



College of Agriculture

Charles B. Browning, Ph.D., *Dean*

Paul D. Hummer, Ph.D., Associate Dean for Resident Instruction

Earl N. VanEaton, Ph.D., Assistant Dean for Resident Instruction

Department Heads

Agricultural Communications, Charles Voyles, M.S.

Agricultural Economics, James E. Osborn, Ph.D.

Agricultural Education, H. Robert Terry, Ph.D.

Agricultural Engineering, D. G. Batchelder, M.S. P.E. (interim)

Agriculture (General), Earl N. VanEaton, Ph.D.

Agronomy, P. W. Santelmann, Ph.D.

Animal Science, Robert Totusek, Ph.D.

Biochemistry, Roger E. Koeppel, Ph.D.

Entomology, Larry A. Crowder, Ph.D.

Forestry, Stanley B. Carpenter, Ph.D.

Horticulture and Landscape Architecture, David W. Buchanan, Ph.D.

Plant Pathology, Jay C. Murray, Ph.D. (interim)

Pre-veterinary Science, Earl N. VanEaton, Ph.D.

The agricultural curriculum is designed to meet the needs of students in a wide range of subject matter related to food and fiber production and associated industries. Courses of study are concerned with personal development as well as professional competence of students in their chosen fields.

Both general education and professional courses are available in 14 major fields of study. Option programs that emphasize production, science, business or other specific areas of specialization are provided in the various departments.

The vast industry of agriculture must have well-educated manpower to carry on work in research, education, business, industry, farming and ranching, international development, government and other areas that together represent more than 500 specific kinds of jobs.

Degrees. The Bachelor of Science degree in Agriculture is offered in the following major fields of study: agricultural communications, agricultural economics, agricultural education, agronomy, animal science, biochemistry, entomology, forestry, general agriculture, horticulture, mechanized agriculture, plant pathology and pre-veterinary science. The Bachelor of Landscape Architecture is also offered in the College of Agriculture.

Graduate study is available in all departments in the College. In addition to the master's degree, which may be obtained in the several departments, the Doctor of Philosophy degree (Ph.D.) may be earned in the following areas: agricultural economics, agricultural education (Ed.D.), agricultural engineering, animal breeding, animal nutrition, biochemistry, entomology, crop science, food science, plant pathology, and soil science.

Requirements for Graduation. General University requirements for graduation are stated elsewhere in this *Catalog*. In addition, specific requirements must be met for the Bachelor of Science and Bachelor of Landscape Architecture degrees in Agriculture. For the Bachelor of Science degree, a total of 130 semester credit hours must be completed satisfactorily in all departments except biochemistry and forestry. Biochemistry requires 124 credit hours while forestry has a 144 credit hour requirement for a B.S. degree. The Bachelor of Landscape Architecture is a five-year program requiring 160 credit hours. No credit will be allowed for MATH 1113 toward meeting the requirements for graduation. A student must have 90 or more semester credit hours of "C" grades or better, including a maximum of 10 hours of basic military science or physical education, and total grade points equal to twice the number of hours required for graduation. Also, a minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.

Honors Program. The Honors Program in the College of Agriculture is designed to provide outstanding students with opportunities to pursue new challenges and academic excellence. Honors courses, seminars, and special honors contracts provide for discussions and independent thought by students who have the desire and ability to explore academic subjects beyond the normal Glasswork material.

Honors awards available in the College of Agriculture are:

- (1) General Education Honors
- (2) Departmental Honors
- (3) The bachelor's degree, with honors

Awards (1) and (2) may each be earned independently of the others. Award (3) is earned by satisfying the requirements of both (1) and (2). The completion of each award is noted on the student's transcript. Students who complete all three receive the bachelor's degree with honors diploma.

All entering freshmen who have ACT composite scores of 27 or above are eligible to become a part of the Honors Program. All other students who have an overall college-level grade-point average of 3.50 or above may enroll in the Honors Program

Additional information may be obtained from the director of the Agriculture Honors Program, Office of the Dean of Instruction, 136 Agricultural Hall.

Transfer Students. Students who transfer from an accredited college or junior college must not have less than a "C" grade-point average. All transferred courses are recorded on the OSU transcript; however, transfer students from a junior college must complete at least one-half of the total credit hours required for graduation in a given curriculum at this institution. Specific departmental requirements needed for graduation are determined by the department in which the student plans to earn his or her degree.

Pre-veterinary Medicine Curriculum. The program in pre-veterinary medicine as offered in the College of Agriculture includes all courses required before application can be made for admission to the College of Veterinary Medicine.

A minimum grade-point average of 2.80 with no grade below "C" is required in order to be eligible for admission to the College of Veterinary Medicine. In addition, at least 60 semester credit hours must be completed which include the required courses listed below:

English composition and public speaking or technical writing (8 hours minimum): ENGL 1113 and 1323; ENGL 2333 (or 3323).

Chemistry (17 hours minimum.)

