



Map Your Future in Plant Sciences

WHY PLANT SCIENCES?

Plant Sciences pairs comprehensive preparation in foundation sciences of biology with practical training in basic and applied Plant Sciences, including biotechnology and plant breeding.

SUBPLANS:

GENERAL PLANT SCIENCES

Provides students with a strong foundation in modern plant biology and related disciplines, including plant molecular biology, plant biotechnology, genomics and genetics of plants, plant physiology, smart agriculture, and plant-environment interactions. Students are prepared not only for careers in plant science research, but also for diverse careers in which their scientific training and knowledge can make a difference.

PLANT HEALTH SCIENCES

Trains students in both biotic and abiotic factors that impact plant health at scales from molecular to microscopic and macroscopic. Professionals working in Plant Health Science apply plant, microbial, and insect sciences to predict disease epidemiology, protect plant, environmental, and human health, and optimize plant growth or yields.



THE UNIVERSITY OF ARIZONA
COLLEGE OF AGRICULTURE & LIFE SCIENCES
Plant Sciences

B.S. in Plant Sciences

PREPARE FOR A BIOSCIENCE CAREER IN AGRICULTURE, HEALTH & SUSTAINABILITY

Do you want to create solutions to feed, clothe, and fuel our planet for future generations to come? The Plant Sciences major prepares students to solve the world's greatest challenges by providing comprehensive training and preparation for specialized careers in diverse areas ranging from global food and energy security to environmental and human health. You may pursue careers in industry related to crop improvement, plant health, agricultural sustainability, biologic pharmaceuticals, natural resource management, or in basic research or medicine.



The Plant Sciences program is right for you if:

- » You are driven toward innovations in research and technology to create efficient processes, and sustainable products.
- » You want to research, test, and analyze soil, microorganisms, and plants.
- » You have a passion for working in collaborative teams within industries related to agriculture, food, and manufacturing.
- » You're conscious of the growing human population and climate change and the need for practical solutions to ensure an abundant supply of sustainable food, renewable energy, medicines, and materials.
- » You want to advance environmental conservation and restoration efforts.
- » You see yourself working in greenhouses, managing land, or breed plants.
- » You're considering pursuing a graduate degree in the biological sciences or a medical degree.

CAREER PATHS

Research Assistant/Technician: Conduct research for pharmaceutical, biotechnical, or food/beverage companies; or academic, institutional, or government research laboratories. Perform research or other laboratory tasks under the supervision of a more senior scientist.

Agronomist: Manage soil and crop field production, conduct research, and develop new crop hybrids and varieties for public and private sectors.

Plant Pathologist: Research and work to understand plant responses to pests to design strategies for pest management.

Plant Breeder: Develop crops adapted to arid and semi-arid environments for public and private sectors.

Graduate or Professional School: Rigorous preparation for many biological science fields in a related field including:

- **MS degree:** Research Associate, with more independence than a Research Assistant.
- **PhD degree:** Scientist or Research Professor. Design experiments and manage projects and people.
- **Medical school** or other health-related advanced degree.

CAREER OPTIONS BY SUB-PLAN

General Plant Sciences: Perform basic and applied research in academic, institutional, or government laboratories; manage the use and development of forests and other natural resources.

Plant Health Sciences: Greenhouse management; optimize agricultural production.



Contact Academic Advisor

Maya Azzi (she/her/hers)

mazzi@arizona.edu

(520) 621-5403



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COLLEGE OF AGRICULTURE & LIFE SCIENCES

