BOTANY | BOTANICAL RESEARCH

The botany curriculum provides a broad background in the biology of plants, from the molecular to the organismic level. Students who major in botany will take courses in ecology, genetics, physiology, taxonomy, evolution, cells and tissues, molecular biology, and biodiversity of plants.

About this Program

- **College**: Liberal Arts and Sciences
- **Degree**: Bachelor of Science
- **Specializations**: General Botany
- **Credits for Degree**: 120
- **Additional Information**: Relevant Minors and/or Certificates

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

Small classes are taught by faculty who have a commitment to undergraduate education. Students participate in mentored research, assisting faculty with research projects on campus and abroad. The major prepares students for careers in industry and government agencies, for graduate and professional schools, and for teaching jobs in high schools.

General Botany

For students who may not intend to pursue a graduate degree but are interested in a career in plant biology. This specialization provides some flexibility in tailoring the courses needed in order to pursue specific interests. Students are encouraged to consult with an advisor and botany faculty member when deciding on which courses to take.

Botanical Research

For students who intend to pursue a graduate degree, and requires research with a faculty member. This specialization provides the coursework background typically required by botany graduate programs. Students are encouraged to consult with an advisor and biology faculty member when deciding on which courses to take.

Coursework for the Major

Required coursework is dependent upon the specialization. Coursework for each specialization can be found below under Critical Tracking and Model Semester Plan.

Relevant Minors and/or Certificates

Students majoring in botany can minor in most other disciplines, and this is a good way to organize students' electives around areas of interest. Note that botany majors cannot minor in biology, nor can biology majors minor in botany (the curricula for the botany and biology majors are too similar).

UFTeach Program

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

Research

Botany majors are strongly encouraged to participate in research, and research is required for the Botanical Research specialization. Research experience is valuable on many levels: it diversifies the college experience; it teaches students how scientists apply the knowledge gained in the classroom to real world questions; it provides the opportunity to work with and get to know researchers who are the best in their field; it introduces students to cutting edge scientific questions and techniques; it can enhance a student’s resume/CV when applying to graduate or professional school; and, finally, it is essential in helping students determine if science is a good career choice.

CLAS biology, botany, and zoology majors may participate in research for course credit, as a scholar (e.g., University Scholar, Science for Life Scholar, Beckman Scholar), as a volunteer, or, in rare cases, as a paid research assistant. Students who plan to enroll for course credit must contact potential research mentors, develop a project, and turn in the required application and proposal no later than the week of drop/add. If the window is missed, students should still contact potential research mentors to discuss upcoming opportunities.

More Info (https://biology.ufl.edu/undergraduates/research)

Related Botany Programs

- Combined Degree
- Bachelor of Science in Botany, CALS
- Botany minor

Botanical Research

This option provides a strong background in the basic sciences and research, and is intended for students who plan to attend graduate school. Minimum grades of C are required in the foundation and botany major requirements.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT 2010C &amp; BOT 2011C</td>
<td>Introductory Botany and Plant Diversity (preferred)</td>
<td>4-7</td>
</tr>
<tr>
<td>BSC 2010 &amp; 2010L</td>
<td>Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory 1</td>
<td>4</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>
</tr>
<tr>
<td>CHM 2045 &amp; 2045L</td>
<td>General Chemistry 1 and General Chemistry 1 Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHM 2046 &amp; 2046L</td>
<td>General Chemistry 2 and General Chemistry 2 Laboratory</td>
<td>4</td>
</tr>
</tbody>
</table>

Select one option: 8-10

Option A

- CHM 2210 | Organic Chemistry 1
- CHM 2211 | Organic Chemistry 2
| CHM 2211L | Organic Chemistry Laboratory |
| Option B |
| CHM 3217 & CHM 3218 | Organic Chemistry/Biochemistry 1 and 2 |
| CHM 2211L | Organic Chemistry Laboratory |
| MAC 2311 | Analytic Geometry and Calculus 1 |

Select one:

| STA 2023 | Introduction to Statistics 1 |
| COP 2800 | Computer Programming Using JAVA (or equivalent) |
| COP 3275 | Computer Programming Using C (or equivalent) |
| BSC 2891 | Python Programming for Biology |