1. General chemistry (8 hours minimum): CHEM 1314 and 1415 (or 1215 and 1225)
2. Organic chemistry (5 hours minimum): CHEM 3015 (or 3053 and 3112).
3. Biochemistry (4 hours minimum): BIOCH 3653 and 3721.

Physics (8 hours minimum): PHYSC 1114 and 1214.

Mathematics (3 hours minimum): MATH 1513 (or 1613 or 1715 or other advanced mathematics).

Biological science (14 hours minimum. Courses must cover zoology, botany, microbiology and genetics. Each course, except genetics, must include laboratory work).

1. Principles of biology: BISC 1303, 1402 and 1603.

2. Microbiology: MICRO 2124.
3. Genetics: ANSI 3423 (or AGRON 3553 or BISC 3024.)

Although these course requirements, plus electives to equal 60 hours, may be completed within two years, most entering pre-veterinary medicine students complete at least three years of preparatory course work or a bachelor's degree. For information as to required tests and application procedures refer to the *College of Veterinary Medicine* section in this *Catalog* and the current *Veterinary Medicine at Oklahoma State University* brochure. Students are also encouraged to contact the assistant dean for resident instruction in the College of Agriculture.

Degree in Pre-veterinary Science. A Bachelor of Science degree in Agriculture with a major in pre-veterinary science may be obtained after the completion of one year in the College of Veterinary Medicine. General education and other requirements for graduation in the College of Agriculture must be met. Specific course requirements shall be fulfilled by completion of the pre-veterinary requirements, the courses listed below and the College of Veterinary Medicine's first year curriculum.

American history (3 semester credit hours): HIST 1103, 1483 or 1493.

American government (3 semester credit hours): POLSC 1013.

Agriculture orientation (1 semester credit hour): AG 1011.

Animal science (7 semester credit hours): ANSI 1124, 2123 or 3543.

Agricultural economics (4 semester credit hours): AGECE 1114.

Agricultural Communications

Associate Professor and Head Charles Voyles, M.S.

Assistant Professor J. G. Harrison, M.A.

(Refer to *Journalism and Broadcasting* in the *College of Arts and Sciences* section of this *Catalog* for list of staff members.)

The modern agricultural complex of production and industry is so diverse and specialized that communication between the segments, as well as with the general public, is vital to the function of the whole. Education in agriculture and journalism to effectively provide such communication is the curriculum objective of the agricultural communications and journalism program.

Students may develop strong emphasis in special-interest areas such as advertising, radio and television work, feature or newswriting and reporting, or research report writing, as well as develop a double-major program of study with specific departments of the College of Agriculture.

Career opportunities are excellent in all areas of modern agriculture for the graduate with a Bachelor of Science degree in Agriculture with a major in agricultural communications.

Agricultural Economics

Professor and Head J. E. Osborn, Ph.D.

Regents Professor L. G. Tweeten, Ph.D. Professors D. D. Badger, Ph.D.; L. V. Blakley, Ph.D.; G. A. Doeksen, Ph.D.; J. R. Franzmann, Ph.D.; D. D. Kletke, Ph.D.; R. D. Krenz, Ph.D.; H. P. Mapp, Ph.D.; J. R. Nelson, Ph.D.; T. R. Nelson, Ph.D.; J. S. Plaxico, Ph.D.; D. E. Ray, Ph.D.; D. F. Schreiner, Ph.D.; O. L. Walker, Ph.D.; C. Ward, Ph.D. Associate Professors F. M. Epplin, Ph.D.; R. A. Jobes, Ph.D.; R. L. Oehrtman, Ph.D.; D. S. Tilley, Ph.D.; J. N. Trapp, Ph.D.; J. E. Williams, Ph.D. Assistant Professors K. B. Anderson, Ph.D.; D. M. Henneberry, Ph.D.; G. J. Knowles, Ph.D.; R. O. Love, Ph.D.; L. D. Makus, Ph.D.; M. A. Nelson, Ph.D.; J. R. Russell, Ph.D.; R. J. Schatzer, Ph.D.; M. L. Tilley, J.D. Instructor G. R. Sloggett, M.S.

Agricultural economics provides professional opportunities for students interested in solving problems in agricultural production and agribusiness, as well as solving problems in the broader areas of resource development, environmental planning, recreation, public policy and agricultural law.

Agricultural economics combines instruction in the agricultural sciences with education in the application of business and economic principles and tools to the science and art of private and public decision-making. Emphasis is placed on the management of agricultural production and marketing firms and upon decision-making and problem-solving guides relevant to public policy decisions.

Careers of agricultural economists reflect the broad base of the educational program, particularly as related to management. Careers in production and marketing include self-employment as farmers or ranchers, and managers of agribusiness marketing firms such as processors, manufacturers and distributors of food products, chemicals and machinery. Other careers include employment by consulting firms, educational institutions and financial agencies in private and governmental research and service activities.

Major areas of course work in agricultural economics include farm management, agricultural marketing, agricultural financial management, resource conservation and development, agricultural prices, agricultural policy and land appraisal. Courses in economic theory, statistics, computer sciences, mathematics and technical agriculture provide additional depth and breadth to the curriculum. An intensive advisement program and a broad range of elective courses permit the student to structure a program consistent with his personal interests, objectives and needs.

