
Plant and Animal Sciences

Val J. Anderson, Chair
275 WIDB, (801) 422-3527

College of Biology and Agriculture Office of Academic
Advisement
379 WIDB, (801) 422-3042

Admission to Degree Program

All degree programs in the Department of Plant and Animal Sciences are open enrollment.

The Discipline

Disciplines in the Department of Plant and Animal Sciences focus on four of the great dilemmas facing mankind in the twenty-first century: harnessing biological technology to meet the needs of an expanding human population in the developing world; assessing and minimizing the impact of human activities on an increasingly vulnerable environment; managing and conserving wildlife and wildlands; and adapting urban landscaping to meet increasing water, space, and other resource limitations while enhancing the aesthetic quality of urban environments.

Majors offered provide a flexible education for directly entering the job market or preparing for professional schools in business, engineering, the health professions (medical and dental schools), landscape architecture, law, public administration, or science.

Wildlife and wildlands conservation is directed at managing wildland ecosystems—optimizing the function and services of natural ecosystems. Students are educated in wildland plants, animals, soils, and ecology, as well as wildlife and land management techniques. This focused approach not only qualifies students for four federal job series occupations but also prepares them to work for a wide array of government and private land-management and conservation agencies.

Career Opportunities

Bio-Agribusiness Management

This intercollege program involving the Marriott School of Management combines a strong science education with business fundamentals. The **biotechnology business emphasis** prepares students for management positions in the burgeoning agricultural biotechnology industry or for graduate study in the biological sciences, law, or business. The **agricultural emphasis** prepares for employment in multiple agribusiness enterprises or for advanced degrees in business or law.

Biotechnology

The biotechnology major educates students in scientific principles and biotechniques used to genetically improve economically important plants and animals. This field holds tremendous promise for meeting the food and fiber needs of the developing world. Students are prepared for immediate employment or for graduate study in plant and animal biotechnology, molecular biology, genetics, or the health professions.

Environmental Science

Students majoring in environmental science learn a broad combination of chemistry, engineering, geology, geography, and plant and soil sciences to help them solve environmental problems. They are prepared for graduate study and direct employment in fields dealing with assessing and remediating human-induced environmental impacts, as well as for careers in law, business, and the health professions.

Landscape Management

This program is accredited by the Professional Landcare Network (PLANET), the leading professional organization in landscape horticulture management. The major combines practice and instruction in horticultural science, business, and landscape

design to prepare students for graduate studies in business, law, landscape architecture, and horticulture, or for direct employment as managers in the growing urban horticulture industry.

Plant Biology

Plant biology students are prepared for a variety of graduate programs emphasizing science (e.g., agronomy, ecology/evolution, horticulture, and molecular biology/biochemistry), the health professions, law, and business.

Wildlife and Wildlands Conservation

This degree program qualifies students for federal job series employment in wildlife biology, range conservation, ecology, zoology, and botany. It also prepares for graduate programs in renewable natural resources and for eventual professional affiliations with state wildlife agencies and a number of federal agencies, including the U.S. Forest Service, Bureau of Land Management, Natural Resource Conservation Service, Fish and Wildlife Service, and Park Service. Graduates are well prepared to deal with complex issues involving wildlife and wildlands management and the overall conservation of natural resources.

Graduation Requirements

To receive a BYU bachelor's degree a student must complete, in addition to all requirements for a specific major, the following university requirements:

- The university core, consisting of requirements in general and religious education (See the University Core section of this catalog for details. For a complete listing of courses that meet university core requirements, see the current class schedule.)
- A minimum of 30 credit hours in residence
- A minimum of 120 credit hours
- A cumulative GPA of at least 2.0

Undergraduate Programs and Degrees

BS	Bio-Agribusiness Management
	Emphases:
	Agricultural Management
	Biotechnology Business
BS	Environmental Science
BS	Genetics and Biotechnology
BS	Landscape Management
BS	Plant Biology
BS	Wildlife and Wildlands Conservation
Minor	Landscape Management

Students should visit the college advisement center for help or information concerning the undergraduate programs. Undergraduate advisement in major requirements is available from departmental faculty (assigned advisor).

Graduate Programs and Degrees

MS	Agronomy
MS	Genetics and Biotechnology
MS	Wildlife and Wildlands Conservation
PhD	Wildlife and Wildlands Conservation

For more information see the BYU 2007–2008 Graduate Catalog.

BS Bio-Agribusiness Management: Agricultural Management Emphasis (60 hours*)

Major Requirements

1. Complete the following agribusiness management core courses:
 - Acc 200.
 - Bus M 300, 488, 489.
 - Econ 110, 210.
 - Org B 320.
 - PAS 391R.
 - Stat 221.

