BOTANY UNDERGRADUATE MAJOR (BS, HBS)

This major offers the following option(s):

- Comprehensive Botany (http://catalog.oregonstate.edu/college-departments/agricultural-sciences/botany-plant-pathology/botany-bs-hbs/comprehensive-botany-option/)
- Customizable (http://catalog.oregonstate.edu/college-departments/agricultural-sciences/botany-plant-pathology/botany-bs-hbs/customizable-option/)
- Ecology, Evolution, and Conservation (http://catalog.oregonstate.edu/college-departments/agricultural-sciences/botany-plant-pathology/botany-bs-hbs/ecology-evolution-conservation-option/)
- Molecular, Cellular, and Genomic Botany (http://catalog.oregonstate.edu/college-departments/agricultural-sciences/botany-plant-pathology/botany-bs-hbs/molecular-cellular-genomic-botany-option/)
- Plant Pathology (http://catalog.oregonstate.edu/college-departments/agricultural-sciences/botany-plant-pathology/botany-bs-hbs/plant-pathology-option/)

Also available via Ecampus.

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 (Corvallis campus only)
- Customizable (Ecampus and Corvallis campus)
- Ecology, Evolution, and Conservation (Corvallis campus only)
- Molecular, Cellular, and Genomic Botany (Corvallis campus only)
- Plant Pathology (Corvallis campus only)

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.

Code	Title	Credits
Baccalaureate Core Course Requirements (not fulfilled within BOT major requirements)		
HHS 231	*LIFETIME FITNESS FOR HEALTH	2
HHS 241	*LIFETIME FITNESS (or any PAC course)	1-2
WR 121	*ENGLISH COMPOSITION	3
Approved speech course COMM		3
Additional approved writing WR II		3
Perspective Courses		*12*
Cultural Diversity		
Literature and the Arts		
Social Processes and Institutions		
Western Culture		
Difference Power Discrimination		*3*
Synthesis courses		*6*
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 & BI 222 & BI 223	*PRINCIPLES OF BIOLOGY: CELLS and *PRINCIPLES OF BIOLOGY: ORGANISMS and *PRINCIPLES OF BIOLOGY: POPULATIONS	
Series B		
BI 204 & BI 205 & BI 206	*INTRODUCTORY BIOLOGY I and *INTRODUCTORY BIOLOGY II and *INTRODUCTORY BIOLOGY III	
Select one of the following:		4
BI 311	GENETICS	
PBG 430 & PBG 431	PLANT GENETICS 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 & CH 261	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 231	
CH 232 & CH 262	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 232	
CH 233 & CH 263	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 233	
CH 331 & CH 332	ORGANIC CHEMISTRY and ORGANIC CHEMISTRY	8
Biochemistry		
Select one of the following:		4-7
BB 350	ELEMENTARY BIOCHEMISTRY	
BB 450 & BB 451	GENERAL BIOCHEMISTRY and GENERAL BIOCHEMISTRY	
Mathematics		
Select 8 credits of the following:		8
MTH 111	*COLLEGE ALGEBRA	
MTH 112	*ELEMENTARY FUNCTIONS	
MTH 231	ELEMENTS OF DISCRETE MATHEMATICS	
MTH 241	*CALCULUS FOR MANAGEMENT AND SOCIAL SCIENCE	
MTH 245	*MATHEMATICS FOR MANAGEMENT, LIFE, AND SOCIAL SCIENCES	
MTH 251	*DIFFERENTIAL CALCULUS	
MTH 252	INTEGRAL CALCULUS	
Statistics		
ST 351	INTRODUCTION TO STATISTICAL METHODS	4
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 [1]		**21**
Free Elective Courses [2]		**23-29**
Total credits required for graduation is 180		

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Baccalaureate Core Course (BCC)

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Writing Intensive Course (WIC)

1

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

2

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

Major Code: 515

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.

First Year		
Fall		**Credits**
BI 221 or BI 204	*PRINCIPLES OF BIOLOGY: CELLS or *INTRODUCTORY BIOLOGY I	4
Select one of the following:		5
CH 121	GENERAL CHEMISTRY	
CH 231 & CH 261	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 231	
MTH 111 or MTH 112 or MTH 231	*COLLEGE ALGEBRA or *ELEMENTARY FUNCTIONS or ELEMENTS OF DISCRETE MATHEMATICS	4
WR 121	*ENGLISH COMPOSITION	3
	Credits	16
Winter		
BI 222 or BI 205	*PRINCIPLES OF BIOLOGY: ORGANISMS or *INTRODUCTORY BIOLOGY II	4
Select one of the following:		5
CH 122	*GENERAL CHEMISTRY	
CH 232 & CH 262	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 232	
MTH 241 or MTH 245 or MTH 251	*CALCULUS FOR MANAGEMENT AND SOCIAL SCIENCE or *MATHEMATICS FOR MANAGEMENT, LIFE, AND SOCIAL SCIENCES or *DIFFERENTIAL CALCULUS	4
Approved Speech (COMM) course		3
	Credits	16
Spring		
BI 223 or BI 206	*PRINCIPLES OF BIOLOGY: POPULATIONS or *INTRODUCTORY BIOLOGY III	4
Select one of the following:		5
CH 123	*GENERAL CHEMISTRY	
CH 233 & CH 263	GENERAL CHEMISTRY and *LABORATORY FOR CHEMISTRY 233	
MTH 252	INTEGRAL CALCULUS [1]	4
Perspective course		3
	Credits	16
Second Year		
Fall		
BOT 220	*INTRODUCTION TO PLANT BIOLOGY	4
CH 331	ORGANIC CHEMISTRY	4
HHS 231	*LIFETIME FITNESS FOR HEALTH	2
Additional approved writing (WR II) course		3
	Credits	13
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
Perspectives course		3
	Credits	16-17
Spring		
BOT 321	PLANT SYSTEMATICS	4
ST 351	INTRODUCTION TO STATISTICAL METHODS	4
Perspectives course		3
Approved elective, including credits towards the selected option		3
	Credits	14
Third Year		
Fall		
BB 450	GENERAL BIOCHEMISTRY	4
BOT 461	MYCOLOGY	5
Synthesis course		3
Approved elective, including credits towards the selected option		3
	Credits	15
Winter		
BB 451	GENERAL BIOCHEMISTRY	3
Select one of the following:		4
BI 311	GENETICS	
PBG 430 & PBG 431	PLANT GENETICS and PLANT GENETICS RECITATION	
BOT 323	^FLOWERING PLANTS OF THE WORLD (or other approved WIC course)	3
Approved electives, including credits towards the selected option		6
	Credits	16
Spring		
BB 350	ELEMENTARY BIOCHEMISTRY (For those who did not take BB 450 and BB 451)	4
BOT 331	PLANT PHYSIOLOGY	4
Perspectives courses		3
Synthesis course		3
Approved elective, including credits towards the selected option for students not taking BB 350		3
Note: Students should complete experiential learning activity before the beginning of the Fourth Year		
	Credits	17
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
	Credits	15-17
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
	Credits	15-17
Spring		
BOT 341	PLANT ECOLOGY	4
BOT 465 or BOT 466	LICHENOLOGY (For students who did not take BOT 461, Mycology) or BRYOLOGY	4

Approved electives, including those for selected option	7-10
Credits	15-18
Total Credits	184-192

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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.

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Baccalaureate Core Course (BCC)

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Writing Intensive Course (WIC)