

PLANT SCIENCES, BACHELOR OF SCIENCE

College of Agricultural & Environmental Sciences

The Major Program

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.

Master Advisor

Daniel Potter (<https://www.plantsciences.ucdavis.edu/people/daniel-potter/>)

Advising for the major is located in 1220 Plant & Environmental Sciences. Please visit our department website (<https://www.plantsciences.ucdavis.edu/undergraduate/>) for more information.

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.

Code	Title	Units
Preparatory Subject Matter		
<i>Biological Science</i>		10
BIS 002A	Introduction to Biology: Essentials of Life on Earth	
BIS 002B	Introduction to Biology: Principles of Ecology & Evolution	
<i>Plant Sciences & Statistics</i>		12

PLS 002	Botany & Physiology of Cultivated Plants	
PLS 003	Seminar: Overview of the Plant Sciences Major (Pending Approval)	
PLS 021 or PLS 021V	Application of Computers in Technology	
PLS 120	Applied Statistics in Agricultural Sciences	
<i>Chemistry</i>		16-22
CHE 002A	General Chemistry	
CHE 002B	General Chemistry	
<i>Choose a series:</i>		
CHE 008A	Organic Chemistry: Brief Course	
CHE 008B	Organic Chemistry: Brief Course	
OR		
CHE 118A	Organic Chemistry for Health & Life Sciences	
CHE 118B	Organic Chemistry for Health & Life Sciences	
CHE 118C	Organic Chemistry for Health & Life Sciences	
<i>Physics</i>		12
PHY 007A	General Physics	
PHY 007B	General Physics	
PHY 007C	General Physics	
<i>Mathematics</i>		8
MAT 017A	Calculus for Biology & Medicine	
MAT 017B	Calculus for Biology & Medicine	
Preparatory Subject Matter Subtotal		58-64
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	
<i>Restricted electives; choose at least two from two different categories:</i>		7-10
<i>Plant Diversity/evolution/taxonomy</i>		
ENH 105	Taxonomy & Ecology of Environmental Plant Families	
EVE 100	Introduction to Evolution	
PLB/PLS 102	California Floristics	
PLB/EVE 108	Systematics & Evolution of Angiosperms	

PLB 143	Evolution of Crop Plants	
PLS/PLB 116	Plant Morphology & Evolution	
<i>Ecology</i>		
PLB/EVE 117	Plant Ecology	
PLS 150	Sustainability & Agroecosystem Management	
ENH 160 series:		
ENH 160	Restoration Ecology	
ENH 160L	Restoration Ecology Laboratory	
PLS 147 series:		
PLS 147	California Plant Communities	
PLS 147L	California Plant Communities Field Study	
<i>Pest management</i>		
PLP 120	Introduction to Plant Pathology	
ENT 110	Arthropod Pest Management	
NEM 100	Plant Nematology	
PLS 105	Concepts in Pest Management	
PLS 176	Introduction to Weed Science	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	
Depth Subject Matter Subtotal		37-40
Areas of Specialization; choose one*:		21-34
*In consultation with an advisor, a student may complete requirements for more than one specialization, which can be noted on the student's transcript.		
Plant Informatics Option (p. 2)		
Ecological Management & Restoration Option (p. 2)		
Environmental Horticulture & Urban Landscape Management Option (p. 2)		
Crop Production & Agroecology Option (p. 3)		
Plant Breeding, Genetics, & Genomics Option (p. 3)		
Crop Quality and Safety Option (p. 4)		
Individual Option (p. 4)		
Total Units		116-138

Areas of Specialization

Plant Informatics Option

Code	Title	Units
Required courses:		15
PLS 124	Introduction to Digital Agriculture (Pending Approval)	3
PLS 125	(Pending Approval)	3
PLS 123	Introduction to Plant & Crop Systems Modeling	3
BIT 150	Applied Bioinformatics	4
Depth (choose 3):		11-12
PLS 105	Concepts in Pest Management	3
ABT/LDA 150	Introduction to Geographic Information Systems	4
PLS 150	Sustainability & Agroecosystem Management	4
PLS 157	Physiology of Environmental Stresses in Plants	4

PLS 158	Mineral Nutrition of Plants	4
HYD 124	Plant-Water-Soil Relationships	4

Ecological Management & Restoration Option

Code	Title	Units
Required Major Electives (not included in AOS unit count):		24-32
PLS/PLB 102	California Floristics	5
Ecological Management and Restoration (Choose at least 4):		12-17
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	3
ENH 120	Management of Container Media	3
PLS 130	Rangelands: Ecology, Conservation & Restoration	3
PLS 135	Ecology & Community Structure of Grassland & Savannah Herbivores	3
ESM 141	Role of Fire in Natural Ecosystems	4
PLS/ESM 144	Trees & Forests	4
PLS 147 & 147L	California Plant Communities and California Plant Communities Field Study	4
PLS 150	Sustainability & Agroecosystem Management	4
ESP 155	Wetland Ecology	4
ENH 160 & 160L	Restoration Ecology and Restoration Ecology Laboratory	5
PLS 162	Urban Ecology	3
PLS 163	Ecosystem & Landscape Ecology	4
PLS 171	Principles & Practices of Plant Propagation	4
Environmental Analysis, Monitoring, and Policy (Choose at least 2):		7-9
ESM 108	Environmental Monitoring	3
LDA/ABT 150	Introduction to Geographic Information Systems	4
ESP 160	The Policy Process	4
ESP 172	Public Lands Management	4
ESP 179	Environmental Impact Assessment	4
Outreach and Communication (choose 1):		3-4
EDU 142	Introduction to Environmental Education	4
Internship:		2
PLS 164	Practicum in Ecological Restoration	1
PLS 192	Internship	1-2

Environmental Horticulture & Urban Landscape Management Option

Code	Title	Units
Required major electives (not included in AOS unit count):		
PLS 105	Concepts in Pest Management	3
ENH 105	Taxonomy & Ecology of Environmental Plant Families	4
Required courses:		8
PLS 162	Urban Ecology	3
PLS 157	Physiology of Environmental Stresses in Plants	4
Depth		

<i>Choose at least 3 of the following:</i>	9-13
ENH 100 Urban Forestry	4
ENH 133 Woody Plants in the Landscape: Growth, Ecology & Management	4
SSC 112 Soil Ecology	3
LDA/ABT 150 Introduction to Geographic Information Systems	4
ENH 120 Management of Container Media	3
ENH 125 Greenhouse & Nursery Crop Production	5
PLS 171 Principles & Practices of Plant Propagation	4
PLS 158 Mineral Nutrition of Plants	4
PLS 123 Introduction to Plant & Crop Systems Modeling	3
<i>Choose one:</i>	4
ESP 171 Urban & Regional Planning	4
ESP 179 Environmental Impact Assessment	4

Crop Production & Agroecology Option

Code	Title	Units
Required major electives (not included in AOS unit count):		
PLS 150	Sustainability & Agroecosystem Management	4
Required courses: 8		
HYD 124	Plant-Water-Soil Relationships	4
PLS 158	Mineral Nutrition of Plants	4
Production (choose 2): 4-9		
PLS 049	Organic Crop Production Practices	3
PLS 112	Forage Crop Production	3
PLS 113	Biological Applications in Fruit Tree Management	2
PLS 114	Biological Applications in Fruit Production	2
PLS/IAD 160	Agroforestry: Global & Local Perspectives	3
PLS 170A	Fruit & Nut Cropping Systems	2
PLS/ESM 144	Trees & Forests	4
PLS 170B	Fruit & Nut Cropping Systems	2
PLS 007	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	4
or PLS 007V	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
ENH 125	Greenhouse & Nursery Crop Production	5
PLS 110	Crop Management Systems for Vegetable Production	4
ENH 120	Management of Container Media	3
PLS 111	Principles of Agronomic Crop Production Systems	4
PLS 171	Principles & Practices of Plant Propagation	4
Advanced soil science (choose 1): 3-4		
SSC 111	Soil Microbiology	4
SSC 102	Environmental Soil Chemistry	3
SSC 112	Soil Ecology	3
SSC 109	Sustainable Nutrient Management	4
Global food systems (choose 1): 4		

ARE 015	Population, Environment & World Agriculture	4
IAD 010	Introduction to International Agricultural Development	4
CRD 020	Food Systems	4
Pest management (choose 1 in addition to core):		3-5
PLS 176	Introduction to Weed Science	4
VEN 118	Grapevine Pests, Diseases & Disorders	3
PLP 120	Introduction to Plant Pathology	4
NEM 100	Plant Nematology	4
ENT 110	Arthropod Pest Management	5
PLS 105	Concepts in Pest Management	3
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	3
Outreach and communication (choose 1):		4
EDU 142	Introduction to Environmental Education	4

Plant Breeding, Genetics, & Genomics Option

Code	Title	Units
Required courses:		18
BIS 101	Genes & Gene Expression	4
PLS 154	Introduction to Plant Breeding	4
BIT 160	Principles of Plant Biotechnology	3
BIT 161B	Plant Genetics & Biotechnology Laboratory	4
BIT 171	Professionalism & Ethics in Genomics & Biotechnology	3
Production (choose 1):		2-5
PLS 049	Organic Crop Production Practices	3
PLS 112	Forage Crop Production	3
PLS 113	Biological Applications in Fruit Tree Management	2
PLS 114	Biological Applications in Fruit Production	2
PLS/IAD 160	Agroforestry: Global & Local Perspectives	3
PLS 170A	Fruit & Nut Cropping Systems	2
PLS/ESM 144	Trees & Forests	4
PLS 170B	Fruit & Nut Cropping Systems	2
PLS 007	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	4
or PLS 007V	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
ENH 125	Greenhouse & Nursery Crop Production	5
PLS 110	Crop Management Systems for Vegetable Production	4
PLS 111	Principles of Agronomic Crop Production Systems	4
ENH 120	Management of Container Media	3
PLS 171	Principles & Practices of Plant Propagation	4
Restricted Elective (choose 1):		3-5
<i>Choose one additional course from either Production or Depth Subject Matter</i>		3-5

Crop Quality & Safety Option

Code	Title	Units
Required courses:		14
PLS 172	Biology and Quality of Harvested Crops	4
PLS 173	Molecular & Cellular Aspects of Postharvest Biology	3
PLS 174	Microbiology & Safety of Fresh Fruits & Vegetables	3
PLS 196	Postharvest Technology of Horticultural Crops	3
Depth (choose 8 units):		8
FST 117	Design & Analysis for Sensory Food Science	4
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption	4
FST 109	Principles of Quality Assurance in Food Processing	3
PLS 007	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	4
or PLS 007V	Just Coffee: The Biology, Ecology & Socioeconomic Impacts of the World's Favorite Drink	
PLS 006	Flower Power; Art & Science of Flowers & Their Uses	2
or PLS 006V	Flower Power; Art & Science of Flowers & Their Uses	
FST 131	Food Packaging	4
PLS 113	Biological Applications in Fruit Tree Management	2
PLS 114	Biological Applications in Fruit Production	2

Individual Option

Code	Title	Units
Choose a minimum of 23 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.		23
Total Units		23