

College of Engineering, Architecture and Technology

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The professionals and semi-professionals who will be largely responsible for the shape of the world in the year 2000 and beyond are just starting their higher education. The power they will exercise makes an exciting prospect and presents a sobering responsibility. Many of the easy problems that are usually solved first are now a part of history. Many difficult problems remain. The need for well-qualified and well-trained people is obvious; one will be embarking on a lifetime of challenge if he or she decides to prepare for a career in engineering, engineering technology or architecture while at Oklahoma State University.

Most of the work of engineers, technologists and architects is concerned with the conception, design and fabrication of devices and installations, and processes and systems that serve human needs. This work provides ample opportunity to express creativity. It requires an ability to make decisions.

Engineers and architects, working side by side and supported by technologists, constitute one of the most powerful agents for change in our society. New ways are found to control the environment, to utilize the resources and forces of nature, to increase productivity of needed goods, and services, in short to improve the quality of life for all.

The College of Engineering, Architecture and Technology (CEAT) offers a complete spectrum of educational opportunities designed to give graduates the capability and the flexibility to meet the ever-changing requirements of our society—a society heavily committed to technological innovation. To be prepared to make continuing contributions, engineers, architects and technologists must have at their command not only the modern tools and processes of industry, but a firm and rigorous education in mathematics and the physical sciences. In order that those contributions be sensitive to genuine human needs, the engineer, architect or technologist must also be schooled in the social sciences and humanities that provide the understanding of non-technical factors that must shape technological innovation.

The curricula are continually evolving to assist the student first to master the enduring principles upon which future practice will be based, and second to acquaint him or her with current applications of these principles. With such a bridge built between theory and practice, the educational experience will support one's following diverse interests and opportunities throughout the productive years of his or her life span.



Degrees

Academic programs offered in the College of Engineering, Architecture and Technology culminate in the following degrees:

Schools of Engineering:

Bachelor of Science in Agricultural Engineering, Chemical Engineering (petroleum and pre-medical options), Civil Engineering, Electrical Engineering (computer engineering option), General Engineering, Industrial Engineering and Management, Mechanical Engineering (aerospace, petroleum and premedical options).

Master of Agricultural Engineering, Environmental Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, General Engineering, Industrial Engineering and Management, and Mechanical Engineering.

Master of Science in agricultural engineering, engineering, chemical engineering, civil engineering, electrical engineering, environmental engineering, general engineering, industrial engineering and management, and mechanical engineering.

Doctor of Philosophy in agricultural engineering, chemical engineering, civil engineering, electrical engineering, general engineering, industrial engineering and management, and mechanical engineering.

Division of Engineering Technology:

Associate Degree and Bachelor of Science in Engineering Technology

School of Architecture:

Bachelor of Architecture, Bachelor of Architectural Engineering, Master of Architecture and Master of Architectural Engineering

Accreditation

The following undergraduate engineering programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology:

Architectural engineering
Agricultural engineering
Chemical engineering
Civil engineering
Electrical engineering
General engineering
Industrial engineering and management
Mechanical engineering
Mechanical engineering (aerospace option)

The following undergraduate engineering technology programs are accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET):

Construction management technology (B.S.)
Electronics technology (associate and B.S.)
Fire protection and safety technology (associate and B.S.)
Manufacturing technology (option) (B.S.)
Mechanical design technology (option) (B.S.)
Mechanical power technology (associate and B.S.)
Petroleum technology (associate and B.S.)

The following programs in architecture are accredited by the National Architectural Accrediting Board:

Bachelor of architecture
Master of architecture

The Engineering Curricula

The traditional four-year bachelor's degree programs in engineering remain available at OSU. However, in order to meet the ever-changing and complex needs of a technological society, one who expects to enjoy a lasting and successful career in the practice of engineering should obtain a background in mathematics, the basic sciences and in engineering that cannot readily be acquired in four years. To meet this primary objective of an engineering education, the Schools of Engineering encourage every qualified student to pursue a curriculum leading to a master's degree over a period of approximately five years, even though it is expected that there will be many entry-level job opportunities available for the graduate with the bachelor's degree. Furthermore, the bachelor's program in engineering is an excellent preparation for professional training in law or medicine, since it provides a student with maximum flexibility in career choices.

High School Preparation

Beginning students who have completed two units of algebra and one each in plane geometry and trigonometry/analysis in high school should be prepared to enter at the expected level in mathematics. In addition, it is recommended that students planning an engineering degree obtain high school credit in one unit of general chemistry, one unit of general physics as well as one-half unit of graphics, if available.

Oklahoma State University offers course work in algebra, trigonometry and preparatory chemis-

try for students who were unable to obtain this work during high school. However, such credit does not count toward the minimum number of semester hours specified for the B.S. degrees.

The selection of the initial chemistry and mathematics courses for an entering student in the College of Engineering, Architecture and Technology is determined by his or her score on placement tests administered at enrollment, the amount of mathematics or chemistry completed in his or her high school program and ACT test scores. When appropriate, students with a strong background can obtain academic credit by advanced standing examination or by College Level Examination Program (CLEP) tests.

Admission Requirements

In order to maintain a high quality, the professional school concept for admission to the engineering and architecture programs is utilized. Students must first be admitted to the pre-engineering or pre-architecture program and complete certain minimum requirements as outlined under "Lower Division Requirements" in order to be considered for admission to a professional school and allowed to pursue the upper-division curriculum. Transfer students are normally first admitted to pre-engineering regardless of the number of hours completed but may be permitted to take selected upper-division courses prior to admission to a professional school as appropriate.

Oklahoma residents may be admitted to pre-engineering, pre-architecture or technology if they meet OSU admission requirements stated elsewhere in the *Catalog*.

Nonresident students applying for admission to pre-engineering as freshmen must meet the following requirements:

Make a composite standard score of 19 or higher on the ACT or a comparable score on a similar battery of standardized national exams. When it is not practical to take such exams (e.g. international students), the student's high school grades should demonstrate comparable competency and the potential for success in an engineering major.

Nonresident freshmen not directly admissible to pre-engineering but those who meet OSU requirements for admission may be admitted to Freshman Programs and Services for one or two semesters in order to fully evaluate their qualifications for admission to pre-engineering. After grades are received each semester, such students will be evaluated and, if qualified, will be admitted to pre-engineering.

