BIOLOGY | BA

The biology majors combine the faculty and resources of the College of Agricultural and Life Sciences and the College of Liberal Arts and Sciences to prepare undergraduates for careers in the biological sciences, advanced study in professional and graduate schools, productive citizenship and leadership, and lifelong learning. The program is comprehensive and flexible, emphasizing the diverse forms, processes, and systems of life. Students in the program complete required and elective courses that promote critical thinking through the investigation and understanding of principles and unifying themes that govern living systems. The biology major offers a broader approach to biology than is available through a major in botany, zoology, or other specialized biological sciences majors.

About this Program

- **College**: Liberal Arts and Sciences
- **Degrees**: Bachelor of Arts | Bachelor of Science: Integrative Biology | Bachelor of Science: Preprofessional Biology
- **Credits for Degree**: 120
- **Additional Information**
- **Related Biology Programs**

To graduate with this major, students must complete all university, college, and major requirements.

The biology degrees develop fundamental knowledge of animals, plants and microorganisms. The degrees and specializations are tailored to meet the needs of preprofessional students, those students preparing for graduate studies in biology or specialized areas, and those seeking careers in education, the allied health professions and interdisciplinary fields such as environmental or biotechnology law, science journalism, and bioscience management.

The CLAS Bachelor of Science in biology offers two specializations. The Bachelor of Science: Integrative Biology is designed for students preparing for graduate studies in biology or specialized areas such as ecology, evolution, genetics, molecular biology, physiology, and systematics. The Bachelor of Science: Preprofessional Biology is designed for students preparing for admission to medical, dental, optometry, veterinary, or other professional schools.

The CLAS Bachelor of Arts in biology is a flexible degree that is best suited for students interested in a career in education, the allied health professions, and interdisciplinary fields such as environmental or biotechnology law, science journalism, and bioscience management.

Coursework for the Majors

The B.S. biology specializations require significant introductory coursework and credits in general biology, calculus and/or statistics, general chemistry, organic chemistry, and physics. The B.A. requires less preparation in mathematics, chemistry and physics. Students who are uncertain about the program that best suits their goals should consult a biology advisor for information and curriculum planning. Students can also individualize their curricula with additional life science courses from other departments, colleges and units at UF.

### Relevant Minors and/or Certificates

#### UFTeach Program

More Info

There is a severe shortage of qualified secondary school biology teachers in Florida and nationwide. Students interested in becoming part of this high-demand profession should see a biology advisor or the UFTeach advisor. UFTeach students complete the UFTeach minor in science teaching with their B.A. or B.S. in biology and have the coursework and preparation for professional teacher certification in Florida when they graduate.

#### Research

More Info

All biology majors are encouraged to participate in research. Research experience is valuable on many levels: it diversifies the college experience, teaches how scientists apply the knowledge gained in the classroom to real world questions, provides the opportunity to work with and get to know researchers who are the best in their field, enables participation in cutting edge scientific questions and techniques, enhances the student’s resume/CV when applying to graduate or professional school and, finally, it is essential to help the student determine if science is an appropriate career choice.

CLAS biology majors may participate in research for course credit, as a scholar (e.g., University Scholar), as a volunteer, or, in rare cases, as a paid research assistant.

#### Related Biology Programs

- Bachelor of Science in Biology, CALS
- Bachelor of Arts in Biology, UF Online

### Bachelor of Arts

The B.A. major is designed for students interested in a career in education, the allied health professions, and interdisciplinary fields such as environmental or biotechnology law, science journalism, and bioscience management. The B.A. is not recommended for students preparing for health professions such as medicine, dentistry, and veterinary medicine.