Ten degree options or specialties are available to students majoring in agricultural economics: farm and ranch management, marketing and business, general, science, pre-law, pre-veterinary business management, international agricultural marketing, and regional and community development with two additional options offering double majors in agricultural economics and accounting and in agricultural economics and computer science. Advanced work

leading to the degree of Master of Science and Doctor of Philosophy in agricultural economics is also offered by the Department.

Agricultural Education

Professor and Head H. Robert Terry, Ph.D.

Professors James P. Key, Ed.D.; James D. Netherton, Ph.D.; Jack W. Pritchard, Ed.D.; Earl N. VanEaton, Ph.D.; **Associate Professors** James Mosley, Ed.D.; Wallace Smith, M.S.; Charles Voyles, M.S. **Assistant Professors** Paul Czarniecki, Ed.D.; Eddy Finley, Ed.D.; Wes Holley, Ed.D.; Roy R. Lessly, Ed.D.; Leon Moon, M.S.; Robert F. Reisbeck, Ed.D.; James Rutledge, M.S.; James D. White, Ed.D.

The program of studies offered by the Department of Agricultural Education is designed to provide both comprehensive and specialized training in preparation for a career as an educator in the various fields of agriculture. In addition to the objective of preparation for licensure as teachers, graduates are professionally well-prepared for work in cooperative extension and other federal and state educational programs and services, as well as international education endeavors. Graduates also may find employment as educational directors and consultants with agribusiness industrial firms and organizations. Study programs are designed for persons desiring to serve at secondary, post-secondary and adult levels. Studies may culminate in the B.S., M.S. or Ed.D. degrees.

The undergraduate teaching option is designed primarily to qualify the bachelor's degree recipient for the Oklahoma Vocational Agriculture Teaching License. This license is recognized as meeting requirements for certification in most other states. The Professional Service Option is designed to focus on careers relating to education in agriculture, but outside of the public school setting. The primary emphasis is upon employment in cooperative extension or closely allied areas. Some students find it advantageous to elect a dual major, thus meeting requirements in both agricultural education and another major within the College of Agriculture. The undergraduate programs in agricultural education are structured to provide ample educational experience in general education, specialized or technical agriculture and professional education.

The graduate program offered in agricultural education not only serves directly as professional improvement for teachers of agriculture but also has flexibility, enabling extension workers, directors of selected governmental programs, and international agricultural workers to plan and pursue studies best suited to their individual needs. For those finishing the Master of Science degree, completion of a thesis is required as well as a minimum of 10 credit hours of course work in technical agriculture or other approved supportive areas. The Master of Agriculture is another degree option within the Department which requires a research report, or an internship or a creative component.

The Doctor of Education degree with a major in agricultural education is conferred upon individuals successfully completing comprehensive studies in

agricultural education, research and a specialty area of the student's choice in agriculture, education or related area. Recipients of the Ed.D. often continue their professional career in the areas of teacher education, curriculum development, administration, supervision and leadership development in vocational-technical and career education, as well as other leadership positions more specifically related to agriculture.

Agricultural Engineering

Professor and Interim Head D. G. Batchelder, M.S., P.E.

Professors F. W. Blaisdell, M.S.; Wendell Bowers, M.S., P.E.; G. H. Brusewitz, Ph.D., P.E.; B. L. Clary, Ph.D., P.E.; J. E. Garton, Ph.D., P.E.; C. T. Haan, Ph.D., P.E.; L. O. Roth, Ph.D., P.E.; D. P. Schwab, M.S., P.E.; Richard W. Whitney, Ph.D., P.E. Associate Professors A. D. Barefoot, M.S., P.E.; G. E. Cook, M.S.; H. W. Downs, Ph.D.; G. A. Kranzler, Ph.D.; A. P. Lewis, M.S.; G. W. A. Mahoney, Ph.D., P.E.; C. E. Rice, Ph.D., P.E.; Assistant Professors R. L. Elliott, Ph.D., P.E.; S. L. Harp, M.S.; R. L. Huhnke, Ph.D., P.E.; D. E. Temple, M.S.; J. B. Solie, Ph.D.; M. L. Stone, Ph.D.; J. D. Summers, Ph.D., P.E.; Bruce Wilson, Ph.D.

The Department of Agricultural Engineering is administered jointly by the College of Agriculture and the College of Engineering, Architecture and Technology.

Mechanized Agriculture Curriculum

The agricultural mechanization curriculum is a four-year program leading to the Bachelor of Science degree in Agriculture. This curriculum is designed to provide the student with a broad general education in the social, biological and physical sciences, and mathematics. Degree candidates will receive technical training in specialized fields of greatest interest to them.

Course work emphasized at Oklahoma State University includes principles of modern mechanized agriculture, automation of farm operations, buildings for production and storage, management and utilization of water including irrigation and utilization of electrical energy. Related course work in fields such as economics, marketing, animal science, and agronomy give mechanized agriculture students the background for competitive positions in related industries. Computer programming and use is required.