Minimum requirements for admission to pre-engineering from Freshman Programs and Services are:

1. an overall grade-point average (GPA) of 2.30, and
2. a GPA of at least 2.30 at OSU in mathematics, physical science and English courses applying toward the degree, and
3. ability to make satisfactory progress toward an engineering degree.

Nonresident transfer students will be admitted directly to pre-engineering if they meet the following requirements:

1. an overall GPA of at least 2.70 on a 4.00 scale, and
2. a GPA of at least 2.50 over all mathematics, physical science, engineering science and engineering courses, and

3. a GPA of at least 2.00 (in at least 12 hours if a full-time student) in the most recent semester completed, and
4. ability to make satisfactory progress toward an engineering degree.

International student applications must be received by June 15, November 1 and April 1 for the fall, spring and summer terms, respectively, to be considered for admission to pre-engineering. All CPA's are calculated using only the last grade in any repeated course.

The College of Engineering, Architecture and Technology, in implementing the policy for admission to engineering programs at Oklahoma State University, provides special consideration; for members of U.S. minority populations, veterans, and educationally or economically disadvantaged citizens who show reasonable promise for successful completion of the undergraduate engineering curricular requirements. All special admissions under these exceptions will be approved by the Office of the Dean of Engineering to ensure that the policy will not affect adversely the admission of students from minority backgrounds. Transfer students will not be admitted if in their most recent semester of transfer credit their performance would have them on probation if enrolled at Oklahoma State University. Students transferring to pre-engineering from another major at OSU must meet the same requirements for admission as a student transferring from another college or university.

The Professional School Concept

In accord with the professional nature of a career in engineering, students entering OSU are admitted into the pre-engineering program, consisting of the course work normally taken the first two years of an engineering curriculum. Near the completion of the pre-engineering course work, the student applies for admission to one of the professional schools of the College to continue in the upper-division program. Students meeting admission standards then pursue a two-year curriculum leading to the B.S. degree or a three-year curriculum leading to a master's degree in their discipline.

Pre-engineering Program. The pre-engineering program is comparable to the freshman and sophomore levels in other disciplines. The content of the pre-engineering program is uniform for all engineering specialties except architectural engineering, and includes course work devoted to mathematics through calculus and differential equations, communication skills, general chemistry, general physics, the engineering sciences commonly referred to as mechanics, thermodynamics and electrical science, and the social sciences and humanities.

Admission to the Professional Schools. A student who will have completed, including his current enrollment, not fewer than 60 semester credit hours of study at an accredited institution of higher learning, and who has demonstrated satisfactory competence in the pre-engineering curriculum described above, is eligible to apply for admission to the professional school of his choice. An overall grade-point average of 2.30 on a 4.00 scale, computed taking the last grade in any repeated course or courses, and with a 2.50 GPA including grades of "C" or better in the calculus, physics, chemistry and engineering science courses, is normally accepted as demonstrated satisfactory competence although a professional school may impose requirements in addition to these nominal requirements. Students may be admitted to the

professional schools with certain limited deficiencies, with the understanding that the deficiencies must be remedied early during their programs of studies in the professional schools.

In addition to the above criteria, if the number of qualified professional school applicants to a given professional school exceeds the number that can be provided a quality program with the resources available, the number admitted each semester to that professional school will be limited. In that event, priority for admission will be given first to Oklahoma resident pre-engineering students and second to the nonresident students in pre-engineering on a best qualified basis as determined by the grade-point average in courses taken and completed at OSU. This practice will preserve the high standards demanded of a quality educational experience sought by students and necessary so that OSU graduates will continue to be highly regarded.

A common prerequisite for any student to enroll in upper-division course work offered by the professional schools of the College is competence equivalent to that required for admission to the schools, as described above. For students who have not been admitted to a professional school, competence will be evaluated on an individual basis by the head of the School or a designated representative.

Master of Engineering

The Master of (specific school) Engineering degree programs are designed to prepare the graduate for the practice of the engineering profession in industry and government. They are distinguished by particular emphasis on developing in students the ability to perform effectively in design and development work; the programs normally include internship experiences as a part of the academic process. Approximately one year of graduate study is taken at the culmination of these programs offered in the Schools of Agricultural Engineering, Chemical Engineering, Civil Engineering, Electrical and Computer Engineering, General Engineering, Industrial Engineering and Management, and Mechanical and Aerospace Engineering.

Admission to one of these programs depends upon being accepted by one of the professional schools in the College of Engineering, Architecture and Technology (CEAT). The programs consist of undergraduate work corresponding to the junior and senior level, and a 32-semester-credit-hour study program in graduate-professional status meeting Graduate College requirements for a Plan III master's degree.

Students may enter a professional school at any level for which they are qualified that exceeds the minimum requirements for eligibility for admission. Admission as an undergraduate requires completion of 60 semester hours of study in an accredited institution of higher learning (up to half of this requirement may be met by advanced standing examination) and demonstrated satisfactory competence in the mathematics, chemistry, physics, engineering sciences, communications, social science and humanities course work normally making up the first two years of an engineering degree program. A grade-point average of 2.30 on a 4.00 scale is usually accepted as evidence of satisfactory competence in this pre-engineering course work.

To be admitted to graduate-professional status in a professional school in the CEAT, a student must have completed a curriculum leading to a B.S. degree in engineering meeting the

requirements of the Accreditation Board for Engineering and Technology. Students with B.S. degrees in physics, chemistry, etc., must complete work to meet ABET undergraduate requirements before gaining graduate-professional status. Scholastic performance in a professional school of CEAT at a level that indicates a high probability of success in a graduate program requiring a 3.00 on a 4.00 scale minimum GPA is also a requirement.

The 32 semester hours in graduate-professional status combine with 64 or more semester hours of undergraduate work to total at least 96 semester hours beyond the pre-engineering level for the professional programs. This course work is taken in accordance with a professional school plan of study established for each student to meet the objectives of the student and the professional school in which he or she is enrolled. Three-year plans of study will include: 16 semester hours of required courses common to all engineering curricula; not fewer than 36 semester hours of additional engineering work specified by the particular professional school, and of these, at least 15 semester hours must be at the 5000 level, exclusive of professional practice; and six to eight hours of professional practice in the graduate year of the plan of study. The courses should be chosen in the graduate year of the plan of study. The courses should be chosen at both undergraduate and graduate levels to meet ABET basic and advanced requirements for course work that is classified as design. (Currently, one-half year of engineering design is required in the basic, i.e., undergraduate programs, and an additional one-third year in the advanced portion.)

