

PLANT SCIENCES, BACHELOR OF SCIENCE

College of Agricultural & Environmental Sciences

The Plant Sciences major is designed for students who are interested in a scientific understanding of how plants grow and develop in managed agricultural ecosystems and how plant products are utilized for food, fiber and environmental enhancement. Advances in science and technology have provided new insights and options for using plants to address the issues associated with providing renewable food, fiber and energy resources for a growing global population while minimizing adverse impacts on the natural environment. Graduates in Plant Sciences are able to apply their skills and knowledge to a diverse range of agricultural and environmental goals or pursue advanced degrees in plant sciences.

The Program

The curriculum provides depth in the biological and physical sciences and a sound understanding of how plants obtain and utilize resources from their environment to sustain their growth and development. The influences of genetics, management systems and environmental inputs on crop development and productivity are emphasized along with the postharvest preservation and marketing of plant products. Students will develop an area of specialization with options in Crop Production, Plant Genetics & Breeding, or Postharvest Biology & Technology. An Individual option is also available to match specific subject matter or career goal interests in the plant sciences. All students gain practical experience through a combination of practical laboratory courses and internships. Students may also pursue an Honors thesis in their senior year.

Advising

Advising for the major is located in 1220 Plant & Environmental Sciences; Plant Sciences Advising (plsadvising@ucdavis.edu). For more information, see Student Advising (<https://www.plantsciences.ucdavis.edu/contact-us>).

Lead Faculty Advisor

Bárbara Blanco-Ulate

Career Alternatives

Graduates from this program are prepared to pursue a wide range of careers, including various technical and management positions in agricultural & business enterprises, farming, or consulting; public, private & non-profit agencies; Cooperative Extension; international development; teaching; or agricultural & environmental journalism and communication services. Graduates are qualified to pursue graduate studies in the natural and agricultural sciences, such as plant biology, genetics, breeding, horticulture, agronomy, biotechnology, ecology, environmental studies, pest management, education, or business management.

The major requirements below are in addition to meeting University Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/university-degree-requirements/>) & College Degree Requirements (<https://catalog.ucdavis.edu/undergraduate-education/college-degree-requirements/>); unless otherwise noted. The minimum number of units required for the Plant Sciences Bachelor of Science is 104.

Code	Title	Units
Preparatory Subject Matter		
<i>Biological Science</i>		10
BIS 002A & BIS 002B	Introduction to Biology: Essentials of Life on Earth and Introduction to Biology: Principles of Ecology & Evolution	
OR		
BIO 001 & 001L & BIO 002 & BIO 002L	Introductory Biology: Ecology & Evolution and Introductory Biology Lab: Ecology & Evolution and Introductory Biology: Molecules to Cells and Introductory Biology Lab: Molecules to Cells	
<i>Plant Sciences & Statistics</i>		12
PLS 002	Botany & Physiology of Cultivated Plants	
PLS 003	Seminar: Overview of the Plant Sciences Major	
PLS 021 or PLS 021V	Application of Computers in Technology	
PLS 120	Applied Statistics in Agricultural Sciences	
<i>Chemistry</i>		16-22
CHE 002A & CHE 002B	General Chemistry and General Chemistry	
<i>Choose a series:</i>		
CHE 008A & CHE 008B	Organic Chemistry: Brief Course and Organic Chemistry: Brief Course	
OR		
CHE 118A & CHE 118B & CHE 118C	Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences and Organic Chemistry for Health & Life Sciences	
<i>Physics</i>		4-8
PHY 007A & PHY 007B	General Physics and General Physics	
OR		
PHY 001A & PHY 001B	Principles of Physics and Principles of Physics	
OR		
PLS 022	Introductory Plant Biophysics	
<i>Mathematics</i>		8
MAT 017A & MAT 017B	Calculus for Biology & Medicine and Calculus for Biology & Medicine	
OR		
MAT 019A & MAT 019B	Calculus for Data-Driven Applications and Calculus for Data-Driven Applications	
Preparatory Subject Matter Subtotal		50-60
Depth Subject Matter		
<i>Soil Science</i>		5
SSC 100	Principles of Soil Science	
<i>Plant Science</i>		25
PLS 100A	Metabolic Processes of Cultivated Plants	