Entrance requirements for aspirants to the Bachelor of Science degree in Agriculture through the mechanized agriculture curriculum are listed under the *College of Agriculture* in this *Catalog*.

Specific types of work in business and industry include product development, product education, firm or association field representatives, farm service advisers, service, sales and editorial work.

Graduates in agricultural mechanization are employed by farm machinery companies, building material suppliers, irrigation equipment companies,

manufacturers of materials-handling equipment, manufacturers of processing equipment, pump companies, electric power companies or cooperatives, and government agencies such as the Farmers' Home Administration and the Federal Land Bank.

A degree with a major in agricultural mechanization requires 130 credit hours. Course work is distributed approximately as follows: basic science and mathematics-20%; applied science and engineering-35%; business-20%, social science and communications-25%.

Agricultural Engineering Degree

Students interested in a degree in agricultural engineering may initially enroll in the College of Agriculture or College of Engineering, Architecture and Technology. If they elect to enroll in the College of Agriculture, they should transfer to the College of Engineering, Architecture and Technology by the end of their first semester. Agricultural engineering students receive basic engineering and also some basic courses in the biological and agricultural sciences. Agricultural engineering courses apply mathematics, basic engineering and science to create and design new systems and equipment for agricultural production and processing. Social studies and humanities prepare students to work with people; these studies are important because the agricultural engineer early in his or her career assumes supervisory and management responsibilities. Microcomputer use is emphasized. In the junior and senior years the student elects engineering and science courses to specialize for career opportunities of his or her choice in one of the following:

Hydrology and water resources, related to agricultural development and production, includes flood control, irrigation, water supply development and drainage.

Design and development of machines and equipment is a field which includes design of power and controls systems, field machines and equipment for handling agricultural products on farms and in factories.

Processing, handling and storage of agricultural products is a specialty including drying, grinding, crushing, temperature and humidity control, and systems for taking raw products of agriculture through the processes necessary to place them on the market.

Environmental engineering for agricultural production includes confined systems requiring sophisticated controls, and open systems such as feedlots, waste management and pollution control resulting from animal and plant production and processing.

A wide variety of employment opportunities are available for agricultural engineers in industry and public service. Some of these opportunities include governmental agencies; irrigation and drainage companies; tractor and machinery manufacturers; manufacturers of agricultural chemicals, producers of steel, building and construction supplies; electric power companies; food processing and canning; and feed processing companies.

Other opportunities include university teaching, research and extension; positions as engineering editors, industrial consultants and positions in foreign service. The United States and most large companies have agricultural engineers in foreign countries.

For those students who wish to prepare themselves for advanced research and teaching, the Department of Agricultural Engineering offers an educational program leading to the degrees of Master of Science, Master of Engineering, and Doctor of Philosophy in agricultural engineering.

In addition to the 76 semester credit hours of common requirements for engineers, agricultural engineers take courses in electronic application, instrumentation, watershed hydrology, flood control, drainage and irrigation, environmental engineering, farm power and machinery, design structures and process engineering. The agricultural engineering program is accredited at the basic level by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Agriculture (General)

Professor and Head Earl N. VanEaton, Ph.D.

The general agriculture program of study is designed to provide students the opportunity of obtaining a broad education in agriculture rather than the more specialized study typical of departmental programs.

Students select general agriculture as their major for one of two reasons:

1. Students undecided on a major may elect to take the general agriculture program as it provides the opportunity to investigate various majors and options. Courses taken in the general agriculture option apply to the B.S. degree programs in Agriculture, as well as degree programs in some other colleges. Transfers from one major to another may be made at any time. Career information and guidance is available from faculty advisers as well as the Agricultural Career Development Center.

2. Students wanting a broad-based degree program may do so through the general agriculture program. This option allows students to prepare themselves for careers that require a broad background of understanding of the modern agricultural complex.

The general agriculture curriculum may be pursued in any department in the college and allows students to select courses of special interest to them in relation to the work they plan to do. Basic courses in general education, the sciences and business are required along with over 40 credit hours of electives, in order to complete requirements for a Bachelor of Science degree in Agriculture.

Agronomy

Professor and Head P. W. Santelmann, Ph.D.