Plant Sciences

For more information, visit plantbiology.arizona.edu

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Plant Sciences Major

General Education Requirements	COURSE	OFFERED	27-35 UNITS
Foreign language (2nd semester proficiency)	Various	F/SP/SU	0-8
First Year Composition 1	ENGL 101	F/SP/SU	3
First Year Composition 2	ENGL 102	SP/SU	3
General Education, Tier 1	TRAD 1	F/SP/SU	3
General Education, Tier 1	TRAD 2	F/SP/SU	3
General Education, Tier 1	INDV 1	F/SP/SU	3
General Education, Tier 1	INDV 2	F/SP/SU	3
General Education, Tier 2	Humanities	F/SP/SU	3
General Education, Tier 2	Individuals & Societies	F/SP/SU	3
General Education, Tier 2	Arts	F/SP/SU	3
*Diversity Emphasis		F/SP/SU	
General Science Core	COURSE	OFFERED	34-36 UNITS
Calculus	MATH 113 or MATH 122A+122B or MATH 125	F/SP/SU	3-5
Introduction to Stats and Biostatistics	MATH 263	F/SP/SU	3
Introductory Physics I, lecture	PHYS 102 (3)	F/SP/SU	3
General Chemistry I Lecture and Laboratory	CHEM 141+143 (3+1) or CHEM 151 (4) or CHEM 161+163 (3+1)	F/SP or F/SP/SU or F	4
General Chemistry II Lecture and Laboratory	CHEM 142+144 (3+1) or CHEM 152 (4) or CHEM 162+164 (3+1)	F/SP or F/SP/SU or F	4
Organic Chemistry I Lecture and Laboratory	CHEM 241A+243A (3+1)	F/SP/SU	4
Biochemistry	BIOC 384	F/ W/SP/SU	3
Introductory Biology I, Lecture	MCB 181R	F/SP/SU	3
Introductory Biology II, Lecture	ECOL 182R	F/SP/SU	3
Science Communication (Choose 1)			
Scientific Writing	ENVS 408	SP	3
or Translating Environmental Science	ENVS 415	SP	3
or Technical Writing	ENGL 308	F/SP/SU	3
or Applied Organizational Communication	COMM 312	F/SP	3
or Business Writing	ENGL 307	F/SP/SU	3
or Communicating Knowledge in Ag & Life	ALC 422	SP	3
Major Core	COURSE	OFFERED	21 UNITS
Colloquium	PLS 195A	F	1
Plant Biology	PLS 240	F	4

Major Core (continued)

Introductory Plant Pathology	PLP 305	F	3
Animal and Plant Genetics	PLS 312	SP	4
Plant Cell Structure and Function	PLS 359	F	3
Plant Growth and Physiology	PLS 360	SP	3
Principles of Plant Physiology Lab	PLS 361	SP	1
Senior Capstone	PLS 498	SP	2
<i>Select a sub-plan - see additional tables</i>			23-29

General Plant Sciences Subplan

Sub-Plan Core	COURSE	OFFERED	15 UNITS
Origins of Food Plants	PLS 307	SP (even years only)	3
Plant Molecular Biology	PLS 358	SP	3
Mechanisms in Plant Development	PLS 440	F	3
Plant Biochemistry and Metabolic Engineering	PLS 448A	F	3
Plant Genetics and Genomics	PLS 449A	contact dept.	3
Sub-plan Electives	COURSE	OFFERED	14 UNITS
<i>See sub plan electives page 3-6</i>			

Plant Health Sciences Subplan

Sub-Plan Core	COURSE	OFFERED	13 UNITS
Introduction to Soil Science	ENVS 200	F, SP	3
Soils Laboratory	ENVS201	F, SP	1
Insect Pest Management for Desert Cropping Systems	ENTO 300	F (even years only)	3
Soil Fertility and Plant Nutrition	ENVS 316	SP	3
Microbial Diversity	PLP 329A	F	3
Sub-plan Electives	COURSE	OFFERED	10 UNITS
<i>See sub plan electives page 3-6</i>			

Sub-Plan Electives

Sub-plan elective courses	COURSE	OFFERED	UNITS
Genetics and Genomics			
Plant Genetics and Genomics	PLS 449A	contact dept.	3
Microbial Genetics	PLP 428R+L	SP	3+2
Genomics	ECOL 326	F	3
Evolutionary Biology	ECOL 335	SP	4
Molecular Genetics	MCB 304	SP	5
Bioinformatics and Genomic Analysis	MCB 416A	F	3
Problem Solving with Genetic Tools	MCB 422	F/SP	3
Population Genetics	ECOL 426	SP	3
Plant Growth and Development			
Mechanisms in Plant Development	PLS 440	F	3
Plant Biochemistry and Metabolic Engineering	PLS 448A	SP	3
Cell and Developmental Biology	MCB 305	F	4
Cell Biology	MCB 410	F/SP	3
Molecular Biology	MCB 411	F/SP	3
Developmental Mechanisms	MCB 455	F	3
Plant Pathology and Microbiology			
General Microbiology	MIC 205	F	3
Microbial Physiology	MIC 328	SP	3
General Virology	PLS 333	F	3
Introductory Plant Pathology	PLP 305	F	3
Microbial Diversity	PLP 329	F	3
General Mycology	PLP 427R+L	F	3+2
Microbial Genetics	PLP428R+L	F	3+2
Antibiotics - A Biological Perspective	PLP 452	F	3
Plant Production			
Crop Science and Production	PLS 306	F	3
Plant Propagation, Production & Management	PLS 330	SP	3
Introductory Plant Pathology	PLP 305	F	3
Soil and Plant Nutrition	ENVS 316	SP	3
Turf and Landscape Technology	AGTM 330	SP	3
Insect Pest Management	ENTO 468	F	3

Sub-Plan Electives (continued)

