

# The University of Arizona College of Agriculture and Life Sciences

## Undergraduate Academic Programs

### Brief History of the College

The University of Arizona was established in 1885 and had as its foundation, what is now called the College of Agriculture and Life Sciences. Both the University and the College of Agriculture and Life Sciences were authorized by the Territorial Legislature and shaped by three pieces of federal legislation. In 1862 the Morrill Act provided the funding for resident classroom instruction in the new land grant universities. In 1887, the Hatch Act, authorized experiment stations and in 1914, the Smith-Lever act established the cooperative extension service. Both the USDA and UA have worked cooperatively to transform agriculture, forestry and rural and urban home life at the state, federal, and global level.



# College of Agriculture and Life Sciences

## Organization

### Departments, Schools, Undergraduate Majors, and Specializations

The College of Agriculture and Life Sciences provides professional education for a wide range of career opportunities in the sciences, business and education. The various curricula offer professional preparation for careers in management, government, public service agencies, retail and service industries, human and animal health, the food processing industry, financial institutions, youth development agencies, conservation and environmental organizations, farming and ranching, research, extension, communications and education. A broad education in a professional knowledge area is combined with foundation courses in the biological, physical and social sciences, communications and the humanities to develop a well-rounded academic experience

Department	Major	Areas of Specialization
Agricultural & Resource Economics	Agricultural Economics & Management Environmental & Water Resource Economics	Agricultural Economics, Agribusiness Management
Agriculture & Biosystems Engineering	Biosystems Engineering Agricultural Systems Management	Agricultural Water Resources Engineering, Biosystems Engineering, Bio-Environmental Engineering
Agricultural Technology Management and Education	Agricultural Technology Management and Education	Agricultural Technology Management, Teaching
Animal Sciences	Animal Sciences	Animal Industry, Science & Pre-Professional, Equine, Dairy, Food Safety and Race Track Industry
Interdisciplinary	Crop Production	Crop Production and Turf Management
Nutritional Sciences	Nutritional Sciences	Dietetics, American Dietetics Association Approved; Nutrition
Plant Sciences	Plant Sciences	Horticultural Systems, Plant Biology, and Turfgrass Cultivation
Soil, Water & Environmental Science	Environmental Science	Land & Water, Environmental Microbiology, Environmental Chemistry, Environmental Science & Technology, Environmental Science & Policy
Veterinary Science & Microbiology	Veterinary Science Microbiology	

# College of Agriculture and Life Sciences Organization

## Departments, Schools, Majors, and Specializations (Continued)

School	Major	Area of Specialization
Norton Family & Consumer Sciences	Family & Consumer Science Education Retailing & Consumer Sciences Family Studies & Human Development	Education, Family Life
Natural Resources	Natural Resources (formerly Wildlife, Watershed and Rangeland Management)	Wildlife Conservation & Management, Fisheries Conservation & Management, Watershed Hydrology & Management, Rangeland Ecology & Management, Landscape



## Overview on the College's organization

### Assessment & Analysis

As the primary land-grant component of the University, the College administers a variety of programs and engages in cooperative efforts with federal, state and county governments and agencies.

There are three broad divisions in the College of Agriculture and Life Sciences:

- **Teaching:** Includes formal, on-campus instruction and informal, off-campus instruction. There are 24 undergraduate and graduate majors among the 13 departments and schools within the College with the major subjects covering Agricultural and Biological Sciences, Environmental Sciences, Family and Consumer Studies and Natural Resources. The teaching area of the College is coordinated by the [Office of Academic Programs](#).
- **Research:** Highlights state priorities, with consideration for regional, national and international needs. There are 11 agricultural research centers and demonstration sites within the state. The research area of the College is coordinated by the [Agricultural Experiment Station](#).
- **Outreach:** Emphasizes non-formal education and transfer of knowledge to audiences throughout the state, based on research information from within the College and elsewhere. There are 22 offices in the 15 counties plus 4 offices on Indian reservations. The outreach/extension area of the College is coordinated by [Arizona Cooperative Extension](#).

# Quality Advising and Mentoring

## COLLEGE OF AGRICULTURE AND LIFE SCIENCES DEPARTMENT HEADS, SCHOOL DIRECTORS AND UNDERGRADUATE ADVISING COORDINATORS

<http://ag.arizona.edu/general/students.html>

### AGRICULTURAL SYSTEMS MANAGEMENT

Yuma Only

Dr. Stephen Poe  
spoe@ag.arizona.edu

928-317-6418

### AGRICULTURAL ECONOMICS AND MANGEMENT

Chavez 319

Dr. Gary Thompson  
aker@ag.arizona.edu  
Dr. Roger Dahlgran  
dahlgran@email.arizona.edu  
Dr. Paul Wilson  
pwilson@ag.arizona.edu  
Ms. Heather Jepsen  
jepsenh@email.arizona.edu

621-6249

621-6254

621-6258

621-2544

### AGRICULTURAL TECHNOLOGY MANAGEMENT AND EDUCATION FORBES 224

Dr. Jack Elliot, Head  
elliott@ag.arizona.edu  
Dr. Jim Knight  
jknight@ag.arizona.edu  
Teaching Option  
Mr. Quint Molina  
qmolina@email.arizona.edu  
Agricultural Technology Management Option  
Dr. Ed. Franklin  
eafrank@ag.arizona.edu

621-7173

621-1523

940-2471

940-3718

### ANIMAL SCIENCES

SHANTZ 221

Dr. Ron Allen, Head  
rallen@ag.arizona.edu  
Ms. Sharon Culotta  
sculotta@cals.arizona.edu  
Ms. Wendy Davis (Race Track Industry Program)  
wdavis@ag.arizona.edu

621-7626

621-9965

621-5663

### BIOSYSTEMS ENGINEERING

SHANTZ 403

Dr. Donald Slack, Head  
slackd@email.arizona.edu  
Dr. Mark Riley  
riley@ag.arizona.edu

621-3691

626-9120

# Quality Advising and Mentoring

## COLLEGE OF AGRICULTURE AND LIFE SCIENCES DEPARTMENT HEADS, SCHOOL DIRECTORS AND UNDERGRADUATE ADVISING COORDINATORS (Continued)

