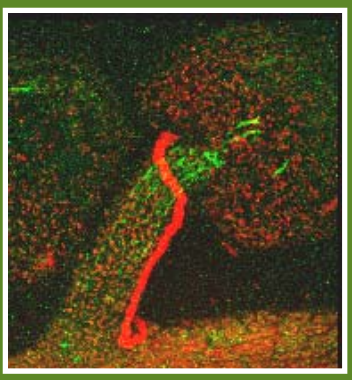
THE UNIVERSITY OF ARIZONA

COLLEGE OF AGRICULTURE & LIFE SCIENCES

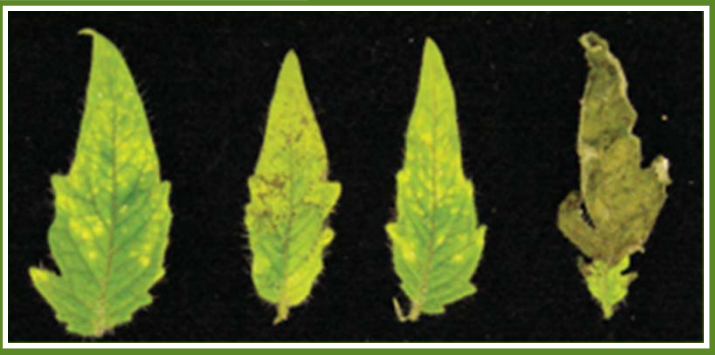
SCHOOL OF PLANT SCIENCES

Discover the science that feeds the world..

B.S., Plant Sciences







Plants and their associated microbes are fundamental to all aspects of our existence. Given the growth of the human population and the effects of this growth on the environment, research and training in the Plant Sciences has never been more critical. Coursework and optional research training prepare majors for post-graduate studies in research, medicine, and pharmacy, or careers in horticulture, agriculture, microbiology, or biotechnology.

For more information contact an advisor:

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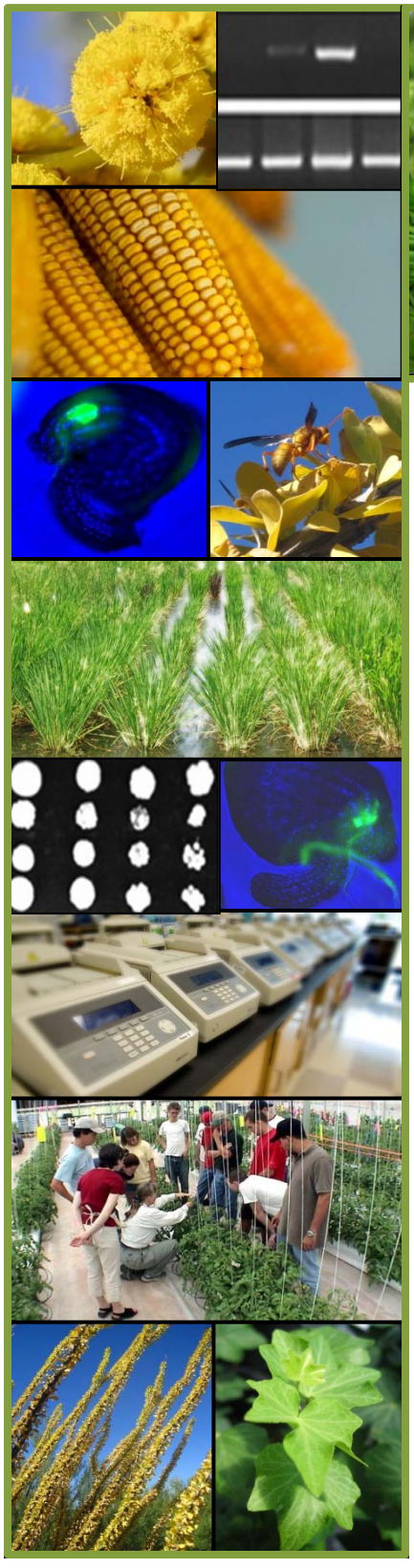
Why major in Plant Sciences?