Plant and Animal Sciences

- Complete one course from the following:
Bus M 371R, 380, 382.
- Complete at least 1 hour of the following:
PAS 199R.
- Complete the following agricultural management courses:
Chem 105, 152.
InBio 370.
NDFS 330.
PAS 282.
- Complete 19 hours from the following elective courses:
Biol 120, 220.
IAS 220, 420.
InBio 341, 380, 525.
MMBio 221.
PAS 100, 215, 283, 301, 305, 306, 331, 369, 390R, 431, 440.
PDBio 562.

Recommended Courses for Students Interested in Crop Management

PAS 100, 282, 283, 301, 305, 331, 369, 431.

Recommended Courses for Students Interested in Livestock Management

Biol 220.
InBio 380.
PAS 215.
PDBio 562.

*Hours include courses that may fulfill university core requirements.

BS Bio-Agribusiness Management: Biotechnology Business Emphasis (61 hours*)

Major Requirements

- Complete the following agribusiness management core courses:
Acc 200.
Bus M 300, 488, 489.
Econ 110, 210.
Org B 320.
PAS 199R, 391R.
Stat 221.
- Complete one course from the following:
Bus M 371R, 380, 382.
- Complete the following biotechnology business courses:
Biol 120, 220, 240, 241, 340, 360.
Chem 105, 106, 285.
InBio 370.
PAS 265, 310R, 485, 487.

Recommended Courses

IAS 220, 420.
InBio 380.
PAS 282, 283, 305, 306, 390R, 440.
PDBio 562.

*Hours include courses that may fulfill university core requirements.

BS Environmental Science (58–59 hours*)

Major Requirements

- Complete the following environmental science core courses:
Biol 150.
PAS 282, 283, 303, 305, 340, 375, 491R.

- Complete one course from the following:
InBio 450.
PAS 490, 494R (2 hours required).
- Complete the following biology courses:
Biol 120, 220, 350.
- Complete at least 6 hours of the following supporting core courses:
Chem 105 or 101; 106; 107 or 103; 152 or 351.
Note: Recommended courses for graduate school track or preprofessional track: Chem 105, 106, 107, 351, 352, 353.
- Complete a minimum of 24 hours (9 hours maximum of lower-division courses) from the following:
Biol 240, 241, 340, 360.
Chem 223, 227, 285, 351, 352, 353, 481.
Econ 440.
Geog 101, 212, 303, 305, 306, 307, 310, 311, 331, 412.
Geol 101, 111, 404, 435.
InBio 370.
Math 112 or 119; 302, 303.
MMBio 221.
PAS 215, 225, 306, 310R, 330, 331, 355, 390R, 402, 411, 416, 419, 511, 514.
Phscs 105 or 121; 106 or 123; 107, 108.
Phil 205.
Pl Sc 535, 536.
Stat 221.

Federal Register Requirements

The federal register requirements for environmental science ecology or physical science can be met by choosing appropriate electives. Ecology requires 30 semester hours of basic and applied biology, including at least 9 semester hours of ecology and 12 hours of physical and mathematical sciences. Physical science requires 25 semester hours of physical sciences (chemistry, physics, math, etc.)

Recommended courses from list of electives for various emphases:

- Environmental Science (Physical Science Emphasis)
Complete 14 hours from the following:
Econ 440.
Geog 101, 212, 412.
Geol 111, 435.
- Environmental Science (Ecology Emphasis)
Complete 18 hours from the following:
InBio 370.
PAS 215, 225, 330, 355, 411, 416, 419.

Preprofessional students should consult with the Preprofessional Advisement Center (3326 WSC) to determine which additional courses they will be required to complete.

The following courses are recommended for students who plan to pursue graduate degrees in environmental science.

- Chem 351, 352, 353, 481.
Math 119 or higher.
Phscs 105, 106, 107, 108.

*Hours include courses that may fulfill university core requirements.

BS Genetics and Biotechnology (61–65 hours*)

Major Requirements

- Complete the following core courses:
Biol 120, 220, 240, 241, 340, 360, 420.
- Complete one course from the following:
InBio 380.
PAS 440.
PDBio 362.

- Complete the following general core courses:
Chem 105, 106, 107, 351, 352, 481.
And complete one course from the following:
Math 112, 119.
- Complete the following genomics and biotechnology core courses:
PAS 265, 310R (2 hours required), 410.
- Complete one course from the following:
MMBio 460.
PAS 485.
PDBio 482.
- Complete one course from the following:
PAS 486, 487.
- Complete 11–12 hours of elective credit from the following:
Biol 350, 421.
Chem 482, 489.
InBio 331, 365, 370, 430, 450, 465, 560.
MMBio 221, 390R, 430, 441, 442, 460, 461, 463, 465, 490R, 554.
NDFS 330.
PAS 199R, 282, 283, 301, 305, 306, 331, 369, 390R, 431, 490, 494R, 514, 525, 559, 575, 580.
PDBio 225, 363, 482, 562, 582.
Stat 221.