### ENVIRONMENTAL SCIENCE

Dr. Jeffrey Silvertooth, Head silver@ag.arizona.edu	SHANTZ 429 621-7228
Dr. Tom Wilson twilson@ag.arizona.edu	621-9308
Dr. James Riley jiriley@ag.arizona.edu	591-4019
Dr. Allan Matthias amatthia@email.arizona.edu	621-7226

### NORTON SCHOOL OF

### FAMILY AND CONSUMER SCIENCES

Dr. Soyeon Shim, Director shim@ag.arizona.edu	<b>McClelland Park Building</b> 621-7147
<u>Family Studies and Human Development</u> Dr. Amy Chandler alc@email.arizona.edu	621-7127
<u>Family &amp; Consumer Sciences Education</u> Dr. Maureen Kelly mekelly@ag.arizona.edu	621-7127
<u>Retailing and Consumer Sciences</u> Ms. Felicia Frontain frontain@ag.arizona.edu	621-7144

### NUTRITIONAL SCIENCES

Dr. Joy Winzerling, Head jwinzerl@ag.arizona.edu	SHANTZ 309 621-3096
Ms. Kelly Jackson kjackson@email.arizona.edu	626-3504

### PLANT SCIENCES

Dr. Robert Leonard, Head plshead@ag.arizona.edu	FORBES 303 621-1945
Ms. Libby Davison edavison@ag.arizona.edu	621-1582

# Quality Advising and Mentoring

## COLLEGE OF AGRICULTURE AND LIFE SCIENCES DEPARTMENT HEADS, SCHOOL DIRECTORS AND UNDERGRADUATE ADVISING COORDINATORS (Continued)

<b><u>NATURAL RESOURCES (School of)</u></b>	BIO SCIENCES EAST 325
<b>Natural Resources (formerly Wildlife Watershed and Rangeland Resources)</b>	
Dr. C.P. Patrick Reid, Director cppr@ag.arizona.edu	621-7257
Ms. Cheryl Craddock ccradoc@email.arizona.edu	621-7260
Dr. William Matter wmatter@ag.arizona.edu	621-7280
<b><u>VETERINARY SCIENCES &amp; MICROBIOLOGY</u></b>	VETERINARY SCIENCE 201
Dr. Jack Schmitz, Head jschmitz@u.arizona.edu	621-4466
Dr. Elaine Marchello evm@email.arizona.edu	621-3058
Dr. Janet Decker jdecker@email.arizona.edu	621-8942
<b><u>GENERAL INFORMATION</u></b>	Forbes 201 & 211
Dr. David E. Cox, Associate Dean	621-3616
Dr. Elaine Marchello, Interim Assistant Dean evm@email.arizona.edu	621-3612
Ms. Nancy Rangel, Academic Advising Coordinator nancyr@ag.arizona.edu	626-3631
Ms. Amy Rogers, Academic Advisor rogers@cals.arizona.edu	621-3611
Mr. Frank Santiago, Coordinator, Recruitment Services fvs@email.arizona.edu	626-9836
	621-1145

# Scholarship Information

The College of Agriculture and Life Sciences has a wide array of scholarships available for its students. All you need to do is fill out **one application**, and that information is submitted to **multiple donors**. You may be eligible for one, so go online at [www.ag.arizona.edu/oap](http://www.ag.arizona.edu/oap) and click on the 'Scholarships' link to submit one electronically. Undergraduate students must be enrolled for a minimum of 12 units for each semester and making academic progress toward completion of their degree. Additional donor criteria for GPA, residency, financial need or classification will be reviewed when applicable.

If you wish to speak with someone directly, please contact the scholarship administrator at 621-3612.

# Student Clubs and Activities

**Alpha Gamma Rho  
National Agricultural Fraternity**  
638 E. University  
Tucson, AZ 85705  
Advisor: Mr. Don Shields  
Donald.shields@gmail.com  
<http://ag.arizona.edu/agr/>

**Aggie House**  
819 N. Euclid  
Tucson, AZ 85719  
Advisor: Dr. Jeff Silvertooth, 621-1977

**Agricultural Communicators of Tomorrow (ACT)**  
Agricultural Education  
Forbes 232, P.O. Box 210036  
Tucson, AZ 85721-0036  
Advisor: Dr. Jack Elliot, 621-7173

**Alpha Tau Alpha**  
Agricultural Education Honorary  
P.O. Box 210036  
Tucson, AZ 85721-0036  
Advisor: Dr. Billye Foster, 621-1523

**Alpha Zeta Honorary**  
P.O. Box 210038  
Tucson, AZ 85721-0038  
Advisor: Dr. Dennis Ray 621-7612  
Dr. Elaine Marchello 621-3058

**Ambassadors for Agriculture and Life Sciences**  
c/o Agricultural Education  
P.O. Box 210036  
Tucson, AZ 85721-0036  
Advisors: Dr. James Knight, 621-9144  
Ms. Amy Rogers, 626-9836  
<http://ag.arizona.edu/OAP/ambassadors/>

**Ambassadors for Family Study and Human Dev.**  
Norton School of Family and Consumer Sciences  
650 N. Park Ave.  
Tucson, AZ 85721  
Advisor: Dr. Amy Chandler, 621-7127  
Ms. Kim Brooke, 621-1715  
Ms. Allison Ewing, 621-7132

**Collegiate Cattle Grower's Association**  
Dept. of Animal Sciences  
P.O. Box 210038  
Tucson, AZ 85721  
Advisor: Dr. Glenn Duff, 626-5573

**Collegiate Equestrian Team**  
Dept. of Animal Sciences, Horse Unit  
4101 N. Campbell Ave.  
Tucson, AZ 85719  
Advisor: Ms. Laura Walker, 318-7023

**Future Retail Leaders Association (F.R.L.A.)**  
Norton School of Family and Consumer Sciences  
650 N. Park Ave.  
Tucson, AZ 85721  
Advisors: Dr. Amy Chandler, 621-9158  
Ms. Felicia Frontain, 621-7144