The professional school plan of study serves as the preliminary plan of study for the graduate portion of the program, but a separate final plan of study must be filed with the Graduate College by the end of the second week of the term during which all requirements for graduation are to be completed.

Scholarships

Several scholarships are funded through private donations, alumni gifts, and industries, and vary in amounts from \$400 to \$1,000 per year.

These scholarships are available for freshman through senior students, and are awarded primarily on the basis of academic achievement and leadership potential. However, during the selection process consideration may be given to financial need and other factors. Freshman students should normally have an ACT composite score of 30 or higher and be in the top 10 percent of their high school graduating class to be competitive for CEAT scholarships.

Each school or department within the College normally has scholarship funds available. These are administered through that school or department rather than through the College's scholarship committee. However, a separate application form is not required.

Application forms and information regarding CEAT may be obtained by contacting the Office of Student Academic Services, CEAT, EN 101, OSU, Stillwater, OK 74078.

Freshman scholarship applications must be completed and on file by March 1 preceding the academic year for which the student expects to receive the scholarship. Applications should be submitted to the Office of Student Academic Services.

Continuing and transfer students should submit scholarship applications to the head of the



school in which they are majoring prior to May 1. In this manner they will also be considered for any departmental scholarships for which they may be eligible as well as for any CEAT scholarship. Students who have not selected a major should submit their applications to the Office of Student Academic Services.

Advisement

The College's Office of Student Academic Services provides advisement for all pre-engineering students and pre-architecture students. (Consult the heading "Division of Engineering Technology" for specific information regarding advisement for students in technology programs.) When a student has gained admission to a professional school of engineering or architecture, he or she will be assigned a faculty adviser.

Each student is personally advised in the planning and scheduling of his or her course work and is counseled and advised individually on matters of career choice, his or her activities on OSU, and on other academic matters. An academic file is created for each student at the time of initial enrollment.

Progress Toward a Degree

Full-time students are expected to complete twelve or more semester credit hours each term with a grade-point average of 2.00 or above to make satisfactory progress toward a degree. Should either the hours completed or grade-point average for any term fall below the minimum, the student may be placed on academic probation. Normally, the terms of probation include a requirement that the student makes satisfactory progress in the term during which he or she is in probationary status, but higher standards may be set as is appropriate. A "C" or better may be required in courses that serve as prerequisites for professional schools of engineering courses in addition to other requirements. When a student does not meet the terms of probation, he or she may be suspended from the College of Engineering, Architecture and Technology. A formal request for reinstatement may be considered by the College Reinstatement Advisory Board prior to the beginning of any subsequent term. Deadlines for submitting such a request may be obtained from the Office of Student Academic Services.

Probation/Suspension

1. Students in the CEAT will be placed on probation at the end of any academic term in which they fall below the criteria for satisfactory progress toward their degree objectives.
 - a. the conditions for satisfactory progress in an academic term are:
 1. at least a 2.00 GPA, and
 2. at least 24 grade points (12 in a summer term) for a full-time student in courses which apply toward the degree objective. Part-time students must make at least a 2.00 GPA.
 - b. Students placed on probation following the fall semester will be subject to suspension following the spring semester. Probation terms are set on an individual basis but normally require at least a 2.00 GPA in at least 12 hours which apply toward the degree for full-time students.
 - c. Students placed on probation following the spring or summer terms will be subject to suspension at the end of the following fall or spring semester depending on the student's academic record. Probation terms normally required of full-time students on probation for the academic year are:
 1. at least a 2.00 GPA in at least 12 hours which apply toward the degree objective in the spring semester, and
 2. at least a cumulative 2.00 GPA for the academic year, and
 3. successful completion of at least 24 hours total which apply toward the degree objective for the fall and spring semesters while on probation. Students on probation for the fall semester only must meet requirements as stated in (b).
2. A student will be subject to suspension at the end of any term in which he or she fails to meet University retention standards. (See "Academic Regulations" in the *Catalog*.)
3. A student will not normally be suspended who is within 24 semester credit hours of graduation.

4. Students who have been reinstated will be suspended at the end of any semester in which they fail to meet probation requirements.
5. Students who have been suspended both for reasons of unsatisfactory progress toward the degree and of academic dishonesty will not be reinstated in the College of Engineering, Architecture and Technology.
6. An effort will be made to appropriately advise students on probation of their academic status at the end of every academic term, but they are responsible for being aware of their academic status and for taking appropriate action.
7. Students on probation will be required to sign an acknowledgement of the terms of their probation. Students will be held subject to the terms of probation established by their advisers whether or not they see their advisers and sign the acknowledgement of the terms of probation.
8. Students on probation will not be allowed to enroll for the term following the end of the probationary period until grades are received verifying that probation requirements have been met.

Reinstatement

Any student who has been suspended from the University for academic reasons may apply for reinstatement by making application through the Office of Student Academic Services in the college in which the student wishes to be reinstated. Students in the CEAT should obtain a copy of CEAT reinstatement procedures to seek reinstatement.

A suspended student who is reinstated will return to school on academic probation and will be subject to the probation procedures above.

Concurrent Enrollment

If a student expects to apply credits toward a degree at OSU that are to be earned at another institution or through correspondence or exten-

sion, while enrolled in one of the programs of the College of Engineering, Architecture and Technology, permission must be obtained in advance. It is the belief of the faculty of the College that such enrollment detracts from the educational process at this institution, and can be justified only in the most unusual circumstances. Normally, if the material for which such permission is sought is available at OSU, permission will not be granted, nor will retroactive permission be granted in any circumstances.

Calculators

An engineering, architecture or technology student is expected to be equipped with an appropriate calculator or computer. Any student not so equipped will be at a disadvantage in learning activities. Necessary functions include exponential functions, the logarithm and inverse logarithm functions in both natural base and base 10, and the trigonometric and inverse trigonometric functions.

