DEPARTMENT OF

BIOLOGY & GEOLOGY

Student Handbook

2016 - 2017
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DEPARTMENT OF BIOLOGY AND GEOLOGY

Student Handbook

Please keep this Handbook for reference throughout your career at the University of South Carolina Aiken. Graduation requirements may change in the future, but you will need to meet only those in effect at the time you first enroll.

This Handbook does not replace the official requirements listed in the Bulletin under which you entered.

Administrative Assistant for
Department of Biology and Geology
Carol Cutsinger, 803-641-3299

Website
http://web.usca.edu/biology
Mission Statement

The mission of the Department of Biology and Geology is to provide an engaging learning environment through excellence in teaching and active faculty and student scholarship. Our main purpose is to develop in our students an understanding of the importance and application of the scientific method as it pertains to both the biological and geological sciences. This is accomplished through faculty/student interactions that reinforce the tenets of the scientific method and expose students to a diversity of discipline-specific problems and the means by which those problems are addressed.

Biology Department Goals

Students of Biology and Geology at USC Aiken are provided the opportunity to understand concepts, conduct research, communicate ideas, and accept responsibilities in scientific settings. Majors and non-majors study the history, laws, principles, and theories of the Biological and/or Geological sciences. By graduation, students of Biology and Geology will have:

1. Developed critical thinking skills
2. Applied the Scientific Method
3. Developed research skills
4. Demonstrated an understanding of the history, terminology, principles, and unifying theories of the Biological and/or Geological sciences

Degree Programs

The department offers a Bachelor of Science or Bachelor of Arts degree in Biology, a minor in Geology, and up to three years of Geology curriculum transferable to other undergraduate institutions. Additionally, we offer courses that support a number of other degrees and that satisfy the university’s General Education Laboratory Science requirement. Students pursuing a biology degree must complete both general education and major requirements as listed in their specific program of study, as well as a minor or cognate. Biology majors may choose from a number of degree options, allowing each student, in consultation with an academic advisor, to tailor the degree to match individual interests. The biology degree culminates with a research-oriented capstone experience that provides students with a comprehensive overview of the methodologies of scientific research. To this end, the Department of Biology and Geology has a long history of providing students with the opportunity to integrate research experiences throughout their degree program. We offer a number of research courses that allow students to work closely with a faculty member in his or her research laboratory.

In addition to a traditional biology degree, we offer two Bachelor of Science degree concentrations: Environmental Remediation and Restoration, which is designed for students who are interested in completing a curriculum with an environmental science focus, and Molecular Biology, which is designed for students who are interested in completing a curriculum that is focused on the molecular interactions that drive cellular/organism function. Each of these degree programs is designed to provide students with the background necessary to continue their education at the graduate level, or to pursue a career related to the particular area.

Our Bachelor of Science degree in Clinical Laboratory Science is designed to prepare students for an allied health career in a medical laboratory setting. Students choosing this degree program will complete coursework that satisfies both general education and major requirements. The major requirements for this program will prepare the student for specific training in the clinical laboratory setting. Admission to the clinical component of the program is required and consists of didactic and clinical training internships offered in collaboration with the University Health Care System in Augusta, GA. Students completing this degree will be prepared to sit for national certification examinations administered by the National Certifying Agency for Medical Laboratory Personnel (NCA) and the American Society of Clinical Pathologists (ASCP). The specific degree requirements for each option can be found on pages 7-11.

To aid students in planning, the department has created several advisement tracks to accommodate a variety of interests. These tracks are discussed further on page 3 and typical courses in each track are listed on page 9. As you develop a program of study, you should use these advisement tracks as a general outline of suitable courses. Importantly, students should discuss their career goals with their academic advisor as they work together to develop a specific program of study. Because these advisement tracks are only for advisement purposes, you are free to develop your own curriculum with courses that you believe are more pertinent to your interests.
One of the unique opportunities available for biology majors is the ability to participate in the research process. For B.S. biology majors this experience is in the form of our BIOL X99 series of courses. Although the minimum requirement for B.S. biology majors is BIOL 498 Research Design, Implementation, and Analysis OR BIOL 499 Applied Biological Research Design, Implementation, and Analysis, some are interested in more in-depth research experiences that take place over a number of semesters. To accommodate these students we offer three research courses, which allow the student to obtain either elective credit (BIOL 199 and 299 Biological research i and ii) or major credit (BIOL 399 Biological Research III) towards the biology degree. USC Aiken Biology faculty members have expertise in a wide range of areas that include behavioral biology, botany, environmental toxicology, immunology, microbiology, molecular biology, parasitology, virology, and wetland/upland ecology. USC Aiken Geology faculty members have expertise in mountain building processes, heavy mineral sand deposits, sedimentology, and environmental geology.

Students wishing to participate in undergraduate research at any level may do so at any time during their college career. However, this process is of critical importance to seniors who wait until the last moment to plan for their senior research. In many cases those who fail to take time to plan for their senior research experience are disappointed in the results. The following guide may be useful in planning the undergraduate research experience:

<table>
<thead>
<tr>
<th>PROCEDURE</th>
<th>PATHWAY TO SUCCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine the general area of biology that most interests you. Ask yourself “What in biology most interests me?”</td>
<td>The answer to this question is your guide to find the right research experience for you. Often the answer to this question comes from coursework you have completed. You may also initiate this conversation with your academic advisor.</td>
</tr>
<tr>
<td>Determine which member(s) of the biology faculty have research interests most aligned with your interests.</td>
<td>This information can be found by reading the research posters hanging in the Science Building, talking to other students or teachers, or by perusing the department’s web page (<a href="http://web.usca.edu/biology/research/">http://web.usca.edu/biology/research/</a>). Use this information to find the best matches for you.</td>
</tr>
<tr>
<td>Make an appointment to speak with the specific faculty member(s) whose research you find interesting.</td>
<td>This is your opportunity to talk directly about your interests and get a feel for the projects available in the respective faculty member’s lab. As you discuss research projects, be aware that there will be few projects that exactly fit your initial ideas. Instead examine the proposed options broadly to determine those that best fit your interests.</td>
</tr>
<tr>
<td>Limited laboratory space or broad personal interests may require you to meet with multiple faculty members.</td>
<td>The earlier you begin this process the more likely you are to be successful in obtaining a project with the faculty member of your choice.</td>
</tr>
<tr>
<td>Once you have been given a project, it is incumbent on you ensure that all of the proper paperwork has been completed</td>
<td>Research courses require a completed Independent Study contract. The contract must be completed by the research mentor and signed by the student, research mentor, academic advisor, and department chair. The completed form must be taken to the Registrar’s Office to complete the registration process.</td>
</tr>
</tbody>
</table>

Those who successfully complete this process should be able to answer the following questions:

- What are my long-terms goals and how does working in Dr. _____’s laboratory prepare me for this goal?
- What are the most interesting reasons to work in Dr. _____’s laboratory?
- What can I expect to gain from completing a research project with Dr. _____?
The Department offers a Bachelor of Science degree and a Bachelor of Arts degree with informal advisement tracks in Molecular/Cellular Biology, Environmental Science, Pre-Medicine, Pre-Dentistry, Pre-Veterinary Medicine, and General Biology. Graduates with a major in Biology are prepared to enter graduate or professional school or to gain employment that requires a high quality education in a liberal arts and sciences setting. Typical careers chosen by our graduates are those related to medicine and health, the environment, teaching, marine or wildlife resources, and industry.

Students pursuing a traditional biology degree, either B.A. or B.S., may use these advisement tracks to develop a program of study. However, you should refer to your Academic Bulletin for other specific requirements of the Biology major. For example, students pursuing a BS Biology degree must complete Applied Biological Research Design, Implementation, and Analysis (BIOL 499) and Senior Seminar (BIOL 490) as part of their major requirements. Students pursuing a BA Biology degree are required to take BIOL 498.

### Biology advisement tracks beyond the core curriculum

<table>
<thead>
<tr>
<th>General Biology</th>
<th>Environmental Science/Ecology</th>
<th>Pre-Veterinary</th>
<th>Pre-Medical and Dental</th>
<th>Cellular and Molecular Biology</th>
</tr>
</thead>
<tbody>
<tr>
<td>One 300-level</td>
<td>BIOL 316</td>
<td>BIOL 315, 330</td>
<td>BIOL 315</td>
<td>BIOL 315</td>
</tr>
<tr>
<td>Two 500-level</td>
<td>BIOL 320</td>
<td>BIOL 340, 360</td>
<td>BIOL 330</td>
<td>BIOL 330</td>
</tr>
<tr>
<td>Two 300-level or above</td>
<td>BIOL 335</td>
<td>BIOL 365, 366</td>
<td>BIOL 340</td>
<td>BIOL 340</td>
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<tr>
<td></td>
<td>BIOL 336</td>
<td>BIOL 502</td>
<td>BIOL 360</td>
<td>BIOL 360</td>
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<td></td>
<td>BIOL 390</td>
<td>BIOL 541</td>
<td>BIOL 367</td>
<td>BIOL 367</td>
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<td></td>
<td>BIOL 525</td>
<td>BIOL 550</td>
<td>BIOL 502</td>
<td>BIOL 502</td>
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<tr>
<td></td>
<td>BIOL 528</td>
<td></td>
<td>BIOL 541</td>
<td>BIOL 541</td>
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<tr>
<td></td>
<td>BIOL 576</td>
<td></td>
<td>BIOL 550</td>
<td>BIOL 550</td>
</tr>
</tbody>
</table>

1The biology core curriculum consists of BIOL 121, 122, 350, 370, and 490/499 OR 498.

Students pursuing a B.S. Biology degree with a concentration in Environmental Remediation and Restoration (ERR) must follow the specific guidelines for this degree. There are differences between the specific courses required for this degree program and those of the general biology degree program. The ERR Program requirements are shown on page 8 and should be discussed with your academic advisor. Those who choose this option will be advised by the Environmental Remediation and Restoration Program Director, Dr. Michele Harmon. Students who deviate from the program’s requirements will not graduate with the ERR concentration.

The Department of Biology is affiliated with research facilities at the Highlands Biological Field Station at Highlands, NC, the Gerace Research Center at San Salvador, Bahamas, and the Environmental Field Station at the Savannah River Forest Station. Our library resources for Biology are updated yearly and currently hold approximately 40 journal subscriptions and hundreds of books on a wide variety of Biology-related topics. The addition of numerous electronic databases has greatly increased the research journals available for both faculty and students.

### Minor in Biology

Non-Biology majors can choose to support their major by completing a minor in Biology. Prerequisites for courses used toward the minor in Biology are Biological Science I and II. The Biology Minor consists of a minimum of 15 hours at or above the 300 level. We suggest that students seek advice of the Department of Biology and Geology Chairperson regarding specific courses best suited for their major. All courses in the minor must be passed with a C or better.
General Education Requirements

**BIOLOGY DEGREE GENERAL EDUCATION REQUIREMENTS (51-54 hours)**

**A. Human Cultures/Physical and Natural World** .................................................................32-34
At least 3 hours must be in non-western world studies. See Bulletin for list of courses available.
Natural Sciences ...................................................................................................................8
CHEM 111 and 112
History of Civilization ...........................................................................................................3
HIST 101 or 102
Social and Behavioral Sciences (at least two areas) ..........................................................6
Psychology, Sociology, Anthropology, Economics, Political Science, Geography
Languages (two semesters of the same language) ................................................................6-8
Humanities (at least two areas) ...........................................................................................9

**History, Literature, Fine Arts History (Art, Music, Theatre), Foreign Language (200 level and above), Humanities (HSSI acronym), Religion, Philosophy (not logic), Honors (HONS acronym)**

**B. Intellectual and Practical Skills** .................................................................16-17
Critical Inquiry ........................................................................................................................1
English 101 and 102 .............................................................................................................6
Students must complete AEGL 101 and 102 with a grade of C or better to fulfill general education requirements and before taking other English courses.
Oral Communication .........................................................................................................3
COMM 201 or 241
Math/Statistics/Logic .........................................................................................................6-7
(Biology majors must take a minimum of one Calculus course, MATH 122 or 141 (3-4); additional hours to be taken from mathematics/statistics/logic.
Satisfactory completion of Writing Proficiency Requirement.
Satisfactory completion of three courses designated as Writing Intensive, at least one of which is in the student's major.

**C. Personal and Social Responsibility** .................................................................3
American Political Institutions ..........................................................................................3
POLI 201, HIST 201, or HIST 202
Inter-Curricular Enrichment Program (ICE)
Two approved events in each semester of enrollment.

**D. Integrative Learning**
While there are no specific course requirements in this category, students are strongly encouraged to include one or more integrative learning experiences in their academic programs: linked courses, study abroad, internship, service learning, faculty-mentored research, capstone.

PLEASE NOTE THAT OUR DEGREE REQUIRES STUDENTS TO TAKE THE LAST 25 PERCENT OF THEIR COURSEWORK ON THE USCA CAMPUS. THEREFORE, NO TRANSFER CREDITS MAY BE USED IN THE LAST 25 PERCENT OF COURSEWORK BEFORE GRADUATION WITHOUT SPECIAL PERMISSION.

AT LEAST 16 HOURS OF THE BIOLOGY MAJOR REQUIREMENTS MUST BE COMPLETED AT USC AIKEN.
Inter-Curricular Enrichment (ICE) Program

Student participation in the Inter-Curricular Enrichment (ICE) Program is among the requirements for graduation from USC Aiken. Students are required to attend approved events that include lectures, performances, films, concerts, and exhibits. The Inter-Curricular Enrichment (ICE) Program is designed to support USC Aiken’s goal to produce “engaged learners and principled citizens” by broadening students’ cultural and intellectual perspectives.

Requirement: USC Aiken undergraduate students who are admitted in Fall 2009 and thereafter will attend at least 2 ICE events per academic semester up to a total of 16 over their 4-year college career. Students will not be approved to receive their degree until they have met the ICE requirement.

Specific provisions of the program are as follows:

- Undergraduate students admitted in Fall 2009 and thereafter are required to attend at least 2 ICE events per academic semester in order to graduate.
- Transfer students will complete 2 ICE events for each academic semester remaining before graduation.
- Part-time students will complete 2 ICE events for every 15 hours of completed course credit.
- Students admitted to and enrolled in degree programs that are delivered entirely online will be given online options to earn ICE credits.
- Freshman Convocation will constitute the first ICE event for entering freshmen.
- Participation in ICE events will be recorded and monitored for each student.
- The calendar of ICE events will be available online.
- Students participating in university Study Abroad programs may earn 2 ICE credits while overseas by participating in pre-approved inter-curricular academic events.
- On occasion, a student may be granted special permission to receive ICE credit for attendance at an off-campus event if he/she can demonstrate an inability to attend on-campus programs. Any such exceptions must be approved in advance by the Assistant Vice Chancellor for Academic Affairs.
- Students may not miss regularly scheduled classes to participate in an ICE event.
- Students may attend only 2 major-specific events per 30 hours of degree credit.
- Expectations for student behavior are the same at ICE events as in the classroom.

Technological Literacy in Biology
To meet the requirement of computer competency, Biology majors are required to successfully complete BIOL 121 and 122, Introductory Biology I and II; BIOL 350, Fundamental Genetics; BIOL 370, Ecology and Evolution; and BIOL 490, Senior Seminar OR BIOL 498 Research Design, Implementation, and Analysis.

Writing Proficiency Requirement
The Writing Proficiency Portfolio (WPP) requires students to further develop and apply skills and competencies from the composition sequence to other university writing contexts. The WPP consists of three course-related papers, including researched writing, to exemplify the student’s best writing in the English language. Additionally, the student must submit a well-developed Reflective Cover Essay to explain the student’s rationales for the portfolio selections.

Writing Intensive Requirement
Satisfactory completion of three courses designated as Writing Intensive, at least one of which is in the student’s major. A list of currently approved WI courses is available at: http://web.usca.edu/academic-affairs/general-education/writing-intensive.dot.
Bachelor of Science Requirements

Bachelor of Science, Biology Major and Cognate Requirements and Electives

Major Requirements ................................................................................................................... 43-47

Biology 121, 122 ............................................................................................................................ 8
Biology 350, 370 .......................................................................................................................... 8
*These four courses represent the core of the program.

Each of these courses must be passed with a grade of C or better:

Biology 305 - Elementary Biostatistics .................................................................................. 3
Another course at the 300-level ............................................................................................... 4
Two 500-level courses .............................................................................................................. 6-8
Additional courses at the 300-level or above ....................................................................... 7-8

BIOL 399 may be used for up to 3 hours of biology credit.

Maximum of two 598s may be used for biology credit.

Biology or Geology 490 AND Biology or Geology 499 OR Biology 498 ................................. 4
Major elective: one additional geology (not GEOL 201) or 300-level
or above biology course ........................................................................................................ 3-4

Cognate or Minor (courses that support the major) ................................................................ 12-18

B.S. Biology majors must complete one of three cognate concentrations OR minor in another area in the College of Sciences:

OPTION 1. Geology Concentration

Option 1 consists of 12 hours taken from the following:

Three courses taken from the 300-, 400- or 500-level Geology (GEOL) courses

Students pursuing this cognate must first complete GEOL 101.

OPTION 2. Physics/Organic Chemistry Concentration

Physics (201, 202, 211, or 212) ............................................................................................... 4-8

Organic Chemistry (331, 331L, 332, 332L) ........................................................................... 4-8

Option 2 can be satisfied by a combination of physics and organic chemistry;

however, if only one of each is taken, four additional hours may be obtained from
upper level chemistry, computer science, experimental psychology, geology, mathematics,
or statistics.

OPTION 3. Geology/Organic Chemistry Cognate

Environmental Geomorphology (GEOL 401) ................................................................. 4

Organic Chemistry (331 and 331L) ....................................................................................... 4

Additional physical science (geology, chemistry, or physics) ........................................ 4

Minor: Acceptable minors from the College of Sciences include geology, chemistry, mathematics, computer science, and psychology.

Electives ........................................................................................................................................... 1-14

TOTAL HOURS REQUIRED ....................................................................................................... 120

Notes

Students must have a minimum GPA of 2.0 in Biology courses to graduate. In addition, a grade of C or better is required in Biology 121, 122, 350, and 370. No more than one D grade will be accepted in required Biology courses. At least sixteen hours of the Biology Major Requirements must be completed at USC Aiken.

No more than three hours of activity courses may be counted as electives.

Physics 201 and 202 are highly recommended electives and are required for admission into some professional schools.
Bachelor of Science Environmental Remediation and Restoration Program Requirements

Bachelor of Science ERRP, Biology Major and Cognate Requirements and Electives

Major Requirements
- Biology 121, 122 ................................................................. 8
- Biology 335, 370, 390 ......................................................... 12

*BIOL 121, 122, and 370 must be passed with a C or better.

- Biology 305 - Elementary Biostatistics .............................. 3
- Two additional courses at the 300-level or above ..................... 7-8
  (No 598)
- BIOL 576 (Two topics courses) ............................................. 6
- Biology or Geology 490 AND Biology or Geology 499 OR Biology 498 ......................................................... 4
- Major elective: one additional geology (not GEOL 201) or 300-level
  or above biology course ................................................ 3-4

Cognate
- Geology/Organic Chemistry Cognate ................................. 12
  - Upper Level Geology ..................................................... 4
  - Organic Chemistry (331 and 331L) ................................... 4
  - Additional physical science (geology, chemistry, or physics) ... 4

Electives ................................................................. 9-14

TOTAL HOURS REQUIRED ......................................................... 120

Notes
Students must have a minimum GPA of 2.0 in Biology courses to graduate. In addition, a grade of C or better is required in Biology 121, 122, and 370. No more than one D grade will be accepted in required Biology courses. At least sixteen hours of the Biology Major Requirements must be completed at USC Aiken.

No more than three hours of activity courses may be counted as electives.

Physics 201 and 202 are highly recommended electives and are required for admission into some professional schools.
Bachelor of Science Molecular Biology Concentration
Requirements

**Bachelor of Science Molecular Biology, Biology Major and Minor Requirements and electives**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Courses</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major Requirements</strong></td>
<td></td>
<td>47-48</td>
</tr>
<tr>
<td>Biology 121, 122</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Biology 315, 350</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Biology 305 - Elementary Biostatistics</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Biology 330</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Biology 340</td>
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<td>Biology 360</td>
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<td>Biology 502</td>
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<td>3</td>
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<td>Biology 541</td>
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<td>3</td>
</tr>
<tr>
<td>Biology 550</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Biology 490 or Geology 490</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Major elective: 300 or 500-level biology (399 may be used)</td>
<td></td>
<td>3-4</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Courses</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cognate</strong></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Organic Chemistry 331, 331L</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Organic Chemistry 332, 332L</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Physics 201</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td><strong>Electives</strong></td>
<td>6-10</td>
</tr>
<tr>
<td><strong>TOTAL HOURS REQUIRED</strong></td>
<td>120</td>
</tr>
</tbody>
</table>

**Notes**

Students must have a minimum GPA of 2.0 in Biology courses to graduate. In addition, a grade of C or better is required in Biology 121, 122, and 350. No more than one D grade will be accepted in required Biology courses. At least sixteen hours of the Biology Major Requirements must be completed at USC Aiken.

No more than three hours of activity courses may be counted as electives.

Physics 201 and 202 are highly recommended electives and are required for admission into some professional schools.
# Bachelor of Science Clinical Laboratory Science

## Bachelor of Science in Clinical Laboratory Science, Biology Major and Internship Requirements and electives

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major Requirements</strong></td>
<td>40</td>
</tr>
<tr>
<td>Biology 121, 122</td>
<td>8</td>
</tr>
<tr>
<td>Biology 315, 350</td>
<td>8</td>
</tr>
<tr>
<td>Biology 305 - Elementary Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>Biology 330</td>
<td>4</td>
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<td>Biology 340</td>
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<td>Biology 360</td>
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<td>Biology 502</td>
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<td>Biology 541</td>
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<tr>
<td>Biology 550</td>
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<tr>
<td><strong>Cognate</strong></td>
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</tr>
<tr>
<td>Organic Chemistry 331, 331L</td>
<td>4</td>
</tr>
<tr>
<td><strong>Clinical Component</strong></td>
<td>24</td>
</tr>
<tr>
<td>Biology 440</td>
<td>12</td>
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<tr>
<td>Biology 450</td>
<td>12</td>
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<tr>
<td><strong>Electives</strong></td>
<td>0-1</td>
</tr>
<tr>
<td><strong>TOTAL HOURS REQUIRED</strong></td>
<td>120</td>
</tr>
</tbody>
</table>

### Notes

- Students must have a minimum GPA of 2.0 in Biology courses to graduate. In addition, a grade of C or better is required in Biology 121, 122, and 350. No more than one D grade will be accepted in required Biology courses. At least sixteen hours of the Biology Major Requirements must be completed at USC Aiken.
- No more than three hours of activity courses may be counted as electives.

### Beginning Fall 2016

We are offering a new BS degree program in Clinical Laboratory Science (BSCLS). The purpose of this degree is to provide a regional professional program for USC Aiken biology majors who are interested in an Allied Health career in a medical laboratory setting. Clinical laboratory scientists perform, develop, evaluate, correlate and assure accuracy and validity of laboratory information; direct and supervise clinical laboratory resources and operations; and collaborate in the diagnosis and treatment of patients (www.naacls.org). The Bachelor of Science degree in Clinical Laboratory Science at the University of South Carolina Aiken is awarded upon successful completion of the CLS curriculum and includes one year of clinical training, which is delivered in collaboration with the University Health Care System in Augusta, GA. Students may complete the clinical component during their senior year as part of a 3+1 program. Alternatively, a student may elect to complete the Molecular Biology concentration before applying for the year of clinical study (4+1 program).

### Admission into the CLS Program

Students should declare a major in Clinical Laboratory Science (CLS) early in their academic career to assure appropriate advisement. Enrollment in the CLS program is a two-step admission process that includes regular admission to USC Aiken and a separate competitive admission into the CLS clinical component. USC Aiken admission does not guarantee acceptance into the clinical program. Students may apply to the clinical program during their junior year upon successful completion of at least 60 hours in the CLS curriculum and must have a 2.75 or higher cumulative GPA. Space in the clinical component is limited to 12 students per year and participants will be chosen on a competitive basis by the CLS Admission committee.

### Progression and Retention

Students must maintain a 2.75 or higher GPA to remain in the program. Students not meeting the minimum GPA requirement, or those who fail to gain admittance into a clinical program, may choose to complete the BS degree program in our Molecular Biology concentration.
Bachelor of Arts Requirements

BACHELOR OF ARTS, BIOLOGY MAJOR AND MINOR REQUIREMENTS AND ELECTIVES

Major Requirements

43-47

Biology 121, 122 .................................................................................................................................................. 8
Biology 350, 370 .................................................................................................................................................. 8

*These four courses represent the core of the program.
Each of these courses must be passed with a grade of C or better.

Biology 305 - Elementary Biostatistics................................................................. 3
One additional course at the 300-level .................................................................. 4
Two 500-level courses ............................................................................................ 6-8
Two additional courses at the 300-level or above.................................................... 7-8

Biology 399 may be used for major credit,
however only three hours of biology credit can be obtained this way.
Maximum of two 598s may be used for biology credit.

Biology 498 ................................................................................................................................................... 4
Major elective: one additional geology (not GEOL 201) or 300-level
or above biology course ......................................................................................... 3-4

Minor or Cognate

12-18

Requirements are prescribed by the college/school that offers the minor or cognate program. See
Department listings for specific requirements. Courses taken toward the minor or cognate cannot be
counted toward major or general education requirements, with the exception of free electives, which
may count toward the minor or cognate. All courses for the minor must be passed with a grade of C
or better. Students should notify their advisor and the department chair of the minor or cognate that is
selected.

Electives .............................................................................................................................. 1-14

TOTAL HOURS REQUIRED................................................................................................. 120

Notes

Students must have a minimum GPA of 2.0 in Biology courses to graduate. In addition, a grade of C or better is required in Biology 121, 122,
350, and 370. No more than one D grade will be accepted in required Biology courses. At least sixteen hours of the Biology Major Requirements
must be completed at USC Aiken.

No more than three hours of activity courses may be counted as electives.

Physics 201 and 202 are highly recommended electives and are required for admission into some professional schools.
Geology Program General Information

The first three years of course work leading to the Bachelor of Science degree in geology are available at USCA in a program that is coordinated with the Columbia campus. Specific requirements for the geology major are listed in the USC Columbia catalog and are also available from the geology advisor at USCA. Appropriate courses at USCA for the geology major include general education courses; GEOL 101, 102, 311, 325, 331, 335, 336, 398, 401, 425, 431, 500 and 570, 571, and 598; and courses in mathematics, chemistry, and physics.

Cognate in Geology

Those students wishing to complete a cognate in geology should choose from the following: Geology 311, 325, 331, 335, 336, 398, 401, 401L, 431, 500, 570, 571, and 598. Geology 101 (Physical Geology) is the prerequisite for these courses.

Minor in Geology

Majors in other disciplines may choose to support their major by completing a minor in geology. Geology 101 (Physical Geology) is the prerequisite for courses used toward a minor in geology. The Geology Minor consists of a minimum of 15 hours drawn from the following:

- GEOL 102 Historical Geology
- GEOL 311 Paleontology
- GEOL 325 Depositional and Diagenetic Environments
- GEOL 331 Structural Geology
- GEOL 335 Igneous and Metamorphic Environments
- GEOL 336 Introduction to Geophysics
- GEOL 398 Topics in Geology
- GEOL 401 Environmental Geomorphology
- GEOL 425 Coastal Field Geology
- GEOL 431 Southern Appalachian Geology
- GEOL 500 Field Geology
- GEOL 570 Environmental Hydrogeology
- GEOL 571 Environmental Hydrogeology Laboratory
- GEOL 598 Advanced Topics in Geology

All courses in the minor must be passed with a grade of C or better.

Beta Beta Beta Biological Honor Society

The Department of Biology and Geology instituted a new chapter of Tri Beta, a national biological honor society, in 2012 with a charter group of nineteen biology majors. Beta Beta Beta (TriBeta) is dedicated to improving the understanding and appreciation of biological study and extending boundaries of human knowledge through scientific research. Research grants are available by application from the National Office, and the local chapter undertakes appropriate service activities on campus and in the community. Members receive copies of the quarterly journal BIOS, published by the Beta Beta Beta Biological Society in the interests of the Society and for the presentation of articles of general interest to biologists. For further information, contact faculty advisor Dr. Andy Dyer. New members are initiated in the Spring of each year.
Assessment of the Biology Program at USC Aiken

The South Carolina Commission on Higher Education and the Southern Association of Colleges and Schools (that accredits USCA) requires USCA through the Department of Biology and Geology to assess the Biology degree program. Assessment is tied to departmental goals and mission. Departmental faculty effect this assessment comprehensively and systematically. The departmental assessment plan is reviewed by the Faculty Assembly Assessment Committee and the USCA Office of Institutional Research and Assessment.

Here are some ways that Biology students participate in this assessment program:

1) Student assessment is administered in each of the core courses within the major: Biological Science I, Biological Science II, Genetics, Ecology & Evolution, and Senior Seminar. Incoming freshmen are assessed during their initial fall semester in Biological Science I and II using a biology pretest and post test. Research skills and the use of the Scientific Method are assessed in Genetics and Ecology & Evolution. The final program assessment occurs in the senior year, during which students complete the Biology Assessment Exam.

2) Research skills and the use of the Scientific Method are ultimately assessed as part of the Senior Research experience. Upon completion of their research experience, each student is required to present the results of their work at a regularly scheduled departmental seminar and write a brief scientific report that describes some experimental component of their project. Written reports are evaluated by the department's assessment committee. Each oral presentation is evaluated by the student's research mentor and members of the department's assessment committee.

The results of assessment are incorporated in the Annual Program Review and referenced in the narrative/budget requests for the coming year. Your participation is important to highlight strengths of the Biology program as well as areas where we have an opportunity to improve our program.

Adjunct Faculty

Elizabeth Burgess, Ph.D. (2009) in Microbiology, University of Georgia
Teaches BIOL 232 Anatomy and BIOL 250 Microbiology

Carl Hammond-Beyer, M.S. (1989) in Biology, Western Illinois University
Teaches BIOL 122 Biological Sciences II.

Norris L. O'Dell, D.M.D. (1975), Ph.D. (1972), Medical College of Georgia
Teaches BIOL 232 Anatomy.

Pam Steen, Ph.D. (2008) in Biomedical Sciences, Medical College of Georgia.
Teaches BIOL 121 Biological Sciences, BIOL 232 Anatomy, and BIOL 242 Physiology.

Frank Syms, Ph.D. (2002) in Geology, University of South Carolina
Teaches GEOL101 Physical Geology.

Bob Van Pelt, Ph.D. (1990) in Earth and Environmental Sciences, City University of New York
Teaches GEOL 103 Environmental Earth Science.
Biology/Geology Course Descriptions

**Biology (BIOL)**

**BIOL 103 Plant Science. (4)** Plant Science is designed to introduce non-biology majors to science and the scientific method through the concepts of botany. The significance of plants, plant development, physiology, genetics, evolution and ecology will be considered. Three lecture hours and three lab hours per week. This course satisfies the General Education Laboratory Science requirement. Students who earned credit for BIOL 200 may not earn credit for BIOL 103.

**BIOL 104 Human Biology. (4)** Human biology is designed to introduce non-biology majors to science and the scientific method through the concepts of human biology. Topics include an overview of human anatomy and physiology, immunity and disease, cancer biology, and genetics. Three lecture and three laboratory hours per week. This course satisfies the General Education Laboratory Science requirement. Students who earned credit for BIOL 205 may not earn credit for BIOL 104.

**BIOL 105 Genetics and Society. (4)** Genetics and Society is designed to introduce non-biology majors to science and the scientific method through the concepts of genetics. Basic genetic principles emphasizing human heredity and the relevance of recent advances in genetics will be considered. Three lecture and three laboratory hours per week. This course satisfies the General Education Laboratory Science requirement. Students who earned credit for BIOL 206 may not earn credit for BIOL 105.

**BIOL 106 Environmental Life Science. (4)** Environmental Life Science is designed to introduce non-biology majors to science and the scientific method through the concepts of ecology and environmental issues. Although the specific focus of each section may vary, all sections will address the basic biological and ecological principles that govern organismal and environmental interactions. Three lecture hours per week and three laboratory hours per week. This course satisfies the General Education Laboratory Science requirement. Students who earned credit for BIOL 270 may not earn credit for BIOL 106.

**BIOL 121 Biological Science I. (4)** Biological principles and concepts through the cellular level of organization including evolutionary processes. This is one of two required introductory courses for biology majors and students in related disciplines. Three lecture and three laboratory hours per week. Students who earned credit for BIOL 101 may not earn credit for BIOL 121.

**BIOL 122 Biological Science II. (4)** Biological principles and concepts from the tissue through ecosystem levels of organization including evolutionary processes. This is one of two required introductory courses for biology majors and related disciplines. Three lecture and three laboratory hours per week. Students who earned credit for BIOL 102 may not earn credit for BIOL 122.

**BIOL 199 Biological Research I. (2)** (Prereq: Departmental permission, 4 hours of biology credit). An independent study course in which students will write a literature review and proposal for a research project. This course is intended for freshman or sophomore biology majors who have the capability and strong desire to conduct biological research. (May not be used to meet general education requirements or for biology major credit.)

**BIOL 232 Anatomy. (4)** A survey of human anatomy to include the development, histology and gross anatomy of human systems with a laboratory emphasis on gross anatomy. The organizational structure and integration of human systems are stressed. Required of students in exercise science, nursing and pre-pharmacy. Not available for major credit in biology. Three lecture and three laboratory hours per week.

**BIOL 242 Physiology. (4)** (Prereq: BIOL 121 or 122 or 232 and CHEM 101 or CHEM 111) A survey course that encompasses all major organ systems of the human body. All explanations begin at the cellular level and include the biochemical mechanisms at this level. Therefore, a basic understanding of biology and chemistry is required. Knowledge of anatomy is also helpful for successful completion of this course. Required of students in nursing and pre-pharmacy. Not available for major credit in biology. Three lecture and three laboratory hours per week.
BIOL 243  **Human Anatomy and Physiology I. (4)** (Co-req: CHEM 101 or 111) Functional anatomy and physiology of the human body, including basic cellular function, tissue organization, integumentary, skeletal, muscular, and nervous systems. The laboratory will introduce the student to the principles of anatomy and physiology as demonstrated by microscopic studies, animal dissections, and physiological experiments.

BIOL 244  **Human Anatomy and Physiology II (4)** (Prereq: BIOL 243, C or better and CHEM 101 or 111) Functional anatomy and physiology of the human body, including the cardiovascular, respiratory, endocrine, digestive, urinary, and reproductive systems. The laboratory will introduce the student to the principles of anatomy and physiology as demonstrated by microscopic studies, animal dissections, and physiological experiments.

BIOL 250  **Microbiology. (4)** (Prereq: BIOL 242 or 244, C or better or EXSC 223 and CHEM 101 (or CHEM 111) An introduction to bacteria and viruses, emphasizing structure, metabolism, and pathogenesis. Discussion of infectious diseases, antigen-antibody relationships, and anti-microbial agents in chemotherapy. Three lecture and three laboratory hours per semester. Not available for biology major credit.

BIOL 299  **Biological Research II. (3)** (Prereq: Departmental permission, 8 hours of biology credit). An independent study course in which students will implement and complete a research project. Oral and written results required. This course is intended for sophomore or junior biology majors who have the capability and strong desire to conduct biological research. (May not be used to meet general education requirements or for biology major credit.)

BIOL 302  **Cell and Molecular Biology. (4)** (Prereq: BIOL 121 and 122, C or better and CHEM 111, or consent of instructor). Principles of prokaryotic and eukaryotic cell structure, molecular organization, and physiology. Genome organization and expression. Cell growth, division, and cell-cell interactions. Three lecture and three lab hours per week.

BIOL 305  **Elementary Biostatistics. (3)** (Prereq: BIOL 121 and 122, C or better and MATH 108, C or better) An introduction to fundamental statistical methods as they apply to the biological and life sciences. Topics covered include experimental design, descriptive statistics, probability, one and two-sample models for population means, analysis of frequencies, correlation, linear regression, ANOVA, and Monte Carlo approaches to hypothesis testing.

BIOL 315  **Comparative Vertebrate Anatomy. (4)** (Prereq: BIOL 121 and 122, C or better) Phylogenetic and comparative aspects of anatomy and embryology. Three lecture and three laboratory hours per week.

BIOL 316  **Vertebrate Zoology. (4)** (Prereq: BIOL 121 and 122, C or better) Morphology, systematics, evolution, life history, distribution and ecology of vertebrates. Laboratory study will emphasize native species. Field trips and collections required. Three lecture and three laboratory hours per week.

BIOL 320  **Principles of Botany. (4)** (Prereq: BIOL 121 and 122, C or better) A survey of extant plant phyla including structure, physiology, development, evolution, and ecology. Three lecture and three laboratory hours per week.

BIOL 325  **Plant Physiology. (4)** (Prereq: BIOL 121 and 122, C or better; pre- or coreq CHEM 112) Principles of plant physiology with an emphasis on higher plants. Topics include: water balance, mineral nutrition, and growth and developmental responses to hormones, light, and stress. Three lecture and three laboratory hours per week.

BIOL 330  **Fundamentals of Microbiology. (4)** (Prereq: BIOL 121 and 122, C or better and CHEM 111) An introduction to the Bacterial and Archeal Domains, emphasizing phylogenetics, metabolic diversity, genetic regulation and physiological activities. Discussion of signal transduction pathways, genetic transfer mechanisms, symbiosis and the ecological significance of these processes. Three lecture hours and three laboratory hours per week.

BIOL 335  **Microbial Ecology. (4)** (Prereq: BIOL 330 or 370, C or better or departmental permission) Microbial Ecology will introduce students to ecological principles as they apply to microorganisms, as well as evolution, biochemical communication, and other factors related to how microorganisms adjust and modify their environment. Examples of symbiosis and other evolutionary mechanisms will be considered in the context of infectious disease. Three lecture hours and three laboratory hours per week.
BIOL 336  **Biology of Fishes (4)** (Prereq: BIOL 121 and 122, C or better) Overview of the biology, evolution, ecology, and conservation of fishes including aspects of systematics, distribution, morphology, life history, and behavior with special emphasis on freshwater and marine species of the Southeastern U.S. Field trips and collections required. Three lecture and three laboratory hours per week.

BIOL 340  **Virology. (4)** (Prereq: BIOL 121 and 122, C or better) Basic virological concepts including viral diseases, virus-cell interactions, and patterns of viral replication. The course will primarily cover those viruses involved in human disease. Three lecture and three laboratory hours per week.

BIOL 350  **Fundamental Genetics I. (4)** (Prereq: BIOL 121 and 122, C or better) Principles of transmission and molecular genetics; quantitative inheritance; recombination; biochemical aspects of gene function and regulation; developmental and population genetics. Examples drawn from microorganisms, plants, animals and man. Three lecture and three laboratory hours per week.

BIOL 360  **Animal Physiology. (4)** (Prereq: BIOL 121 and 122, C or better and CHEM 111) Cellular, systemic and organismal principles with a significant emphasis upon comparative aspects of animal physiology. Three lecture and three laboratory hours per week.

BIOL 365  **Animal Nutrition. (3)** (Prereq: BIOL 121, 122, C or better) Basic concepts of companion animal nutrition including a survey of the primary macromolecules, vitamins and minerals; comparative anatomy and physiology of metabolic, digestive and urinary systems; analysis and comparison of commercially available feeds; nutrient requirements for specific animal species and life stages. Three lecture hours per week.

BIOL 366  **Animal Behavior. (4)** (Prereq: BIOL 121, 122, C or better or departmental permission) An introduction to the mechanistic and evolutionary components of animal behavior including the nervous system, sensory systems, hormones and genetics as well as a survey of general behaviors such as habitat selection, feeding, mating, communication and aggression. One Saturday field trip required. Three lecture and three laboratory hours per week.

BIOL 367  **Neurobiology (4)** (Prereq: BIOL 121 and 122, C or better or departmental permission) An introduction to the structure and function of the human nervous system to include basic neuroanatomy, neurophysiology and interaction/ cooperation between the nervous, sensory, muscle and endocrine systems. Emphasis will be placed on cellular processes and communication. The lab will focus on brain dissection and electrophysiological demonstrations/ student designed experiments. Three lecture and three lab hours per week.

BIOL 370  **Ecology and Evolution. (4)** (Prereq: BIOL 121 and 122, C or better and MATH 111 or above) Introduction to theory of ecological interactions, population biology, evolutionary processes, and adaptive strategies of organisms. Three lecture and three laboratory hours per week.

BIOL 381  **Tropical Marine Biology. (3)** (Prereq: BIOL 370, C or better or departmental permission) The objective of this course is to provide an overview of tropical marine ecosystems and their biological communities with a special focus on coral reefs and coral reef organisms. There will be a strong emphasis on systematics, taxonomy, and the ecology of dominant taxa and species. Each day will consist of lectures and trips to the field. A large portion of the time in the field will be spent snorkeling on near-shore patch reefs and surveying coSTATT and inland environments. Course is taught at a field station in the tropics. Special permission required. Additional fees assessed for travel and field station use. Students may count only BIOL 381 or BIOL 575 Topics in Ecology: Ecology of the Bahamas for major credit in Biology. Students who earned credit for BIOL 581 may not earn credit for BIOL 381.

BIOL 390  **Environmental Science and Human Health. (4)** (Prereq: BIOL 121 and 122, C or better and CHEM 111) A focus on the interactions between humans and the environment. Course provides information on environmental quality and the impact of environmental degradation on human health, wildlife, and other bioreceptors in aquatic and terrestrial ecosystems. The course will address environmental stressors and pollution, their sources in the environment, their modes of transport and transformation, and their ecological and human health effects. Three lecture and three laboratory hours per week.

BIOL 399  **Biological Research III. (3)** (Prereq: Departmental permission and 12 hours of biology credit) An independent study course in which students will propose and complete a research project. This course is intended for junior
or senior biology majors. In order to successfully complete this course students must: actively participate in lab or field activities (to include regular meetings with their mentor), produce a written or oral report of results, and prepare a formal proposal for their Senior Research project (unless taken after completion of the Senior Research requirement). This course may be repeated for a maximum of 6 hours of credit, three of which may be used towards the biology major. Contract required.

BIOL 440 Medical Technology Internship I. (12) (Prereq: Completion of 3-year academic portion of CLS degree; admission into CLS program) A 24-week didactic internship in collaboration with the University Health Care System.

BIOL 450 Medical Technology Internship II. (12) (Prereq: Completion of 3-year academic portion of CLS degree; admission into CLS program) A 24-week didactic internship in collaboration with the University Health Care System.

BIOL 490 Senior Seminar (1) (Prereq: Senior Status; Coreq: BIOL 499) A seminar series designed to introduce students to current research in biology and geology through weekly seminars by faculty, visiting scientists, and USCa biology majors. This course must be taken as a co-requisite with the biology capstone course, BIOL 499. Students enrolled in Senior Seminar will be expected to pose a question of scientific significance and prepare a research proposal describing an appropriate experimental design to answer the question. Research proposals will be evaluated based on the student’s ability to discuss the question, propose pertinent experiments to test the question, and to make proper use of the scientific literature. The course will culminate in student oral presentations of work conducted in the capstone course.

BIOL 498 Research Design, Implementation, and Analysis. (4) (Prereq: Senior status) A capstone experience designed to provide a comprehensive overview of the methodologies of biological research with emphasis on hypothesis formation, experimental design, data analysis, and interpretation through reviews of the scientific literature. Students will learn and practice techniques for data calculation, analysis, and presentation. Class times will also be dedicated to the development of the skills necessary to present scientific results to a wider audience through discussion of techniques observed in the departmental seminars. Three lecture hours per week and attendance at Friday departmental seminars.

BIOL 499 Applied Biological Research Design, Implementation, and Analysis. (3) (Prereq: departmental permission and senior status; Coreq: BIOL 490 or GEOL 490). A capstone experience involving independent scientific research. Students will work directly with a faculty mentor to pose a question of biological significance, write a proposal specifying research expectations, develop an experimental procedure, and collect and evaluate data. Students are required to present their data in both written and oral form. Ten laboratory hours per week. Research topic should be approved one semester prior to enrollment. Must be taken during the same semester of enrollment in BIOL 490 or GEOL 490.

BIOL 502 Advanced Cell/Molecular Biology. (3) (Prereq: BIOL 350 or 360, C or better or departmental permission). A discussion of eukaryotic cell function associated with gene expression, protein processing, and signal transduction. Major topics include DNA replication and repair, eukaryotic gene structure and expression, RNA synthesis and processing, protein synthesis and processing, and cell signaling. Three lecture hours per week.

BIOL 510 Developmental Biology. (4) (Prereq: BIOL 350) Introduction to the cellular, genetic, molecular, and morphological processes underlying development of invertebrates and vertebrates from gamete production through zygote, embryological, and fetal stages. The course will also explore processes of organ formation, metamorphosis, and post-natal regeneration. The lab component involves experimental manipulation of a range of embryonic organisms. The course will include an independent project using zebrafish embryos which will involve data collection, and will culminate in a written report with an oral presentation. Three lecture and three laboratory hours per week.

BIOL 516 Herpetology. (4) (Prereq: BIOL 316, C or better or Departmental permission) Systematics, distribution, morphology, life history, behavior, ecology and current literature of amphibians and reptiles with special emphasis on South Carolina species. Field trips and collections required. Three lecture and three laboratory hours per week.

BIOL 525 Conservation Biology. (3) (Prereq: BIOL 370, C or better or departmental permission) This course is designed to introduce students to the ways in which principles of the natural sciences and social issues are synthesized into conservation biology. During the course we will discuss how conservation biology can be used to conserve
and protect biological diversity. The focus will be primarily on the biological issues, within the context of social, legal, or political considerations through which conservation programs are implemented. The intent of this course is to demonstrate how the tools of natural scientists like biologists, ecologists, and systematists can be applied to the solution of some practical problems in conservation biology.

BIOL 528 Seasonal Flora. (4) (Prereq: BIOL 320, C or better or departmental permission) Introduction to vascular plant systematics with emphasis on field identification and collection of flora native to South Carolina. Will concentrate on the prevailing flora at the time of the year the course is taught. Seasonal Flora is normally offered in Maymester.

BIOL 531 Parasitology. (4) (Prereq: BIOL 370, C or better) A survey of the major parasite taxa, the evolutionary relationships among them, and the ecological and evolutionary consequences of utilizing other organisms as habitat. The laboratory portion of the course focuses on the collection, preservation, and identification of parasitic organisms, culminating in development of a parasite collection by each student. Field trips required. Three lecture and three laboratory hours per week.

BIOL 540 Cancer Biology. (3) (Prereq: BIOL 350 or BIOL 360, C or better or departmental permission) Regulation and events involved in signal transduction, cell division, and oncogenesis. These mechanisms underlie current understanding of the onset and maintenance of cancer in humans. Three lecture hours per week.

BIOL 541 Principles of Biochemistry. (3) (Prereq: CHEM 331 and BIOL 121, C or better or departmental permission) A survey of the fundamental principles of biochemistry. The topics covered include: cellular chemistry, amino acid structure and chemistry, protein structure, carbohydrate chemistry, enzyme kinetics and enzyme inhibition. Three lecture hours per week.

BIOL 542 Principles of Biochemistry II. (3) (Prereq: BIOL 541, C or better or departmental permission) Advanced principles of biochemistry including specific enzymatic mechanisms (e.g., dehydrogenases, kinases, carboxylases), biochemical regulation (e.g., function of dinucleotides, metals, and other coenzymes, specific feedback mechanisms, induction of enzyme activity), and electron transport (e.g., diversity of electron donors involved in electron transfer mechanisms). Three lecture hours per week.

BIOL 550 Immunology. (3) (Prereq: BIOL 350 or 360, C or better or departmental permission) Basic immunological concepts including hematopoiesis; immunoglobulin structure, function, and genetics; antigen processing and presentation; cellular immunology; hypersensitivity; immune responses to disease; and vaccines. Three lecture hours per week.

BIOL 560 Aquatic Biology. (4) (Prereq: BIOL 370, C or better) An examination of the physical and chemical characteristics of freshwater habitats and the ecology of freshwater organisms. The laboratory portion of the course will focus on collection of aquatic organisms and quantification of relevant habitat characteristics. Field trips required. Three lecture and three laboratory hours per week.

BIOL 570 Principles of Ecology. (4) (Prereq: BIOL 370, C or better and statistics) Interactions between organisms and the environment; ecosystem structure and function; sampling techniques and data analysis. Three lecture and three laboratory hours per week.

BIOL 575 Topics in Ecology. (3-4) (Prereq: BIOL 370, C or better). Any of the courses listed below are offered only if student interest is sufficient. Courses are not part of the Department’s standard course sequence. Courses include Ecology of the Bahamas, Ecology of the Southern Appalachians, Forest Ecology, Marine Ecology, and Wetlands Ecology. Students may count only BIOL 380 or BIOL 575 Topics in Ecology: Ecology of the Bahamas for major credit in Biology. Credit awarded for successful completion is dependent on the course offered: four credit hours accompany courses with a laboratory component.

BIOL 576 Topics in Environmental Science (3) (Prereq: BIOL 390, C or better or departmental permission) Selected topics in environmental science; courses are intended to provide specific instructions/training in the areas of environmental remediation and restoration. Topics include Environmental Remediation, Toxicology and Risk Assessment, Restoration Ecology, and other topics not covered in existing courses. Three lecture hours per week.
BIOL 583  Pathology of Coastal Organisms. (3) (Prereq: BIOL 330, C or better or departmental permission) Course will be concerned with known and suspected coastal invertebrate diseases. Emphasis will be placed on techniques involved with the identification, pathogenesis, microbiology, and ecology of the pathogens, and the ecological significance of stress and disease occurrence. Particular consideration will be given to diseases of coral reef organisms. Basic principles regarding coral reef biology and marine microbiology also will be covered. Course will consist of lectures, field trips, and evening laboratories. Course will be taught at a field station in the tropics. Special permission required. Additional fees assessed for travel and by the field station.

BIOL 598  Special Topics: (Biology). (3-4) (Prereq: BIOL 121 and 122, C or better or departmental permission) A lecture course in advanced biological science not covered in detail in existing courses. Courses for three credit hours will meet for three lecture hours each week. Those courses for four credit hours will meet for three lecture and three laboratory hours each week.

Geology (GEOL)

GEOL 101  Physical Geology. (4) The study of the earth's surface and internal processes and resulting rock products. Plate tectonics and the rock cycle will be used as integrating paradigms for observations of current distribution of rock products. Three lectures and three laboratory hours per week.

GEOL 102  Historical Geology. (4) The interpretation of earth's history and the history of life through time by application of the principle of uniformitarianism and the laws of stratigraphy. Attention is focused on changes in atmosphere, climate, biosphere, and tectonic style over time. Three lectures and three laboratory hours per week.

GEOL 103  Environmental Earth Science. (4) Analysis of the basic energy cycles of the earth. The interaction of human activity with earth processes to affect the environment. Three lectures and three laboratory hours per week.

GEOL 199  Geological Research I. (1-2) (Prereq: Consent of Instructor, 4 hours geology credit) An independent study course in which students will conduct a literature review and write a proposal for a research project or conduct a preliminary research project. This course is intended for freshman or sophomore students interested in geological research. GEOL 199 may be repeated for a maximum of 4 credits. Contract required.

GEOL 201  Integrated Earth Science. (4) A survey of major earth systems. Internal geologic processes; surface geologic processes; geologic time; atmosphere, weather and climate; ocean circulation patterns; the earth in the context of the solar system and the universe. Not intended for students who major in the sciences. Three lecture and three laboratory hours per week.

GEOL 299  Geological Research II. (1-2) (Prereq: Consent of Instructor, 8 hours geology credit) An independent study course in which students will propose and complete a research project. This course is intended for sophomore or junior students interested in geological research. In order to successfully complete this course students must actively participate in lab, field activities (to include regular meetings with their mentor) and produce a written or oral report of results. This course may be repeated for a maximum of 4 credits. Contract required.

GEOL 311  Paleontology. (4) (Prereq: GEOL 101, or BIOL 121, C or better or departmental permission) Descriptive environmental biogeographic and evolutionary aspects of paleontology, using examples from the major groups of fossils. Three hour lecture, three hour laboratory each week. Field trips.

GEOL 325  Depositional and Diagenetic Environments. (4) (Prereq: GEOL 101, C or better) A survey of the mineralogy and petrology, spatial and temporal frameworks and sequence stratigraphy of sedimentary environments emphasizing sedimentary basins. Includes coverage of deposition and diagenesis: cements, mineralization, and the development of porosity and permeability. 3 lecture and 3 laboratory hours per week. Required field trips.

GEOL 331  Structural Geology. (4) (Prereq: GEOL 101 and MATH 122 or MATH 141, C or better) Deformation of the earth, stress, strain, elastic behavior, brittle and ductile deformation, geology and mechanics of simple geologic structures, selected orogenic belts. Three hour lecture and three laboratory hours per week. Occasional field trips.

GEOL 335  Igneous and Metamorphic Environments. (4) (Prereq: GEOL 101, CHEM 111, C or better) A survey of the mineralogy and petrology of igneous and metamorphic rocks emphasizing plate tectonic settings. The temporal
and spatial frameworks of metamorphic and igneous activity at plate margins will be covered as well as crystal
chemistry, magma genesis, and P-T-t paths. 3 lecture and 3 laboratory hours per week. Required field trips.

GEOL 336  Introduction to Geophysics. (4) (Prereq: MATH 142, GEOL 101, and PHYS 201 or PHYS 211, C or better)
Structure and dynamics of the solid earth; fundamentals of plate tectonics, geodesy, gravity, seismology, geo-
chronology, and thermal studies. Includes laboratory.

GEOL 363  Geographic Information Systems (GIS) in the Sciences. (4) (Prereq: GEOL 101 or GEOL 401, C or better
AND completion of the first (free) modules of on-line courses in “Understanding Map Projections and Coordi-
nate Systems” & “Understanding Geographic Data” at www.esri.com) Introduction to geographic data, and its
use in an ArcGIS software environment. Topics include map projections and coordinate systems, spatial data
creation and collection methods, relational database design, GIS data management, personal geodatabases, the
use of domains and subtypes, topology rules, spatial analysis, surface modeling and predictive modeling, case
studies using GIS as a decision-making tool.

GEOL 398  Topics in Geology (1-4) (Departmental permission) Selected topics in the Geological Sciences. Laboratory and
field experiences may be included where appropriate.

GEOL 399  Independent Study. (1-4) (Prereq: Departmental permission).

GEOL 401  Environmental Geomorphology. (4) (Prereq: GEOL 101 or GEOL 103 or GEOL 201, C or better) Analysis
of the processes that create land forms at outcrop, map, and regional scales in a plate tectonic context. Applica-
tion of inductive reasoning to the interpretation of geomorphic features. Lab emphasizes basic principles of
mapmaking in the field. Required field trips in addition to the listed lab time will be posted in the “Schedule of
Classes” available during pre-registration.

GEOL 431  Southern Appalachian Geology. (4) (Prereq: GEOL 101, C or better) The stratigraphic, structural, magmatic,
and metamorphic features of the Southern Appalachian origin, studied through the readings in the literature and
outcrop observation. Requires one weekend field trip and a five day field trip over Spring Break. Special Fee
assessed at registration covers lodging and transportation on the trips.

GEOL 490  Senior Seminar. (1) (Prereq: Senior status; Coreq: BIOL 499) A seminar series designed to introduce students
to current research in biology and geology through weekly seminars by faculty, visiting scientists, and USCA bi-
ology majors. This course must be taken as a co-requisite with the biology capstone course, BIOL 499. Students
enrolled in Senior Seminar will be expected to pose a question of scientific significance and prepare a research
proposal describing an appropriate experimental design to answer the question. Research proposals will be
evaluated based on the student’s ability to discuss the question, propose pertinent experiments to test the ques-
tion, and to make proper use of the scientific literature. The course will culminate in student oral presentations
of work conducted in the capstone course.

GEOL 499  Geology Capstone. (3) (Prereq: Consent of Instructor, 12 hours geology credit; Coreq: BIOL or GEOL 490) A capstone experience designed to introduce students to the planning and execution of research and the pre-
sentation of research findings. Students will work directly with a faculty member to develop and carry out a
research project of geological significance. Enrollment in this course requires an independent study contract.
GEOL 499 is specifically designed for those who show an aptitude and a desire to conduct geological research.
Minimum time requirement: one conference and five laboratory or field hours per week.

GEOL 500  Field Geology. (6) (Prereq: 16 hours in geology, not including GEOL 103, or 201, C or better; departmental
permission) Geologic field techniques including the use of field instruments and preparation of geologic maps
and cross sections. Supervised geologic investigations of a local area. Written final report required.

GEOL 570  Environmental Hydrogeology. (3) (Prereq: GEOL 101, C or better and MATH 122 or MATH 141 or depart-
mental permission) Environmental consideration of the hydrologic cycle, occurrence and movement of ground
water, aquifer analysis and water well emplacement and construction. Water quality, pollution parameters, and
the geochemistry of selected natural water systems. The effects of environmental problems, waste disposal, and
water development upon the aqueous geochemical regime. Occasional field trips. (Laboratory GEOL 571 is
optional).
Biology/Geology Faculty

April DeLaurier, Ph.D. (2003) in Biochemistry, University College London. Dr. DeLaurier is a developmental biologist who studies skeletal formation in zebrafish. Her research uses genetic manipulation and live cell imaging to understand the genes and cellular mechanisms that pattern the craniofacial skeleton. She teaches 121 Biological Science I and 315 Comparative Vertebrate Anatomy.

Allen Dennis, Ph.D. (1989) in Geology, University of South Carolina. Holder of the SCANA Professorship Chair of Physical Sciences. Dr. Dennis conducts research on mountain building processes. He teaches 101 Physical Geology; 102 Historical Geology and 431 Southern Appalachian Geology. Advises Geology students.

Andrew Dyer, Ph.D. (1996) in Plant Ecology, University of California, Davis. Dr. Dyer's research interests are in population and community ecology, invasive species ecology, and habitat restoration. His current research focuses on population biology of invasive grasses, including competitive ability and germination traits. He teaches 122 Biological Science II; 320 Botany; 370 Ecology and Evolution; and 570 Principles of Ecology. Advises Biology students interested in ecology.

Kelly Gibson, Ph.D. (2012) in Marine Geology and Geophysics, University of Miami. Dr. Gibson's research interests are in reconstruction of abrupt changes in climate and the nutrient and hydrologic cycles from marine sediments and isotope geochemistry and the role of the tropics in the global climate system. She teaches 103 Environmental Earth Science and 201 Integrated Earth Science.

C. Nathan Hancock, Ph.D. (2005) in Biochemistry, University of Missouri-Columbia. Dr. Hancock is a plant biologist interested in the genes that control agronomic traits. His research focuses on using a transposable element from rice to discover gene functions. He teaches 121 Biological Science; 325 Plant Physiology and 541 Biochemistry. Advises biology majors.


Michele Harmon, Ph.D. (2003) in Environmental Health Sciences, University of South Carolina. Dr. Harmon's research interests include aquatic toxicology, environmental fate and transport of metals, and wetland biochemistry. She teaches 106 Environmental Life Science, 390 Environmental Science and Human Health, 576 Topics in Environmental Science. Directs the Environmental Restoration and Remediation Program.

William Jackson (Department Chair), Ph.D. (1995) in Immunology, Medical College of Georgia. Dr. Jackson’s experience is in the use of viral vectors as delivery vehicles of therapeutic genes. He conducts research on the use of anti-HIV ribozymes as a means of inhibiting viral replication. He teaches 340 Virology; 350 Genetics; 550 Immunology; and 502 Advanced Cell/Molecular Biology. Advises Biology and Pre-medicine majors.

Suchreet Mander, Ph.D. (2013) in Cellular Biology and Anatomy, Georgia Regents University. Dr. Mander teaches 243 and 244 Anatomy & Physiology I and II.


Kristina Ramstad, Ph.D. (2006) in Organismal Biology and Ecology, University of Montana, Missoula. Dr Ramstad's work draws on genomic sequencing and field based ecological studies to address fundamental questions in the evolution, ecology and demography of at-risk species. She is particularly interested in the impacts of genetic bottleneck effects and inbreeding on population persistence, the effects of mating system on genetic variation, and applied conservation management, and has worked with a broad array of taxa, including salmon, tuatara, and kiwi. She teaches 122 Biological Sciences II and 316 Vertebrate Zoology.

Bradley Reinhart, M.S. (2003) in Environmental Toxicology, University of Georgia. Mr. Reinhart serves as the department's lab manager and teaches labs for 106 Environmental Life Science and 121 and 122 Biological Science. Advises Biology majors.
Harry E. Shealy, Ph.D. (1972) in Biology, University of South Carolina. Distinguished Professor Emeritus.

Virginia Shervette, Ph.D. (2006) in Wildlife and Fisheries Sciences, Texas A&M University. Research in the Fish/Fisheries Conservation Lab examines ecosystem, community, and species responses to anthropogenic impacts in aquatic systems along the watershed gradient including freshwater, estuarine, and marine environments. We also investigate issues relating to human dimensions of fisheries management including benefits and risks associated with fish and other seafood consumption. Dr. Shervette teaches 122 Biological Science II, 336 Biology of Fishes, and 576 Topics in Environmental Science. Advises students in the Environmental Restoration and Remediation Program.

Garriet Smith, Ph.D. (1981) in Microbiology, Clemson University. Dr. Smith conducts research on microbial ecology of coSTATI marine and freshwater ecosystems. He teaches 250 Microbiology, 330 Fundamentals of Microbiology; 335 Microbial Ecology and 583 Pathology of Coastal Organisms. Advises Pre-veterinary medicine and Biology majors.

John Spooner, Ph.D. (1964) in Entomology, University of Florida. Distinguished Professor Emeritus.

Jessica Sullivan, Ph.D. (2015) in Geological Science, University of South Carolina. Dr. Sullivan's research focuses on understanding the interactions between process and form in coastal wetland ecosystems. She teaches 103 Environmental Earth Science, 201 Integrated Earth Science, 401 Geomorphology.


John Westbrook, Ph.D. (1972) in Zoology, University of Georgia. Distinguished Professor Emeritus.

Karin Willoughby, M.A. (1975) in Geology, Virginia Polytechnic and State University. Sr. Instructor, retired.


Derek Zelmer, Ph.D. (1998) in Biology, Wake Forest University. Dr. Zelmer's research is in among-scale interactions of population and community processes in aquatic systems, determinants of parasite community structure in aquatic vertebrates, and transmission dynamics of parasites in lotic ecosystems. He teaches 122 Biological Science, 370 Ecology and Evolution, 531 Parasitology, and 560 Aquatic Biology. Advises Biology majors.
Standard Operating Procedures

I. General Procedures

A. Meet and talk with your advisor.

B. Begin English and Mathematics requirements during first semester. Be aware of and plan to complete General Education requirements in the first 60 hours. (See Advisement Worksheet, pages 23-4.)

C. Biology 121, 122, should be completed by the end of your sophomore year, typically after your freshman year. *When arranging your schedule each semester, schedule lab classes, pre-requisite classes and classes offered less frequently than every semester (see D) first.*

D. Course rotation effective 2013-2017

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<td>BIOL 550</td>
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* Note this rotation is tentative and for planning purposes only. The scheduling of particular courses depends on staffing, student interest and enrollment considerations. Courses not listed may be offered at least two academic terms a year (e.g., 106, 121, 122, 232, 242, 250) or based on faculty interest and student demand.

E. Biology 199, 299, 399, and 499 are courses designed to develop your skills in analytical thinking, decision making, leadership and responsibility. These courses will require you to review scientific literature, design and conduct research projects and present results in both written and oral forms. Your project must be planned in advance with your advisor and have departmental approval before you can register for these courses.
**Possible Program of Study to Complete B.S. or B.A., Biology in 3 years**

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<tr>
<th>Summer I (16 hrs †)</th>
<th>Fall I (17 hrs)</th>
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<tr>
<td>BIOL 122</td>
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<th>Spring I (14 hrs)</th>
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<tr>
<td>BIOL 350 (390 for ERRP)</td>
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<tr>
<td>CHEM 111</td>
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<tr>
<td>HIST 10</td>
<td>POLI 201 (or HIST 201 or 202)</td>
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<td>BIOL 305</td>
<td>Hum or SS</td>
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<th>Fall II (submit writing portfolio) (13-15 hrs)</th>
<th>Spring II (13-16 hrs)</th>
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<td>BIOL 3/5 _ _ _</td>
<td>BIOL 3/5 _ _ _ (BIOL 335 for ERRP)</td>
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<td>COMM (201, 241) _ _ _</td>
<td>BIOL 5 _ _ (BIOL 576 for ERRP)</td>
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<td>Cognate or Minor° _ _ _</td>
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<th>Fall III (12-15 hrs)</th>
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<td>elective _ _ _</td>
<td>elective _ _ _</td>
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- BIOL 121 and BIOL 122 can be taken in either order.
- BIOL 121, 122, 350, 370 must all be passed at a level of C or better.
- It is highly recommended to take the math placement test to avoid spending an elective on MATH 108. A score of 4 on the Math Placement Test places a student into MATH 122, or STAT 201. A score of 5B on the Math Placement Test places a student out of MATH 111.
- LIFE scholarship requires 30 credit hours/year. It is the responsibility of a LIFE scholar to ensure that 30 hours are accumulated over the course of a year. Activities courses (e.g. swimming, aerobics, tennis, CPR) are one way to accumulate these credits.
- 120 credit hours required for graduation.
- B.S. Students must complete a cognate (at least 12 hours) or a minor in another discipline from the College of Sciences. At least eight hours of cognate is drawn from CHEM 331/332, PHYS 201/202, or PHYS 211/212. Any other remaining hours would be drawn from appropriate courses in the College of Math and Sciences. Another option for B.S. students is to take 12 hours of upper level Geology courses for the cognate or a combination of geology and organic chemistry.
- Acceptable Humanities and Social Studies courses are listed in your 2013-2014 Academic Bulletin. At least three hours must be in non-Western world studies. A listing of acceptable courses can be found in your 2013-2014 Academic Bulletin and on the back of the advisement worksheet.
Advisement Form—B.S. or B.A. in Biology

Name:_______________________________________ Date of Entry:____________________ VIP ID:_____________________

Advisor:_______________________________ Bulletin of Choice:______________

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<tr>
<th>GENERAL EDUCATION:</th>
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<th>MAJOR REQUIREMENTS</th>
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*Three hours from Social & Behavioral Science or Humanities must be in Non-Western Studies

☐ Non-Western requirement (3 hours)  
☐ ICE Requirement Completed

☐ Writing Proficiency: Date Completed__________ Score______
☐ Writing Intensive Crs.  1. ____________________________
  (Prereq ENGL A101/102)  2. ____________________________
  (One in Major)  3. ____________________________

TOTAL HOURS (120 required for graduation) _______

Effective Fall 2015
Advisement Form—B.S. in Biology—Environmental Remediation & Restoration

Name:__________________________ Date of Entry:______________ VIP ID:____________________

Advisor:________________________ Bulletin of Choice:______________

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*Three hours from Social & Behavioral Science or Humanities must be in Non-Western Studies

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**ADDITIONAL REQUIREMENTS**

| BIOL A305—Elem. Biostatistics | 3 |
| BIOL A3 | 4 |
| BIOL A3 | 3-4 |
| BIOL A576__ | 3 |
| BIOL A576__ | 3 |
| (Add’l GEOL or 3/5 level BIOL) | 3-4 |
| BIOL/GEOL A490– Senior Seminar | 1 |
| BIOL A499 | 3 |

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</table>

Non-Western requirement (3 hours)
ICE Requirement Completed
Writing Proficiency: Date Completed_____ Score_____
Writing Intensive Crs. 1. (Prereq ENGL A101/102)2. (One in Major) 3. _____________
Advisement Form—B.S. Concentration in Molecular Biology

Name: ___________________________ Date of Entry: ________________ ID#: __________________

Advisor: __________________________ Bulletin Year: ________________

<table>
<thead>
<tr>
<th>GENERAL EDUCATION:</th>
<th>51-54 Hours</th>
<th>MAJOR REQUIREMENTS</th>
<th>47-48 Hours</th>
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<tbody>
<tr>
<td>NATURAL SCIENCES</td>
<td></td>
<td>Core Requirements (16 hours)</td>
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</tr>
<tr>
<td>CHEM A111—General Chemistry I</td>
<td>4</td>
<td>BIOL A121—Biological Science I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM A112—General Chemistry II</td>
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<td>BIOL A122—Biological Science II</td>
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<td>HISTORY OF CIVILIZATION (HIST A101 or A102)</td>
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<td>BIOL A350—Fundamental Genetics</td>
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<td>HIST A10 _</td>
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<td>BIOL A315—Comparative Vert Anatomy</td>
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<tr>
<td>SOCIAL AND BEHAVIORAL SCIENCES (6 hrs—2 areas)*</td>
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<td>ADDITIONAL REQUIREMENTS</td>
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<tr>
<td></td>
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<td>BIOL 305—Elementary Biostatistics</td>
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<td>BIOL A330—Microbiology</td>
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<td>BIOL A340—Virology</td>
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<td>BIOL A360—Animal Physiology</td>
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<td>BIOL A502-Eukaryotic Cell/Molec Biol</td>
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<td>BIOL A541—Biochemistry I</td>
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<td>FOREIGN LANGUAGE (6-8 hrs—same language)</td>
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<td>BIOL A550—Immunology</td>
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<td>BIOL/GEOL 490—Senior Seminar</td>
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<td>BIOL A499—Applied Biological Research</td>
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<td>Major elective (300 or 500 level biology)</td>
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<td>HUMANITIES (9 hrs—two different areas)*</td>
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<td>CRITICAL INQUIRY</td>
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<td>AFCI 101 (Required for freshmen only)</td>
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<td>ENGL A101</td>
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<td>ENGL A102</td>
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<td>ORAL COMMUNICATION (COMM A201 or A241)</td>
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<td>ORAL COMMUNICATION (COMM A201 or A241)</td>
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<td>COMM A ____</td>
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<td>MATHEMATICS (6-7 hrs—MATH A122 or A141 required)</td>
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<td>MATHEMATICS (6-7 hrs—MATH A122 or A141 required)</td>
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<td>MATH A122 (placement or MATH A108)</td>
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<td>MATH A141 (placement or MATH A111/112)</td>
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<td>Additional hours to be taken from math/statistics/logic</td>
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<tr>
<td>AMERICAN POLITICAL INSTITUTIONS (POLI A201, HIST A201 or HIST A202)</td>
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</table>

*Three hours from Social & Behavioral Science or Humanities must be in Non-Western Studies

☐ Non-Western requirement (3 hours)
☐ ICE Requirement Completed

☐ Cognate

☐ Electives (6-10 hours)

TOTAL HOURS (120 required for graduation) ________

☐ Writing Proficiency: Date Completed ___________ Score ___________
☐ Writing Intensive Crs. 1. ___________
(Prereq ENGL A101/102) 2. ___________
(One in Major) 3. ___________

Effective Fall 2015
### Advisement Form—B.S. Clinical Laboratory Science

**Name:** ____________________________  **Date of Entry:** ____________________  **ID #:** ____________________  

**Advisor:** ____________________________  **Bulletin of Choice:** ________________

### GENERAL EDUCATION: 51-54 Hours

<table>
<thead>
<tr>
<th>Sem</th>
<th>Grade</th>
<th>Credit</th>
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</table>

#### NATURAL SCIENCES
- CHEM A111—General Chemistry I  
  Credit: 4
- CHEM A112—General Chemistry II  
  Credit: 4

#### HISTORY OF CIVILIZATION (HIST A101 or A102)
- HIST A10__  
  Credit: 3

#### SOCIAL AND BEHAVIORAL SCIENCES (6 hrs—2 areas)*

1. ________________________________  
   Credit: 3
2. ________________________________  
   Credit: 3

#### FOREIGN LANGUAGE (6-8 hrs—same language)

- 3-4  

#### HUMANITIES (9 hrs—two different areas)*

1. ________________________________  
   Credit: 3
2. ________________________________  
   Credit: 3
3. ________________________________  
   Credit: 3

#### CRITICAL INQUIRY
- AFCI 101 (Required for freshmen only)  
  Credit: 1

#### ENGLISH
- ENGL A101  
  Credit: 3
- ENGL A102  
  Credit: 3

#### ORAL COMMUNICATION (COMM A201 OR A241)
- COMM A ___  
  Credit: 3

#### MATHEMATICS (6-7 hrs—MATH A122 or A141 required)
- MATH A111 (placement or MATH A108)  
  Credit: 3
- MATH A122 (placement or MATH A108)  
  Credit: 3
- MATH A141 (placement or MATH A111/112)  
  Credit: 4

*Additional hours to be taken from math/statistics/logic

### MAJOR REQUIREMENTS

#### Core Requirements (16 hours)

<table>
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<tr>
<th>Sem</th>
<th>Grade</th>
<th>Credit</th>
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- BIOL A121—Biological Science I  
  Credit: 4
- BIOL A122—Biological Science II  
  Credit: 4
- BIOL A350—Fundamental Genetics  
  Credit: 4
- BIOL A315—Comparative Vert Anatomy  
  Credit: 4

#### ADDITIONAL REQUIREMENTS

- BIOL 305—Biostatistics  
  Credit: 3
- BIOL A330—Microbiology  
  Credit: 4
- BIOL A340—Virology  
  Credit: 4
- BIOL A360—Animal Physiology  
  Credit: 4
- BIOL A502-Eukaryotic Cell/Molec Biol  
  Credit: 3
- BIOL A541—Biochemistry I  
  Credit: 3
- BIOL A550—Immunology  
  Credit: 3

#### COGNATE
- CHEM 331/331L—Organic Chemistry I  
  Credit: 4

#### CLINICAL COMPONENT

**24 Hours**

- BIOL 440—Medical Technology Internship I  
  Credit: 12
- BIOL 450—Medical Technology Internship II  
  Credit: 12

#### ELECTIVES (0-1 hour)

- None

### TOTAL HOURS (120 required for graduation)

- 120

- Writing Proficiency: Date Completed__________ Score______
- Writing Intensive Crs.  
  1. ______________________________
  (Prereq ENGL A101/102)  
  2. ______________________________  
  (One in Major)  
  3. ______________________________

- Non-Western requirement (3 hours)
- ICE Requirement Completed

*Three hours from Social & Behavioral Science or Humanities must be in Non-Western Studies*
INTER-CURRICULAR ENRICHMENT (ICE)

- **Undergraduate** students will attend at least 2 ICE events per academic semester up to a total of 16 over their 4-year college career.
- **Transfer** students will complete 2 ICE credits for each academic semester remaining before graduation.
- **Part-time students** will complete 2 ICE events for every 15 hours of completed course credit.
- **Students participating in Study Abroad programs** may earn 2 ICE credits while overseas by participating in pre-approved inter-curricular academic events.

<table>
<thead>
<tr>
<th>Event</th>
<th>Term</th>
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*Note: If AHST 101 or AHST 102 is used toward the History of Civilization requirement, the same course cannot count for the Humanities requirement. Also, if AHST 201 or AHST 202 is used towards the American Political Institutions requirement, the same course cannot count for the Humanities requirement.*

---

HUMANITIES

(Bolded numbers indicate that course also qualifies as a non-Western)

- **Art History (AATH):** 105, 106, 206, 312, 335, 397, 398
- **Communications (ACOM):** 351, 352, 353, 450, 455, 462
- **English (ENGL):** See below
- **Foreign Languages, Literatures & Culture:**
  - (GERM): 303, 305, 395, 397, 398, 399
- **History (HIST):** All history courses*
- **Honors (HONS):** 101
- **Humanities (HSSI):** 107, 201, 202, 211, 301
- **Music (MUSC):** 173, 175, 371, 372, 374, 393
- **Philosophy (PHIL):** 102, 211, 302, 303, 304, 311, 312, 350, 390, 399
- **Religion (RELG):** 101, 103, 301, 302, 390, 399
- **Theater (THEA):** 161, 361, 362

SOCIAL SCIENCE

Any courses in the following disciplines: **Psychology (PSYC)**

- **Sociology (SOCY):** (see below for non-western)
- **Anthropology (ANTH):** (see below for non-western)
- **Political Science (POLI):** (see below for non-western)
- **Geography (GEOG):** (see below for non-western)
- **Economics (ECON):**

ENGLISH LITERATURE courses 200 & up

(bolded numbers indicate that course also qualifies as a Non-Western)


NON-WESTERN qualifying courses

- **Art History (ARTH):** 397
- **Anthropology (ANTH):** 102, 315, 352, 490
- **Communications (COMM):** 450
- **English (ENGL):** 291, 385, 396, 435
- **Foreign Languages, Literatures & Culture**
  - (FREN): 303, 306, 388
  - (SPAN): 303, 320, 321, 380, 388, 397, 426, 488
- **Geography (GEOG):** 102, 198
- **History (HIST):** 345, 346, 347, 361, 362, 366, 423, 447, 448, 492
- **Music (MUSC):** 175
- **Political Science (POLI):** 122, 123, 330, 483, 487, 492
- **Religion (RELG):** 103
- **Sociology (SOCY):** 410

Effective Fall 2015
Post-Graduate Opportunities

EMPLOYMENT

As a student you can gain valuable work experience and enhance your academic curriculum by involvement in the college work-study program, the Co-op program, research projects, or volunteer work with faculty members.

Potential employers for biology and geology majors, before and after you graduate, include City, State, and Federal Agencies. The CSRA also has a number of industries that employ biologists. You should visit the USCA Placement Office where biology and geology job and career opportunities are listed. Seek the advice and knowledge of faculty members, they often can suggest potential employers and help you prepare a resume or serve as references.

We also encourage biology/geology students to consider entering the teaching profession at the elementary, secondary or higher education level. Talk with Dr. Jeffrey Priest or other staff at the Ruth Patrick Science Education Center regarding volunteer or paid work opportunities related to science education.

PRE-DENTAL, PRE-MEDICAL AND PRE-VETERINARY STUDENTS

Admission to medical, dental, or veterinary schools normally requires a baccalaureate degree. Students interested in these health professions should contact a “pre-med”, “pre-vet”, or “pre-dent” advisor in their Freshman year. Dr. William Jackson advises premedical students. Dr. Michelle Vieyra advises pre-veterinary. Dr. April DeLaurier advises pre-dentistry. Students need to become aware of the professional school admissions process, including entry aptitude tests and the content of these tests, early in their undergraduate careers. Mathematics, Physics, Organic Chemistry, and Biology are the normal key ingredients for success in Medical School.

GRADUATE SCHOOL PREPARATION

As a Biology major you may seek employment with the B.S. or B.A. degree or attend graduate school to obtain a Masters or Doctorate (Ph.D.) degree. Information about graduate schools and admission requirements may be obtained from faculty members, the library, the graduate school, department bulletin boards or the Career Services Office. Planning for graduate school should begin early, preferably in the Freshman and Sophomore years to incorporate the Math, Chemistry, and Physics normally needed as an undergraduate. Independent Study (AB10 199, 299, and 399) and Undergraduate Research (BIOL 499) are excellent courses to prepare you for pursuing an advanced research degree and a career as a professional biologist.

ALLIED HEALTH PROGRAMS

USCa offers science-oriented students the opportunity of completing one of several two-year pre-professional programs including: medical technology, physical therapy, occupational therapy, cytotechnology, dental hygiene, medical records administration, respiratory therapy and radiologic technology. Each pre-professional allied health program is determined by the intended transfer institution (e.g. MCG or MUSC), therefore you should coordinate closely with the institution to which you plan to apply. Dr. Suchreet Mander advises students interested in allied health sciences.
Opportunities for Development of Leadership and Responsibility

Many careers call for leadership and responsibility in a scientific setting. The Biology or Geology Program can assist your growth and development in these areas by offering opportunities in:

1. **Co-op Program.** Allows the student to work for a local employer and study at USCA in a prescribed program. See Corey Feraldi in Career Services.

2. **Work-Study Financial Aid.** Student may work for the Biology and Geology Department assisting in lab preparations, or other duties and receive financial aid. See the Financial Aid Office.

3. **Independent Study (BIOL 199, 299, 399, and 499).** These courses allow you to gain experience in scientific literature review, experimental design, and conducting research as an undergraduate. These courses provide field and/or lab experience that employers and graduate schools view as valuable. Contact any faculty member for information.

4. **Research Assistant Volunteer.** Students interested in helping on research projects should contact the professor for information about ongoing projects.

5. **Teaching-related activities.** See the Dean of the School of Education about science education opportunities.

6. **Biology and Geology lab assistants.** Students may be employed by the department as lab assistants, research assistants, or office assistants. See the Departmental Administrative Assistant to apply.

7. **USCA Students for a Sustainable Campus.** This group is working to promote environmental sustainability and awareness within USCA and the surrounding community through education and practice. Our goal is to help USCA become an example of a sustainable institution. Students from all majors are welcome to join.

8. **The Horticulture Club.** Provides students an opportunity to gain knowledge and educate others about plants and plant science through hands-on experiences and networking. The club maintains a sustainable garden on campus, grows and sells plants, and goes on field trips. Students from all majors are welcome to join.

9. **The Animal Health Club.** Serves to mentor pre-veterinary students at USCA, participate in volunteer projects, and help local animal rescue and control efforts. Any USCA student interested in animal health or welfare is encouraged to participate.

10. **TriBeta Biological Honor Society.** The Department of Biology and Geology instituted a new chapter of Tri Beta, a national biological honor society, in 2012 with a charter group of nineteen biology majors. Beta Beta Beta (TriBeta) is dedicated to improving the understanding and appreciation of biological study and extending boundaries of human knowledge through scientific research. Research grants are available by application from the National Office, and the local chapter undertakes appropriate service activities on campus and in the community. Members receive copies of the quarterly journal BIOS, published by the Beta Beta Beta Biological Society in the interests of the Society and for the presentation of articles of general interest to biologists. For further information, contact faculty advisor Dr. Andy Dyer. New members are initiated in the Spring of each year.
Library Resources

The USC Aiken Library directly subscribes to the journals and databases below in the areas of Biology, Geology, and General Sciences. In addition, USCA students and faculty have electronic access to over 30,000 journals including 2,026 Biology and Geology related journals in Elsevier’s Science Direct, GeoScience World, Springer Link and Wiley Interscience.

Current Biology Journals in the Library

American Journal of Botany
Auk
Biochemistry and Molecular Biology Education
Bioscience
Botanical Review
Canadian Journal of Microbiology
Canadian Journal of Plant Science
Castanea
Copeia
Ecological Applications
Ecology
Economic Botany
Herpetologica
Herpetological Review
Horticulture
International Journal of Plant Sciences (Former Title: Botanical Gazette)
Invertebrate Biology
Journal of Herpetology
Journal of Mammology
Journal of the Torry Botanical Society
Journal of Wildlife Management
Microbial Ecology
Protein Science
Society for the Study of Amphibians & Reptiles Membership

Current Geology Journals in the Library

American Journal of Science
Earth
Journal of Geology
Journal of Geoscience Education
South Carolina Geology
Southeastern Geology
Water Resources Research

Science in General

JAMA: Journal of the American Medical Association
Nature
Proceedings of the National Academy of Sciences of the US
Science
ANNUAL REVIEWS SCIENCES COLLECTION INCLUDING ANNUAL REVIEWS OF:

Analytical Chemistry
Animal Biosciences
Biochemistry
Biomedical Engineering
Biophysics
Cell and Developmental Biology
Chemical and Biomolecular Engineering
Earth and Planetary Sciences
Ecology, Evolution, and Systematics
Entomology
Environment and Resources
Fluid Mechanics
Food Science and Technology
Genetics
Genomics and Human Genetics
Immunology
Marine Science
Medicine
Microbiology
Neuroscience
Nutrition
Pathology
Pharmacology and Toxicology
Physical Chemistry
Physiology
Phytopathology
Plant Biology
Public Health/Virology

ELECTRONIC RESOURCES

The following databases have resources pertaining to science. Each database can be accessed from the USCA Library Homepage Electronic Resources Guide and most have a direct link from the Library Research Page.

ACS (American Chemical Society)
Agricola
Algology Mycology & Protozoology Abstracts
Animal Behavior Abstracts
Applied Science and Technology Full Text
ASFA 1: Biological Sciences
ASFA 2: Ocean Technology, Policy
ASFA 3: Aquatic Pollution & Env.
ASFA Aquaculture Abstracts
ASFA Aquatic Sciences/Fisheries Abs
ASFA Marine Biotechnology Abs
Bacteriology Abstracts
BioEngineering Abstracts
Biological Sciences
Biology Digest
Biotechnology Research Abs
Calcium & Calcified Tissue Abs
Chemoreception Abstracts
Ecology Abstracts
EIS: Digests of Environmental Impact Statements
Endocrinology Abstracts
Entomology Abstracts
Environment Abstracts
Environmental Engineering Abs
Environmental Sciences and Pollution Management
Elsevier’s Science Direct
Genetics Abstracts
GeoRef
GeoRef in Process
GeoScience World
GreenFILE
GREENR
Human Genome Abs
Human Population & Natural Res. Mgmt.
Humanities E-Book Project
Illustrata: Natural Sciences
Immunology Abstracts
Industrial and Applied Microbiology Abs
JSTOR
Medical & Pharm. Biotech. Abs
MedLine
Neuroscience Abstracts
Nucleic Acids Abstracts
Oceanic Abstracts
Oncogenes and Growth Factors Abs
Plant Science
Pollution Abstracts
PubMed
PubMed Central
Science Direct
Science Reference Center
SciFinder Scholar
Springer Link
Sustainability Science Abstracts
Toxicology Abstracts
TOXLINE
Virology and AIDS Abstracts
Water Resources Abstracts
Web of Science (Science Citation Index)
Wiley Online Library

The library reference staff offers workshops as well as one-on-one assistance. Call extension 3465 and ask for reference help.