**Horticulture Club**  
Plant Sciences  
P.O. Box 210036  
Tucson, AZ 85721-0036  
Advisor: Ms. Libby Davison, 621-1582

**Jacobs-Cline Society**  
Agricultural Education  
P.O. Box 210036  
Tucson, AZ 85721-0036  
Advisor: Mr. Frank Santiago, 621-1145  
Mr. Quint Molina, 940-2471

**Kappa Omicron Nu**  
Norton School of Family and Consumer Sciences  
650 N. Park Ave.  
Tucson, AZ 85721  
Advisor: Ms. Pat Sparks, 626-9536

**Minorities in Agriculture, Natural Resources and  
Related Sciences (MANNRS)**  
Office of Academic Programs  
Forbes 211, P.O. Box 210036  
Tucson, AZ 85721  
Advisor: Mr. Frank Santiago



# Student Clubs and Activities

## **Nutritional Sciences Club**

Shantz 307  
Tucson, AZ 85721  
Advisor: Ms. Kelly Jackson 626-3504

## **Pre-Veterinary Club**

Box 210090  
Tucson, AZ 85721-0090  
Advisor: Dr. Michael Riggs, 621-8445

## **Race Track Industry Club**

845 N. Park Ave. Ste. 370  
Tucson, AZ 85721  
Advisor: Mr. Doug Reed, 621-5660

## **Rodeo Club**

Dept. of Animal Sciences  
PO Box 210038  
Tucson, AZ 85721-0038  
Advisor: Dr. John Marchello, 621-1188

## **Sigma Alpha—National Agricultural Sorority**

PO Box 20894  
1303 E. University Blvd.  
Tucson, AZ 85719-0521  
Advisors: Ms. Nancy Rangel 621-3611

## **Soil, Water and Environmental Science Club**

P.O. Box 210033  
Tucson, AZ 85721-0033  
Advisor: Dr. Jim Riley, 591-4019

## **Students in Free Enterprise (S.I.F.E.)**

University of Arizona  
PO Box 210033  
Tucson, AZ 85721-0033  
Advisor: Melinda Burke, 621-1295

## **Tierra Seca**

Student Chapter of the Society for Range Management  
School of Natural Resources  
P.O. Box 210043  
Tucson, AZ 85721-0043  
Advisor: Dr. Mitch McClaran, 621-1673

## **Wildlife Society**

School of Natural Resources  
P.O. Box 210043  
Tucson, AZ 85721-0043  
Advisor: Dr. Bill Mannan, 621-7283

# The University of Arizona College of Agriculture and Life Sciences

Management, sales and analyst careers in:

- Manufacturing
- Retailing and wholesaling
- Real estate
- Finance/banking/brokerage
- Agribusiness firms
- International business
- Graduate study in business, law or economics

Course work includes:

- Microeconomics
- Macroeconomics
- Marketing
- Management
- Strategy
- Finance
- Accounting
- Negotiation

## Agribusiness Economics & Management Bachelor of Science Degree

The Agribusiness Management Option (B.S. Agricultural Economics and Management) prepares students for management careers in all aspects of modern business, not just agribusiness.

Students acquire the skills to analyze financial and economic information, evaluate competitive strategies, manage risk, develop new markets and enterprises, and work effectively with others. Capstone courses, problem solving, case studies, and real-world simulations prepare students for future careers in business. Smaller classes, accessible advising and outstanding teachers make this op-



tion a viable alternative to any traditional business school.



**Contact information:**  
**Agricultural and Resource Economics**  
**Economics Building 403**  
**The University of Arizona**  
**PO Box 210023**  
**Tucson, AZ 85721-0023**  
**(520) 621-6241 FAX: (520) 621-6250**  
**<http://ag.arizona.edu/AREC/arechome.html>**

**Still in High School?**

**Interest in business and problem solving; moderate to substantial knowledge of math.**

# The University of Arizona College of Agriculture and Life Sciences

## *Option –Teaching*

- *Agricultural Science teacher*
- *Biology teacher*
- *General Science teacher*
- *Extension Education*

## *Option - Technology Management*

- *Careers in agribusiness, banking, mechanization, marketing, communications, public relations, landscape / nursery, and turf.*

## **Option—Teaching course work**

**A ED 195A** Introduction to Teaching Agriculture and the Related Sciences  
**A ED 301** Youth Leadership Development  
**A ED 407/507** Principles of Vocational Education  
**A ED 422/522** Communicating Knowledge in Agriculture and the Life Sciences  
**A ED 438/538** The Teaching of Secondary School Agricultural Science  
**A ED 460/ 560** Instructional Materials Development  
**A ED 462/562** Curriculum Development  
**A ED 485/585** Teaching Psychomotor Skills in Laboratory Sciences  
**A ED 493/593** Student Teaching  
**A ED 498** Senior Capstone  
**A ED 497B/597G** Practicums

## **Option—Technology Management course work**

**AGTM 100** Principles and Practices of Agricultural Mechanization  
**AGTM 120** Micro computing Applications  
**AGTM 330** Turf and Landscape Technology  
**AGTM 350** Applications in Agricultural Mechanics  
**AGTM 351** Operations in Agricultural Mechanics  
**AGTM 380** Global Agricultural and International Relations  
**AGTM 422/522** Communicating Knowledge in Agriculture and the Life Sciences  
**AGTM 432/532** Technology Management

## **Agricultural Technology Management and Education**

This major has two options. The first one is the *Teaching* option which provides course work in basic sciences, technical agriculture, teaching principles and techniques, and communication skills. The teacher preparation in agricultural education for secondary schools or community colleges meets requirements for Arizona secondary school certification in agricultural education and general science. Formal admission to professional education courses is required. Requirements include a cumulative GPA of 2.0 or better, a faculty interview, and successful completion of admission application. The *Technology Management* option includes course work in communications, business, economics, environmental science, and agricultural technology. This option provides students with the skills necessary to enter the agricultural industry in a number of careers including, but not limited to, ornamental plant/nursery industry, the landscape management industry, agribusiness/banking, and golf and turf industry.