Special Academic Programs

Co-op Program. The College of Engineering, Architecture and Technology offers an experience-based program, Cooperative Education (Co-op). Co-op allows engineering and technology students to achieve a balanced education through the combination of theoretical and practical knowledge during their early years of professional development. The student's education is a cooperative effort between the University and industry. Students alternate semesters on campus with work semesters in industry during their junior and senior years. The periods of employment constitute an essential element in the educational process. Students gain practical knowledge which is carried back to the classroom, giving academic programs a sense of reality. By the time they receive their degrees, students have accumulated the equivalent of a year-and-a-half of progressively challenging work experience.

Participation in Co-op is voluntary; transfer students must successfully complete at least one semester at OSU prior to their first placement. Students may obtain further information about the program from the coordinator, Room 101A, Engineering North.

Engineering Honors Program. The Honors Program provides opportunities for challenging and individual study for undergraduate students of unusually high ability, motivation and initiative. Honors classes, seminars and independent study courses are structured to put interested students and teachers together in ways which encourage discussion and a mature approach to learning. Invitation to the program is extended only to approximately the top five percent of entering students.

Each honors course completed with an "A" or "B" grade is identified on the student's transcript as such. A special bachelor's degree Honors diploma is conferred upon graduation for successful completion of all Honors Program requirements.

Qualified high school scholars will be eligible for the Honors Program beginning with their first enrollment at OSU as freshmen. An ACT composite score of at least 30 is required for Engineering and Architecture Honors students and at least 26 for Technology Honors students.

All other OSU students and transfer students who are classified as freshmen (27 semester credit hours or fewer), and who have completed twelve or more hours with a grade-point average of 3.50

or above are eligible to join the Honors Program regardless of their ACT scores.

Requirements for a Bachelor's Degree with Honors. (1) A grade-point average of 3.50, both overall and in the major field. (2) A total of 12 semester credit hours with grades of "A" or "B" in honors sections of basic introductory-type courses from at least three of the following areas: English or foreign languages, mathematics or logic, social sciences, natural or physical sciences and humanities. (3) Honors credit with grades of "A" or "B" in a total of 12 semester hours of junior and senior courses within the student's major field, including at least three hours of independent study. (4) Acquisition and submission of a formal application for the Honors degree within two weeks after the beginning of the final semester.

Job Placement. An employment service is provided for students in the College. This service is available to students interested in obtaining summer or permanent employment.

The placement office is coordinated with the University Placement Office and assists students in signing up for interviews with companies interviewing on campus. Lists of employment opportunities with companies not recruiting on campus are maintained at all times. Resources are available to assist the student seeking employment including company literature, resume information, interviewing tips and placement annuals.

Placement orientation sessions are held at the beginning of each semester to familiarize the students with the services provided.

Tutoring Program. A tutoring program is provided to assist students in their understanding of fundamental courses in mathematics, physics, chemistry and engineering science. Tutors are provided by the student honorary organizations in the College.

The sessions are held each fall and spring semester Monday through Thursday evenings. Each session lasts 30 minutes and the student is charged a nominal fee. Students may sign up for a maximum of one hour if they wish.

Information about the program can be obtained in the Office of Student Academic Services.

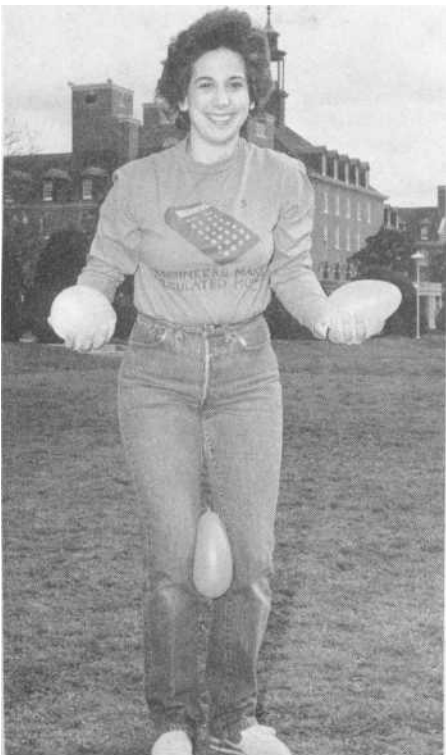
General Education

The College of Engineering, Architecture and Technology urges its students to make maximum use of the course work required by the College and the schools for simultaneous fulfillment of many of the general education requirements.

Opportunities to satisfy General Education requirements with required courses in the schools of Engineering include:

English. Students are required to complete a course in technical report writing. Thus, students making an "A" or "B" in the first English composition course (ENGL 1113), may skip ENGL 1323 and take the report writing course, ENGL 3323 to meet both the general education requirement for English and the College requirement.

Humanities and Social Science. Engineering students must complete a total of 16 semester credit hours to meet this requirement, which is in compliance with the minimum requirements stipulated by the Accreditation Board for Engineering and Technology. By taking American history and political science to meet general education requirements, three or four additional hours of social and behavioral science, and six or seven hours of humanities, the 16 hours can meet the University's requirements in these areas. Furthermore, if one



of these courses is selected from those meeting the University's requirements for an International Dimension, the total number of hours for the degree can be held to the minimum.

Basic Science and Mathematics. All students are required to complete 32 semester credit hours in these areas to meet college requirements. Eighteen of these credits can be used to meet University requirements in Natural Science and in Abstract and Quantitative Thought. The required chemistry and physics course work meet the University requirement for Scientific Investigation.

The total college requirements amount to 54 semester hours, well over the 40 hours required by the University for general education. However, no more than 18 of the 32 hours in mathematics and science can be counted toward General Education, and the several hours of course work more advanced than what would normally be approved for General Education.

Opportunities for simultaneously meeting the requirements imposed by the School of Architecture and General Education requirements parallel those of the schools of Engineering with some variations. Specific courses, required in the Architecture curriculum, may be used to meet General Education requirements as follows: Urban Sociology (SOC 3423) can be used to meet the minimum requirements in Social and Behavioral Science, and Architecture and Society (ARCH 2003) can be used to satisfy three credit hours of General Education credit in the Humanities as well as the International Dimension requirement. At least 17 semester hours of basic science and mathematics can be counted toward General Education requirements, and required course work in "History and Theory of Architecture" can be used for General Education credit, except that at least one General Education course unrelated to the major must be included.

