: Any MATH or STAT course, or a score of 620 or higher on the SAT Math section, or a score of 26 or higher on the ACT Math section, or a 65 or better on the Clemson Mathematics Placement Test. Coreq: STAT 2301.

STAT 2301 Statistical Methods I Laboratory 0 (2) Non-credit laboratory to accompany STAT 2300. Coreq: STAT 2300.

WFB 4680 Herpetology 4 (3) Physiology, functional morphology, ecology, evolution, biomechanics and current literature of amphibians and reptiles. Laboratory study examines morphology and identification of world families and United States genera, as well as southeastern species. Field trips are required. May also be offered as BIOL 4680. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: WFB 4681.

WFB 4681 Herpetology Laboratory 0 (3) Non-credit laboratory to accompany WFB 4680. May also be offered as BIOL 4681. Coreq: WFB 4680.

WFB 4720 Ornithology 4 (3) Biology of birds: their origin and diversification, adaptations, phylogeny, classification, structure and function, behavior, ecology, and biogeography. Field identification is emphasized, and field trips are required. May also be offered as BIOL 4720. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: WFB 4721.

WFB 4721 Ornithology Laboratory 0 (3) Non-credit laboratory to accompany WFB 4720. May also be offered as BIOL 4721. Coreq: WFB 4720.

WFB 4770 Ichthyology 3 (2) Systematics, life history, distribution, ecology, and current literature of fish. Laboratory study of morphology and identification of U.S. genera, as well as all southeastern species. Field trips are required. May also be offered as BIOL 4770. Preq: BIOL 1040 and BIOL 1060; or BIOL 1110. Coreq: WFB 4771.

WFB 4771 Ichthyology Laboratory 0 (3) Non-credit laboratory to accompany WFB 4770. May also be offered as BIOL 4771. Coreq: WFB 4770.

General Education

Mission Statement

In order to become informed and productive citizens, undergraduate students need to think critically and synthetically about substantive and often interlinked aesthetic, ethical, historical, linguistic, philosophical, societal, scientific, and quantitative global challenges and issues.

Therefore, in addition to being prepared to complete a major course of study, Clemson University undergraduate students are required to undertake a general education core course of study to develop and to demonstrate the ability to synthesize information relevant to complex issues, to evaluate the quality and utility of the information, and to use the outcomes of their analysis to reach persuasive logical conclusions.

The Clemson University undergraduate curriculum is designed such that arts and humanities, mathematics, natural sciences, social sciences, and written and oral communication contribute to the holistic development of its students.

General Education Student Learning Outcomes

Communication
Students will demonstrate competence in communication through organization of a central message with supporting materials in the chosen medium.

Arts and Humanities
Students will analyze, interpret, and employ aesthetic, ethical, linguistic, and/or philosophical discourse in relevant contexts; or students will create, perform, interpret, reinterpret, and/or criticize artistic works.

Mathematics
Students will demonstrate mathematical literacy through interpretation of mathematical forms and performing calculations.

Natural Sciences
Students will demonstrate the process of scientific reasoning through experimental activity and critical comparison of their results to those predicted by accepted natural science principles.

Social Sciences
Students will use social science concepts and evidence to explain human actions or behaviors in the past, the present, and/or the future.

Global Challenges
Students will demonstrate critical thinking through analysis of global challenges; evaluate how varying perspectives influence global challenges; and demonstrate the integration of ethics into analysis of global challenges.

An undergraduate student whose enrollment in a curriculum occurs after May 15, 2022, must fulfill the general education requirements in effect at that time. If a student withdraws from the University and subsequently returns or does not remain continuously enrolled (summers excluded), the student's curriculum year will be changed to the one in effect at the time of the return for students with fewer than 90 credits. The curriculum year will remain the same as when they were last enrolled for seniors (90 credits or more). The student's major department can approve an exception. Students should submit a Change of Academic Program Request via iROAR to request the approval.

Requirements - 31 Credit Hours

To meet general education student learning outcomes, 31 total credit hours are required, distributed as follows.

Note: General education requirements in some major courses of study are more restrictive than those shown below.

A. Communication (minimum of 6 credit hours)
English Composition (3 credit hours)
ENGL 1030
Oral Communication (3 credit hours)
COMM 1500, COMM 2500, HON 1950, HON 2230, or an approved cluster of courses such as: AS 3090, AS 3100, AS 4090, AS 4100; or ML 1010, ML 1020. Students taking clusters must still earn at least 31 hours from the General Education Coursework list.