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### **Contact information:**

**Frank Santiago**  
**Forbes Building 201**  
**The University of Arizona**  
**PO Box 210036**  
**Tucson, AZ 85721-0036**  
**(520) 621-1145 FAX: (520) 621-9889**  
**URL <http://ag.arizona.edu/AED/aedhome.html>**

### **Still in High School?**

**Classes in agricultural education, biology, chemistry are recommended.**

**Scholarships and internships are available!**  
*Visit our web-site and select teacher prep program: See Prop 301 Opportunities for information and applications.*

# The University of Arizona College of Agriculture and Life Sciences

- Livestock production management
- Positions in racing administration and industries
- Agribusiness firms, financial in, breeding associations
- Graduate school
- Veterinary medicine or other professional school

## OPTIONS

### Animal Industry

Includes additional business, plant/range management

### Food Safety

Emphasis on producing safe foods

### Dairy Science Pathway

Emphasis on the Dairy Industry

### Science/Pre-professional

additional upper-division lab science courses

### Equine Industry

Emphasis on equine business and management

### Equine Science/Pre-professional

Emphasis on equine science including advanced coursework in lab sciences.

### Race Track Industry

additional business, advanced animal sciences

## Animal Science Bachelor of Science Degree

Animal scientists study the breeding, production, marketing, and use of animals in agriculture, entertainment, and companionship. Students learn the biological processes involved in genetics, nutrition, and reproduction as well as the business aspects of livestock and racing management. Specializations include animal industry, science and pre-professional training, equine or race track industry.



### Contact:

**Shantz Building Room 205**

**The University of Arizona, P.O. Box 210038**

**Tucson, AZ 85721-0038**

**(520) 621-7623; FAX (520) 621-9435**

**URL: <http://animal.cals.arizona.edu/>**

Do you have interest in the biological sciences, or in the science and business of domestic animal management?

# Animal Sciences

## Animal Industry Option

The Industry option will provide students with coursework not only about animal management and production, but also classes in business management and marketing, communications and leadership. This program is aimed at students who are interested in owning and/or operating an animal facility, sales and financial fields of the animal industry.

\*\*Also now available: ***Dairy Science and Food Safety Options!!!***

### Curriculum:

- General Education Coursework
  - College algebra and Statistics
  - Composition; Foreign language (1 yr)
  - General biology ;Inorganic chemistry (1 yr)
  - Communications (1 yr); Computer Applications (1 course)
- Animal Genetics and Animal Breeding
- Anatomy & Physiology of Animals
- Food Safety and Meat Animal Composition
- Professional Development
- Feeds and Feeding; Fundamentals of Nutrition
- Reproductive Physiology
- Ag Marketing, Business Management, Economics, 3 other business electives

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# Animal Sciences

## Science and Pre-professional Option

This option prepares students for admission to Colleges of Veterinary Medicine and other professional schools while providing hands-on animal production coursework. Students are also prepared to pursue M.S. and Ph.D. programs of study.

### Curriculum:

- General Education Coursework
  - College algebra and Statistics
  - Composition; Foreign language (1 yr)
  - General biology; Inorganic chemistry (1 yr)
  - Communications (1 yr); Computer Applications (1 course); Organic chemistry (1 yr)
- Animal Genetics and Animal Breeding
- Anatomy & Physiology of Animals
- Food Safety and Meat Animal Composition
- Professional Development
- Feeds and Feeding; Fundamentals of Nutrition
- Reproductive Physiology
- Animal Science Electives
- Biochemistry, Physics

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### Other Opportunities:

#### V bar V Ranch

**Ag Farm Complex that offers students hands on learning with Beef, Dairy, and Equine Production and Meat Science**

**Livestock judging, Equestrian show team, Block and Bridle club**

**Rodeo team**



# Animal Sciences

## Equine Options

The Department of Animal Science offers undergraduates two Equine Science Options: The Science Path prepares students seeking advanced degrees; while the Industry Path prepares students to enter the equine industry upon graduation.

### Curriculum:

- General Education Coursework
- Equine Specific Courses
  - Equine Conformation and Performance Appraisal
  - Introduction to Horse Science
  - Horse Training & Conditioning (Weanling, Yearling or Two Year old)
  - Introduction to Horsemanship
  - Equine Reproductive Management
  - Equine Assisted Reproductive Technologies
  - Equine Nutrition and Management
  - Equine Enterprises
  - Managing the Racing Animal
  - Racing Organization, Structure and Management
  - Race Track Business & Financial Management
  - Marketing & Media Relations
  - Animal Racing Laws and Enforcement

**Science Path:** Fulfills requirements for admission to Colleges of Veterinary Medicine, Medical, Pharmacy, Dental, as well as M.S. and Ph.D. programs.

**Industry Path:** Students acquire a blend of animal science courses along with business courses that prepare them for the industry at the managerial level.

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### Other Opportunities:

**V bar V Ranch**

**Ag Farm Complex that offers students hands on learning with Beef, Dairy, and Equine Production and Meat Science**

**Livestock judging, Equestrian show team, Block and Bridle club**

**Rodeo team**



# Animal Sciences

## Race Track Industry Option

The Race Track Industry Program provides students opportunities not duplicated by any other program in the world. Leading industry speakers, symposiums, internships and coursework present students with first hand experience in the pari-mutual racing industry.