Regents Professor B. B. Tucker, Ph.D. **Professors** D. J. Banks, Ph.D.; L. I. Croy, Ph.D.; L. H. Edwards, Ph.D.; H.A.L. Greer, Ph.D.; G. V. Johnson, Ph.D.; J. S. Kirby, Ph.D.; F. E. LeGrand, Ph.D.; J. Q. Lynd, Ph.D.; W. E. McMurphy, Ph.D.; O. G. Merkle, Ph.D.; L. G. Morrill, Ph.D.; J. C. Murray, Ph.D.; R. M. Reed, Ph.D.; L. M. Rommann, Ph.D.; E. E. Sebesta, Ph.D.; E. L. Smith, Ph.D.; J. H. Stiegler, Ph.D.; J. F. Stone, Ph.D.; J. F. Stritzke, Ph.D.; C. M. Taliaferro, Ph.D.; L. M. Verhalen, Ph.D.; D. E. Weibel, Ph.D.; R. L. Westerman, Ph.D.; B. C. Wright, Ph.D. **Associate Professors** R. M. Ahring, Ph.D.; J. L. Caddel, Ph.D.; R. J. Crabtree, Ph.D.; D. M. Engle, Ph.D.; D. L. Ketring, Ph.D.; E. G. Krenzer, Ph.D.; D. S. Murray, Ph.D.; D. L. Nofziger, Ph.D.; T. E. Peeper, Ph.D.; P. L. Sims, Ph.D.; B. B. Webb, Ph.D.; **Assistant Professors** B. J. Carter, Ph.D.; B. F. Carver, Ph.D.; K. J. Donnelly, Ph.D.; R. L. Gillen, Ph.D.; D. S. Howie, Ph.D.; W. P. Inskeep, Ph.D.; R. C. Johnson, Ph.D.; J. A. Kovar, Ph.D.; Dale Rollins, Ph.D.; J. R. Sholar, Ph.D.; N. B. Thomas, M.S.

Agronomy is the science of soil management and production of field crops, forages and rangeland. Undergraduate options include crops and soils, business, science, range management and plant protection. Each of these options provides a thorough preparation in the sciences relating to its specialization.

Modern agricultural production requires a highly technical approach to problems such as soil and water conservation, crop and range improvement and management, prevention and abatement of agricultural sources of environmental pollution, and judicious use of agricultural chemicals. In the vast field of agribusiness, technical preparation in agronomy is essential in supplying agricultural producers with up-to-date information, as well as improved seed, fertilizers, management systems and pesticides. Processing, distribution and marketing of food, fiber and feed crops require an integration of production technology with economics at all levels. Agronomists are in demand for research and marketing positions in universities, industry and government. Concern for future food supplies creates an urgency for technological advancement in food production which cannot be ignored.

Each of the areas of study is designed to permit students of varying backgrounds and experiences to attain a level of preparation commensurate with their capabilities and motivation. There are no specific prerequisites.

Careers in agronomy include farm or ranch operation or management; land appraisal for banks or loan companies; technical sales and service for seed, fertilizer or agricultural chemical supply companies; federal employment in soil and range conservation; research positions as plant breeders, fertilizer chemists and weed control specialists with federal or state experiment stations or private industries; teaching and extension positions with colleges and universities; and a broad range of employment or ownership in retail businesses supplying feed, seed, grain, fertilizers, agricultural chemicals and other agricultural supplies and services.

Study for the B.S. degree, in addition to a standard agronomic academic

program, provides a thorough grounding in the biological and physical sciences, with sufficient elective hours to permit flexibility. Master's and doctoral degrees leading to careers in teaching, research and extension are also available.

Animal Science

Professor and Head Robert Totusek, Ph.D.

Professors Clifford Burton, Ed.D.; Linville J. **Bush, Ph.D.**; **Richard R. Frahm, Ph.D.**; **Don R. Gill, Ph.D.**; **S. E. Gilliland, Ph.D.**; **John J. Guenther, Ph.D.**; **Robert L. Henrickson, Ph.D.**; **Gerald W. Horn, Ph.D.**; **Joe H. Hughes, Ph.D.**; **W. G. Luce, Ph.D.**; Charles V. Maxwell, Ph.D.; Robert L. Noble, Ph.D.; Fredric N. Owens, Ph.D.; Curtis W. Richardson, Ph.D.; Elbert J. **Turman, Ph.D.**; **Donald G. Wagner, Ph.D.**; **Robert P. Wettemann, Ph.D.**; **Associate Professors Joe G. Berry, Ph.D.**; **David S. Buchanan, Ph.D.**; **J. R. Kropp, Ph.D.**; **Keith S. Lusby, Ph.D.**; **Charles A. McPeake, Ph.D.**; **Fred K. Ray, Ph.D.**; **Jack D. Stout, Ed.D.**; **Robert G. Teeter, Ph.D.** **Assistant Professors Earl P. Aalseth, Jr., Ph.D.**; **Howard G. Dolezal, Ph.D.**; **David W. Freeman, Ph.D.**; **Rodney D. Geisert, Ph.D.**; **F. Theodore McCollum, Ph.D.**; **James W. Oltjen, Ph.D.**; **Donald R. Topliiff, Ph.D.**
Instructors Glenden D. Adams, M.S.; Jarold E. Callahan, M.S.

The Department of Animal Science offers professional training at two levels: *undergraduate*, leading to the Bachelor of Science degree in Agriculture; and *graduate*, leading to the Master of Science degree or the Doctor of Philosophy degree in nutrition, animal breeding, animal reproduction and food science. The Master of Agriculture degree is also offered.

Animal science is concerned with the science, art and business of the production of beef cattle, dairy cattle, horses, poultry, sheep and swine. An animal scientist is concerned with the application of the principles of the biological, physical and social sciences to the problems associated with livestock and poultry production.

Animal science is also concerned with providing specialized training in the food industry, which is the largest and most important industry in the United States. The food industry option provides expertise in the processing, quality control and marketing of meat, dairy and poultry products.