The pattern for meeting General Education requirements with course work also meeting departmental requirements is similar in the Division of Engineering Technology, but with some variations from department to department. Required course work in mathematics and basic science is utilized to meet up to 18 semester hours of General Education requirements also. Meeting the remaining General Education requirements is not influenced by departmental requirements. In each case, provision is made for an elective to complete the minimum 15 semester credit hours in course work not directly supportive of the major. These hours, and the required hours in the Humanities (H) and Social and Behavioral Studies (S) areas provide an opportunity for the student to also meet the International Dimension requirement without adding hours to the program. The Scientific Investigation requirement is met as a part of the course work meeting professional requirements for basic science.

Lower-division Requirements

In the Schools of Engineering and the School of Architecture the lower-division course work is devoted to qualifying for admission to the associated upper division; i.e., in each case continued progress in the program is contingent on successful completion of lower-division course work measured against standards that are considerably higher than University retention standards.

Engineering. Admission to a professional school. A student is eligible to apply for admission to one of the professional schools of Engineering when

the classes in which he or she is enrolled will bring his or her total semester credit hours of course work at an accredited institution of higher learning to at least 60 hours. Admission to the professional school is the demonstration of an acceptable level of competence in subject matter comparable to that covered in the General Education and Pre-Engineering components of the lower-division curriculum as described in detail in the publication, *Undergraduate Programs and Requirements* and acceptance by the appropriate professional school. The demonstration of competence is normally in the context of formal course work, but up to one half of the requirements may be completed by examination.

An acceptable level of competence for the purpose of admission to a professional school may be demonstrated by achieving all of the following:

1. Of the 60 or more semester credit hours, at least 51 shall be from the General Education and Pre-engineering courses specified for the degree. The minimum grade-point average in these 51 hours is 2.30, and final grades of "C" or better are required in each English, mathematics, physics, chemistry or engineering science/engineering course.
2. A minimum of 12 of the required semester hours must be completed at Oklahoma State University, with a grade-point average of 2.30 or better in these courses.
3. The overall grade-point average applicable to the mathematics, physics and chemistry courses, and those engineering science and engineering courses taken prior to admission to a professional school, should equal or exceed 2.50.

While 60 semester hours are specified for the common pre-engineering curriculum, in some cases, preliminary courses pertinent to an individual major are recommended to be taken in the sophomore year. When such courses are taken, it is understood that pre-engineering course work may be deferred to the junior year. Consult the *Undergraduate Programs and Requirements* or the particular requirement sheet for these details.



Architecture. Admission to the upper division (third year) in the School of Architecture is granted to the most qualified applicants up to the capacity of the program. However, to be considered, a student must have completed 60 semester credit hours, all required architecture courses specified for the first two years with grades of "C" or better, and maintained an overall GPA of 2.30 or better. Furthermore, first preference will be given to students who have completed ENGSC 2114 prior to admission.

Technology. The specific requirements for continuation beyond the lower division in the various majors in the Division of Technology are not uniform. Programs that do not include an associate degree may have stipulations regarding admission to the upper division. Attention is directed to the requirement sheet for the appropriate major or the publication *Undergraduate Programs and Requirements* for the specific conditions a student must satisfy.

Departmental Clubs and Honor Societies

Alpha Epsilon (juniors & seniors in agricultural engineering)

Alpha Pi Mu (juniors & seniors in engineering)

Amateur Radio Club

American Institute of Architects

American Institute of Astronautics & Aeronautics

American Institute of Chemical Engineers

American Institute of Industrial Engineers

American Society of Agricultural Engineers

American Society of Civil Engineers

American Society of Mechanical Engineers

Chi Epsilon (civil, architectural or general engineering students)

Construction Management Society

Construction Specifications Institute

Engineerets (spouses of students in CEAT)

Engineering Student Council

Eta Kappa Nu (electrical engineering students)

Fire Protection Society

Institute of Electrical & Electronics Engineers

Omega Chi Epsilon (chemical engineering students)

Pi Tau Sigma (mechanical and aerospace engineering students)

Society of Automotive Engineers

Society of Black Engineers, Technologists & Architects

Society of Electronic Electrical Power Technology

Society of Manufacturing Engineers

Society of Mechanical Technicians

Society of Petroleum Engineers

Society of Women Engineers

Tau Alpha Pi (technology honorary)

Tau Beta Pi (engineering students)

Tau Iota Epsilon (technology students)

Agricultural Engineering

Professor and Head David R. Thompson, Ph.D.

Agricultural engineers working in industry, for educational and research institutions and government agencies or as private consultants provide the agricultural industry with essential engineering services. These services include power applications, machine design and testing, structural design and development, livestock and crop han-

ding equipment systems. Other services embrace the design and development of erosion, flood control, irrigation and drainage systems. The agricultural industry also depends on agricultural engineers to develop methods, equipment and systems for storing, processing and packaging products and transporting them to market.

Agricultural engineering students take courses in engineering science as well as courses in biological and agricultural sciences. Building on this foundation of basic courses, the specialized agricultural engineering courses apply this knowledge in mathematics, physics, chemistry and engineering science to design and develop new components and systems for agricultural production and processing. The curriculum also includes social studies and humanities for a better understanding of the principles of motivating people to achieve desired responses. This is important because the agricultural engineer often assumes supervisory and management responsibilities early in his or her career.

In the professional engineering program students elect additional engineering and science courses to supplement a program of authentic involvement in engineering practice. This additional educational experience provides more specialization in career opportunities for agricultural engineers.

Hydrology and water resources includes flood control, irrigation, water supply development and drainage. Students interested in this specialty elect additional courses in fluid mechanics, soil mechanics, soil physics and water quality.

Design and development of machines and equipment, power and controls systems, field machines, and equipment for handling agricultural products on farms and factories are included in agricultural engineering. Courses elected in advanced strength of materials, vibrations, hydraulic power and machine design help prepare students for this type of work.

Processing, handling and storage of agricultural products embraces 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. Courses in process engineering, heat and mass transfer, instrumentation, refrigeration and systems analysis are used for electives to strengthen the student's education in this area of work.

Environmental engineering for animal and plant production includes confined systems requiring sophisticated controls, and open systems such as feedlots, waste management and pollution control resulting from animal and plant production. Usual elective courses to support this specialty are heat and mass transfer, systems analysis, control theory and thermodynamics.

Fundamental courses for agricultural engineers are also offered in the professional engineering program. These courses include: agricultural engineering applications, plant science, animal science, electrical application and instrumentation, watershed hydrology, flood control and drainage engineering, field machinery, environmental engineering, irrigation engineering, farm power, power and machinery laboratory, farm machinery design, light structures, process engineering and waste management.