Recommended Courses

- PAS 100, 282 (for plant biotechnology students).
PDBio 562 (for animal biotechnology students).
Phscs 105, 106 (107, 108) (for graduate school preparation in biotechnology).

*Hours include courses that may fulfill university core requirements.

BS Landscape Management (62.5–64.5 hours*)

Major Requirements

- Complete the following required departmental courses:
PAS 100, 103, 105, 198R, 199R, 211, 212, 214, 282, 283, 301, 319, 320, 331, 391R, 402, 431.
- Complete the following required non-departmental courses:
Acc 200.
Bus M 300, 488, 489.
Econ 110.
InBio 430.
I Sys 100, 101.
And complete one course from the following:
Chem 101, 105.
- Complete one course from the following:
InBio 235.
PAS 112, 210, 213, 330, 380.

Recommended Courses

A management minor is *strongly* recommended.

Completion of the following courses (some listed above) will meet the requirements for this minor:

- Acc 200.
Bus M 300, 371R, 489.
Econ 110.
Math 110.
Org B 320.
Stat 221.

The following courses are also suggested:

- Bus M 372.
TMA 150.

The ability to speak Spanish is highly valuable to those pursuing careers in landscape management. The following courses are therefore recommended:
Span 101, 102, 105.

For students planning to pursue a master's degree in landscape architecture (MLA), the following courses are also recommended:

- Biol 350.
CM 105.
Geog 212.
PAS 380.
VASTu 103.

For students planning to pursue a master's degree in horticulture science (MS), the following courses are recommended:

- Biol 350.
Chem 106, 107, 351, 352, 481.
Math 119 or Stat 221.
Phscs 105, 106.
PAS 305, 369, 390R, 440, 494R, 511.

*Hours include courses that may fulfill university core requirements.

BS Plant Biology (62–68 hours*)

Major Requirements

- Complete the following core courses:
Biol 120, 220, 240, 241, 340, 350, 360, 420.
- Complete the following:
Chem 105, 106, 107.
- Complete one of the following options:
Either Chem 152, 285
Or Chem 351, 352, 481.
- Complete one course from the following:
Math 112, 119.
Stat 221.
- Complete the following major core courses:
InBio 430.
PAS 100, 282, 283, 310R, 440.
- Complete a minimum of 7 hours from the following (see the suggested tracks below):
Biol 421.
Chem 482.
InBio/PAS 265.
InBio 331.
PAS 301, 303, 305, 306, 330, 331, 369, 486.
- Complete an additional 5–6 hours from the following list or from item 6 above:
InBio 235, 341, 441, 450, 580, 581.
PAS 198R, 199R, 210, 310R, 355, 402, 416, 431, 485, 494R, 575.

Suggested Tracks That Prepare for Graduate Study

- Agronomy:
Chem 105, 106, 107, 351, 352.
PAS 303, 305, 306, 331, 369, 431, 440.
Stat 221.
Recommended additional courses:
Chem 481.
Phscs 105, 106.
- Plant molecular/Cell biology/Biochemistry:
Chem 105, 106, 107, 351, 352, 481, 482.
InBio 331.
InBio/PAS 265.
PAS 486.

Plant and Animal Sciences

Recommended additional courses:

PAS 494R or InBio 490R (2 hours minimum).

Phscs 105, 106.

Competency in both calculus and statistics.

3. Plant ecology and evolution:

Chem 105, 106, 107; 152 and 285 or 351 and 352.

InBio 235, 310, 331, 355, 356.

PAS 440.

Recommended additional courses:

Phscs 105, 106.

Competency in both calculus and statistics.

4. Horticultural science:

Chem 105, 106, 107, 351, 352.

InBio 331.

PAS 301, 302, 305, 306, 331, 369, 431, 440.

Recommended additional courses:

Chem 481.

Phscs 105, 106.

PAS 198R or 199R.

*Hours include courses that may fulfill university core requirements.

BS Wildlife and Wildlands Conservation (64 hours*)

The Discipline

This degree program qualifies students for federal job series employment in wildlife biology, range conservation, zoology, and botany. It also prepares for graduate programs in renewable natural resources and for eventual professional affiliations with state wildlife agencies and a number of federal agencies, including the U.S. Forest Service, Bureau of Land Management, Fish and Wildlife Service, and Park Service. Graduates are well prepared to deal with complex issues involving wildlife and wildlands management and the overall conservation of natural resources.