The ranch operations option provides another area of study available for students in the Department of Animal Science. Ranching represents the second largest source of income and the most important renewable resource in Oklahoma. Study in this option will provide training in areas important in the successful operation of a ranching program.

Students completing a degree with a major in animal science have a wide choice of challenging careers, a brief listing of which includes: ownership and/or management of farms, ranches, feedlots or other production units; livestock marketing; employment with state and federal agencies concerned with inspection, grading or regulation; sales and service positions with feed, chemical or pharmaceutical companies, positions in agricultural extension or teaching; and work in the processing, distributing and merchandising of dairy, poultry and

meat products. Students who earn the master's or doctor's degree can look forward to careers in teaching, research or extension with universities, the U.S. Department of Agriculture or private industry.

Undergraduate students may elect an option in the area of pre-veterinary medicine, production, business, food industry, livestock merchandising, ranch operations, science or a double major with agricultural education to qualify to teach vocational agriculture. In addition, students have the opportunity to concentrate their studies on one of the animal groups (meat animals, dairy, horses or poultry). Internship programs providing six months of work experience are available in all options. Students may complete the pre-veterinary medicine requirements at the same time they are working toward a B.S. degree in animal science. Regardless of their option, all students follow a similar curriculum for the first two years which includes basic courses in the physical, biological and social sciences, plus a series of basic courses in the agricultural sciences and business areas.

Upper-class students complete a basic core of advanced science courses including genetics, physiology, and nutrition. In addition, students complete a number of advanced animal science courses which are designed to apply business concepts and the basic sciences to livestock production or food processing. Every opportunity is taken in teaching to utilize the excellent herds, flocks and processing facilities owned or operated by the Department.

Biochemistry

Professor and Head Roger E. Koeppe, Ph.D.

Professors Donald C. Abbott, Ph.D.; Margaret K. Essenberg, Ph.D.; Richard C. Essenberg, Ph.D.; Robert K. Gholson, Ph.D.; Franklin R. Leach, Ph.D.; Ta-Hsiu Liao, Ph.D.; Ulrich K. Melcher, Ph.D.; Earl D. Mitchell, Ph.D.; Eldon C. Nelson, Ph.D.; George V. Odell, Ph.D.; H. Olin Spivey, Ph.D.; George R. Waller, Ph.D.; Chang-An Yu, Ph.D. Assistant Professors Charles O. Gardner, Ph.D.; Andrew J. Mort, Ph.D. Research Biochemist Linda Yu, Ph.D. Instructor Judy A. Hall, M.S.

Biochemistry, the central scientific discipline linking the chemical, physical and biological sciences, exerts a profound influence on the progress of medicine and agriculture. By applying concepts and methods of chemistry and physics to the fundamental problems of biology, biochemists have made great progress in their effort to understand the chemistry of living organisms.

Biochemists are concerned with living things. They must acquire some knowledge of the biological sciences. Since a biochemist's tools are the physical sciences, he or she must receive sound training in mathematics, physics and chemistry.

Challenging positions for well-trained biochemists are available in colleges and universities, state and federal laboratories, research institutes, medical centers and in an increasing number of industrial organizations, particularly

the pharmaceutical and food industries. Biochemists are involved with research on the chemistry of processes occurring in plants, animals, and various microorganisms, and with the discovery and development of antibiotics, vitamins, hormones, enzymes, insecticides and molecular genetic techniques.

At the undergraduate level a major in biochemistry administered by the Department of Biochemistry is available through either the College of Agriculture or the College of Arts and Sciences. An honors program is available. The curriculum provides a broad background in chemistry and biological science and permits flexibility in meeting particular interests of the student. Courses in biochemistry are based on general, organic and analytical chemistry. The biochemistry curriculum provides students with sufficient training in the basic sciences of mathematics, physics, chemistry and biology to meet the needs for graduate study in most fields of modern science related to agriculture or medicine. The curriculum is excellent for preprofessional students of medicine, dentistry and veterinary medicine. Because many of the opportunities in biochemistry require advanced training, a major part of the program in the Department of Biochemistry is concerned with its graduate program leading to the M.S. or Ph.D. degree. This graduate program is an integral part of extensive basic research activities in the Oklahoma Agricultural Experiment Station. These research activities provide opportunities for part-time employment of undergraduate majors to improve their professional competence.

Entomology

Professor and Head Larry A. Crowder, Ph.D.

Professors R. C. Berberet, Ph.D.; R. L. Burton, Ph.D.; Stanley Coppock, Ph.D.; W. A. Drew, Ph.D.; R. D. Eikenbary, Ph.D.; J. A. Hair, Ph.D.; O. N. Nesheim, Ph.D.; D. C. Peters, Ph.D.; K. N. Pinkston, Ph.D.; R. G. Price, Ph.D.; J. R. Sauer, Ph.D.; K. J. Starks, Ph.D.; R. E. Wright, Ph.D.; J. H. Young, Ph.D. **Associate Professors** R. W. Barker, Ph.D.; D. R. Barnard, Ph.D.; H. G. Koch, Ph.D.; J. O. Moffett, Ph.D.; J. A. Webster, Ph.D. **Assistant Professors** G. W. Cuperus, Ph.D.; W. Scott Fargo, Ph.D.