Graduate Programs

The School of Agricultural Engineering offers three programs leading to post-baccalaureate degrees: Master of Agricultural Engineering, Master of Science and Doctor of Philosophy. The Master of Agricultural Engineering program places emphasis on design and internship in engineering experience to prepare the graduate for practice in the engineering profession.

Facilities for design and research are available in processing of agricultural products, plant and animal environment, energy in agriculture, microelectronics, light structures, agricultural power and machinery, pesticide application, soil and water resources development, irrigation, hydraulics, and hydrology.

Research projects are supported by the Agricultural Experiment Station. A well-trained faculty, many of them registered professional engineers with research, consulting and design experience, guide the graduate students' activities and help plan programs to meet the students' needs. Graduate students prepare designs and specifications for special equipment and facilities needed to carry out their work. They are expected to demonstrate by thesis and supporting research or by designs the ability to organize a design problem or an experimental investigation, carry it to completion and report the results.

Admission Requirements. Admission to either the Master of Science or Doctor of Philosophy degree program requires graduation from an engineering curriculum accredited by the Accreditation Board for Engineering and Technology.

Admission to the Master of Agricultural Engineering degree program is permitted for students who meet the prerequisites as stated in the "Master of Engineering" section. The departmental graduate committee will evaluate the applicant's credentials to determine equivalency and specify requirements to overcome deficiencies. A student must be accepted by an adviser in the Department prior to official admission to the graduate program.

Degree Requirements. A candidate for any of the degrees listed above follows an approved plan of study which must satisfy at least the minimum University requirements for that particular degree.

School of Architecture

**Professor and Interim Head Alan Brunken,
M.Arch., A.I.A.**

Architecture is the difficult and complex art and science of designing and implementing a setting for human life. It is unique among today's professions in that its successful practice requires a blend-in roughly equal shares-of traits normally considered less than compatible; human empathy, artistic creativity, technological competence and organizational and economic acumen.

In contrast to art, architecture is rarely self-generated; it is rather a creative response to a stated or perceived human need. It thus must be more user-oriented than fine art alone and more humane than pure science. The keenest technological and economic functionality will fall far short of becoming architecture, unless it also strongly appeals to man's spiritual and emotional values.

The School's educational program strives to balance the human, visual and technological ele-

ments which go into design through a blend of lectures, seminars and studio courses. The primary thrust is directed at those planning to enter the profession of architecture; this goal will not necessarily be the choice of all.

The School offers both undergraduate and graduate curricula in architecture and architectural engineering. The undergraduate degree programs are in architecture and architectural engineering (structures). Each of the above undergraduate programs are professional degrees and require five years to complete. The School of Architecture also offers a one-year long master's program in both architecture and architectural engineering.

In an effort to maintain the most effective balance between students, faculty and facilities, the faculty reviews and selects the most qualified candidates based upon academic achievement and professional potential for admission to the upper division of the program. The minimum requirements for admission to the upper division (third year) of the program may vary from year to year as the best qualified students are selected. However, as a prerequisite to be considered for admission, the student must have (1) completed a minimum of 60 semester credit hours, (2) completed, with a grade of "C" or better, all lower-division architectural courses required in the first two years; and (3) maintained an overall grade-point average of 2.30 or higher in the 60 or more semester credit hours. First preference will be given to those students who have successfully completed ENGSC 2114 prior to the admission date.

Projects submitted for regular class assignments in architectural design may be retained by the School for accreditation and archival purposes. All projects not retained for these purposes will be returned to the student.

Transfer Students

Due to the professional nature of the program, evaluation of courses as substitutes for professional courses within the School is necessarily accomplished on a course-by-course basis. Classroom courses are evaluated through course description, texts required and content covered. The content and level of rigor of architectural studio courses, particularly at the beginning of the curriculum, vary widely among accredited schools of architecture. For this reason, studio course substitution is evaluated by a committee of the studio faculty through the examination of examples of the students' works performed in each course in question.

Graduate Programs

The School of Architecture offers opportunity for graduate study in architecture leading to the professional degrees, Master of Architecture and Master of Architectural Engineering.

Prior to admission to the status of 'graduate professional' in the Graduate College, a student will have completed as a minimum the preprofessional program in architecture corresponding to approximately four years of academic work and equivalent in content to the first four years of the architectural curriculum at Oklahoma State University.

Graduate programs are offered in architecture and architectural engineering (structures). Candidates with a four-year preprofessional degree must enter the two-year master's program in architecture or architectural engineering. Candidates with a five-year professional degree may be admitted to the one-year master's program in architecture



hours in residence (or at least 32 credit hours if admitted with a five-year B.Arch or B.Arch. Engr. degree).

Chemical Engineering

Professor and Head Billy L. Crynes, Ph.D.,
P.E.

Chemical engineers apply chemical, physical, and engineering principles to solve important problems and to supply vital materials for our technology-based civilization. Their work ranges from pharmaceuticals to fuels to industrial chemicals to bioengineering and to many others. It includes energy conservation and pollution control. The emphasis on chemistry and the chemical nature of everything we use is what makes chemical engineers different from other kinds of engineers.

Chemical engineers often find themselves defining a problem or product, developing a process to do what is needed, and then designing the plant to carry out the process. After the plant is started, chemical engineers will commonly manage operations, oversee equipment maintenance, and supervise control of product quality. They trouble-shoot the problems which hinder smooth operations, and they plan for future expansions or improvements. Their training and knowledge make them well qualified to market the products from a plant, the processing equipment for it, or even the complete plant itself.

The varied background and experience of chemical engineers make them ideally suited for advancement into top-level managerial and executive positions.

The academic preparation of chemical engineers for such a broad variety of careers must be based on a strong foundation in the basic sciences and mathematics. Computer competency is a must. Fundamental professional courses follow to provide the student an opportunity to apply the basic sciences to chemical engineering problems. Engineering design and laboratory courses integrate the more fundamental studies and demonstrate that engineering is a process of assembling knowledge from many fields and sources into a practical answer to a real problem. At the bachelor's level, three degree options are offered: (1) the regular course option prepares a graduate for a wide range of employment opportunities; (2) the petroleum option is specifically for those students interested in the energy field of petroleum and natural gas production, and (3) the premedical option is for those who wish preparation for medical school or seek employment in medically-related professions. All of these options prepare a student for success in M.S. or Ph.D. study at OSU or at other universities.