- **Spectacular career opportunities**. Our majors go on to graduate school, medical school, pharmacy school, and law school – or enter the workforce in horticulture, biotechnology, biofuels development, microbiology, computational biology, international development, ag-business, and sustainable agriculture.

- **An outstanding learning environment.** Our majors enjoy an interdisciplinary environment with small class sizes, a low student-to-faculty ratio, scholarships, internships, and opportunities for travel. Students gain hands-on experience in real-life applications of bioinformatics, genomics, molecular and cellular biology, microbial sciences, genetics, biotechnology, and plant breeding, propagation, and improvement.

- **Research and training opportunities in world-class facilities**. Plant Sciences majors engage in cutting-edge research and training in our internationally recognized centers, such as the Controlled Environment Agriculture Center, iPlant Collaborative, Bio5 Institute, the University of Arizona Herbarium, and diverse field stations and agricultural centers.

- **A chance to change the world.** Plants feed, power, and medicate the planet. They are the foundation of global biodiversity and global climate – and key to our future. Plant Sciences majors are at the forefront of emerging technologies and global sustainability.

Plant Science Major Requirements

General Education	Course	Units
First Year Composition 1	ENGL 101	3
First Year Composition 2	ENGL 102	3
General Education, Tier 1	TRAD 1	3
General Education, Tier 1	TRAD 2	3
General Education, Tier 1	INDV 1	3
General Education, Tier 1	INDV 2	3
General Education, Tier 2	Humanities	3
General Education, Tier 2	Individuals & Societies	3
General Education, Tier 2	Arts	3
Foreign language	various	0-8
Total		27-35
Math, Computation, & Communication	**Course**	**Units**
Calculus	MATH 124	5
ISTA course	ISTA 100, 116, or 130	3
Introduction to Statistics and Biostatistics	MATH 263	3
Science Communication (Choose 1) Scientific Writing OR Translating Environmental Science OR Technical Writing OR Applied Organizational Communication OR Business Writing OR Communicating Knowledge in Ag & Life Sci.	 ENVS 408 OR ENVS 415 OR ENGL 308 OR COMM 312 OR ENGL 307 OR AED 422	3
Total		14
Foundation Science	**Course**	**Units**
General Chemistry 1	CHEM 151	4
General Chemistry 2	CHEM 152	4
Organic Chemistry 1	CHEM 241A	3
Organic Chemistry Lab 1	CHEM 243A	1
Biochemistry	BIOC 384	3
Biochemistry	BIOC 385	3
Introductory Physics 1	PHYS 102	3
Introductory Physics Lab 1	PHYS 181	1
Introductory Biology 1	MCB 181R	3
Introductory Biology 2	MCB 182R	3
Introductory Biology Lab	MCB 181L or 182L	1
Total		29
Plant Science major	**Course**	**Units**
Plant Biology	PLS 240	4
Animal and Plant Genetics	PLS 312	4
Plant Growth and Physiology	PLS 360	3
Plant Cell Structure and Function	PLS 359	3
Colloquium	PLS 195A	1
Senior Capstone	PLS 498	2
Core electives (Choose 2) Evolutionary Biology Genomics Mechanisms in Plant Development Introductory Plant Pathology Physiol. of Plant Production in Controlled Environ.	 ECOL 335 ECOL 326 PLS 440 PLP 305 PLS475A	6
Free electives	see list	17
Total		40

Plant Sciences Major Free Electives

Choose a minimum of 17 upper division units from any of the following courses:

