

# 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.

## Lead Faculty Advisor

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

**Advising** for the major is located in 1220 Plant & Environmental Sciences; plsadvising@ucdavis.edu. For more information, see Undergraduate Advising.

## 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 116.

Code	Title	Units
<b>Preparatory Subject Matter</b>		
<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 &amp; 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	General Chemistry	
CHE 002B	General Chemistry	
<i>Choose a series:</i>		
CHE 008A	Organic Chemistry: Brief Course	
CHE 008B	Organic Chemistry: Brief Course	
<b>OR</b>		
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	
<b>OR</b>		
MAT 019A	Calculus for Data-Driven Applications	
MAT 019B	Calculus for Data-Driven Applications	
Preparatory Subject Matter Subtotal		58-64
<b>Depth Subject Matter</b>		
<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 105	Taxonomy & Ecology of Environmental Plant Families
EVE 100	Introduction to Evolution
PLB 143	Evolution of Crop Plants
PLS/PLB 116	Plant Morphology & Evolution

*Ecology*

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

*Pest Management*

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.

Crop Production & Agroecology Option (p. 2)

Crop Quality & Safety Option (p. 2)

Ecological Management & Restoration Option (p. 3)

Environmental Horticulture & Urban Landscape Management Option (p. 3)

Individual Option (p. 3)

Plant Breeding, Genetics, & Genomics Option (p. 3)

Plant Informatics Option (p. 4)

**Total Units** 116-138

## Areas of Specialization

### Crop Production & Agroecology Option

Code	Title	Units
<b>Required Major Electives; not included in AOS unit count:</b>		
PLS 150	Sustainability & Agroecosystem Management	
<b>Required courses:</b>		<b>8</b>
HYD 124	Plant-Water-Soil Relationships	
PLS 158	Mineral Nutrition of Plants	
<b>Production; choose two:</b>		<b>4-9</b>
PLS 049	Organic Crop Production Practices	
PLS 112	Forage Crop Production	

PLS 113	Biological Applications in Fruit Tree Management	
PLS 114	Biological Applications in Fruit Production	
PLS/IAD 160	Agroforestry: Global & Local Perspectives	
PLS 170A	Fruit & Nut Cropping Systems	
PLS/ESM 144	Trees & Forests	
PLS 170B	Fruit & Nut Cropping 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	
ENH 125	Greenhouse & Nursery Crop Production	
PLS 110	Crop Management Systems for Vegetable Production	
ENH 120	Management of Container Media	
PLS 111	Principles of Agronomic Crop Production Systems	
PLS 171	Principles & Practices of Plant Propagation	
<b>Advanced Soil Science; choose one:</b>		<b>3-4</b>
SSC 111	Soil Microbiology	
SSC 102	Environmental Soil Chemistry	
SSC 112	Soil Ecology	
SSC 109	Sustainable Nutrient Management	
<b>Global Food Systems; choose one:</b>		<b>4</b>
ARE 015	Population, Environment & World Agriculture	
IAD 010	Introduction to International Agricultural Development	
CRD 020	Food Systems	
<b>Pest Management; choose one in addition to core:</b>		<b>3-5</b>
PLS 176	Introduction to Weed Science	
VEN 118	Grapevine Pests, Diseases & Disorders	
PLP 120	Introduction to Plant Pathology	
NEM 100	Plant Nematology	
ENT 110	Arthropod Pest Management	
PLS 105	Concepts in Pest Management	
PLB/EVE 119	Population Biology of Invasive Plants & Weeds	
<b>Outreach &amp; Communication; choose one:</b>		<b>4</b>
EDU 142	Introduction to Environmental Education	
<b>Total Units</b>		<b>26-34</b>

### Crop Quality & Safety Option

Code	Title	Units
<b>Required Courses:</b>		<b>14</b>
PLS 172	Biology and Quality of Harvested Crops	
PLS 173	(Discontinued)	
PLS 174	Microbiology & Safety of Fresh Fruits & Vegetables	
PLS 196	(Discontinued)	
<b>Depth; choose 8 units:</b>		<b>8</b>