Major Requirements

1. Complete the following:
Biol 120, 220, 350.
NDFS 330.
PAS 282, 283, 440.
2. Complete the following:
InBio 341, 430, 447, 450.
PAS 115, 215, 225, 330, 355, 357, 411, 416, 417, 419, 424, 446.

Recommended Courses for Graduate School Track

Biol 240, 340.

Chem 105, 106 and either Chem 152 or 351.

Phscs 105, 106; or equivalents.

Recommended Courses for Preprofessional Track

Chem 105, 106, 107, 351, 352, 353.

Phscs 105, 106, 107, 108.

PDBio 305 or 362 or InBio 380.

GIS Applications

Students interested in GIS applications should consider a minor in geographic information systems (20–23 hours). See the Geography Department for details.

*Hours include courses that may fulfill university core requirements.

Minor Landscape Management (17.5–18 hours*)

Minor Requirements

1. Complete the following:
PAS 103, 214, 282, 391R.
2. Complete one course from the following:
PAS 198R, 199R.
3. After consulting with a faculty advisor, complete 8 hours from the following:
Design
PAS 101, 112, 213, 380.
Installation
PAS 211, 212, 283, 319, 320.
Maintenance
PAS 210, 283, 319, 320, 431.

Note: Electives need not be taken from the same emphasis to fill this requirement.

Note: PAS 100 will substitute for 3 hours under the elective requirement.

Plant and Animal Sciences (PAS)

Undergraduate Courses

100. Living With Plants. (3:3:0) F, W, Sp

Physiological, morphological, and ecological characteristics of plants used for food, fiber, and aesthetic enhancement.

103. Residential Landscape Design. (3:3:0) F, W

Design and composition as applied to development of residential grounds.

105. Landscape Design Graphics. (2:2:0) W Prerequisite: PAS 103.

Communication through descriptive drawing and professional plan graphics: plan views, elevation, color, and computer-aided design.

112. Floral Design. (3:2:2) F, W, Sp

History and principles of floral design; identification, care, and handling of cut flowers; techniques of arranging flowers and other plant materials for home and professional use. Fee.

115. Introduction to Wildlife and Wildlands Conservation.

(1:1:0) F

Assisting students in choosing individual professions and curricula.

198R. BYU Grounds Practicum. (0.5:0:0) F, W, Sp, Su Prerequisite: instructor's consent; concurrent employment with BYU Grounds Department.

Multiple horticultural experiences through collaboration with BYU Grounds.

199R. Academic Internship. (1–3:Arr.:Arr. ea.) F, W, Sp, Su Prerequisite: consent of both department chair and cooperative education coordinator.

Work experience evaluated by supervisor and posted on student's transcript.

210. Herbaceous Plants. (2:2:0) F

Identification and landscape use of flowers and groundcovers.

211. Landscape Structures. (2:2:0) F 1st blk. Prerequisite: PAS 103.

Theory and mechanics of hardscape design and construction.

212. Landscape Laboratory. (1:0:2) F 2nd blk. Prerequisite: PAS 211.

Working methods of the landscape industry: irrigation, equipment, and materials.

213. Interior Landscapes. (2:2:0) F, W Recommended: PAS 103.

Design and management of interior landscapes; identification and culture of indoor plants; drawing and computer-aided design.

214. Landscape Bidding and Estimating. (2:2:0) W Prerequisite: Math 110 or equivalent; PAS 103.

Competitive bidding strategies, quantity takeoffs, bid analyses for landscape construction and maintenance.

215. Principles of Range Management. (3:3:0) W

Overview of rangeland resources and management principles, including rangeland classification, multiple use management, natural resource policy, and grazing management.

225. Principles of Wildlife Ecology and Management. (3:3:0) F

Prerequisite: Biol 100.

Skillfully applying knowledge and ethics to preserving, enhancing, and regulating wildlife populations and habitats.

265. (PAS-InBio) Genomics. (3:2:1) F, W Prerequisite:

bioinformatics major status or Biol 120.

Introduction to genomics and genome projects (human, plant, bacterial, yeast, parasites). Introduction to genes and genomes; computational and statistical approaches for analyzing genomic data, including genome sequencing and annotation, gene expression and the transcriptome, proteomics and functional genomics, and genetic variation and SNPs.

282. Introduction to Soil Science. (3:3:0) F, W, Sp Prerequisite: concurrent enrollment in PAS 283 for all majors. Recommended: one semester of college chemistry and Math 110.

Physical, chemical, and microbiological properties of soils that affect plant growth in natural, agricultural, and urban environments.