Course Title	Number	Offered	Units
Genetics and Genomics			
Microbial Genetics	PLP 428R+L	S	3+2
Genomics	ECOL 326	F	3
Evolutionary Biology	ECOL 335	S	4
Molecular Genetics	MCB 304	S	5
Bioinformatics and Genomic Analysis	MCB 416A	F	3
Problem Solving with Genetic Tools	MCB 422	F, S	3
Population Genetics	ECOL 426	S	3
Plant Growth and Development			
Mechanisms in Plant Development*	PLS 440	F	3
Plant Biochemistry and Metabolic Engineering	PLS 448A	S	3
Cell and Developmental Biology	MCB 305	F	4
Cell Biology	MCB 410	F, S	3-4
Molecular Biology	MCB 411	F, S	3-4
Developmental Mechanisms	MCB 455	F	3
Plant Pathology and Microbiology			
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
Biology & Characterization of Plant Pathogenic Agents	PLP 451	S	4
Antibiotics - A Biological Perspective	PLP 452	F	3
Plant Production			
Crop Science and Production	PLS 306	F	3
Plant Propagation, Production & Management	PLS 330	F Odd	4
Turfgrass Management	PLS 355	F	3
Nursery Systems Management	PLS 339	F	3
Landscape Horticulture	PLS 354	S Odd	3
Weed Science	PLS 405	F	3
Fundamentals of Crop Science	PLS 406	S	1
Turfgrass Science: Environmental Stress	PLS 455	F	3
Introductory Plant Pathology	PLP 305	F	3
Soil and Plant Nutrition	ENVS 316	S	3
Turf and Landscape Technology	AGTM 330	S	3
Insect Pest Management	ENTO 468	F	3
Water and Soils			
Soil and Plant Nutrition	ENVS 316	S	3
Irrigation Principles and Management	ENVS 404	F, S	3
Soil Genesis, Morphology & Classification	ENVS 431	F	3
Water Harvesting	ECOL 454	S	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

Plant Sciences Major Free electives (continued)

Controlled Environment Production Systems			
Introduction to Hydroponics	PLS 217F	3	
Nursery Systems Management	PLS 339F	3	
Advanced GH Crop Production	PLS 397B	S	3
Physiology of Crop Production in CEA	PLS 475A	S	3
Applied Instrumentation in CEA	ABE 479	S	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, S	3
Biodiversity			
Systematic Botany	PLS 472S	4	
Microbial Diversity	PLP 329	S	3
Evolution of Plant Form and Function	ECOL 340	F, S	3
Biodiversity and the Tree of Life	ECOL 345	S	3
Phylogenetic Biology	ECOL 465	F	3
Conservation Biology	ECOL 406R	F	3
Biotechnology			
Introduction to Biotechnology	PLS 340F	3	
Recombinant DNA Methods & Appl.	PLS 473F, S	4	
Resource Management			
Economics, Ethics & Environmental Mgmt	AREC 350	S	3
Water, Environment and Society	GEOG 304	F, S, Su1, Su2	3
Vegetation Management of Wildlands	RAM 446	S	4
Natural Resources Ecology	RNR 316	F	3
Natural Resources Measurements	RNR 321	S	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	S	3
Air and Water	WSM 402	F	3
Natural Resources Management Practices	RNR384	S	3
Scientific Philosophy/Education			
Medicinal Plants	PLS 480F	3	
Philosophy of the Biol. Sciences	ECOL 421	S	3
Sonoran Desert Discovery	ECOL 464	F, S	3
Art of Scientific Discovery	ECOL 479	F, S	3
Additional Free Elective Courses			
Directed Research	PLS 392F, S, Su1, Su2	1-6	
Internship	PLS 393F, S, Su1, Su2	1-6	
Independent Study	PLS 399F, S, Su1, Su2	1-3	
Honors Independent Study	PLS 399H	F, S	1-3
Preceptorship	PLS 491F, S	1-8	
Honors Preceptorship	PLS 491H	F, S	1-3
Directed Research	PLS 492F, S,Su1, Su2	1-6	
Internship	PLS 493F, S, Su1, Su2	1-6	
Honors Thesis	PLS 498H	F, S, Su1, Su2	3
Independent Study	PLS 499F, S, Su1, Su2	1-5	
Honors Independent Study	PLS 499H	F, S, Su1, Su2	3