FST 117	Design & Analysis for Sensory Food Science
ARE 100A	Intermediate Microeconomics: Theory of Production & Consumption
FST 109	Principles of Quality Assurance in Food Processing
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
FST 131	Food Packaging
PLS 113	Biological Applications in Fruit Tree Management
PLS 114	Biological Applications in Fruit Production
<b>Total Units</b>	<b>22</b>

### Ecological Management & Restoration Option

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

PLS 164	(Discontinued)
PLS 192	Internship
<b>Total Units</b>	<b>24-32</b>

### Environmental Horticulture & Urban Landscape Management Option

Code	Title	Units
<b>Required Major Electives; not included in AOS unit count:</b>		
ENH 105	Taxonomy & Ecology of Environmental Plant Families	
PLS 105	Concepts in Pest Management	
<b>Required Courses:</b>		<b>8</b>
PLS 162	Urban Ecology	
PLS 157	Physiology of Environmental Stresses in Plants	
<b>Depth</b>		
<i>Choose at least three of the following:</i>		<i>9-13</i>
ENH 100	Urban Forests are Nature-Based Solutions	
ENH 133	Woody Plants in the Landscape: Growth, Ecology & Management	
SSC 112	Soil Ecology	
LDA/ABT 150	Introduction to Geographic Information Systems	
ENH 120	Management of Container Media	
ENH 125	Greenhouse & Nursery Crop Production	
PLS 171	Principles & Practices of Plant Propagation	
PLS 158	Mineral Nutrition of Plants	
PLS 123	Introduction to Plant & Crop Systems Modeling	
<i>Choose one:</i>		<i>4</i>
ESP 171	Urban & Regional Planning	
ESP 179	Environmental Impact Assessment	
<b>Total Units</b>		<b>21-25</b>

### 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
<b>Total Units</b>		<b>23</b>

### Plant Breeding, Genetics, & Genomics Option

Code	Title	Units
<b>Required courses:</b>		<b>18</b>
BIS 101	Genes & Gene Expression	
PLS 154	Introduction to Plant Breeding	
BIT 160	Principles of Plant Biotechnology	
BIT 161B	Plant Genetics & Biotechnology Laboratory	
BIT 171	Professionalism & Ethics in Genomics & Biotechnology	
<b>Production; choose one:</b>		<b>2-5</b>
PLS 049	Organic Crop Production Practices	
PLS 112	Forage Crop Production	

PLS 113	Biological Applications in Fruit Tree Management
PLS 114	Biological Applications in Fruit Production
PLS/IAD 160	Agroforestry: Global & Local Perspectives
PLS 170A	Fruit & Nut Cropping Systems
PLS/ESM 144	Trees & Forests
PLS 170B	Fruit & Nut Cropping 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
ENH 125	Greenhouse & Nursery Crop Production
PLS 110	Crop Management Systems for Vegetable Production
PLS 111	Principles of Agronomic Crop Production Systems
ENH 120	Management of Container Media
PLS 171	Principles & Practices of Plant Propagation
<b>Restricted Elective; choose one:</b>	
Choose one additional course from either Production or Depth Subject Matter.	
<b>Total Units</b>	<b>23-28</b>

## Plant Informatics Option

Code	Title	Units
<b>Required courses:</b>		<b>15</b>
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	
<b>Depth; choose three:</b>		<b>11-12</b>
ABT/LDA 150	Introduction to Geographic Information Systems	
HYD 124	Plant-Water-Soil Relationships	
PLS 105	Concepts in Pest Management	
PLS 150	Sustainability & Agroecosystem Management	
PLS 157	Physiology of Environmental Stresses in Plants	
PLS 158	Mineral Nutrition of Plants	
<b>Total Units</b>		<b>26-27</b>