283. Introduction to Soil Science Laboratory. (1:0:3) F, W, Sp

Prerequisite: PAS 282 or concurrent enrollment.

Laboratory techniques in determining soil physical, chemical, and fertility properties.

301. Plant Growth and Reproduction. (3:2:2) W Prerequisite: PAS 100 or equivalent.

Scientific principles of plant propagation by seeds, cuttings, budding and grafting, and tissue culture.

303. Soils Conservation and Resources. (3:3:0) F Prerequisite: PAS 100 or equivalent; PAS 282, Chem 105 (or 101), Math 110 or equivalent. Recommended: Geol 111.

Taxonomy of world soils; conservation and management of agricultural, wildland, wetland, and urban soils.

305. Soils and Water Quality. (3:3:0) W Prerequisite: PAS 100 or equivalent, PAS 282, Chem 105 (or 101), Math 110 or equivalent.

Principles and practices of safe agricultural and urban waste management; amendments and nutrients, including remediation methods for conserving soils and water quality.

306. Soil Fertility and Plant Nutrition Laboratory. (1:0:3) W

Prerequisite: PAS 305 or concurrent enrollment.

Laboratory for studying nutrient-supplying power of soils, nutrient deficiencies and toxicities, and plant adaptation to nutritional stresses.

310R. Mentored Laboratory Techniques. (1–3:0:Arr. ea.) F, W, Sp, Su Prerequisite: Chem 107 or equivalent; instructor's consent.

Juniors or seniors in plant and animal sciences majors receive mentored training in plant, soil, and/or biotechnology lab instrumentation and protocols.

319. Turf Science. (2:1:2) F Prerequisite: PAS 100.

Management of turf relative to climate, soil, and use on the golf course, park, and private areas.

320. Arboriculture. (3:3:0) W Prerequisite: PAS 100, 282. Recommended: InBio 205.

Biology and culture of woody plants for use in urban landscapes.

330. Wildland Plant Identification and Ecology. (3:2:3) W

Identification, characteristics, phenology, distribution, site adaptation, forage value, and response to management of significant range and pasture plants.

331. Science of Plant Pest Control. (3:3:0) W Prerequisite: PAS 100, 282; or equivalents.

Identifying important insect, disease, and weed pest problems. Pest classification, biology, and methods of control.

340. Air Pollution and Air Quality. (3:3:0) F

Biogenic and anthropogenic factors influencing air pollution and air quality. How various compounds (CO_x, SO_x, NO_x, particulate matter, ozone, etc.) are generated and influence air quality. Other topics include global warming, coal-fired power generation, transportation-derived pollutants, smog, acid rain, ozone depletion, etc.

355. Wildland Vegetation Measurements and Analysis. (3:2:3)

F even yr. Recommended: Stat 221, Engl 316.

Field methodologies for vegetation inventories and analysis (density, biomass, cover, frequency, utilization, etc.) in wildland settings.

357. Wildlife Methods. (3:2:3) W odd yr. Recommended: Biol 350, PAS 355.

Measurement techniques for inventorying wildlife species and their habitats.

369. Science of Plant Production. (4:4:0) F Prerequisite: PAS 100, 282 or equivalent.

Scientific principles of crop production related to agronomic and horticultural plants, including relationship of management principles and physiological processes in plants.

375. Environmental Policies and Laws. (2:2:0) W Prerequisite: Biol 150.

Environmental laws (Clean Water Act, Clean Air Act, etc.) and the regulations (National Environmental Policy Act, Nutrient Management Plan, etc.) established in the USA to improve environmental quality.

380. Plant Community Design. (2:2:0) W Prerequisite: PAS 103, 105, InBio 235.

Design and ecology of thematic plant communities.

390R. Special Topics in Plant and Animal Sciences. (1–3:Arr:0 ea.) F, W

Various topics of importance in plant and animal sciences.

391R. Careers in Plant and Animal Sciences. (1:1:0 ea.) F For sophomores and juniors.

Current information on internships, career options, and employment preparation skills in the plant and animal sciences.

402. Urban Soils and Water. (4:4:0) F Prerequisite: PAS 100, 282.

Principles of water management, soil physics, and soil fertility used in a problem-solving environment addressing current challenges in managing soils and water in the urban landscape.

410. Advanced Biotechnology Instrumentation. (2:0:6) F, W, Sp, Su Prerequisite: PAS 310R.

Laboratory experiences using advanced biotechnology and genomics instrumentation and protocols.

411. Watershed Management. (3:2:3) F even yr. Prerequisite: Biol 350.

Processes and management of the hydrologic cycle on forests and rangelands. Field trips required.