Entomology is the science and study of insects and related organisms regarding their biology, structure, identification, physiology, economic significance and population manipulation.

Education in entomology prepares the student for a career in industry, public service with state or federal agencies, or self-employment. A background in the basic physical and biological sciences is required before specialization in entomology can be initiated. The entomologist is qualified for a wide range of activities including research, teaching, quarantine and enforcement, insect control with insecticides or biological control agents, agriculture, pest control, insecticide sales or distribution, military entomology and pest management consulting.

For those students who wish to prepare themselves better for entomology

positions, the Department offers advanced work leading to the degrees of Master of Science and Doctor of Philosophy in entomology.

Forestry

Professor and Head Stanley B. Carpenter, Ph.D.

Professors Ralph W. Altman, Ph.D.; Max R. Craighead, M.S.; J. E. Langwig, Ph.D.; David W. Robinson, Ed.D. **Associate Professors** Thomas C. Hennessey, Ph.D.; David K. Lewis, D.Phil.; Charles G. Tauer, Ph.D.; Robert F. Wittwer, Ph.D. **Assistant Professors** Thomas B. Lynch, Ph.D.; Parker J. Wigginton, Jr., Ph.D. **Instructor** Thomas Kuzmic, M.S.

America's forests are an important natural renewable resource. With proper decisions concerning management, our forests can provide a bounty of uses and values for generations to come. Professional foresters play a vital role in developing and utilizing the forest and its diverse resources: timber, water, wildlife, range forage, recreation and wilderness.

Professional foresters manage the planting, growth and harvest of trees, while at the same time protecting forests from the harmful effects of fire, disease and insects. Foresters today are problem solvers using a blend of science, technology, economics and sociology to produce the products of the forest desired by society. Foresters work with private landowners and city planners, they teach and conduct research at universities, they administer parks and recreation areas, they manage the business of forest industry, and they manage the public forest land.

Graduates with a Bachelor of Science degree may be employed by federal agencies, including the U.S. Forest Service, Bureau of Land Management, the Soil Conservation Service, the Fish and Wildlife Service, and the Bureau of Indian Affairs. In addition, state, county and municipal governments employ foresters in a variety of positions. Wood-using industries retain foresters for land management, land and timber acquisition and harvesting positions as well as in mill production and administrative work. Foresters work for associations promoting the use of forest products and in many other public relations jobs. Some foresters are self-employed as consultants, specializing in timber and land appraisals, management planning and a variety of special services. Recipients of advanced degrees, especially the doctorate, may conduct research for the federal or state governments, universities or industrial organizations, or may enter the teaching profession.

The Department of Forestry offers a major in forestry leading to a Bachelor of Science degree in Agriculture. A forest management degree option is offered for the individual with career aspirations in the U.S. Forest Service and other federal agencies, state and local forestry organizations, forest industry and consulting. The forest products option is designed for those interested in the business, manufacturing and sales aspects of forestry. For the student with a research career in mind, a forest science option is available. Requirements

for a B.S. degree include the successful completion of an eight-week summer session and a total of 144 credit hours of course work. The summer session is scheduled to follow the sophomore year and is held annually in different forest settings. Past summer sessions have been held across the U.S. from Maine to Oregon, from Montana to Florida, and even in Brazil. Students learn field forestry skills and observe state-of-the-art operations.

The Department of Forestry maintains a research station in southeastern Oklahoma in the midst of the Ouachita National Forest and industrial timber holdings. Oklahoma has an active and progressive forest industry with one of the most modern highly mechanized timber harvesting systems in the world. The largest paper mill in the southern United States is located in the pine-oak forests of southeastern Oklahoma. Field trips to this area comprise part of the instruction in many forestry courses.

The Department of Forestry also offers graduate work leading to the Master of Science degree in forest resources. Programs are designed to serve the needs of individual students and to fulfill certain specialty areas. Current areas of study include forest biometrics, forest ecology, forest economics, forest genetics and tree improvement, forest management, tree physiology, silviculture, forest regeneration, forest soils and watershed management.

Horticulture and Landscape Architecture

Professor and Head David W. Buchanan, Ph.D.

Professors James E. Motes, Ph.D.; J. Steve Ownby, M.S., M.L.A.; Richard N. Payne, Ph.D.; Glenn G. Taylor, Ph.D.; Carl E. Whitcomb, Ph.D. **Associate Professors** Raymond E. Campbell, Ph.D.; Paul J. Mitchell, M.S.; Michael W. Smith, Ph.D. **Assistant Professors** Stuart W. Akers, Ph.D.; A. Douglas Brede, Ph.D.; Georganna Collins, M.L.A.; Robert L. Green, Ph.D.; Brian A. Kahn, Ph.D.