### Curriculum:

- General Education Coursework
- Race Track Specific Courses
  - Managing the Racing Animal
  - Racing Organization, Structure and Management
  - Marketing & Media Relations
  - Animal Racing Laws and Enforcement

**Business Path:** Business Administration and Management electives (21 units)

**Animal Path:** Anatomy and Physiology of Domestic Animals, Reproduction, Nutrition and Equine Training and Conditioning coursework (23-26 units)

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### Other Opportunities:

**The U of A Race Track Industry Program hosts the world's largest Race Tract Symposium every year in December. This event provides extensive student interactions with world wide race track organizations, businesses and corporations. Students play an integral role in producing this first class event.**



# The University of Arizona College of Agriculture and Life Sciences

- engineering consulting firms
- agricultural and biotechnology industries
- government agencies
- good preparation for careers in law, business and government

## Curriculum Includes:

- Biology
- Chemistry
- Calculus
- Statistics
- Fluid Mechanics
- Thermodynamics
- Computer Aided Design (CAD)
- Bioprocess Engineering
- Water Resources Engineering
- Machinery
- Engineering Design
- General Education Courses



## Biosystems Engineering Bachelor of Science Degree

This program is in conjunction with the College of Engineering. Biosystems engineers use engineering, math, and biology to design and manage resources such as food, soil, air, water and biomaterials. They work on projects involving wise use of energy, materials, biochemicals, and recyclable wastes. They combine technical knowledge, computer techniques, and control systems for a deeper understanding of biological processes -- knowledge which someday may be used to design life support systems for colonies on other planets. Students may specialize in bio-environmental engineering, biosystems engineering, irrigation and water resource engineering or pre-medicine.



**Contact information:**  
**Shantz Building 403**  
**The University of Arizona**  
**PO Box 210038**  
**Tucson, AZ 85721-0038**  
**(520) 621-1607**  
**FAX: (520) 621-3963**  
**URL <http://ag.arizona.edu/ABE>**

## Still in High School?

1/2 unit of trigonometry required; calculus, physics, biology and chemistry strongly recommended



# The University of Arizona College of Agriculture and Life Sciences

- Business
- Farming
- Golf Courses
- Horticulture
- Consulting companies

## **Soil, Water and Environmental Science & Plant Sciences Bachelor of Science Degree in Crop Production**

This undergraduate program provides a solid foundation for students entering a career in modern agriculture and crop production. This degree program provides a good base for students interested in work associated with field crops, permanent tree crop production, turf science, and/or a broad array of horticultural crops that are grown throughout the western United States and other regions in the world. Due to the flexible nature of this program, students can elect to focus on either Agronomy or Turf Science. Fundamentals derived from this program can be applied to crop production systems and land management programs locally, regionally, or globally. Also, graduates from this program will be well prepared academically to enter graduate degree programs.



Course work includes:

In addition to the general education requirements,

- Soil science
- Plant science
- Chemistry
- Economics
- Biology
- Irrigation

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**Contact information:**  
**Shantz Building 429**  
**The University of Arizona**  
**PO Box 210038**  
**Tucson, AZ 85721-0038**  
**(520) 621-1646**  
**FAX: (520) 621-1647**  
**<http://ag.arizona.edu/SWES/uegrad.html>**

**Still in High School?**

**Moderate to substantial  
knowledge of math,  
chemistry and biology**

# The University of Arizona College of Agriculture and Life Sciences

- Business
- Industry
- Environmental firms
- Government natural resource agencies
- Law Firms
- Consulting companies

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Course work includes:

In addition to the general education requirements,

- Biology
- Chemistry
- Math
- Internship
- Toxicology
- Soil science

## Soil, Water and Environmental Science Bachelor of Science Degree Environmental Science

The program integrates biology, ecology, chemistry, and physics into the study of environmental quality in land and water resources. Environmental scientists investigate how to monitor, resolve, and prevent environmental problems, develop new environmental technology products, evaluate and amend environmental policies, and develop and enforce environmental regulations. They are employed by many government agencies and private businesses. Students may specialize in environmental biology, environmental microbiology, environmental science and technology, environmental chemistry, land and water (pollution science), environmental science and policy, environmental remote sensing and geospatial analysis and soil and water science.



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**Shantz Building 429**  
**The University of Arizona**  
**PO Box 210038**  
**Tucson, AZ 85721-0038**  
**(520) 621-1646**  
**FAX: (520) 621-1647**  
**<http://ag.arizona.edu/SWES/uegrad.html>**

**Still in High School?**

**Moderate to substantial  
knowledge of math,  
chemistry and biology**

# The University of Arizona College of Agriculture and Life Sciences

Careers in or as:

- Planners
- Government regulatory agencies
- Consulting companies
- Teachers
- Entrepreneurs and business managers
- Environmental communicators and educators
- Graduate study in law economics

Course work includes:

- Microeconomics
- Macroeconomics
- Natural resource economics
- Environmental economics and management
- Law
- Environmental conflict resolution

## Environmental and Water Resource Economics Bachelor of Science Degree

This program explores the economic explanations underlying modern environmental and water resource issues. This major prepares students for careers as environmental professionals, trained to address the environmental and natural resource management challenges of the 21st century. Some of the more prominent challenges include pollution prevention, global climate change, integrating environmental costs and benefits into the global market economy, biodiversity and species extinctions, creating sustainable communities, environmental justice, and the provision of clean and plentiful water.



Students are encouraged to acquire additional preparation in complimentary areas such as environmental science, renewable natural resources, and environmental law.

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**Contact information:**  
**Agricultural and Resource Economics**  
**Economics Building 403**  
**The University of Arizona**  
**PO Box 210023**  
**Tucson, AZ 85721-0023**  
**(520) 621-6241 FAX: (520) 621-6250**  
**<http://ag.arizona.edu/AREC/arechome.html>**

### Still in High School?

Prepare yourself for this degree by taking courses in math, biology, and subjects that provide exposure to environmental topics

# The University of Arizona College of Agriculture and Life Sciences

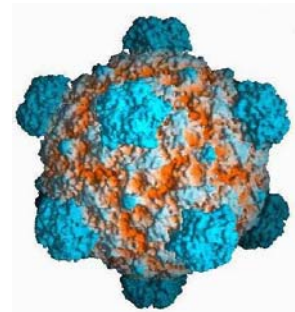
- Pre-med or other pre-health degree program
- Graduate or professional study
- Industry
- Bacteriologist
- Mycologist
- Immunologist
- Virologist

Composition & General Education (27 units)  
Foreign Language (1 year)  
Communication (1 public speaking course)  
Biostatistics & Calculus (1 course of each)  
Physics (1 year lecture/lab)  
Inorganic Chemistry (1 year lecture/lab)  
Organic Chemistry (1 year lecture/lab)  
Biology (1 year lecture/lab)  
Introductory Microbiology (1 lect/lab course)  
Genetics (1 course)  
Biochemistry (1 course)  
Molecular Biology (1 course)  
MIC courses: Microbial Physiology, Immunology, Microbial Lab Techniques, Bacterial Genetics and Electives (virology, bacteriology, mycology, parasitology, etc.)