416. Wildland Vegetation Improvement. (3:2:3) F odd yr.

Prerequisite: Biol 350, PAS 311.

Habitat improvement for domestic and wild animals. Plant control by mechanical equipment, herbicides, and prescribed fire. Restoration of disturbed lands. Field trips required.

417. Natural Resource Planning and Conflict Resolution. (3:2:3)

F odd yr. Prerequisite: PAS 215, 225, Biol 350.

Development of a multiple-use natural resource plan for watershed, forestry, recreation, wildlife, and livestock. Policies that govern planning and conflict resolution.

419. Forest Management and Ecology. (3:2:3) F even yr.

Managing forests, emphasizing ecosystem management. Field trips required.

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424. Wildlife Law Enforcement. (3:3:0) W Prerequisite: Biol 100 or equivalent.

Current and historical principles of federal and state wildlife law enforcement, case development, evidence, evaluation, human rights, and testimony.

431. Integrated Management of Plant Pests. (3:2:3) F Prerequisite: PAS 100, 282, 331.

Diagnosing, identifying, and managing weed, insect, and disease problems in plants. Integrated pest management solutions. Proper pesticide management and safety.

440. Plant Physiology. (3:3:0) F Prerequisite: GE Biological Science requirement; college chemistry. Recommended: Chem 285; or 351, 352.

Photosynthesis, respiration, water relations, mineral nutrition, growth of flowering plants.

446. (PAS–InBio) Ornithology. (3:2:3) W Prerequisite: InBio 341.

Avian systematics, evolution, distribution, and natural history. Two three-day field trips required.

485. Plant Breeding and Biotechnology. (2:2:0) F Prerequisite: Biol 372.

Introduction to modern plant improvement through selective breeding and application of plant biotechnology.

486. Plant Cell Biology. (2:2:0) W Prerequisite: Biol 360.

Aspects of cell biology unique to plant organisms, emphasizing current research through study of published scientific literature.

487. Readings in Animal Biotechnology. (2:2:0) W Prerequisite: Biol 240.

Discussion of assigned literature in animal biotechnology.

490. Case Studies. (2:1:2) F alt. yr. Prerequisite: PAS 282.

Contemporary agricultural and environmental problems using decision case studies dealing with environmental technology issues and analysis.

491R. Undergraduate Seminar. (1:1:0 ea.) W

Current information in the plant and animal sciences.

494R. Mentored Learning Experience. (1–6:Arr.:Arr. ea.) F, W, Sp, Su Prerequisite: supervisor's consent.

Topics vary. Registration required for mentored experiences.

500-Level Graduate Courses (available to advanced undergraduates)

511. Soil Physics. (3:3:0) W even yr. Prerequisite: PAS 282, Chem 105, Math 112 or 119; or equivalents. Recommended: Phscs 105 or 121, or equivalent.

Physical relationships of water, heat, and gases in soils; physical and chemical properties of clays. Mathematical modeling of physical properties and transport processes.

514. Soil Microbiology. (2:2:3) W odd yr. Prerequisite: Chem 106, 107; or equivalents.

Ecology and role of soil microorganisms in nutrient cycling, decomposition of organic matter and waste materials, and degradation of agricultural chemicals in soil.

515. Agrostology: Taxonomy and Ecology of Grasses. (3:2:3) W even yr. Prerequisite: InBio 230 or equivalent.

Classification and ecology of grasses, emphasizing important forage species.

520. Saline and Sodic Soils. (3:2:3) F even yr. Prerequisite: PAS 305, Chem 105, 106, 107; or equivalents.

Physical and chemical properties of saline and sodic soils and irrigation waters—their diagnosis, reclamation, and management for sustainable crop production.

525. Plant Development. (3:3:0) F odd yr. Prerequisite: Biol 360 or equivalent; PAS 486 or equivalent.

Molecular and genetic interactions in plant development.

540R. Topics in Plant Physiology. (3:3:0 ea.) On dem. Prerequisite: PAS 440 or equivalent; PAS 494R or concurrent enrollment.

Topics in advanced plant physiology.

546. World Bird Families. (3:4:2) W 2nd blk. Prerequisite: PAS 446 or instructor's consent.

Distribution, composition, and characteristics of world bird families, using museum specimens.

551. Quantitative Ecology. (2:2:1) W odd yr. Prerequisite: Biol 350 or equivalent; Stat 221 or 511 or concurrent enrollment.

Quantitative methods for ecological sampling and data analysis.

552. Terrestrial Ecosystems. (3:3:0) F even yr.

Theory and application of plant and animal distribution in terrestrial environments.

