BACHELOR OF ARTS

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 (http://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/)
- **Degrees:** Bachelor of Arts (p. 1) | Bachelor of Science
- **Specializations:** Integrative Biology (BS) (http://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/BIO_BA_BS/BIO_BS03/) | Preprofessional Biology (BS) (http://catalog.ufl.edu/UGRD/colleges-schools/UGLAS/BIO_BA_BS/BIO_BS04/)
- **Credits for Degree:** 120
- **More Info**

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

Department Information

The Department of Biology studies life at all levels from molecules to the biosphere to understand the evolution, structure, maintenance and dynamics of biological systems. The department's teaching and research provide the integrative and conceptual foundations of the life sciences.
Website (https://biology.ufl.edu/)

CONTACT

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Curriculum

- Biology UF Online
- Biology | CALS
- Biology | CLAS
- Botany Minor
- Botany | CALS
- Botany | CLAS
- Combination Degrees
- Zoology
- Zoology Minor

The BA 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 BA is not recommended for students preparing for health professions such as medicine, dentistry, and veterinary medicine.

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.

Degrees

Bachelor of Science

The CLAS Bachelor of Science in biology offers two specializations.

Bachelor of Science | Integrative Biology
Designed for students preparing for graduate studies in biology or specialized areas such as ecology, evolution, genetics, molecular biology, physiology, and systematics.

Bachelor of Science | Preprofessional Biology
Designed for students preparing for admission to medical, dental, optometry, veterinary, or other professional schools.

Bachelor of Arts
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 BS Biology specializations require significant introductory coursework and credits in general biology, calculus and/or statistics, general chemistry, organic chemistry, and physics. The BA 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 Certificates
UFTeach Program
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 BA or BS in Biology and have the coursework and preparation for professional teacher certification in Florida when they graduate.
More Info (http://education.ufl.edu/uf-teach/)

Research
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.

More Info (http://major.biology.ufl.edu/do-research/)

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.

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

Code	Title	Credits
Required Foundation Coursework		
BSC 2010 & 2010L	Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory 1	4
BSC 2011 & 2011L	Integrated Principles of Biology 2 and Integrated Principles of Biology Laboratory 2	4
Select one option:		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:		4-5
MAC 1147	Precalculus Algebra and Trigonometry	
MAC 1114 & MAC 1140	Trigonometry and Precalculus Algebra	
A higher math course		
Select one option:		8-10
Option A		

PHY 2004	Applied Physics 1	
& 2004L	and Laboratory for Applied Physics 1	
PHY 2005	Applied Physics 2	
& 2005L	and Laboratory for Applied Physics 2	
Option B		
PHY 2053	Physics 1	
& 2053L	and Laboratory for Physics 1	
PHY 2054	Physics 2	
& 2054L	and 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 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	Physiology and Molecular Biology of Plants	
& 3503L	and Physiology and Molecular Biology of Plants Laboratory [3]	
BSC 3096	Human Physiology	
MCB 2000	Microbiology	
& 2000L	and Microbiology Laboratory	
MCB 3020	Basic Biology of Microorganisms	
& 3020L	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 [3]	
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	
BOT 2800C	Plants in Human Affairs	
PLP 2000	Plants, Plagues and People	
PLP 2060	Fungus among Us: Mushrooms, Molds and Civilization	
PSB 3002	Physiological Psychology	
VEC 2100	World Herbs and Vegetables	
BA Electives [4]		
Approved biological science courses (minimum)		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 BA electives must be taken at UF.

Critical Tracking

Critical Tracking records each student's progress in courses that are required for progress toward 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 (https://cpm.flvc.org/advance-search/) 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

Semester 6

- Complete a minimum of 2 of the remaining Biology major 3000/4000 level required core courses

Semester 7

- Complete a minimum of 2 of the remaining Biology major 3000/4000 level required core courses

Semester 8

- Complete BSC 4936 (Capstone)
- Complete all remaining Biology major 3000/4000 level required core courses

Model Semester Plan

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).

Approved Biology electives may not count towards the 3000 level or above electives outside of the major.

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.