PLS 100B	Growth & Yield of Cultivated Plants
PLS 100C	Environmental Interactions of Cultivated Plants
PLS 100AL	Metabolic Processes of Cultivated Plants Laboratory
PLS 100BL	Growth & Yield of Cultivated Plants Laboratory
PLS 100CL	Environmental Interactions of Cultivated Plants Laboratory
PLS 101	Agriculture & the Environment
PLS 152	Plant Genetics
PLS 192	Internship (Capstone Experience: Internship/Research Report)
or PLS 199	Special Study for Advanced Undergraduates

Restricted electives; choose at least two from two different categories: 7-10

Plant Diversity/Evolution/Taxonomy

ENH 006	Introduction to Environmental Plants
EVE 100	Introduction to Evolution
EVE 127	Systematics of Vascular Plants
or PLB 127	Systematics of Vascular Plants
or PLS 127	Systematics of Vascular Plants
PLB 143	Evolution of Crop Plants
PLS/PLB 116	Plant Morphology & Evolution

Ecology

ENH 160 & 160L	Restoration Ecology and Restoration Ecology Laboratory
PLB/EVE 117	Plant Ecology
PLS 136Y	Management of Grazed Ecosystems
PLS 147 & 147L	California Plant Communities and California Plant Communities Field Study
PLS 150	Sustainability & Agroecosystem Management

Pest Management

ENT 110	Arthropod Pest Management
NEM 100	Introduction to Nematode Parasites
PLB/EVE 119	Population Biology of Invasive Plants & Weeds
PLP 120	Introduction to Plant Pathology
PLS 105	Concepts in Pest Management
PLS 176	Introduction to Weed Science

Depth Subject Matter Subtotal 37-40

Areas of Specialization; choose one: 17-34

In consultation with an advisor, a student may complete requirements for more than one specialization, which can be noted on the student's transcript.

Applied Plant Ecology Option (<https://catalog.ucdavis.edu/departments-programs-degrees/plant-sciences/plant-science-bs/#ecological>)

Crop Production & Agroecology Option (<https://catalog.ucdavis.edu/departments-programs-degrees/plant-sciences/plant-science-bs/#cropp>)

Crop Quality & Safety Option (<https://catalog.ucdavis.edu/departments-programs-degrees/plant-sciences/plant-science-bs/#cropq>)

Environmental Horticulture & Urban Ecology Option (<https://catalog.ucdavis.edu/departments-programs-degrees/plant-sciences/plant-science-bs/#environmental>)

Individual Option (<https://catalog.ucdavis.edu/departments-programs-degrees/plant-sciences/plant-science-bs/#ind>)

Plant Breeding, Genetics, & Genomics Option (<https://catalog.ucdavis.edu/departments-programs-degrees/plant-sciences/plant-science-bs/#plantb>)

Plant Informatics Option (<https://catalog.ucdavis.edu/departments-programs-degrees/plant-sciences/plant-science-bs/#plant>)

Total Units

104-134

Areas of Specialization

Applied Plant Ecology Option

Code	Title	Units
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Required Major Electives (not included in AOS unit count):

EVE 127	Systematics of Vascular Plants	
or PLB 127	Systematics of Vascular Plants	
or PLS 127	Systematics of Vascular Plants	

Plant & Ecosystem Ecology; choose at least four: 12-17

ENH 100	Urban Forests are Nature-Based Solutions	
ENH 120	Management of Container Media	
ENH 133	Woody Plants in the Landscape: Growth, Ecology & Management	
ENH 160 & 160L	Restoration Ecology and Restoration Ecology Laboratory ¹	
ESM 141	Role of Fire in Natural Ecosystems	
PLB 117	Plant Ecology ¹	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	
PLS 130	Grassland Ecology	
PLS 136Y	Management of Grazed Ecosystems	
PLS/ESM 144	Trees & Forests	
PLS 147 & 147L	California Plant Communities and California Plant Communities Field Study ¹	
PLS 148	Field Course: Flora of Northern California's Mountains	
PLS 150	Sustainability & Agroecosystem Management	
PLS 162	Urban Ecology	
PLS 163	Ecosystem & Landscape Ecology	