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## Microbiology Bachelor of Science Degree

A multidisciplinary field, microbiology uses the techniques of chemistry, biochemistry, genetics, ecology, pathology, and physiology to study organisms ranging from viruses and parasites to tapeworms. Microbiologists study the role of microscopic organisms in infectious diseases. They also investigate gene expression at the molecular level, biochemistry of cell surfaces, cell populations in various organs, and the role of microorganisms in biodegradation.



**Contact:**  
**Veterinary Science & Microbiology**  
**Bldg, Room 202**  
**The University of Arizona, P.O. Box 210090**  
**Tucson, AZ 85721-0090**  
**(520) 621-3058; FAX (520) 621-6366**  
**URL: [microvet.arizona.edu](http://microvet.arizona.edu)**

**Still in High School?**  
Prepare yourself for this degree by taking courses in math (calculus), physics, chemistry and biology.

# The University of Arizona College of Agriculture and Life Sciences

## Two Options:

- **Dietetics**  
Emphasis on application of nutrition to health care and education
- **Nutrition**  
Additional upper-division math and science courses

## Careers for Dietetics Option

- Public Health Nutrition
- Medical Nutrition Therapy
- Sports Nutrition
- Corporate Wellness Programs
- Private Nutrition Consulting
- Food Service Management
- Nutrition Research

## Careers for Nutrition Option

- Food Science and Technology
- Food Research and Development
- Biomedical Research and Biotechnology
- Medical, Dental, Pharmacy or Graduate School



## Nutritional Sciences Bachelor of Science Degree

Nutritional science is the study of nutrition and foods-- in health and disease. Courses cover nutrition education, medical nutrition therapy, food service management, and nutritional biochemistry. Nutritional science combines physiology, chemistry, cell biology and biochemistry with application to human nutrition and foods. Students may specialize in either dietetics or nutrition. The dietetics option can lead to "Registered Dietitian" credentials from the American Dietetic Association and careers in the health field. The dietetics program is fully approved by the Commission on Accreditation for Dietetics Education (CADE), the credentialing agency of the American Dietetics Association (ADA). The nutrition option prepares students for graduate study in nutrition, pharmacy, dentistry, medicine and physical therapy, or careers in the food or biotechnology industries.



**Contact:**  
**Kelly Jackson, M.S., RD**  
**Shantz Building 309**  
**The University of Arizona**  
**PO Box 210038**  
**Tucson, AZ 85721-0038**  
**(520) 626-3504**  
**FAX: (520) 621-9446**  
**<http://nutrition.arizona.edu>**

## Still in High School?

Prepare yourself for this degree by taking courses in math, consumer sciences, and subjects that provide exposure to science-related concepts

# Nutritional Sciences

## Dietetics Option vs Nutrition Option

At a Glance, both of these options will provide you with coursework in:

Metabolism	Diet Therapy
Nutritional Biochemistry	Therapeutic Nutrition
Food Science Fundamentals	Technical Writing
Life Cycle Nutrition	Human Physiology

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### Curriculum common for both options includes:

- Composition and General Education (approx. 27 units)
- College Algebra (Math 110 or higher), Statistics (1 course), Physics (1 course)
- General Biology (1 course), Microbiology (1 course), Biochemistry (2 courses)
- Inorganic Chemistry (1 yr), Organic Chemistry (1 yr), Computer applic. (1 course)
- Technical writing (1 course)

### Dietetics Coursework:

- Food Science Lab
- Nutrition Assessment and Management
- Community Nutrition
- Educational Theory
- Food Service Organization and Management
- Institutional Food Service Management and Lab
- Dietetic Internship Prep Workshop

### Nutrition Coursework:

- Analytical Chemistry with lab
- 2 semesters of Physics with lab
- Calculus
- Molecular Biology
- Advanced Physiology

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### Other Opportunities:

- **Kappa Omicron Nu Honor Society**
- **Nutritional Sciences Club**
- **Student membership in American Dietetic Association**
- **Independent studies**
- **Research**
- **Volunteer or employment with local dietitians**



# The University of Arizona College of Agriculture and Life Sciences

- Botanist
- Golf course superintendent
- Plant breeder
- Landscape designer
- Ecologist
- Research technician
- Nursery/greenhouse/farm manager
- Graduate study

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#### Coursework includes:

15 units	Plant Sciences core courses
12 units	Plant Sciences Electives
16 units	Chemistry
12 units	Biological Sci- ences

#### Options:

- Controlled Environ-  
ment Agriculture
- Horticulture Systems
- Plant Biology
- Plant Microbiology

## Plant Sciences Bachelor of Science Degree

The field involves the study of a wide range of organisms, from the smallest bacteria to the largest of living things. Plant scientists investigate processes that occur on a time scale from fractions of a second to eons. They may examine plant structure, growth, ecology, and genetics as well as a variety of agricultural technologies. Plant scientists improve our supply of foods, fibers, medicines, building materials, turf and landscape plants. They may be involved in managing parks, forests, rangelands and wilderness areas or help solve problems related to environment quality. Wherever plants grow, plant scientists work to understand their roles in the lives of the earth's populations.



# Plant Sciences

## Plant Microbiology Option

This option provides experience in understanding principles of relationships between plants and associated microflora. Areas of interest include plant pathogenic and beneficial microbes, soil microbiology, and plant disease management. Courses include offerings from Plant Pathology, Entomology, Microbiology, and Ecology and Evolutionary Biology.

### **Curriculum:**

Plant Pathology, Environmental Microbiology, General Mycology, Microbial Genetics, Plant Pathogenic Agents

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# Plant Sciences

## Plant Biology Option

For students interested in a broad treatment of plant sciences, this option provides an opportunity to explore the biology of plants from the level of the ecosystem through molecular interactions within cells. Additional course options exist in Plant Pathology, Entomology, Molecular and Cellular Biology, and Ecology and Evolutionary Biology.