Upon completing the B.S. studies the qualified student is encouraged to continue in one of two master's programs.

Graduate Programs

The School of Chemical Engineering offers three programs leading to post-baccalaureate degrees: the Master of Chemical Engineering degree, the Master of Science degree, and the Doctor of Philosophy degree.

or architectural engineering. The architecture program is accredited by the National Architectural Accrediting Board (NAAB); the architectural engineering degree has a strong engineering base and is accredited by the Accrediting Board for Engineering and Technology (ABET).

All regulations and procedures as established by the Graduate College for a master's degree apply to the graduate professional degree programs in the School of Architecture except as follows:

Admission Requirements. It is the policy of the School of Architecture to balance students with available faculty and facilities to achieve excellence in professional education. Annually, approximately twenty of the best qualified applicants are admitted to the graduate program leading to a professional degree of Master of Architecture or Master of Architectural Engineering. Admission to the program is based on undergraduate academic records and accomplishments, examples of work, practical experience and recommendations from practicing architects, engineers and educators. A grade-point average over the courses in the curriculum for the pre-professional degree, as measured by an institution's registrar, or 2.50 or higher is necessary for consideration for admission.

Admission Date. Applications for admission to the professional program must be filed by February 15. The admissions committee will review these applications and notify all applicants by March 31. Late applications will be considered if vacancies exist. Normally, applications for admission are accepted for the fall semester *only*.

Transfer of Credits. A maximum of 16 credit hours taken at another accredited college or university offering a similar type of graduate program may be accepted toward a graduate-professional degree in the School of Architecture. Such cases will be determined by review by the graduate professional committee of the School of Architecture.

Students' Portfolios. For the Master of Architecture program, photographic examples of work performed in architectural design and other professional courses and/or actual practice are to be submitted with the application for review by the

admissions committee of the School of Architecture. (Note: Slides are not acceptable.) Portfolios should be mailed directly to the School of Architecture no later than February 15. Portfolios are not required for the Master of Architectural Engineering programs.

Degree Requirements. The student must have made up all deficiencies specified by the admissions committee. The student must have completed the 64 credit hours of course work specified in one of the options of the professional program in the School of Architecture with a minimum grade-point average of 3.00.

Extent of Enrollment. A graduate-professional may not count toward a degree more than 16 credit hours taken during a semester, nor more than nine credit hours earned in a summer session, without special permission.

Plan of Study. A preliminary plan of study must be filed in the Graduate College prior to enrolling for the second semester or prior to enrolling for the 18th graduate-professional credit hour (or upon admission, if transferring more than 17 credit hours).

Creative Component. Each candidate for the graduate-professional degrees in architecture and architectural engineering is required to do a professional project and report in a subject appropriate to the candidate's degree program and has approval of his adviser.

Thesis or Report. In lieu of the creative component professional project, the graduate-professional degree candidate in architectural engineering may do a thesis or report which conforms in format to published thesis regulations by the Graduate College.

Final Examination. At least four weeks prior to Commencement, a candidate must take an oral examination. The examination will be administered by an examination committee appointed by the dean of the Graduate College upon recommendation by the School. The examination will cover the entire graduate program, including the professional project.

Candidates for the graduate-professional degree must complete at least 48 semester credit

A program of independent study and research on a project under the direction of a member of the Graduate Faculty will be satisfactorily completed by all graduate students. For the Master of Science candidate the project may result in a thesis or report; for the Master of Chemical Engineering candidate the project will result in a report; for the Doctor of Philosophy candidate the project will result in his or her dissertation.

Admission Requirements. Admission to either the Master of Science or Doctor of Philosophy degree programs requires graduation from a chemical engineering curriculum approved by the American Institute of Chemical Engineers. Graduates from other curricula should submit transcripts to the head of the School of Chemical Engineering for evaluation.

Admission to the Master of Chemical Engineering degree program is permitted for students who have the minimum competencies as stated under

"The Master of Engineering." Students may enter the program at any level for which they are qualified provided they are accepted by the School of Chemical Engineering.

The Master of Chemical Engineering Degree. This program involves one year study beyond the B.S. degree course work. A minimum of 32 semester credit hours are required to incorporate CHENG 5213, 5423, 5633, 5743, 5793, 5843, and six additional hours of approved graduate-level elective courses. Also, a professional internship is required which is represented by enrollment in CHENG 5030 for at least six semester credit hours. Two semester credit hours of CHENG 5990, Special Problems, are required.

This program is distinguished by the incorporation of an intern experience to give students real-time engineering practice, usually in an industrial environment under the guidance of an industrial preceptor as well as a University professor.

The Master of Science Degree. General requirements for the Master of Science degree in Chemical Engineering are 30 semester credit hours beyond the B.S. degree of course work and an acceptable thesis (a minimum of six hours of credit required for thesis research). The chemical engineering courses taken must include CHENG 5213, 5423, 5633, 5843, and 5743.



Doctor of Philosophy Degree. The general credit requirement is a minimum of 90 semester credit hours beyond the B.S. degree including at least 30 hours of credit for research. The student must select a minor field with at least 12 hours of credit in this area. The chemical engineering courses must include CHENG 6023 or 6113, at least one other 6000-level CHENG course, and 12 hours of credit in other 5000- and 6000-level CHENG courses. Each student is responsible for consultation with his or her advisory committee in preparing the study plan.

Civil Engineering

Professor and Head Robert K. Hughes,
Ph.D., P.E.

The exceptional diversity of professional practice in civil engineering presents many career opportunities for students well-founded in the physical sciences, mathematics, geology and biology.

The concern of civil engineers is man's environment—its control, alteration and utilization. Civil engineers engage in planning, designing and constructing highways, waterway and railway systems, harbors and shipping facilities, systems for the treatment and distribution of water and for the collection and treatment of sewage and industrial waste, dams and hydroelectric works, airports and terminals, structures of every kind including buildings, bridges, towers, industrial plants, aircraft, missiles, space vehicles, surface vehicles and submarines, tunnels and subway systems, schemes for the control of water and air pollution, and many other works of general benefit to society.

