**BIOLOGY MAJOR, B.S.**

Biology is the study of life from both basic and applied perspectives across a broad range of analytical levels, from the molecule and cell to the organism and ecosystem. This program is designed for students who intend to continue graduate study in biological or health sciences.

**Student Learning Outcomes**

Upon completion of the biology (B.A., B.S.) program, students should be able to:

- **Knowledge Base**: Demonstrate knowledge of major concepts, theoretical perspectives, empirical findings, and historical trends in the broad field of Biology
- **Research Methods**: Apply basic research methods in the biological sciences, including research design, data analysis, and data interpretation
- **Critical Thinking Skills**: Demonstrate the use of critical and creative thinking skills in upper-level biology courses and in their approach to undergraduate research
- **Application of Knowledge, Research Methods, and Critical Thinking**: Apply knowledge of the field of biology, research skills, and critical thinking skills to undertake a course-based, field, or laboratory research project

**Requirements**

In addition to the program requirements, students must:

- earn a minimum final cumulative GPA of 2.000
- complete a minimum of 45 academic credit hours earned from UNC-Chapel Hill courses
- take at least half of their major core requirements (courses and credit hours) at UNC-Chapel Hill
- earn a minimum cumulative GPA of 2.000 in the major core requirements. Some programs may require higher standards for major or specific courses.

For more information, please consult the degree requirements section of the catalog (https://catalog.unc.edu/undergraduate/degree-requirements/).

### Code Title Hours

**Gateway Course**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 101 &amp; 101L</td>
<td>Principles of Biology and Introductory Biology Laboratory H, F</td>
<td>4</td>
</tr>
</tbody>
</table>

**Core Requirements**

**Fundamentals Core Courses**

- BIOL 103 How Cells Function F, 3
- BIOL 104 Biodiversity F, 3
- BIOL 105L Biological Research Skills 1

**Intermediate Level Core Courses**

- Two from among the following five options: 6-7
  - BIOL 220 Molecular Genetics H
  - BIOL 240 Cell Biology H
  - BIOL 250 Evolutionary Biology
  - BIOL 260 Introduction to Ecology

An organismal structure and diversity course (see list below)

Four biology electives (each of three or more credits) numbered above 200 (not including BIOL 213, BIOL 222, BIOL 253, BIOL 291, BIOL 292, BIOL 293, BIOL 294, BIOL 295, BIOL 296, BIOL 353, a second semester of BIOL 395, and BIOL 495). At least two courses in the major must have a laboratory (not including BIOL 101L or BIOL 105L). ENEC 489 can also count as a biology elective.

**Additional Requirements**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 101 &amp; 101L</td>
<td>General Descriptive Chemistry I and Quantitative Chemistry Laboratory I H, F</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 102 &amp; 102L</td>
<td>General Descriptive Chemistry II and Quantitative Chemistry Laboratory II H, F</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 261</td>
<td>Introduction to Organic Chemistry I H</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus of Functions of One Variable I H, F</td>
<td>4</td>
</tr>
</tbody>
</table>

Two of the following: 6-8

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 232</td>
<td>Calculus of Functions of One Variable II H, F</td>
<td>6-8</td>
</tr>
<tr>
<td>PHYS 115</td>
<td>General Physics I: For Students of the Life Sciences F</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 119</td>
<td>Introductory Calculus-based Electromagnetism and Quanta</td>
<td>4</td>
</tr>
<tr>
<td>COMP 110</td>
<td>Introduction to Programming and Data Science H</td>
<td>4</td>
</tr>
<tr>
<td>or COMP 111</td>
<td>Introduction to Scientific Programming</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 222</td>
<td>Introduction to Programming with Biological Data</td>
<td>4</td>
</tr>
<tr>
<td>STOR 120</td>
<td>Foundations of Statistics and Data Science F</td>
<td>4</td>
</tr>
<tr>
<td>or STOR 215</td>
<td>Foundations of Decision Sciences</td>
<td>4</td>
</tr>
<tr>
<td>or STOR 151</td>
<td>Introduction to Data Analysis</td>
<td>4</td>
</tr>
<tr>
<td>or STOR 155</td>
<td>Introduction to Data Models and Inference</td>
<td>4</td>
</tr>
</tbody>
</table>

One of the following: 4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 114</td>
<td>General Physics I: For Students of the Life Sciences F</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 118</td>
<td>Introductory Calculus-based Mechanics and Relativity H, F</td>
<td>4</td>
</tr>
</tbody>
</table>

A choice of two additional allied sciences electives selected from the course list below (some courses are more than 3 credits)

Remaining General Education requirements and enough free electives to accumulate 120 academic hours

**Total Hours** 62-65

H Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.

1 With a C grade or better in BIOL 101
2 Both BIOL 103 and BIOL 104 need to be completed before taking a 400-level BIOL class in the major.
3 Core courses taken beyond the two required ones may be used as electives.
4 At least two courses in the major must be numbered above 400 (not including BIOL 501 and BIOL 692H). One additional elective may consist of a total of three hours of courses numbered above 600 (not including BIOL 692H).
5 BIOL 395 counts as a laboratory course for students entering in Fall 2022 or later. Other laboratory courses include all of the Organismal Structure and Diversity courses listed below, any course with an "L" designation (except BIOL 253/BIOL 253L, which does not count as an elective in the major), and the following courses: BIOL 255H, BIOL 256, BIOL 459, BIOL 461, BIOL 463, BIOL 526H, BIOL 535, BIOL 562, and BIOL 563.

### Allied Science Electives

All allied science elective courses need to have a minimum of three credit hours.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 143</td>
<td>Human Evolution and Adaptation</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 148</td>
<td>Human Origins</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 298</td>
<td>Biological Anthropology Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 315</td>
<td>Human Genetics and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 318</td>
<td>Human Growth and Development</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 412</td>
<td>Paleoanthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 414</td>
<td>Laboratory Methods: Human Osteology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 415</td>
<td>Laboratory Methods: Zooarchaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 416</td>
<td>Bioarchaeology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 470</td>
<td>Medicine and Anthropology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 623</td>
<td>Human Disease Ecology</td>
<td>3</td>
</tr>
<tr>
<td>ASTR ---</td>
<td>Any ASTR course above 99</td>
<td>3</td>
</tr>
<tr>
<td>BIOC 107</td>
<td>Introduction to Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>BIOC 108</td>
<td>Introduction to Biochemistry</td>
<td>4</td>
</tr>
<tr>
<td>BIOL ---</td>
<td>Any BIOL course above 101, except BIOL 213, BIOL 291, BIOL 292, BIOL 294, BIOL 295, BIOL 296, and BIOL 495</td>
<td>3</td>
</tr>
<tr>
<td>BIOS ---</td>
<td>Any BIOS course</td>
<td>3</td>
</tr>
<tr>
<td>BMME 335</td>
<td>Biomaterials</td>
<td>3</td>
</tr>
<tr>
<td>CHEM ---</td>
<td>Any CHEM course above 101</td>
<td>3</td>
</tr>
<tr>
<td>COMP ---</td>
<td>Any COMP course above 100, except COMP 380</td>
<td>3</td>
</tr>
<tr>
<td>EMES ---</td>
<td>Any EMES course above 100</td>
<td>3</td>
</tr>
<tr>
<td>ENEC 202</td>
<td>Introduction to the Environmental Sciences</td>
<td>4</td>
</tr>
<tr>
<td>ENEC 256</td>
<td>Mountain Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>ENEC 324</td>
<td>Water in Our World: Introduction to Hydrologic Science and Environmental Problems</td>
<td>3</td>
</tr>
<tr>
<td>ENEC 403</td>
<td>Environmental Chemistry Processes</td>
<td>3</td>
</tr>
<tr>
<td>ENEC 406</td>
<td>Atmospheric Processes II</td>
<td>4</td>
</tr>
<tr>
<td>ENEC 410</td>
<td>Earth Processes in Environmental Systems</td>
<td>4</td>
</tr>
<tr>
<td>ENEC 411</td>
<td>Oceanic Processes in Environmental Systems</td>
<td>4</td>
</tr>
<tr>
<td>ENEC 415</td>
<td>Environmental Systems Modeling</td>
<td>3</td>
</tr>
<tr>
<td>ENEC 471</td>
<td>Human Impacts on Estuarine Ecosystems</td>
<td>4</td>
</tr>
<tr>
<td>ENEC 489</td>
<td>Ecological Processes in Environmental Systems</td>
<td>4</td>
</tr>
<tr>
<td>EPID 600</td>
<td>Principles of Epidemiology for Public Health</td>
<td>3</td>
</tr>
<tr>
<td>EXSS 175</td>
<td>Human Anatomy</td>
<td>3</td>
</tr>
<tr>
<td>EXSS 276</td>
<td>Human Physiology</td>
<td>3</td>
</tr>
<tr>
<td>GECO 110</td>
<td>The Blue Planet: An Introduction to Earth’s Environmental Systems</td>
<td>3</td>
</tr>
<tr>
<td>GECO 111</td>
<td>Weather and Climate</td>
<td>3</td>
</tr>
<tr>
<td>GECO 212</td>
<td>Environmental Conservation and Global Change</td>
<td>3</td>
</tr>
<tr>
<td>GECO 222</td>
<td>Health and Medical Geography</td>
<td>3</td>
</tr>
<tr>
<td>GECO 253</td>
<td>Introduction to Atmospheric Processes</td>
<td>4</td>
</tr>
</tbody>
</table>
Majors

Suggested Program of Study for B.S. offered every term.
entering UNC–Chapel Hill in the fall term. Some courses may not be plans represented in this catalog are intended for first-year students. A degree plan that is specific and unique to their interests. The sample minor, etc.). Students should meet with their academic advisor to create may differ depending on the course of study selected (second major, completion within the expected eight semesters. The actual degree plan to complete the major and other requirements needed for degree. Sample plans can be used as a guide to identify the courses required

Sample Plan of Study
Sample plans can be used as a guide to identify the courses required to complete the major and other requirements needed for degree completion within the expected eight semesters. The actual degree plan may differ depending on the course of study selected (second major, minor, etc.). Students should meet with their academic advisor to create a degree plan that is specific and unique to their interests. The sample plans represented in this catalog are intended for first-year students entering UNC–Chapel Hill in the fall term. Some courses may not be offered every term.

Suggested Program of Study for B.S. Majors

First Year  Hours

First-Year Foundation Courses  
IDST 101  College Thriving  1
ENGL 105  or  English Composition and Rhetoric  3
or  English Composition and Rhetoric (Interdisciplinary)
First-Year Seminar or First-Year Launch (https://catalog.unc.edu/undergraduate/ideas-in-action/first-year-seminars-launches/)  3
Triple-I and Data Literacy (https://catalog.unc.edu/undergraduate/ideas-in-action/triple-i/)

Global Language through level 3 (https://catalog.unc.edu/undergraduate/ideas-in-action/global-language/)  varies

Major Courses
BIOL 101  Principles of Biology  4
& 101L and Introductory Biology Laboratory  4
CHEM 101  General Descriptive Chemistry I  4
& 101L and Quantitative Chemistry Laboratory I  4
A fundamentals course BIOL 103 or BIOL 104  3
BIOL 105L  Biological Research Skills  1
MATH 231  Calculus of Functions of One Variable  4

Additional Courses
Gen Ed course  3

Hours  30

Sophomore Year
The remaining Fundamentals course BIOL 103 or 104  3
Two core BIOL courses  6
CHEM 102  General Descriptive Chemistry II  4
& 102L and Quantitative Chemistry Laboratory II  4
CHEM 261  Introduction to Organic Chemistry I  3
First course from among COMP, MATH, PHYS, STOR options (see course list on the Requirements tab)  3-4
Lifetime Fitness  1
Gen Ed and elective courses  10

Hours  31

Junior Year
PHYS 114  General Physics I: For Students of the Life Sciences  4
or  Introductory Calculus-based Mechanics and Relativity
Second course from among COMP, MATH, PHYS, STOR options (see course list on the Requirements tab)  3-4
Biography electives (two courses, one with lab)  7
Gen Ed and elective courses  15

Hours  30

Senior Year
Biography electives (two courses, one with lab)  7
Allied sciences electives (two courses)  6

Note: Students who want to pursue research in molecular or cellular biology are highly encouraged to add CHEM 262 and then CHEM 430 (as one of their biology electives). Students who want to pursue a pre-medical or pre-dentistry path are highly encouraged to add CHEM 262 and then CHEM 430 (as one of their biology electives), as well as CHEM 241/L and CHEM 262L.

Free electives as needed to complete 120 academic hours  16

Hours  29

Total Hours  120

H  Honors version available. An honors course fulfills the same requirements as the nonhonors version of that course. Enrollment and GPA restrictions may apply.

F  FY-Launch class sections may be available. A FY-Launch section fulfills the same requirements as a standard section of that course, but also fulfills the FY-SEMINAR/FY-LAUNCH First-Year Foundations requirement. Students can search for FY-Launch sections in ConnectCarolina using the FY-LAUNCH attribute.
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Biology Major, NUS Joint Degree
Biology B.S. majors may wish to consider applying for the Joint Degree Program, an innovative joint undergraduate degree program between the University of North Carolina at Chapel Hill and the National University of Singapore. UNC–Chapel Hill undergraduates spend anywhere from two to four semesters at the National University of Singapore and receive a joint bachelor of science degree from both institutions. For further information, contact the Study Abroad Office.

Special Opportunities in Biology
Students are encouraged to speak with their advisor about opportunities to serve as peer advisors in the Health Professions Advising Office, or to join Tri-Beta, the National Biological Sciences Honor Society.

Honors in Biology
Candidates for honors or highest honors must secure approval from the departmental honors advisor. They must have three hours of BIOL 395, take BIOL 692H, and maintain a grade point average of 3.3, both overall and in biology courses (exclusive of BIOL 692H and including only one semester of BIOL 395), calculated at the end of the semester preceding the semester in which they graduate. Other requirements are detailed on the department website (http://bio.unc.edu/undergraduate/honors-info/).

High-Impact/Experiential Education
After completing BIOL 201 or BIOL 202 (or a 200-level core course under the new curriculum), students are encouraged to pursue high-impact/experiential education opportunities. The department offers several courses that meet the High-Impact/Experiential Education requirement and the Research and Discovery requirement from the General Education curriculum.

Laboratory Teaching Apprenticeships and Assistantships
Opportunities exist to assist graduate instructors in lecture or undergraduate laboratory courses. Interested students should contact the instructor of the course, and will need to submit a form to obtain approval from the departmental director of undergraduate studies.

Undergraduate Awards
All awards include a personal plaque, a monetary gift, and a place on Coker Hall’s list of department honorees. The awards include:

- The Stephen G. Brantley Award in honor of Henry Van Peters Wilson, given annually to a senior biology major for excellence in research in molecular and cellular biology.
- The Robert Ervin Coker Award, given annually to a senior biology major for excellence in research in organismal biology and ecology.
- The John N. Couch Award, given annually to a senior biology major with interests in plant biology who has demonstrated the highest ideals of scholarship and research.
- The Irvine R. Hagadorn Award, given annually to the junior biology major based on academic and research excellence. This award is also recognized by the UNC–Chapel Hill chancellor at the Annual Chancellor’s Awards Ceremony.

- The Francis J. LeClair Award, given annually to a senior biology major for academic excellence in biology with an emphasis in plant sciences.

Undergraduate Research
An undergraduate research experience can be extremely valuable to explore career choices and to prepare for postgraduate work in the biological sciences. Undergraduates may take a CURE course, and/or participate directly in the research of faculty in the Department of Biology or other departments (with Biology sponsorship). This research opportunity allows students to put their knowledge of biology into practice through participation in cutting-edge research. Students’ participation in research can begin as early as their second year by registration in BIOL 395.

Undergraduates with a 2.0 grade point average or higher in biology courses are encouraged to enroll in BIOL 395. Information concerning the procedure for enrolling in a research course can be obtained from the chair of the department’s undergraduate honors research program. Additional information can be found on the department’s website (http://bio.unc.edu/undergraduate/research/).

Department Programs
Majors

- Biology Major, B.S. (p. 1)
- Biology Major, B.A. (https://catalog.unc.edu/undergraduate/programs-study/biology-major-ba/)

Minor

- Biology Minor (https://catalog.unc.edu/undergraduate/programs-study/biology-minor/)

Graduate Programs

- M.A. in Biology (https://catalog.unc.edu/graduate/schools-departments/biology/)
- M.S. in Biology (https://catalog.unc.edu/graduate/schools-departments/biology/)
- Ph.D. in Biology (https://catalog.unc.edu/graduate/schools-departments/biology/)

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