Select one option: 3-8

| Option A |
| PHY 2053 & 2053L | Physics 1 and Laboratory for Physics 1 |
| PHY 2054 & 2054L | Physics 2 and Laboratory for Physics 2 |

| Option B |
| PHY 2048 & 2048L | Physics with Calculus 1 and Laboratory for Physics with Calculus 1 |
| PHY 2049 & 2049L | Physics with Calculus 2 and Laboratory for Physics with Calculus 2 |

**Required Courses for the Botanical Research Specialization**

| AGR 3303 | Genetics | 3-4 |
| or PCB 3063 | Genetics |
| PCB 4674 | Evolution | 4 |
| BOT 2710C | Practical Plant Taxonomy | 3 |
| BOT 3503 & 3503L | Physiology and Molecular Biology of Plants and Physiology and Molecular Biology of Plants Laboratory | 5 |
| BOT 4911 | Undergraduate Research in Botany | 2 |
| BSC 3911 | Entering Research in Biology | 1 |
| BSC 4936 | Critical Analysis of Biological Research | 2 |

**Ecology and Florida Biodiversity**

Select two: 6-8

| PCB 4043C | General Ecology |
| PCB 3601C | Plant Ecology |
| BOT 3151C | Local Flora of North Florida |
| BSC 3307C | Climate Change Biology |

**Cells and Tissues**

Select one: 3-4

| BOT 4935/5225C | Special Topics (Plant anatomy) |
| PCB 3023 | Essential Cell Biology |
| BCH 4024 | Introduction to Biochemistry and Molecular Biology |

**Biodiversity Breadth**

Select one: 3-4

| BOT 2011C | Plant Diversity |
| BOT 4650 | Plant Symbiosis |
| PCB 4460 | Biodiversity and Ecology Field Immersion |
| ZOO 4205C | Invertebrate Biodiversity |
| ZOO 4307C | Vertebrate Biodiversity |
| ZOO 4472C | Avian Biology |
| ZOO 4926 | Special Topics in Zoology (Mammalogy) |
| ENY 3005 & 3005L | Principles of Entomology and Principles of Entomology Laboratory |
| WIS 4934 | Topics in Wildlife Ecology and Conservation (Mammalogy) |
| PLP 3002C | Fundamentals of Plant Pathology |
| PLP 4653C | Basic Fungal Biology |
| MCB 2000 | Microbiology |
| & 2000L | and Microbiology Laboratory |
| MCB 3020 & 3020L | Basic Biology of Microorganisms and Laboratory for Basic Biology of Microorganisms |

**Total Credits**: 71-83

1. Students who choose BOT 2011C to fulfill the foundation requirements may not use BOT 2011C to fulfill the biodiversity breadth requirements for the major.
2. Must be taken concurrently with BOT 4911.

**Critical Tracking**

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.

Equivalent critical-tracking courses as determined by the State of Florida Common Course Prerequisites (http://www.flvc.org/cpp/displayRecord.jsp?cip=260301&track=01) may be used for transfer students.

**Semester 1**

- Complete 1 of 5 critical-tracking courses, including lab:
  - 2.0 UF GPA required

**Semester 2**

- Complete 1 additional critical-tracking course, including labs
  - 2.0 UF GPA required

**Semester 3**

- Complete 1 additional critical-tracking course, including labs, with a 2.5 GPA required for all critical-tracking courses
  - 2.0 UF GPA required

**Semester 4**

- Complete 1 additional critical-tracking course, including labs, with a 2.5 GPA required for all critical-tracking courses
  - 2.0 UF GPA required

**Semester 5**

- Complete all 5 critical-tracking courses, including labs, with a 2.5 GPA required for all critical-tracking courses
  - 2.0 UF GPA required

**Model Semester Plan**

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

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).

CHM 2211, CHM 2211L, PHY 2054, PHY 2054L, PHY 2049, and PHY 2049L count towards 3000 level or above electives outside of the major. COP 3275 may also count towards the requirement if taken.

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**
CHM 2045 & 2045L | General Chemistry 1 and General Chemistry 1 Laboratory (Critical Tracking; Gen Ed Physical Sciences) | 4
IDS 1161 | What is the Good Life (Gen Ed Humanities) | 3
MAC 2311 | Analytic Geometry and Calculus 1 (Critical Tracking; State Core Gen Ed Mathematics) | 4
State Core Gen Ed Composition [1](http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext); Writing Requirement | 3
BSC 1920 | First Year Introduction: Biology at UF (recommended elective) | 1
**Semester Two**
Select one:
BSC 2010 & 2010L | Integrated Principles of Biology 1 and Integrated Principles of Biology Laboratory 1 (Critical Tracking; Gen Ed Biological Sciences) | 3-4
BOT 2010C | Introductory Botany (Critical Tracking; Gen Ed Biological Sciences) | 3
CHM 2046 & 2046L | General Chemistry 2 and General Chemistry 2 Laboratory (Critical Tracking; Gen Ed Physical Sciences) | 4
State Core Gen Ed Social and Behavioral Sciences [1](http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext); Gen Ed Composition; Writing Requirement | 3
Elective | 2
**Semester Three**
Select one:
BSC 2011 & 2011L | Integrated Principles of Biology 2 and Integrated Principles of Biology Laboratory 2 (Critical Tracking; Gen Ed Biological Sciences) | 4
BOT 2011C | Plant Diversity (Critical Tracking; Gen Ed Biological Sciences) | 3
CHM 2210 | Organic Chemistry 1 (Gen Ed Physical Sciences) | 3
State Core Gen Ed Humanities [1](http://catalog.ufl.edu/UGRD/academic-programs/general-education/#genedcoursestext); Gen Ed Social and Behavioral Sciences | 6
**Semester Four**
CHM 2211 & 2211L | Organic Chemistry 2 and Organic Chemistry Laboratory | 5
PHY 2053 & 2053L | Physics 1 and Laboratory for Physics 1 (Gen Ed Physical Sciences) | 5
Select one:
STA 2023 | Introduction to Statistics 1 (Gen Ed Mathematics) | 3
COP 2800 | Computer Programming Using JAVA (or equivalent) | 3
COP 3275 | Computer Programming Using C (or equivalent; Gen Ed Mathematics) | 3
BSC 2891 | Python Programming for Biology | 3
Elective or Gen Ed Mathematics | 3
**Semester Five**
Select one:
PCB 4043C | General Ecology | 3
PCB 3601C | Plant Ecology | 4
BOT 3151C | Local Flora of North Florida | 5
BSC 3307C | Climate Change Biology | 5
PCB 4674 | Evolution | 4
PHY 2054 | Physics 2 | 5
& 2054L | and Laboratory for Physics 2 | 5
Gen Ed Humanities | 3
**Semester Six**
BSC 2710C | Practical Plant Taxonomy | 3
Select one:
BOT 4911 | Undergraduate Research in Botany | 3
& 4911C | and Entering Research in Biology | 3
Electives | 4
Foreign language | 5
**Semester Seven**
AGR 3303 | Genetics | 3-4
or PCB 3063 | or Genetics | 3-4
BOT 4911 | Undergraduate Research in Botany | 1-4
& BSC 3911 | and Entering Research in Biology | 1-4
Select one:
PCB 4043C | General Ecology | 3
PCB 3601C | Plant Ecology | 4
BOT 3151C | Local Flora of North Florida | 5
BSC 3307C | Climate Change Biology | 5
Foreign language | 5
**Semester Eight**
BSC 3307C | Climate Change Biology | 5
BSC 4936 | Critical Analysis of Biological Research | 2
Biodiversity breadth course | 3
Elective | 3
**Total Credits** | 117-126
Gen Ed Mathematics if COP 2800 or BSC 2891 taken for computational requirement.

Academic Learning Compact

The botany major is offered by both the College of Liberal Arts and Sciences and the College of Agricultural and Life Sciences. This major provides a foundation in the life sciences with emphasis on plant systems. Students will learn the diversity of life, the structure of organisms and ecosystems and how they function (i.e., the acquisition, flow, organization and uses of information, energy and nutrients in living systems). Students will learn the scientific method and how it facilitates the discovery of new knowledge in botany and biology, including how to critically evaluate hypotheses and conclusions.

Before Graduating Students Must

• Achieve acceptable performance in all required botany courses.
• 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

$I = Introduced; R = Reinforced; A = Assessed$

<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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<tbody>
<tr>
<td>BOT 2011C</td>
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Assessment Types

• Major field test for biology
• Bioethics quiz
• Scientific paper