Plant Sciences Major
4-Year Sample Plan

Course Title/Semester	Units	Course Title/Semester	Units
SEMESTER 1		**SEMESTER 5**	
ENGL 101 English Composition	3	PLS 359 Plant Cell Structure/ Function	3
MATH 124 Calculus	4	BIOC 385 Metabolic Biochemistry	3
CHEM 151General Chemistry	4	Free elective Upper Division	3
TIER I	3	2nd Language, 1st Semester	4
PLS195 Colloquium	1	Free elective Upper Division	3
SEMESTER 2		**SEMESTER 6**	
ENGL 102 English Composition	3	PLS 360 Plant Growth & Physiology	3
CHEM 152 General Chemistry II	4	PHYS 102 Introductory Physics	3
TIER I	3	PHYS 181 Intro Physics Lab	1
ECOL182R Introductory Biology II	3	Core elective	3
ECOL 82L Intro Biology Lab	1	2nd Language, 2nd Semester	4
SEMESTER 3		**SEMESTER 7**	
CHEM 241A Organic Chemistry	3	COMM 312, ENGL 307, ENGL308, ENGL 413, SWES408, SWES415 or AED422	3
CHEM 243A Organic Chemistry Lab	1	TIER II	3
PLS 240 Plant Biology	4	TIER II	3
MCB 181 Intro Biology I	3	Core elective	3
ISTA 100 or 116 or 130	3	Free elective upper division	3
SEMESTER 4		**SEMESTER 8**	
MATH 263 Intro Statistics/Biostatistics	3	PLS 498 Senior Capstone	2
BIOC 384 Biochemistry	3	TIER II	3
PLS 312 Animal and Plant Genetics	4	Free elective Upper Division	3
TIER 1	3	Free elective Upper Division	3
TIER 1	3	Free elective Upper Division	5
		Total units required	**120**

Requirements for the Plant Sciences Minor

Plant Science minor requirement	Course	Units
Plant Biology	PLS 240	4
Animal and Plant Genetics	PLS 312	4
Plant Cell Structure and Function or Plant Growth and Physiology	PLS 359 or PLS360	3
Free electives	various	7

Summary of degree requirements

Plant Science minor requirements	11 units
Lab courses	2 units
Upper division courses	7 units
Required for PLS minor	18 units
Minimum minor GPA	2.0
Minimum minor credit taken in residence at UA	3 units

Career Opportunities for Plant Science Majors

Health Care-

- Physician- molecular and genomic medicine, plant-based pharmaceuticals, integrative medicine
- Dentist
- Veterinarian
- Pharmacist
- Medical Technician

Law-

- Patent or Corporate lawyer (Biotech/Ag Co.)

Biotech Industry-

- Biochemist
- Research technician or biologist
- Greenhouse or field manager
- Biological supplies product developer

Education and Academia-

- Professor
- Extension agent or specialist
- Technical staff (lab manager or researcher
- School teacher or administrator
- Herbarium or living collections curator
- Greenhouse manager

Landscape Management-

- Landscape contractor
- Sod and seed production manager
- Sports turf (Athletic fields) manager
- Golf course superintendents & assistant
- Parks grounds supervisor

Publishing-

- Science editor, Science- or Technical writer

Professional Societies-

- Scientific society director, associate/administrator

Sales and Private Industry-

- Biotech, Ag. chemical or equipment sales rep.
- Nursery owner or manager
- Plant pathologist/ Epidemiologist
- Microbiologist
- Agricultural engineer
- Environmental scientist

Government-

- USDA, NSF and NIH agency position
- Research director or administrator
- National, state and local government state conservation and wildlife agent
- Agricultural inspector (USDA)

Science and Society/ Public Policy-

- Food-, Soil-, or Horticultural scientist
- Urban forestry manager or Arborist
- Soil and water conservationist
- Botanical garden – director, scientist, or educational program coordinator
- Government and private industry policy advocate
    - conservation & environmental policy
    - Agricultural policy
    - Science policy