All coursework for the major must be completed with minimum grades of C.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Required Foundation Coursework</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSC 2010 &amp; 2010L</td>
<td>Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory 1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>BSC 2011 &amp; 2011L</td>
<td>Integrated Principles of Biology 2 and Integrated Principles of Biology Laboratory 2</td>
<td>4</td>
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</tbody>
</table>

Select one of the following options: 6-8

**Option A:**
- CHM 1030 & CHM 1031 Basic Chemistry Concepts and Applications 1 and Basic Chemistry Concepts and Applications 2

**Option B:**
- CHM 2045 & 2045L General Chemistry 1 and General Chemistry 1 Laboratory
CHM 2046 & 2046L General Chemistry 2 and General Chemistry 2 Laboratory
Select one of the following: 4-5
MAC 1147 PreCalculus Algebra and Trigonometry
MAC 1114 Trigonometry
& MAC 1140 PreCalculus Algebra
A higher math course
Select one of the following options: 8-10
Option A:
PHY 2004 & 2004L Applied Physics 1
& 2005 Applied Physics 2
& 2005L Laboratory for Applied Physics 1
& 2005 Laboratory for Applied Physics 2
Option B:
PHY 2053 Physics 1
& 2053L Laboratory for Physics 1
PHY 2054 Physics 2
& 2054L Laboratory for Physics 2
STA 2023 Introduction to Statistics 1 3

Required Core Coursework 1
Biology Distribution Courses
Select at least one course from three of the following five groups: 9-13
Molecular Biology, Cellular Biology and Genetics
AGR 3303 Genetics
BCH 3023 Elementary Organic and Biological Chemistry
PCB 3023 Essential Cell Biology 3
PCB 3063 Genetics
PCB 3134 Eukaryotic Cell Structure and Function
PCB 4522 Molecular Genetics
or PCB 4553 Population Genetics
Organismal Biology
BOT 3503 & 3503L Physiology and Molecular Biology of Plants and Physiology and Molecular Biology of Plants Laboratory 3
BSC 3096 Human Physiology
MCB 2000 Microbiology
& 2000L and Microbiology Laboratory
MCB 3020 & 3020L Basic Biology of Microorganisms and Laboratory for Basic Biology of Microorganisms 3
PCB 3134 Eukaryotic Cell Structure and Function 3
PCB 3713C Cellular and Systems Physiology 3
PCB 4712 Comparative Biomechanics
PCB 4723C Physiology and Molecular Biology of Animals 3
ZOO 3603C Evolutionary Developmental Biology
ZOO 3713C Functional Vertebrate Anatomy
Ecology
BSC 3307C Climate Change Biology
PCB 3601C Plant Ecology
PCB 4043C General Ecology
Evolution and Diversity
BOT 2011C Plant Diversity
BOT 2710C Practical Plant Taxonomy
BOT 3151C Local Flora of North Florida
PCB 4674 Evolution 3
ZOO 3513C Animal Behavior
ZOO 4205C Invertebrate Biodiversity
ZOO 4307C Vertebrate Biodiversity
Biology and Society
AGG 3501 Environment, Food and Society
AGR 2332 Seeds of Change

Biology Distribution Courses
Select 15 credits minimum approved biological science courses: 15
Capstone
BSC 4936 Critical Analysis of Biological Research 2

Total Credits 55-64

1 This major requires a minimum of 30 credits in core courses. At least 18 of the 30 credits of the required core coursework must be taken at UF. Any additional credits remaining after completion of required coursework must be met by taking courses from the approved additional life sciences electives.
2 At least two Biology Distribution Courses must be taken at UF. Only one 2000-level course may be applied to the Biology Distribution Course requirement.
3 Course has specific prerequisites. Students should consult the course description when planning their programs to ensure that they may select this course.
4 At least nine credits of B.A. Electives must be taken at UF. Critical Tracking records each student’s progress in courses that are required for entry to each major. Please note the critical-tracking requirements below on a per-semester basis.

For degree requirements outside of the major, refer to CLAS Degree Requirements: Structure of a CLAS Degree.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites may be used for transfer students.

Semester 1
• Complete one of the following: BSC 2010/BSC 2010L; or CHM 1025 or CHM 1030 or CHM 2045/CHM 2045L; or MAC 1147 or equivalent or higher math course
• 2.0 UF GPA required

Semester 2
• Complete CHM 1030 or CHM 2045/CHM 2045L and one of the following: BSC 2010/BSC 2010L or MAC 1147 or equivalent or higher MAC course
• 2.0 UF GPA required

Semester 3
• Complete BSC 2010/BSC 2010L and MAC 1147 or equivalent or higher MAC course
• 2.0 UF GPA required

Semester 4
• Complete CHM 1031 or CHM 2046/CHM 2046L; BSC 2011/BSC 2011L; and MAC 1147 or equivalent or higher MAC course with a 2.5 GPA required for all critical-tracking courses
• 2.0 UF GPA required
Semester 5
• Complete at least one biology distribution course
• 2.5 GPA required for all critical-tracking courses
• 2.0 UF GPA required

Students are expected to complete the writing requirement while in the process of taking the courses below. Students are also expected to complete the general education international (GE-N) and diversity (GE-D) requirements concurrently with another general education requirement (typically, GE-C, H or S).

To remain on track, students must complete the appropriate critical-tracking courses, which appear in bold. These courses must be completed by the terms as listed above in the Critical Tracking criteria.

This semester plan represents an example progression through the major. Actual courses and course order may be different depending on the student’s academic record and scheduling availability of courses. Prerequisites still apply.

<table>
<thead>
<tr>
<th>Course Semester</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semester One</td>
<td>CHM 1030 Basic Chemistry Concepts and Applications 1 (Critical Tracking, Gen Ed Physical Sciences)</td>
<td>3-4</td>
</tr>
<tr>
<td>Select one:</td>
<td>CHM 2045 General Chemistry 1 and General Chemistry 1 Laboratory (Critical Tracking, Gen Ed Physical Sciences)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IUF 1000 What is the Good Life (Gen Ed Humanities)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>MAC 1147 Precalculus Algebra and Trigonometry (Critical Tracking, State Core Gen Ed Mathematics)</td>
<td>4</td>
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<tr>
<td></td>
<td>BSC 1920 First Year Introduction: Biology at UF (recommended biology elective)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>State Core Gen Ed Composition; Writing Requirement</td>
<td>3</td>
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<tr>
<td>Credits</td>
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<td>14-15</td>
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</tbody>
</table>

Semester Two
Select one:
• CHM 1031 Basic Chemistry Concepts and Applications 2 (Critical Tracking) 3-4
• CHM 2046 General Chemistry 2 and General Chemistry 2 Laboratory (Critical Tracking) 3-4
• STA 2023 Introduction to Statistics 1 (Gen Ed Mathematics) 3
• Gen Ed Composition; Writing Requirement 3
• State Core Gen Ed Social and Behavioral Sciences 3
• Elective 3-4

Credits 15-17

Semester Three
BSC 2010 Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory 1 (Critical Tracking, State Core Gen Ed Biological Sciences) 4

Gen Ed Social and Behavioral Sciences 3
Foreign language 5
Elective 3

Credits 15

Semester Four
BSC 2011 & 2011L Integrated Principles of Biology 2 and Integrated Principles of Biology Laboratory 2 (Critical Tracking, Gen Ed Biological Sciences) 4

State Core Gen Ed Humanities 3
Gen Ed Social and Behavioral Sciences 3
Foreign language 5

Credits 15

Semester Five
PHY 2004 Applied Physics 1 & 2004L and Laboratory for Applied Physics 1

Biology distribution courses (Critical Tracking) 6-8
Elective (3000 level or above, not in major) 3
Elective 3

Credits 16-18

Semester Six

Gen Ed Humanities 3
Biology distribution course 3-5
Elective (3000 level or above, not in major) 3
Elective 3

Credits 16-18

Semester Seven
B.A. electives 9
Electives (3000 level or above, not in major) 6

Credits 15

Semester Eight
BSC 4936 Critical Analysis of Biological Research 2
Select 6 Biology B.A. elective credits (see approved list) 6
Select 6 elective credits (3000 level or above, not in major) 6

Credits 14

Total Credits 120

See course descriptions for prerequisites and requirements

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>AGR 4320</td>
<td>Plant Breeding</td>
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<tr>
<td>ALS 4161</td>
<td>Exotic Species and Biosecurity Issues</td>
<td>3</td>
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<tr>
<td>ALS 4162</td>
<td>Consequences of Biological Invasions</td>
<td>3</td>
</tr>
<tr>
<td>ALS 4163</td>
<td>Challenges in Plant Resource Protection</td>
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<tr>
<td>ANS 3006</td>
<td>Introduction to Animal Science</td>
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<tr>
<td>&amp; 3006L</td>
<td>and Introduction to Animal Science Laboratory</td>
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<tr>
<td>ANS 3319C</td>
<td>Reproductive Physiology and Endocrinology in Domestic Animals</td>
<td>4</td>
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<tr>
<td>ANS 3440</td>
<td>Principles of Animal Nutrition</td>
<td>4</td>
</tr>
<tr>
<td>ANT 3514C</td>
<td>Introduction to Biological Anthropology</td>
<td>4</td>
</tr>
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<td>ANT 4531</td>
<td>Molecular Genetics of Disease</td>
<td>3</td>
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<td>ANT 4552</td>
<td>Primate Behavior</td>
<td>3</td>
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<tr>
<td>ANT 4554C</td>
<td>Primate Evolution</td>
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<td>ANT 4586</td>
<td>Human Evolution</td>
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<td>APK 2100C</td>
<td>Applied Human Anatomy with Laboratory</td>
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<td>BCH 4024</td>
<td>Introduction to Biochemistry and Molecular Biology</td>
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<td>BMS 4136C</td>
<td>Human Histology</td>
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<td>BOT 2710C</td>
<td>Practical Plant Taxonomy</td>
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</tr>
<tr>
<td>BOT 2800C</td>
<td>Plants in Human Affairs</td>
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</tr>
<tr>
<td>BOT 3151C</td>
<td>Local Flora of North Florida</td>
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</tr>
<tr>
<td>BOT 3503</td>
<td>Physiology and Molecular Biology of Plants Laboratory</td>
<td>5</td>
</tr>
<tr>
<td>&amp; 3503L</td>
<td>Physiology and Molecular Biology of Plants Laboratory</td>
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</tr>
</tbody>
</table>

Credits 108
Students in the Major Will Learn to
Student Learning Outcomes (SLOs)

Content

1. Identify, describe and explain the basic terminology, concepts, methodologies and theories used within the biological sciences.
Critical Thinking
2. Analyze biological information and develop reasoned solutions to problems using the processes and applications of scientific inquiry.
3. Discriminate ethical behavior from unethical behavior in scientific research.

Communication
4. Communicate knowledge, ideas and reasoning clearly and effectively in written or oral forms appropriate to the biological sciences.

Curriculum Map
I = Introduced; R = Reinforced; A = Assessed

<table>
<thead>
<tr>
<th>Courses</th>
<th>SLO 1</th>
<th>SLO 2</th>
<th>SLO 3</th>
<th>SLO 4</th>
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</thead>
<tbody>
<tr>
<td>AGR 3303 or PCB 3063 or PCB 4522</td>
<td>R</td>
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<td>R</td>
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<tr>
<td>ANS 3319C or R BOT 3503 or HOS 4304 or PCB 3713C or PCB 4723C</td>
<td>R</td>
<td>R</td>
<td></td>
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<tr>
<td>BSC 1920</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td></td>
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<tr>
<td>BSC 2010</td>
<td>I</td>
<td>I</td>
<td>I</td>
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<tr>
<td>BSC 2011</td>
<td>I</td>
<td>I</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>BSC 4936</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>MCB 3020 and MCB 3020L, or PCB 3134 or PCB 4674</td>
<td>R</td>
<td>R</td>
<td></td>
<td>R</td>
</tr>
</tbody>
</table>

Assessment Types
- Major field test for biology
- Bioethics module
- Scientific literacy paper