553. Restoration Ecology. (3:3:0) W odd yr. Prerequisite: PAS 282, 416, InBio 350; or equivalents.

Nature of ecosystem disturbance and plant succession; developing science and practice of ecological restoration; case studies of applied restoration.

554. Wildlife Behavioral Ecology. (3:3:0) W Prerequisite: Biol 100, 350; or equivalents.

Integrating principles of ethology, sociobiology, and behavioral ecology using examples from wildlife resources; behavioral sampling methods. Field trips required.

559. Plant Molecular Breeding. (2:2:0) W even yr. Prerequisite: PAS 265, 485, Biol 340; or equivalents; PAS 494R or concurrent enrollment.

Molecular genetic methods applied to improvement of economically important plants.

560. Soil and Plant Analysis. (3:2:4) W Prerequisite: PAS 282 or equivalent.

Laboratory chemical analysis of soils and plant materials in soil and plant research.

575. Plant Pathology. (3:2:3) F odd yr. Prerequisite: PAS 100 or InBio 131; PAS 331 or Biol 220 or 240; or equivalents.

Concepts associated with symptoms, development, control, and classification of plant diseases.

580. Plant Transformation. (2:1:3) W even yr. Prerequisite: Biol 360, PAS 486; or equivalents.

Theory and methods of plant transformation.

598R. Advanced Topics in the Plant and Animal Sciences. (1–3:Arr.:0 ea.) On dem.

Graduate Courses

For 600- and 700-level courses, see the BYU 2007–2008 Graduate Catalog.

Plant and Animal Sciences Faculty

Professors

Allen, Phil S. (1990) BS, MS, Brigham Young U., 1983, 1985; PhD, U. of Minnesota, 1990.

Anderson, Val Jo (1988) AS, Snow Coll., 1980; BS, MS, Utah State U., 1982, 1985; PhD, Texas A&M U., 1989.

Black, Hal L. (1975) BS, MS, U. of Utah, 1966, 1968; PhD, U. of New Mexico, 1972.

Booth, Gary M. (1972) BS, MS, Utah State U., 1963, 1966; PhD, U. of California, Riverside, 1969.

Christensen, Allen C. (2001) BS, Brigham Young U., 1957; MS, U. of California, Davis, 1960; PhD, Utah State U., 1979.

Crookston, R. Kent (1998) BS, Brigham Young U., 1968; PhD, U. of Minnesota, 1972.

Fairbanks, Daniel J. (1988) BS, Brigham Young U., 1982; MS, U. of Minnesota, 1985; PhD, U. of Arizona, 1988.

Flinders, Jerran T. (1976) BS, MS, U. of Utah, 1967, 1968; PhD, Colorado State U., 1971.

Hess, Wilford M. (1962) BS, Brigham Young U., 1957; MS, PhD, Oregon State U., 1960, 1962.

Jolley, Von D. (1977) BS, Brigham Young U., 1970; MS, PhD, Iowa State U. of Science and Technology, 1974, 1976.
 Kellems, Richard O. (1986) BS, Brigham Young U., 1969; MS, PhD, Oregon State U., 1975, 1976.
 Roundy, Bruce A. (1994) BA, MS, U. of Nevada, Reno, 1973, 1977; PhD, Utah State U., 1984.
 Terry, Richard E. (1980) BS, Brigham Young U., 1972; MS, PhD, Purdue U., 1974, 1976.
 White, Clayton M. (1970) BA, PhD, U. of Utah, 1961, 1968.

Associate Professors

Coleman, Craig E. (1996) BS, MS, Brigham Young U., 1985, 1987; PhD, The Pennsylvania State U., 1992.
 Hopkins, Bryan G. (2007) BS, MS, Brigham Young U., 1990, 1991; PhD, Kansas State U., 1995.
 Jellen, Eric N. (1996) BS, Brigham Young U., 1986; MS, PhD, U. of Minnesota, 1988, 1992.
 Maughan, Peter J. (2002) BS, MS, Brigham Young U., 1990, 1991; PhD, Virginia Polytechnic Inst. and State U., 1994.
 Robinson, Todd F. (1996) BS, MS, Brigham Young U., 1986, 1988; PhD, Cornell U., 1996.
 Smith, Tom S. (2006) BS, Brigham Young U., 1982; MS, U. of Alaska, 1987; PhD, Brigham Young U., 1992.
 Stevens, Mikel R. (1994) BS, MS, Brigham Young U., 1977, 1983; PhD, U. of Arkansas, 1993.
 Woolstenhulme, Loreen Allphin (1996) BS, MS, Brigham Young U., 1991, 1992; PhD, U. of Utah, 1996.

Assistant Professors

Geary, Bradley G. (2003) BS, Brigham Young U., 1995; MS, PhD, Washington State U., 1997, 1999.
 Petersen, Steven L. (2006) BS, MS, Brigham Young U., 1994, 1997; PhD, Oregon State U. 2004.
 St. Clair, Samuel B. (2007) BS, MS, Brigham Young U., 1998, 1999; PhD, Pennsylvania State U., 2004.
 Udall, Joshua A. (2006) BS, Brigham Young U., 1995; MS, U. of Idaho, 1997; PhD, U. of Wisconsin, 2003.

Assistant Teaching Professor

Jolley, Greg V. (2003) BS, Brigham Young U., 1995; MLA, Kansas State U., 1999.

Senior Scientist

Webb, Bruce L. (1978) BS, MS, Brigham Young U., 1972, 1978.

Part-Time Faculty

Hunter, Norah T. (1983) BS, MS, Brigham Young U., 1982, 1992.

Adjunct Professors

Nelson, Williams

Collaborators and Adjunct Faculty

James Davis, Durant McArthur, Susan Meyer, Stephen Monsen, David Nelson, Jordan Pederson, Stewart Sanderson, Gary Strobel, Renee Van Buren

Emeriti

Andersen, William R. (1966) BS, MS, Utah State U., 1956, 1958; PhD U. of California, Davis, 1963.
 Brotherson, Jack D. (1969) BS, MA, Brigham Young U., 1964, 1967; PhD, Iowa State U. of Science and Technology, 1969.
 Ellsworth, D. Delos (1975) BS, Arizona State U., 1958; MS, Cornell U., 1959.
 Gardner, Robert W. (1966) BS, Utah State U., 1958; MS, PhD, Cornell U., 1962, 1964.
 Harper, Kimball T. (1973) BS, MS, Brigham Young U., 1958, 1960; PhD, U. of Wisconsin, Madison, 1963.
 Hooper, Gary C. (1992) BS, Brigham Young U., 1963; PhD, U. of California, Riverside, 1968.
 Horrocks, R. Dwain (1978) BS, Brigham Young U., 1962; MS, PhD, Pennsylvania State U., 1964, 1967.
 Jeffery, Larry S. (1984) BS, Utah State U., 1962; PhD, North Dakota State U., 1966.
 Moore, Glen (1954) BS, Brigham Young U., 1949; PhD, U. of Chicago, 1954.
 Nelson, Sheldon D. (1972) BS, Brigham Young U., 1967; PhD, U. of California, Riverside, 1971.

Orme, Leon E. (1969) BS, Utah State U., 1953; MS, U. of Tennessee, Knoxville, 1955; PhD, Michigan State U., 1958.
 Pace, Ronald T. (1961) BS, MS, Brigham Young U., 1955, 1958.
 Park, Robert L. (1965) BS, Brigham Young U., 1956; MS, PhD, Cornell U., 1958, 1962.
 Robison, Laren R. (1971) BS, MS, Brigham Young U., 1958, 1959; PhD, U. of Minnesota, Minneapolis, 1962.
 Rushforth, Samuel R. (1970) BS, Weber State Coll., 1966; MS, PhD, Brigham Young U., 1968, 1970.
 Shumway, R. Phil (1949) BS, Utah State U., 1947; MS, U. of Minnesota, Minneapolis, 1949; PhD, Utah State U., 1959.
 Shupe, G. Merrill (1988) DVM, Washington State U., 1956.
 Smith, Bruce N. (1974) BS, MS, U. of Utah, 1959, 1962; PhD, U. of Washington, 1964.
 Smith, H. Duane (1969) BS, MS, Brigham Young U., 1963, 1966; PhD, U. of Illinois, 1969.
 Stutz, Howard C. (1952) BS, MS, Brigham Young U., 1940, 1951; PhD, U. of California, Berkeley, 1956.
 Tidwell, William D. (1966) BS, MS, Brigham Young U., 1954, 1963; PhD, Michigan State U., 1966.
 Vallentine, John F. (1968) BS, Kansas State U., 1952; MS, Utah State U., 1953; PhD, Texas A&M U., 1959.
 Wallentine, Max V. (1962) BS, Utah State U., 1955; MS, PhD, Cornell U., 1956, 1960.
 Weber, Darrell (1969) BS, MS, U. of Idaho, 1958, 1959; PhD, U. of California, Davis, 1963.
 Whitton, Leslie (1962) BS, Utah State U., 1949; MS, U. of California, Davis, 1953; PhD, Cornell U., 1964.
 Williams, C. Frank (1971) BS, MS, Utah State U., 1967, 1968; PhD, Oregon State U., 1971.

Polish

See Germanic and Slavic Languages.