Environmental Analysis, Monitoring, Policy, and Outreach; choose at least one: 3-5

EDU 142	Introduction to Environmental Education	
ESM 108	Environmental Monitoring	
ESM 185	Aerial Photo Interpretation & Remote Sensing	
ESM 186	Environmental Remote Sensing	
ESP 160	The Policy Process	
ESP 172	Public Lands Management	

ESP 179	Environmental Impact Assessment	
LED/ABT 150/ LDA 150 DISCONTINUED FOR WINTER 2026 **	Introduction to Geographic Information Systems	
PLS 125	Proximal & Remote Sensing of Plants	
Internship:		2
PLS 192	Internship	
Total Units		17-24

¹ Suggest selecting one of these to meet the major's Ecology depth requirement.

** Course(s) discontinued; see your advisor for course options.

Crop Production & Agroecology Option

Code	Title	Units
Required Major Electives; not included in AOS unit count:		
PLS 150	Sustainability & Agroecosystem Management	
Required courses:		8
HYD 124	Plant-Water-Soil Relationships	
PLS 158	Mineral Nutrition of Plants	
Production; choose two:		4-9
ENH 120	Management of Container Media	
ENH 125	Greenhouse & Protected Cultivation Systems	
PLS 007	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
or PLS 007V	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
PLS 013	Chocolate, Covered: The Past, Present, & Future of Cacao	
PLS 049	Organic Crop Production Practices	
PLS 110	Crop Management Systems for Vegetable Production	
PLS 111	Principles of Crop Production	
PLS 112	Forage Crop Production	
PLS 113	Biological Applications in Fruit Tree Management	
PLS 114	Biological Applications in Fruit Production	
PLS/ESM 144	Trees & Forests	
PLS/IAD 160	Agroforestry: Global & Local Perspectives	
PLS 170A	Fruit & Nut Cropping Systems	
PLS 170B	Fruit & Nut Cropping Systems	
PLS 171	Principles & Practices of Plant Propagation	
Advanced Soil Science; choose one:		3-4
SSC 111	Soil Microbiology	
SSC 102	Environmental Soil Chemistry	
SSC 112	Soil Ecology	
SSC 109	Sustainable Nutrient Management	
Global Food Systems; choose one:		4
ARE 015	Population, Environment & World Agriculture	

CRD 020	Food Systems	
IAD 010	Introduction to International Agricultural Development	
Pest Management; choose one in addition to core:		3-5
ENT 110	Arthropod Pest Management	
NEM 100	Introduction to Nematode Parasites	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	
PLP 120	Introduction to Plant Pathology	
PLS 105	Concepts in Pest Management	
PLS 176	Introduction to Weed Science	
VEN 118	Grapevine Pests, Diseases & Disorders	
Outreach & Communication; choose one:		3-4
AED 100	Concepts in Agricultural & Environmental Education	
EDU 142	Introduction to Environmental Education	
Total Units		25-34

Crop Quality & Safety Option

Code	Title	Units
Required Courses:		
PLS 172	Biology and Quality of Harvested Crops	
PLS 174	Microbiology & Safety of Fresh Fruits & Vegetables	
Depth; choose 12 units:		12
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption	
FST 109	Principles of Quality Assurance in Food Processing	
FST 117	Design & Analysis for Sensory Food Science	
FST 131	Food Packaging	
PLS 006	Flower Power; Art & Science of Flowers & Their Uses	
or PLS 006V	Flower Power; Art & Science of Flowers & Their Uses	
PLS 007	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
or PLS 007V	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
PLS 013	Chocolate, Covered: The Past, Present, & Future of Cacao	
PLS 113	Biological Applications in Fruit Tree Management	
PLS 114	Biological Applications in Fruit Production	
PLS 123	Introduction to Plant & Crop Systems Modeling	
PLS 124	Introduction to Digital Agriculture	
PLS 125	Proximal & Remote Sensing of Plants	
Total Units		19

Environmental Horticulture & Urban Ecology Option

Code	Title	Units
Required Major Electives; not included in AOS unit count:		
ENH 006	Introduction to Environmental Plants	
PLS 105	Concepts in Pest Management	
Required Courses:		7
PLS 162	Urban Ecology	
PLS 157	Physiology of Environmental Stresses in Plants	
Depth		
<i>Choose at least three of the following:</i>		<i>9-13</i>
ENH 100	Urban Forests are Nature-Based Solutions	
ENH 120	Management of Container Media	
ENH 125	Greenhouse & Protected Cultivation Systems	
ENH 133	Woody Plants in the Landscape: Growth, Ecology & Management	
LED/ABT 150/ LDA 150 DISCONTINUED FOR WINTER 2026 **	Introduction to Geographic Information Systems	
PLS 123	Introduction to Plant & Crop Systems Modeling	
PLS 158	Mineral Nutrition of Plants	
PLS 171	Principles & Practices of Plant Propagation	
SSC 112	Soil Ecology	
<i>Choose one:</i>		<i>4</i>
ESP 171	Urban & Regional Planning	
ESP 179	Environmental Impact Assessment	
Total Units		20-24

** Course(s) discontinued; see your advisor for course options.

Individual Option

Code	Title	Units
Choose a minimum of 20 upper division units, with approval from the master advisor, to form a coherent program of study resulting in expertise and competence in a sub-discipline of plant sciences.		20
Total Units		20

Plant Breeding, Genetics, & Genomics Option

Code	Title	Units
Required courses:		
BIT 160	Principles of Plant Biotechnology	
BIT 161B	Plant Genetics & Biotechnology Laboratory	
BIT 171	Professionalism & Ethics in Genomics & Biotechnology	
PLS 154	Introduction to Plant Breeding	
Production; choose one:		2-5
ENH 120	Management of Container Media	
ENH 125	Greenhouse & Protected Cultivation Systems	
PLS 007	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	

or PLS 007V	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
PLS 049	Organic Crop Production Practices	
PLS 110	Crop Management Systems for Vegetable Production	
PLS 111	Principles of Crop Production	
PLS 112	Forage Crop Production	
PLS 113	Biological Applications in Fruit Tree Management	
PLS 114	Biological Applications in Fruit Production	
PLS/ESM 144	Trees & Forests	
PLS/IAD 160	Agroforestry: Global & Local Perspectives	
PLS 170A	Fruit & Nut Cropping Systems	
PLS 170B	Fruit & Nut Cropping Systems	
PLS 171	Principles & Practices of Plant Propagation	
Restricted Elective; choose one:		3-5
BIT 150	Applied Bioinformatics	
Choose one additional course from either Production or Depth Subject Matter.		
Total Units		19-24

Plant Informatics Option

Code	Title	Units
Required courses:		
BIT 150	Applied Bioinformatics	
PLS 123	Introduction to Plant & Crop Systems Modeling	
PLS 124	Introduction to Digital Agriculture	
PLS 125	Proximal & Remote Sensing of Plants	
Depth; choose three:		11-12
ABT 060	Introduction to Unmanned Aerial Systems for Agriculture & Environmental Science	
ABT 150	Introduction to Geographic Information Systems	
HYD 124	Plant-Water-Soil Relationships	
MCB 185	Computer Programming for Biologists	
PLS 157	Physiology of Environmental Stresses in Plants	
TAE 030	Mobile Communication & Computing Technologies for Agriculture & the Environment	
TAE 100	Smart Control Systems for Agricultural & Environmental Technologies	
Total Units		24-25