Horticulture is the science and art associated with the culture and production of flowers, trees, shrubs, turfgrass, vegetables, fruits and nuts. It also includes the proper use and maintenance of plants in the landscape. Thus, horticulture is involved with the production of a significant part of our food supply and provides a major source of the beauty in and around our homes, cities, parks, highways, golf courses and other public areas.

Today, horticulture requires highly trained and capable people to help meet the food demands of society and to be involved in activities that lead to a better quality of life.

Studies in horticulture cover a wide variety of plants and subjects. Factors such as nutrition, irrigation, genetics, propagation, control of flowering and fruit and seed production are considered in their relationship to culture, production, harvesting and storage. Students can prepare themselves for careers in public grounds administration, horticulture business, production, teaching, extension and research.

The training that the student obtains is related to the specific area of em-

phasis that is chosen. Regardless of one's interest, objectives, or area of emphasis, a good knowledge and understanding of horticulture is a necessity. A student can receive a Bachelor of Science (B.S.) degree and choose from the two following options:

(1) *Horticulture* provides the training and expertise for production of fruits, nuts, vegetables, nursery crops, flower crops, etc. Training can be general, have a business or science orientation, or be chosen to emphasize a particular commodity area of horticulture;

(2) *Turf Management* provides the training for turfgrass production and for management of turfgrass in golf courses, in parks, home landscapes, along highways, etc. After the B.S. degree is completed, a qualified student may choose to pursue a graduate degree, specializing in any option.

Landscape architecture is the art of design, planning or management of the land and arrangement of natural and man-made elements thereon through application of cultural and scientific knowledge. It is also concerned with resource conservation and stewardship to the end that the resultant environment serves a useful and enjoyable purpose.

There are two options in the landscape area:

(1) *Landscape Architecture* is the study of art, business, construction, design, ecology, engineering and horticulture in a five-year professional program leading to the Bachelor of Landscape Architecture (B.L.A.) degree. Typical employers include landscape architecture firms, architectural-engineering firms and governmental agencies dealing with land planning, urban planning and design, or parks and recreation.

In an effort to maintain an effective balance between students, faculty, and facilities, enrollment in the fourth and fifth years of the program is limited to 25 students each. Students will be evaluated during their third year by the faculty to select the most qualified candidates based upon academic achievement and professional potential. Minimum requirements may vary each year; however, a student must have completed a minimum of 60 credit hours with "C" average or above in all courses required as prerequisites to the last two years of the B.L.A. program.

(2) *Landscape Contracting* is a four-year study leading to the Bachelor of Science in Agriculture degree. It emphasizes the implementation and management phases of landscape development. Course work includes basic landscape architectural design, construction technology, business and horticulture. Graduates are employed by landscape nurseries, contracting companies, design/building firms and landscape maintenance companies. Qualified students may also pursue graduate degrees in either option.

Plant Pathology

Professor and Interim Head Jay C. Murray, Ph.D.

Professors George L. Barnes, Ph.D.; Francis J. Gough, Ph.D.; Hassan A. Melouk, Ph.D.; Charles C. Russell, Ph.D.; Roy V. Sturgeon, Jr., Ph.D.; **Associate Professors** Kenneth E. Conway, Ph.D.; Larry L. Singleton, Ph.D.; Ervin Williams, Jr., Ph.D.; **Assistant Professors** Alexander B. Filonow, Ph.D.; Jacqueline Fletcher, Ph.D.; Robert M. Hunger, Ph.D.; John L. Sherwood, Ph.D.

Plant pathology is a broad discipline that ranges from basic studies of physiological and genetic aspects of plant diseases to the development of practical plant disease controls. It encompasses the science required to understand the causes of plant diseases as well as the art of preventing or controlling these diseases. Thus, the plant pathologist must have knowledge of plant biology as well as practical plant culture.

At the undergraduate level, the Department of Plant Pathology offers the degree option Plant Health Management. This program is designed to provide students with a broad background in the important aspects of growing healthy plants, including good cultural practices and adequate pest control. The curriculum draws heavily on courses from other departments and during the first two years stresses plant biology and plant culture. During the third year, emphasis is directed toward learning the principles of pest management. The fourth year of the program is designed to consolidate information gained during the first three years into an effective and practical Plant Health Management concept.

Graduates of the Plant Health Management program have the opportunity to pursue a wide range of careers. Some of these career areas are: managers of plant-related industries such as nurseries, orchards, and golf courses; agricultural chemical company representatives; Cooperative Extension, 4-H, and the Federal Government; and operation of family farms and ranches. Although this program is designed to prepare students for immediate employment, it has sufficient flexibility to provide a suitable background for entrance into the department's graduate program.

In order to become a fully trained plant pathologist, one or more graduate degrees in plant pathology are required. The Department offers both M.S. and Ph.D. programs with opportunities to specialize in a wide range of basic or applied research fields. Well-trained plant pathologists have the opportunity to pursue challenging careers in state and federal governments, colleges and universities, agriculture-related industries, and private consulting.

A Master of Science in Agriculture degree also is offered for those who wish to obtain graduate training in plant pathology but who do not wish to pursue a research career.