Sub-plan elective courses	COURSE	OFFERED	UNITS
Water and Soils			
Soil and Plant Nutrition	ENVS 316	SP	3
Irrigation Principles and Management	ENVS 404	F/SP	3
Soil Genesis, Morphology & Classification	ENVS 431	F	3
Water Harvesting	ECOL 454	SP	3
Soil and Water Resources Engineering	ABE 455	F	3
Irrigation System Design	ABE 456	F	3
Soil and Water Conservation	ENVS 461	Su1/2 3	
Controlled Environment Production Systems			
Introduction to Hydroponics	PLS 217	F	3
Plant Biochemistry and Metabolic Engineering	PLS 448A	SP	3
Advanced GH Crop Production	PLS 397B	SP	3
Physiology of Crop Production in CEA	PLS 475A	SP	3
Applied Instrumentation in CEA	ABE 479	SP	3
Irrigation Engineering	ABE 455	F	3
Irrigation System Design	ABE 456	F	3
Engineering Biological Processes	ABE 481A	F	3
Controlled Environment Systems	ABE 483	F	3
GH Pest Management	ENT/ABE 497C	F	3
Irrigation Principles and Management	ENVS 404	F/SP	3
Biodiversity			
Systematic Botany	PLS 472	SP	4
Microbial Diversity	PLP 329	SP	3
Evolution of Plant Form and Function	ECOL 340	F/SP	3
Biodiversity and the Tree of Life	ECOL 345	SP	3
Phylogenetic Biology	ECOL 465	F	3
Conservation Biology	ECOL 406R	F	3
Biotechnology			
General Microbiology	MIC 205	F	3
Introduction to Biotechnology	PLS 340R	F	3
Plant Biotechnology Lab	PLS424L	SP	2

Sub-Plan Electives (continued)

Sub-plan elective courses	COURSE	OFFERED	UNITS
Biotechnology (continued)			
Recombinant DNA Methods & Appl.	MCB 473	F/SP	4
Microbial Genetics	PLP428R	SP	3
Antibiotics- A Microbial Perspective	PLP 452	F	3
Plant Biotechnology			
Introduction to Biotechnology	PLS 340	F	3
Plant Biotechnology	PLS424R	SP	3
Plant Biotechnology Lab	PLS424L	SP	2
Internship in Biotechnology	PLS392/492	F/SP/Su1/ Su2	3
Metabolic Biochemistry	BIOC 385	F/W/SP/Su	3
Plant Biochemistry and Metabolic Engineering	PLS448A	F	3
Irrigation System Design	ABE 456	F	3
Computation			
Great Ideas of the Information Age	ISTA100	F/SP	3
Statistical Foundations for the Information Age	ISTA 116	SP	3
Computational Thinking and Doing	EC ISTA 130 OL 340	F/SP	3
Sequence Data: An Interdisciplinary Perspective	ISTA 310	F	3
Resource Management			
Economics, Ethics & Environmental Mgmt	AREC 350	SP	3
Water, Environment and Society	GEOG 304	F	3
Plant Biotechnology Lab	PLS424L	F/SP/ Su1/ Su2	3
Vegetation Management of Wildlands	RAM 446	SP	3
Field Botany	RNR 230R/L	F (L, R)/ Su1/ SP (R)	3
Natural Resources Ecology	RNR 316	F	3
Natural Resources Measurements	RNR 321	SP	3
Noxious, Invasive Plants of Arizona	RNR 400	Su1/Su2	3
Useful Wild Plants of Arizona	RNR 401	Su1/ Su2	3
Sustainable Management of Arid Lands & Salt Affected Soils	ENVS 401	SP	3
Air and Water	WSM 402	F	3
Natural Resources Management Practices	RNR384	SP	3

Sub-Plan Electives (continued)

Sub-plan elective courses	COURSE	OFFERED	UNITS
Scientific Philosophy/Education			
Medicinal Plants	PLS 480	F	3
Philosophy of the Biol. Sciences	ECOL 421	SP	3
Sonoran Desert Discovery	ECOL 464	F/SP	3
Art of Scientific Discovery	ECOL 479	F/SP	3
Additional Free Elective Courses			
Directed Research	PLS 392	F/SP/ Su1/ Su2	1 to 5
Internship	PLS 393	F/ SP/ Su1/ Su2	1 to 5
Independent Study	PLS 399	F/ SP/ Su1/Su2	1 to 5
Honors Independent Study	PLS 399H	F/SP	1 to 5
Preceptorship or Honors Preceptorship	PLS 491 or 491H	F/SP	1 to 5
Directed Research	PLS 492	F/SP/Su1/ Su2	1 to 5
Internship	PLS 493	F/S/Su1/ Su2	1 to 5
Honors Thesis	PLS 498H	F/ SP/ Su1/Su2	1 to 5
Independent Study	PLS 499	F/ SP/ Su1/ Su2	1 to 5
Honors Independent Study	PLS 499H	F/SP/ Su1/ Su2	1 to 5