### **Curriculum:**

Plant Diversity & Evolution, Plant Cell Biology, Plant Pathology, Molecular Biology

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### **Other Opportunities:**

**Internships, UBRP, UMPIRE, student work  
with various research projects**





# Plant Sciences

## Horticulture Systems Option

This option provides students exposure to production and culture of citrus and woody ornamental crops. Classes focus on intensive propagation and production systems (greenhouse, nursery and field), physiology of woody plants, and the use of ornamentals in landscapes and urban environments in arid regions.

### Curriculum:

Plant Propagation, Nursery Systems, Landscape Horticulture, Weeds, Plant Pathology, Soil Fertility

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# Plant Sciences

## Controlled Environment Option

The Controlled Environment Agriculture option will provide the student with a broad background in this area. Information covered includes greenhouse structures and other protected agriculture techniques, environmental controls, sensors and computer systems, seedling production, greenhouse crop physiology, plant nutrition and nutrient solution/drip irrigation management, integrated pest management, bee management, personnel management and marketing strategies.

### Curriculum:

Hydroponics, Greenhouse Engineering, Plant Pathology, Agriculture and Food Marketing, Pest Management

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### Other Opportunities:

**Horticulture Club, Internships, Campus Arboretum work, UBRP, UMPIRE, student work with various research projects**



# The University of Arizona College of Agriculture and Life Sciences

- Pre-vet or other pre-health degree program
- Graduate or professional study
- Industry
- Food Safety
- Animal technicians/handlers
- Pharmaceuticals
- USDA

Composition & General Education (27 units)

Foreign Language (1 year)

Communication (1 public speaking course)

College Algebra (1 course)

Biostatistics (1 course)

Physics (1 year lecture/lab)

Inorganic Chemistry (1 year lecture/lab)

Organic Chemistry (1 year lecture/lab)

Biology (1 year lecture/lab)

Introductory Microbiology (1 lect/lab course)

Genetics (1 course)

Biochemistry (1 course)

VSC courses: Animal Anatomy & Physiology

Immunology, Electives (virology, mycology, bacteriology, diseases, etc.)

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## Veterinary Science Bachelor of Science Degree

This program applies the biomedical sciences to the health and welfare of animals and studies the public health aspects of human-animal relationships. Students explore human-animal relationships; animal reproduction, anatomy and physiology; the care of animal populations; microbiology; disease ecology and pathology.



**Contact:**  
**Veterinary Science & Microbiology**  
**Bldg, Room 202**  
**The University of Arizona, P.O. Box 210090**  
**Tucson, AZ 85721-0090**  
**(520) 621-3058; FAX (520) 621-6366**  
**URL: [microvet.arizona.edu](http://microvet.arizona.edu)**

**Still in High School?**

Prepare yourself for this degree by taking courses in math (calculus), physics, chemistry and biology.

# The University of Arizona College of Agriculture and Life Sciences

Norton School of Family and Consumer Sciences

## Career Areas

- Family lawyer
- Social worker
- Health professional
- Child Life specialist
- Counselor
- Arbitrator
- Court advocate
- Research specialist
- Family life education
- Child & family policy maker
- Gerontologist

## Coursework Topics

- Lifespan development & relations
- Child and adolescent development
- Problems in development and relations
- Skills and theories of counseling
- Issues in aging
- Program planning and evaluation

## Family Studies and Human Development Bachelor of Science Degree

Majors complete a core curriculum taught by award-winning faculty, designed to provide a foundation in family relationships, interpersonal processes and human development across the life span. To help students explore and define career options and to create strong resumes for eventual job and graduate school applications, we provide experiential learning opportunities (internships, practica, independent study) in community workplaces and on faculty research projects.



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### Contact information:

Amy Chandler, Ph.D.  
Family Studies and Human Development Office: Room 210  
Norton School of Family and Consumer Sciences Bldg.  
1110 E South Campus Dr  
The University of Arizona  
Tucson, Arizona 85721-0033  
(520) 621-7127; FAX (520) 621-3401  
URL: [ag.arizona.edu/fcs/fshd](http://ag.arizona.edu/fcs/fshd)

### Still in High School?

Prepare yourself for this degree by taking courses in consumer sciences and subjects relevant to human issues: psychology, human development and biology

# The University of Arizona College of Agriculture and Life Sciences

## Norton School of Family and Consumer Sciences

### Career Areas

- Family and Consumer Science Education Teacher, K-12
- Career and Technology Education (FACS) Teacher, 6-12

### Coursework

30 semester hours in Family and Consumer Sciences Classes including:

- Human development
- Consumer economics
- Family and human relationships
- Nutrition and health
- Food production/culinary arts

30 semester hours in professional preparation including:

- Classroom management
- Curriculum and instruction
- Assessment and evaluation
- Educational foundations
- Organization and administration
- Student teaching

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## Family and Consumer Science Education Bachelor of Science Degree

Family and Consumer Sciences Education (FACS) students are prepared to teach in school settings. FACS majors can obtain provisional Arizona teacher certification in secondary education (grades 7 -12) and standard certification in Career and Technical Education in FACS.



### Contact information:

Maureen E. Kelly, Ph.D. [mekelly@ag.arizona.edu](mailto:mekelly@ag.arizona.edu)  
Family and Consumer Sciences Education  
Rm. 203J  
Norton School of Family and Consumer Sciences  
650 North Park Avenue  
Tucson, Arizona 85721-0078  
(520) 621-7141; FAX (520) 626-3209  
URL: [ag.arizona.edu/fcs/facs](http://ag.arizona.edu/fcs/facs)

### Still in High School?

Prepare yourself for this degree by taking courses in math & family and consumer sciences

# The University of Arizona College of Agriculture and Life Sciences

## Norton School of Family and Consumer Sciences

### Career Areas

- Store Management
- Merchandise Buying
- Merchandise Management
- Market Research Analyst
- Advertising and Sales Promotion
- Personnel Management
- Operations Management
- Product Development
- Global Servicing

\*Advanced degrees may be necessary for some careers

### Coursework

General Education (36 units)

Foreign Language Requirement (1 year)

Business Administration Course work (18 units)

Math, Research & Statistics Foundation courses (12 units)

Sample RCSC Courses:

- Visual Merchandising and Store Design
- Merchandise Planning and Control
- Retail Strategy
- Consumer Concepts and Theory
- Global Retailing
- Retail Database Technologies
- Services Retailing
- E-Commerce
- Product Development and Brand Strategies



## Retailing and Consumer Sciences Bachelor of Science Degree

Students examine retailing marketing and management principles that are applied across a broad spectrum of U.S. and global retail businesses including store, catalog, Internet, and service-oriented firms. Traditional academic preparation is supplemented by experiential learning opportunities offered via the Terry J. Lundgren Retailing Center through activities such as one-on-one exposure to retail executives, seminars, internship programs, global conferences, and study tours.