B. Mathematics (minimum of 3 credit hours)
MATH 1010, 1020, 1060, 1070, 1080, 2070; STAT 2220, 2300, 3090, 3300.

C. Natural Science with Lab (minimum of 4 credit hours)
ASTR 1010/1030, 1020/1040; BIOL 1030/1050, BIOL 1040/1060, 1090, 1100, 1110, 1200/1220, 1200/1230; CH 1010, 1020, 1050, 1060; GEOG 1060, GEOL 1010/1030, 1120/1140, 2020; PHSC 1170, 1180; PHYS 1220/1240, 1800/1820, 2000, 2070/2090, 2080/2100, 2210/2230, 2400.

D. Arts and Humanities (minimum of 6 credit hours)
Literature – 3 credits
Any 2000-level ENGL literature course or any of the other courses listed ENGL 2020, 2120, 2130, 2140, 2150, 2160; CHIN 4010, 4020; FR 2600, 3000, 3040; GER 2600, 3060, 3600, 3610, 3690; HON 1900, 2210; ITAL 3020; JAPN 4010, 4060; RUSS 3600, 3610; SPAN 3040, 3110, 3130.

Non-Literature – 3 credits
AAH 1010; ART 2100; CHIN (PHIL) 3120, 3130, 4140, CHIN 4990; ENGL (GW) 3010, ENGL (WCIN) 3570, ENGL (LANG, WCIN) 4540; FR 3070, 3170; GBS (WS) 3100; GER 2400, 3400; GW (ENGL) 3010, GW 4050; HIST 1930; HON 1910, 2030, 2100, 2220; JAPN 3070, 3080, (WCIN) 4560; LANG 2540, 3400, 3420, LANG (ENGL, WCIN) 4540; MUSC 1510, 1520, 1530, 1540, 2100, 2510, 2530, (THEA) 3080, (THEA) 3090, 3110, 3120, 3130, 3140, 3170, 3450, 3610, 3620, 3630, 3640, 3680, 3690, 3700, 3710, 3720; PHIL 1010, 1020, 1030, (CHIN) 3120, (CHIN) 3130, 3230, 3260, 3440, (WS) 3490, (CHIN) 4140; PRTM 2140; REL 1010, 1020, 3010, 3020, 3030, 3060, 3070, 3090, 3120, 3130, 3150; RUSS 3400; SPAN 3070, 3080; STS 1010, 2150, 3010; THEA 2100, (MUSC) 3080, (MUSC) 3090, 3160, 3170; WCIN (ENGL) 3570, (ENGL, LANG) 4540, (JAPN) 4560; WS 3010, WS (PHIL) 3490.

E. Social Sciences (minimum of 6 credit hours) Selected from two different fields. Note: AGRB and ECON are considered the same field.
AGRB 2020; ANTH 2010; COMM 1070, 1800, 3080; ECON 2000, 2050, 2110, 2120; GEOG 1010; HIST 1010, 1020, 1720, 1730; HON 1920, 2020, 2200; POSC 1010, 1030; PRTM 3010; PSYC 2010; SOC 2010, 2020. *Note: AGRB and ECON are considered the same field.*

F. Global Challenges (minimum of six credit hours)
Global Challenges credit hours must be selected from two different fields unless identified below as interdisciplinary[1]. At least three credit hours must be selected from a course(s) at the 3000-level or higher. A transfer course at the 3000/4000 level may not be used to satisfy the General Education Global Challenges Requirement. While a 3000/4000 level transfer course may fulfill other degree requirements, students must enroll in a Clemson course(s) on the Global Challenges list to fulfill the upper-level Global Challenges Requirement.
AAH 3050; AGED 4160, (EDF) 4800; AGRB 2050; ANTH 3010, 3200, 3250, (LANG) 3910, (JAPN) 4170, (JUST, SOC) 4850; ARCH 3040, ASL 3500; AUE 3010; AVS 3700, 4150; BIOE 4010; BIOL 2000, (WFB) 3130, BIOL 4930; BSHS 3330; BUS 3400; COMM 1800, 3800; CPSC 2920; CSM 3070; ECAS 1900[1], 2900[1], 3210[1], 3900[1], 3910[1]; ECE 4960; ECON 3190, 4580; ED 3010; EDF (AGED) 4800; EDHC 3300; EDHD 4310; EDLT 2000; EDSC 4260; EES 4140, 4860; ENGL 3490, 3560; ENGR 1020, 1510; ENSP (GEOL) 1250, 2000[1], 2010[1]; ENT 2000; FDSC 3010; FNPS 2140, 3680; FOR 4160; GBS 1000[1]; GC 4440; GEOG 1030,