Course	Title	Credits
Semester One		
Quest 1 (Gen Ed Humanities)		3
BSC 1920	First Year Introduction: Biology at UF (recommended biology elective)	1
Select one:		3-4
CHM 1030	Basic Chemistry Concepts and Applications 1 (**Critical Tracking**; Gen Ed Physical Sciences)	
CHM 2045	General Chemistry 1	
& 2045L	and General Chemistry 1 Laboratory (**Critical Tracking**; Gen Ed Physical Sciences)	
MAC 1147	Precalculus Algebra and Trigonometry (**Critical Tracking**; State Core Gen Ed Mathematics)	4
State Core Gen Ed Composition (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext); Writing Requirement		3
	Credits	**14-15**
Semester Two		
Select one:		3-4
CHM 1031	Basic Chemistry Concepts and Applications 2 (**Critical Tracking**)	
CHM 2046	General Chemistry 2	
& 2046L	and General Chemistry 2 Laboratory (**Critical Tracking**)	
STA 2023	Introduction to Statistics 1 (Gen Ed Mathematics)	3
Gen Ed Composition; Writing Requirement		3
State Core Gen Ed Social and Behavioral Sciences (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
Elective		3-4
	Credits	**15-17**
Semester Three		
BSC 2010	Integrated Principles of Biology 1	4
& 2010L	and Integrated Principles of Biology Laboratory 1 (**Critical Tracking**; State Core Gen Ed Biological Sciences)	
Quest 2 (Gen Ed Biological, Physical, or Social and Behavioral Sciences)		3
Foreign language		5
Elective (or Gen Ed Social and Behavioral Sciences if Quest 2 course is not GE-S)		3
	Credits	**15**
Semester Four		
BSC 2011	Integrated Principles of Biology 2	4
& 2011L	and Integrated Principles of Biology Laboratory 2 (**Critical Tracking**; Gen Ed Biological Sciences)	
State Core Gen Ed Humanities (http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext)		3
Gen Ed Social and Behavioral Sciences		3
Foreign language		5
	Credits	**15**
Semester Five		
PHY 2004	Applied Physics 1	4
& 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		
PHY 2005	Applied Physics 2	4
& 2005L	and Laboratory for Applied Physics 2	

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		
Approved electives		9
Electives (3000 level or above, not in major)		6
	Credits	**15**
Semester Eight		
BSC 4936	Critical Analysis of Biological Research (**Critical Tracking**)	2
Approved electives		6
Electives (3000 level or above, not in major)		6
	Credits	**14**
	Total Credits	**120**

Approved Electives

Code	Title	Credits
AGR 4320	Plant Breeding	3
ALS 3153	Agricultural Ecology	3
ALS 4161	Exotic Species and Biosecurity Issues	3
ALS 4162	Consequences of Biological Invasions [1]	3
ALS 4163	Challenges in Plant Resource Protection [1]	3
ANS 3006 & 3006L	Introduction to Animal Science and Introduction to Animal Science Laboratory	4
ANS 3319C	Reproductive Physiology and Endocrinology in Domestic Animals	4
ANS 3440	Principles of Animal Nutrition	4
ANT 3514C	Introduction to Biological Anthropology	4
ANT 4531	Molecular Genetics of Disease	3
ANT 4552	Primate Behavior	3
ANT 4554C	Primate Evolution	3
ANT 4586	Human Evolution	3
APK 2100C	Applied Human Anatomy with Laboratory	4
BCH 4024	Introduction to Biochemistry and Molecular Biology	4
BMS 4136C	Human Histology	4
BOT 2710C	Practical Plant Taxonomy	3
BOT 2800C	Plants in Human Affairs	3
BOT 3151C	Local Flora of North Florida	3
BOT 3503 & 3503L	Physiology and Molecular Biology of Plants and Physiology and Molecular Biology of Plants Laboratory	5
BOT 4935	Special Topics	1-4
BSC 1920	First Year Introduction: Biology at UF	1
BSC 2862	Global Change Ecology and Sustainability	3
BSC 3307C	Climate Change Biology	4
BSC 3402	Theory and Practice in the Biological Sciences	2
BSC 3911	Entering Research in Biology	1
BSC 4821C	Evolutionary Biogeography	3
BSC 4910	Individual Mentored Research in Biology	0-3
BSC 4912	Advanced Mentored Research in Biology	0-4
BSC 4930	Special Topics in Biology	1-4
ENY 2890	Using Insect Research to Understand the Nature of Scientific Engagement	3
ENY 3005 & 3005L	Principles of Entomology and Principles of Entomology Laboratory	3
ENY 3007C	Life Science	3
ENY 3563	Introduction to Tropical Entomology	3
ENY 3564L	Tropical Entomology Field Laboratory	2
ENY 4161	Insect Classification	3
ENY 4210	Insects and Wildlife	3
ENY 4453	Behavioral Ecology and Systematics	3

ENY 4455C	Social Insects	3
ENY 4660 & 4660L	Medical and Veterinary Entomology and Medical and Veterinary Entomology Laboratory	3
FAS 4202C	Biology of Fishes	4
FAS 4305C	Introduction to Fishery Science	3
FOR 3342C	Tree Biology	3
GLY 3603C	Paleontology	4
HOS 3305	Introduction to Plant Molecular Biology	3
HOS 4304	Horticultural Physiology	3
HOS 4313C	Laboratory Methods in Plant Molecular Biology	2
HUN 4221	Nutrition and Metabolism	3
HUN 4445	Nutrition and Disease: Part 1	2
HUN 4446	Nutrition and Disease: Part 2	3
MCB 4203	Bacterial Pathogens	3
MCB 4271L	Antimicrobial Resistance Lab	1
MCB 4304	Genetics of Microorganisms	3
MCB 4320C	The Microbiome	3
MCB 4403	Prokaryotic Cell Structure and Function	3
MCB 4503	General Virology	3
NEM 3002	Principles of Nematology	3
PCB 3023	Essential Cell Biology	3
PCB 3109	Cancer Biology	3
PCB 3134	Eukaryotic Cell Structure and Function	3
PCB 3402	Disease Ecology and Evolution	3
PCB 3601C	Plant Ecology	3
PCB 4043C	General Ecology	4
PCB 4085	Genetical Ethics	1
PCB 4233	Immunology	3
PCB 4522	Molecular Genetics	3
PCB 4553	Population Genetics	4
PCB 4674	Evolution	4
PHI 3633	Bioethics	3
PLP 3002C	Fundamentals of Plant Pathology	4
PLS 3004C	Principles of Plant Science	3
PLS 3223 & 3223L	Plant Propagation and Plant Propagation Laboratory	3
PSB 3002	Physiological Psychology	3
PSB 3340	Behavioral Neuroscience	3
PSB 4434	Neurochemistry, Pharmacology and Behavior	3
PSB 4504	Developmental Psychobiology	3
PSB 4810	Neurobiology of Learning and Memory	3
SWS 4223	Environmental Biogeochemistry	3
WIS 3553C	Introduction to Conservation Genetics	4
WIS 4203C	Landscape Ecology and Conservation	3
WIS 4443C	Wetland Wildlife Ecology	4
WIS 4501	Introduction to Wildlife Population Ecology	3
WIS 4547C	Avian Field Techniques	2
WIS 4554	Conservation Biology	3
WIS 4601C	Quantitative Wildlife Ecology	3
WIS 4945	Wildlife Techniques	3
ZOO 3513C	Animal Behavior	4
ZOO 3603C	Evolutionary Developmental Biology	4
ZOO 3713C	Functional Vertebrate Anatomy	4
ZOO 4050	Animal Behavior	3
ZOO 4205C	Invertebrate Biodiversity	4
ZOO 4232	Human Parasitology	3
ZOO 4307C	Vertebrate Biodiversity	4
ZOO 4403C	Marine Biology	4
ZOO 4472C	Avian Biology	4
ZOO 4926	Special Topics in Zoology	1-4

[1] Only one of ALS 4162 and ALS 4163 can apply toward ALS credits.

Academic Learning Compact

Biology is the study of the many diverse forms, processes and systems of life. These studies range across all levels of the biological hierarchy, from the simplest to the most complex life forms, across all environments on the earth and across recent and evolutionary time that interconnects ancestors to their descendants.

To understand this vast diversity, the field of biology correspondingly relies on integrative and comparative approaches for the resolution of the general processes, principles and unifying themes that govern living systems. Biology is therefore very interdisciplinary and biologists rely on knowledge from the physical sciences and mathematics, as well as from across the disciplines and subdisciplines of biology for advances and breakthroughs.

The Biology major is administered jointly by the College of Agricultural and Life Sciences and the College of Liberal Arts and Sciences.

Before Graduating Students Must

- Achieve a passing score for all content subsections of the Major Field Test for Biology. Content subscore areas are molecular biology and genetics, organismal biology, evolution, ecology and population biology.
- Achieve a passing score on the analytical skills assessment indicator of the Major Field Test for Biology.
- Achieve a passing score on the bioethics module quiz in BSC 4936. The content of the module and quiz are reviewed and approved by a faculty committee.
- Achieve a passing score on the scientific literacy paper assignment given in BSC 4936. This paper is graded using a faculty-developed rubric.
- Complete requirements for the baccalaureate degree, as determined by faculty.

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

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

Assessment Types

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