### Contact information:

Retailing and Consumer Sciences, FCS 123  
Norton School of Family and Consumer  
Sciences  
1110 E. South Campus Drive  
The University of Arizona  
Tucson, AZ 85721-0033  
(520) 621-1295; FAX (520) 621-3209  
URL: [ag.arizona.edu/fcs/rcsc](http://ag.arizona.edu/fcs/rcsc)

### Still in High School?

Prepare yourself for this degree by taking courses in math, consumer sciences, and subjects that provide exposure to business-oriented topics such as marketing, accounting, economics, and vocational education.

# The University of Arizona College of Agriculture and Life Sciences

## Careers

- Engineering consulting firms
- Agricultural and biotechnology industries
- Government agencies
- Good preparation for careers in law, business and government

Be a biologist or manager in:

- Forest Service
- Fish & Wildlife Service
- National Park Service
- Bureau of Land Management
- Natural Resources Conservation Service
- State Game & Fish Departments
- State Parks & Land Departments
- Conservation Organizations

Select an “**option**” in either:

- Wildlife Conservation & Management
- Fisheries Conservation and Management
- Rangeland Ecology & Management
- Watershed Hydrology & Management
- Landscape Assessment & Analysis

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## Natural Resources Bachelor of Science in Natural Resources

The School of Natural Resources provides instruction related to the conservation and management of natural resources. Students in the School learn to integrate physical and biological sciences with socio-economic and political factors necessary for the conservation, protection and management of plant and animal species, ecosystems and landscapes. Students who graduate from the School assume leadership positions in agencies and organizations that manage and administer forests, wetlands, rangelands, parks, refuges, and other wildlands in Arizona and the nation.



**Contact:**  
**Bio Sciences East Bldg., Rm. 325**  
**The University of Arizona**  
**PO Box 210043**  
**Tucson, AZ 85721-0043**  
**(520) 621-7255**  
**FAX: (520) 621-8801**  
**<http://www.ag.arizona.edu/srnr/>**

**Still in High School?**

**Moderate to substantial knowledge of math and the biological sciences is recommended**

# **Wildlife, Watershed & Rangeland Resources**

## **Rangeland Ecology & Management Option**

Rangeland Ecology and Management deals with the biological and physical processes of rangeland ecosystems and application of this knowledge to sustainable use of rangelands. Faculty guide students in developing the scientific background, knowledge, and skills to become resource managers, ecologists, restoration biologists, or conservation biologists able to help manage rangeland resources so their long-term productivity is assured. Students find employment in a variety of federal, state, and tribal land management agencies, on ranches and preserves, with environmental consulting firms and companies specializing in disturbed land restoration, or private conservation organizations.

Courses include: Plant Taxonomy, Soils, Ecology, Rangeland Plant Communities, Grazing Ecology, Rangeland Inventory & Monitoring, Vegetation Management, Resource Policy and Planning, and numerous electives.

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# **Wildlife, Watershed & Rangeland Resources**

## **Wildlife Conservation & Management Option & Fisheries Conservation & Management Option**

Wildlife Conservation & Management and Fisheries Conservation & Management focus on wild animals, fish, and other aquatic organisms. They involve the study of the relationships among organisms, with humans, and with the physical and biological environment that makes their habitat. Faculty guide students in developing the scientific background, knowledge, and skills to maintain healthy populations and species diversity, work for conservation of declining and endangered species, manage populations that are hunted or fished, and coordinate resource management activities to maintain environmental quality. Professionals in the wildlife and fisheries are employed by a variety of federals, state, and tribal agencies, large land owners, environmental consulting firms, and conservation organizations. There are many international opportunities for graduates as well.

Courses include: Ecology, Genetics, Anatomy, Avian Wildlife Management, Mammalian Wildlife Management, Fishery Management, Limnology, Ornithology, Mammalogy, Resource Policy and Planning and several electives



# **Wildlife, Watershed & Rangeland Resources Watershed Hydrology & Management Option**

Watershed Hydrology and Management is the art and science of managing wildland drainage basins, with special consideration of the quantity and quality of water resources. Faculty guide students in developing the scientific background, knowledge, and skills to manage landscapes for sustained productivity of products such as water, wood, forage, wildlife, and recreational opportunities. Watershed management graduates are qualified for careers in integrated land management and water resources. Many are employed as hydrologists. Employers include federal or state agencies, municipal water districts, private consulting firms, and conservation organizations.

Courses include: Ecology, Geographic Information Systems, Native Plant Taxonomy, Watershed Hydrology, Watershed Management, Fire Ecology, Erosion, Water Quality, Microbiology, Resource Policy and Planning, and several electives.

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# **Wildlife, Watershed & Rangeland Resources Landscape Assessment & Analysis Option**

The Landscape Assessment & Analysis Option provides students with a strong background in natural resource science and management, computer technology, and geographical information systems (GIS). Students are prepared for careers in resource inventory, monitoring, and mapping; in spatial analysis and planning for environmental management; and as information specialists in natural resources. Students have excellent employment opportunities in the private sector and with resource management and planning agencies at the local, state, national and international levels.

Courses include: Ecology, Geographic Information Systems, Advanced GIS, Resource Mapping, Remote Sensing, Computer Programming, Resource Measurements, Re-