4500, 4600; GEOL 1200, (ENSP) 1250, 2300; GER 4160; GLCH 1510, 1550[1], 1990[1], 2990[1], 3510[1], 3520[1], 3990[1]; HIST 1220, 1240, 2150, 3120, 3210, 3230, 4370; HLTH 2980, 3100, 3300; HON 1960[1], 2060[1], 3820, 3960[1]; HPA 2010; HUM 3060; IE 4880; INNO 3930[1]; INT 3010, 3500, 3600; IS 1020[1], 1030[1], 1040[1]; JAPN (ANTH) 4170; JUST 4130, (ANTH, SOC) 4850; 4950; LANG 3100, 3480, (ANTH) 3910, 4620; LARC 1150, 1160, 4230; MATH 2190, 2800; ME 3120; MGT 4150; MICR 4930; MKT 3030; MSE 4070; MUSIC 3150; NURS 1400, 3300; PHIL 1040, 1240, 3450, 3460; PHYS 2450; PKSC 3200; POSC 1020, 1040, 3620, 3760, 3770, 4480, 4570, 4590; PRTM 3500; PSYC 2500, 3570; REL 2010, 3350; RS (SOC) 3010; SCT 3000; SOC (RS) 3010, 4030, 4140, 4440, 4600, 4710, 4810 (ANTH, JUST) 4850; STS 1020[1],3030[1]; SUST 2040[1]; THEA 3150: WFB (BIOL) 3130; WS 1030[1]

[1] This course is interdisciplinary.

TENTATIVE SCHEDULE OF COURSE OFFERINGS

We reserve the right to change course offerings as required by staff changes, demand, and budgetary considerations.

	Fall		*Spring*		*Summer*	
Biochemistry	3050		3050		1st	2nd
			4320		3050††††	3050††††
Biological Sciences	1010	4510	1010	4830	1030††††	1030††††
	1030	*4610	1030	4890	1040††††	1040††††
[1]Summer Minimester A	1040	4620	1040	*4910	1060	1050
[2]Summer Minimester B	1050	4670	1050	4920	2000††††	2000††††
[3]Summer Minimester C	1100	*4700	1060	4930	3530††††	2220
[4]Summer Minimester D	2220	4750	1110	*4940	4490[2]	3350††††
[5]Long Summer	3000	4780	2230	4950	4610††††	4170
	3010	4800†	*3020	4960	4670	4550
	*3030	4830	*3040	4970	4830	4610††††
	*3040	4890	3060	4980	4890[2]	4830
	3070	*4910	3080		*4910	*4910
	3080	4920	3160		4920[5]	
	3110	4930	*3350		4960	
	3150	*4940	3510			
	*3350	4950	3530			
	3510	4960	*3940			
	3530	4970	4190			
	*3940	4980	4210			
*Honors section also	4020		4370			
available	4030		*4400			
	*4040		4460			
†odd years only	4060		4480††			
	4070		*4610			
††even years only	*4200		4620			
	4250		4640††			
†††Online & On-campus	4260		*4690†			
	4300		*4700			
††††Online only	*4400		4710			
	*4410		4750			
	4430		4780†			
	4440		4800†			
Genetics	3000		3000		3000††††	
Microbiology	3050	4190	3050	*4140	3050	
	3060	4510	3060	4500	3060	
	*3940	*4910	4070	*4910	4920[5]	
	4040	4920	*3940	4920		
	*4050	4930	*4000	4930		
	*4140	*4940	4020	*4950		
	*4150	*4950	4030††	4980		
	*4160	4980	*4110			
	4170		*4120			
	4180		*4130			

The Department of Biological Sciences Course Sequence Planner

NAME:_____ **MAJOR:**_____
CUID: _____ **DATE:** _____

Fall:	Hrs	Spring:	Hrs	Summer:	Hrs

Fall:	Hrs	Spring:	Hrs	Summer:	Hrs

Fall:	Hrs	Spring:	Hrs	Summer:	Hrs

Fall:	Hrs	Spring:	Hrs	Summer:	Hrs

Notes: