Botany and plant pathology are concerned with the study of plants at all levels of biological organization, from molecular and cellular processes to the global ecosystem. This breadth of field reflects the wide range of issues and problems that confront plant biologists. In addition to addressing fundamental questions in plant biology, plant scientists in the 21st century will be called upon to provide information useful for producing food, fiber, and medicine for an increasing population, and for increasing our understanding of the diversity of plant and ecological systems and their interactions with humans. Students studying botany and plant pathology at OSU receive the basic science background necessary for such contributions, and may choose to focus in a particular area within plant science.

The undergraduate program in the Department of Botany and Plant Pathology is designed for students who wish to receive a BS in Botany degree and for students pursuing degrees in other fields that require a knowledge of plant biology. For example, students who have an undergraduate major in biology or environmental sciences may wish to emphasize botany courses in their upper-division course work.

Completion of the undergraduate curriculum in botany can qualify students for graduate work in various areas of plant biology and plant pathology, and for positions in state and federal agencies, and industries concerned with plants and their products.

Prospective botany majors should obtain a strong background in the biological and physical sciences at the high school level. Specifically recommended are a minimum of three years of high school mathematics, including algebra, geometry, and some exposure to trigonometry, one year of chemistry, one year of biology, one year of physics, and courses designed to develop computer and writing skills. Students without an adequate background in mathematics and science may make up these deficiencies early in their college careers.

Completion of one of the following options is required for the BS in Botany:

- Comprehensive Botany
- Customizable
- Ecology, Evolution, and Conservation
- Molecular, Cellular, and Genomic Botany
- Plant Pathology

**Major Code: 515**

- Communicate scientific concepts, experimental results and analytical arguments clearly and concisely verbally and in writing.
- Apply scientific methods, reasoning and appropriate mathematics to describe, explain and understand biological systems.
- Demonstrate understanding of five core concepts in biology: evolution; pathways and transformations of energy and matter; information flow, exchange, and storage; structure and function; and biological systems.
- Use interdisciplinary approaches (applying chemistry and quantitative skills) to work on biological problems.
- Describe the complex networks of interactions that determine energy flow and the cycling of water, carbon, nitrogen, and minerals within ecosystems.
- Identify and analyze the anatomical and morphological features of plants and plant structures as they enable plant function and reveal plant evolutionary histories.
- Recognize and describe the features of vascular plant groups using standard botanical terminology. Interpret the evolutionary and phylogenetic relationships of plants by evaluating analytical and experimental tools used to understand organismal diversity.
- Incorporate information from physiology, genetics, developmental biology, biochemistry and genomics to explain how plants integrate water-relations, mineral and organic nutrition, solute transport, respiration and photosynthesis, hormonal and environmental signals to regulate the processes of growth and reproduction.
- Describe and implement laboratory methods typically used in plant biology.

The required curriculum meets the course requirements of the university and the College of Agricultural Sciences and provides for a broad background in plant science. Completing an option and engaging in an experiential learning activity allows students to fulfill their individual education goals and prepare for career aspirations.

All Botany undergraduate majors are required to do the following:

1. Complete the core course curriculum meeting the requirements of the university, College of Agricultural Sciences, and Botany academic requirements.
2. Select and complete the course curriculum of a 21-credit option to obtain advanced scientific background and skills in a particular area of plant science. Students may select a pre-determined botany option from the catalog or create a customized option with approval of a BOT advisor. Course work delivered in the options provides students with advanced knowledge and skills related to the study of plants and plant-like organisms in natural and managed ecosystems and in the laboratory.
   1. Comprehensive Botany
   2. Customizable Option
   3. Ecology, Evolution, and Conservation
   4. Molecular, Cellular, and Genomic Botany
   5. Plant Pathology
3. Participate in an experiential learning and subsequent student seminar. Every Botany major is required to have an experiential learning (EL) component in their curriculum that is not part of a scheduled academic course. The EL component can take many forms but must involve a minimum of 60 hours of work and must have a substantial educational objective that is related to the BOT degree. Academic credit is not required but may be earned by enrolling in research (BOT 401) or internship (BOT 410). Paid and voluntary positions are both acceptable. To meet the requirement, the student and the EL supervisor must make a written agreement that is approved by a Botany advisor. After completion of the EL project, the student is required to participate in a 1-credit student seminar during Fall term of the senior year (BOT 407), to reflect on the EL project and to incorporate it into future career planning activities.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>HHS 231</td>
<td>*LIFETIME FITNESS FOR HEALTH</td>
<td>2</td>
</tr>
<tr>
<td>HHS 241</td>
<td>*LIFETIME FITNESS (or any PAC course)</td>
<td>1-2</td>
</tr>
<tr>
<td>WR 121</td>
<td>*ENGLISH COMPOSITION</td>
<td>3</td>
</tr>
<tr>
<td>Approved speech course COMM</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Additional approved writing WR II</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Perspective Courses**

- Cultural Diversity
- Literature and the Arts
- Social Processes and Institutions
- Western Culture

**Difference Power Discrimination**

3 credits

**Synthesis courses**

6 credits

Contemporary Global Issues

Science, Technology and Society

**Botany Core Course Requirements (fulfills BCC requirements in life sciences, physical sciences, and mathematics)**

### Biology

- **BB 314** CELL AND MOLECULAR BIOLOGY 4
- Select one of the following biology series (or their honors version): 12
  - **Series A**
    - BI 221 *PRINCIPLES OF BIOLOGY CELLS
    - & BI 222 and *PRINCIPLES OF BIOLOGY ORGANISMS
    - & BI 223 and *PRINCIPLES OF BIOLOGY POPULATIONS
  - **Series B**
    - BI 204 *INTRODUCTORY BIOLOGY I
    - & BI 205 and *INTRODUCTORY BIOLOGY II
    - & BI 206 and *INTRODUCTORY BIOLOGY III
- Select one of the following: 4
  - BI 311 GENETICS
  - PBG 430 PLANT GENETICS
  - & PBG 431 and PLANT GENETICS RECITATION

### Chemistry

Select one of the following: 15

- **Series A**
  - CH 121 GENERAL CHEMISTRY
  - CH 122 *GENERAL CHEMISTRY
  - CH 123 *GENERAL CHEMISTRY

- **Option B**
  - CH 231 GENERAL CHEMISTRY
  - & CH 261 and *LABORATORY FOR CHEMISTRY 231
  - CH 232 GENERAL CHEMISTRY
  - & CH 262 and *LABORATORY FOR CHEMISTRY 232
  - CH 233 GENERAL CHEMISTRY
  - & CH 263 and *LABORATORY FOR CHEMISTRY 233
  - CH 331 ORGANIC CHEMISTRY
  - & CH 332 and ORGANIC CHEMISTRY

### Additional Quantitative Skills

Select a minimum of two courses from the following: 7-9

- BOT 476 INTRODUCTION TO COMPUTING IN THE LIFE SCIENCES
- CS 161 INTRODUCTION TO COMPUTER SCIENCE I
- CS 162 INTRODUCTION TO COMPUTER SCIENCE II
- GEOG 360 GISCIENCE I: GEOGRAPHIC INFORMATION SYSTEMS AND THEORY
- GEOG 361 GISCIENCE II: ANALYSIS AND APPLICATIONS
- PH 201 *GENERAL PHYSICS
- PH 265 SCIENTIFIC COMPUTING
- ST 352 INTRODUCTION TO STATISTICAL METHODS
- ST 411 METHODS OF DATA ANALYSIS
  - Others by approval of advisor (or additional courses from Mathematics block)

### Writing Intensive Course

Select one course from the following: 3-4

- BI 371 *ECOLOGICAL METHODS
- BOT 323 *FLOWERING PLANTS OF THE WORLD
- HSTS 415 **THEORY OF EVOLUTION AND FOUNDATION OF MODERN BIOLOGY
- HSTS 419 **STUDIES IN SCIENTIFIC CONTROVERSY: METHODS AND PRACTICES
- HSTS 425 **HISTORY OF THE LIFE SCIENCES
- MB 311 *MOLECULAR MICROBIOLOGY LAB: A WRITING INTENSIVE COURSE

### Botany Core Courses

- BOT 220 *INTRODUCTION TO PLANT BIOLOGY 4
- BOT 313 PLANT STRUCTURE 4
- BOT 321 PLANT SYSTEMATICS 4
- BOT 331 PLANT PHYSIOLOGY 4
- BOT 332 LABORATORY TECHNIQUES IN PLANT BIOLOGY 3
- BOT 341 PLANT ECOLOGY 4
- BOT 407 SEMINAR 1

Select one non-vascular plant course from the following: 4-5

- BOT 416 AQUATIC BOTANY
- BOT 461 MYCOLOGY
- BOT 465 LICHENOLOGY
- BOT 466 BRYOLOGY

### Transcript Visible Option Courses

<table>
<thead>
<tr>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>ST 351 INTRODUCTION TO STATISTICAL METHODS</td>
<td>4</td>
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</table>

**Free Elective Courses**

- 23-29 credits

Total credits required for graduation is 180

* Baccalaureate Core Course (BCC)

^ Writing Intensive Course (WIC)
This outline is generally valid for students pursuing any of the botany options. Certain major requirements can be fulfilled by taking courses from each SELECT menu, such as the Math requirement, Additional Quantitative Skills, WIC, and Non-vascular plants. For clarity, the term-by-term map does not show all of these choices, which are dictated by a student's math placement, interests, and option. At least one of each type of course requirement is shown in the plan, and the full menus are provided at the end of the term-by-term. Students should be aware that some of these courses are needed to fulfill requirements for specific options. Students should also be aware that the Experiential Learning requirement should be completed before the start of the senior year.

**Major Code: 515**

Includes 21 credits of coursework in fulfillment of one of the BOT transcript-visible options

Students are encouraged to speak with an academic advisor to ensure that electives best fit the desired career path or interests

**First Year**

### Fall
- **BI 221** *PRINCIPLES OF BIOLOGY* CELLS (or *INTRODUCTORY BIOLOGY I*) 4
- Select one of the following: 5
  - **CH 121** GENERAL CHEMISTRY
  - **CH 231** GENERAL CHEMISTRY
  - and *LABORATORY FOR CHEMISTRY 231*
- **MTH 111** *COLLEGE ALGEBRA* 4
- or **MTH 112** or **MTH 231**
  - ELEMENTS OF DISCRETE MATHEMATICS
- **WR 121** *ENGLISH COMPOSITION* 3

### Winter
- **BI 222** *PRINCIPLES OF BIOLOGY* ORGANISMS (or *INTRODUCTORY BIOLOGY II*) 4
- Select one of the following: 5
  - **CH 122** GENERAL CHEMISTRY
  - **CH 232** GENERAL CHEMISTRY
  - and *LABORATORY FOR CHEMISTRY 232*
- **MTH 241** *CALCULUS FOR MANAGEMENT AND SOCIAL SCIENCE* 4
- or **MTH 245** or **MTH 251**
  - *MATHEMATICS FOR MANAGEMENT, LIFE, AND SOCIAL SCIENCES* or *DIFFERENTIAL CALCULUS*
- Approved Speech (COMM) course 3

### Spring
- **BI 223** *PRINCIPLES OF BIOLOGY* POPULATIONS (or *INTRODUCTORY BIOLOGY III*) 4
- Select one of the following: 5
  - **CH 123** GENERAL CHEMISTRY
  - **CH 233** GENERAL CHEMISTRY
  - and *LABORATORY FOR CHEMISTRY 233*
- **MTH 252** INTEGRAL CALCULUS 4
- **Perspective course** 3

### Second Year

### Fall
- **BOT 220** *INTRODUCTION TO PLANT BIOLOGY* 4
- **CH 331** ORGANIC CHEMISTRY 4
- **HHS 231** *LIFETIME FITNESS FOR HEALTH* 2

### Winter
- **BB 314** CELL AND MOLECULAR BIOLOGY 4
- **BOT 313** PLANT STRUCTURE 4
- **CH 332** ORGANIC CHEMISTRY 4
- **HHS 241** *LIFETIME FITNESS* (or any PAC course) 1-2
- **Perspective course** 3

### Spring
- **BOT 321** PLANT SYSTEMATICS 4
- **ST 351** INTRODUCTION TO STATISTICAL METHODS 4
- **Perspective course** 3
- **Approved elective, including credits towards the selected option** 3

### Third Year

### Fall
- **BB 450** GENERAL BIOCHEMISTRY 3
- Select one of the following: 4
  - **BI 311** GENETICS
  - **PBG 430** PLANT GENETICS
  - and PLANT GENETICS RECITATION
  - **BB 323** *FLOWERING PLANTS OF THE WORLD* (or other approved WIC course) 3
- **Approved electives, including credits towards the selected option** 6

### Winter
- **BB 451** GENERAL BIOCHEMISTRY 3
- **Approved elective, including credits towards the selected option** 3

### Fourth Year

### Fall
- **BOT 407** SEMINAR (for senior undergraduates) 1
- **CS 161** INTRODUCTION TO COMPUTER SCIENCE I (or other approved quantitative skills course) 4
- **Approved electives, including those for selected option** 10-12

### Winter
- **BOT 332** LABORATORY TECHNIQUES IN PLANT BIOLOGY 3
- **ST 352** INTRODUCTION TO STATISTICAL METHODS (or other approved quantitative skills course) 4
- **Approved electives, including those for selected option** 8-10

### Spring
- **BOT 341** PLANT ECOLOGY 4
- **BOT 465** or **BOT 466** LICHENOLOGY (for students who did not take BOT 461, Mycology) or BRYOLOGY 4
8 Mathematics credits should be taken during the First Year. Path depends on student's Math Placement score. All students must complete through MTH 112 during the First Year. Specific options require high-level math courses.

* Baccalaureate Core Course (BCC)

^ Writing Intensive Course (WIC)