The professional curriculum in civil engineering is based on the pre-engineering courses in mathematics, physical sciences and engineering sciences. On this foundation, required courses train the student in the basic skills needed for the professional practice of civil engineering and provide the tools for more advanced study. Engineering theory and principles are developed in a way that will encourage their application to the solution of practical problems. Elective courses give experience in the solution of typical problems and develop the judgement and confidence of the student engineer.

The purpose of the curriculum is to prepare the student for his or her professional career as a designer, office engineer, field engineer, contractor, engineering businessman or manager. The graduate of this program will be well-prepared for work in engineering offices, city, state and federal governments and organizations, and the construction, chemical, petroleum and transportation industries.

Some degree of specialization is provided through the choice of elective courses in structures, engineering mechanics, transportation engineering, soil mechanics and foundations, construction engineering and management, bioenvironmental engineering and water resources. Strong support for various parts of the program are given by the departments of Industrial Engineering and Management, Mechanical and Aerospace Engineering, Agronomy, Business Administration, Chemistry, Geology, and Microbiology.

Graduate Programs

The School of Civil Engineering offers five programs leading to post-baccalaureate degrees—the Master of Civil Engineering degree, the Master of Environmental Engineering degree, the Master of Science degree in civil engineering, the Master of Science degree in environmental engineering, and the Doctor of Philosophy degree. The Master of Civil and Environmental Engineering degrees are graduate professional degrees with increased emphasis on professional practice through a broad spectrum of management, economic and technical studies and the incorporation of actual engineering design experience before graduation. The Master of Science degree, on the other hand, is characterized by a higher degree of technical specialization in a particular area of study. The Doctor of Philosophy degree is designed to prepare a student for research and for the teaching profession in engineering.

Major areas of study in the School are applied mechanics, structural analysis and design, transportation, construction engineering and management, geotechnical engineering, water resources, and bioenvironmental engineering. Research in all major fields is continuously pursued. Master of Civil Engineering candidates may choose either to specialize or to engage in a broadly based program of study, in accordance with an approved and purposeful plan of study.

Admission Requirements. Candidates for the Master of Science or Doctor of Philosophy degree must have graduated from a civil engineering curriculum accredited by the Accreditation Board for Engineering and Technology. Graduates from other curricula and schools should submit transcripts to the head of the School of Civil Engineering for evaluation.

Admission to the Master of Civil Engineering or Environmental Engineering degree program is permitted for students who meet the minimum prerequisites as stated under "Master of Engineering." Students may enter the program at any level for which they are qualified provided the minimum admissions criteria are met and they are accepted by the School of Civil Engineering.

Degree Requirements. All degree programs follow an approved plan of study that must be submitted at a designated time. All programs are characterized by the flexibility available in a study plan that is designed to satisfy the particular needs of the student, while conforming to the general requirements implied by the title of the degree and specified by the University.

The Master of Civil Engineering or Environmental Engineering degree requires the completion of at least 100 semester credit hours of work beyond the minimum criteria stated for admission to the Professional School. This may include six semester credit hours for professional practice. Experienced engineers may substitute additional course work for professional practice.

The Master of Science degree in either Civil or Environmental Engineering requires the completion of at least 30 semester credit hours beyond the bachelor's degree, including a research thesis for which not more than six semester credit hours may be granted. The non-thesis option (32 semester credit hours) described in the "Graduate College" section may be permitted at the discretion of the student's adviser.

The Doctor of Philosophy degree requires the completion of at least 90 semester credit hours of course work beyond the bachelor's degree, including not more than 30 semester credit hours

for the research thesis. In addition, the candidate must complete six semester credit hours of course work in an area such as languages, mathematics, statistics, experimental techniques, research methodology, or similitude, (as specified by the advisory committee) that will facilitate his or her research effort. Generally, official admission as a candidate for the Doctor of Philosophy degree in any program offered by the School will not be granted until a member of the Graduate Faculty in the School agrees to serve as major (or thesis) adviser for the prospective candidate.

Electrical and Computer Engineering

Professor and Head James Baker, Ph.D., P.E.

If a student enjoys mathematics and has a natural curiosity about electronics, computers, communications, motors, generators or other electrical devices, then a career in electrical and computer engineering may be an excellent and exciting choice.

Electrical Engineering

The electrical engineering program provides the fundamentals for a career in many related areas. All around is seen the astounding impact of microelectronics on consumer products such as calculators, electronic watches, TV games, home computers and microwave ovens, but the future impact will be even more astounding on worldwide satellite communications, energy conservation, automation of industrial plants, oil and gas exploration, electrical power generation and distribution, to mention a few.

The undergraduate electrical and computer engineering program at Oklahoma State University prepares each graduate for a life-long professional career. During the first two years, students complete a carefully designed pre-engineering program consisting of mathematics, physical sciences, engineering sciences and selected courses in the humanities and social sciences. During the final two years of the program, each student concentrates his or her study on electrical and computer engineering subjects and can elect from the following areas: computer engineering, electronics, energy systems, communications, control systems, electromagnetics, solid state devices and network theory/signal processing.

Computer Engineering

A special program option in computer engineering is offered by the School of Electrical and Computer Engineering. This option is designed for students who have a strong interest in computers and desire to gain a full understanding of both the electronic hardware and the programming software aspects of modern computer systems. A student in computer engineering will also gain a detailed knowledge of one or more applications where computers are being used as integral components of advanced engineering systems; examples are instrumentation and test facilities, communication systems,

power systems and process control systems. Students in computer engineering will work directly with microprocessors, microcomputers, and minicomputers and develop special electronic circuits for interfacing these computers to various peripheral devices.

In addition to the laboratories devoted to research, separate instructional laboratories give students "hands-on" experience in microcomputers, minicomputers, digital logic design, electronics, electrical machinery, networks, instrumentation and electromagnetics. In most instances, the student is guided through laboratory exercises which are closely related to classroom lectures. Here the student has the opportunity to verify theoretical principles and design concepts presented in the lectures. In other courses, the laboratory formats are more open-ended, allowing the student to experiment freely and exercise individual discretion in discovering experimental results.

The School of Electrical and Computer Engineering offers a full range of undergraduate and graduate program options. A degree in electrical or computer engineering is also an excellent foundation for graduate work in other professional fields such as medicine and law. Many graduates also pursue advanced programs in business and management after earning a degree in engineering.

Graduate Programs

The School of Electrical and Computer Engineering offers three graduate degrees: Master of Electrical Engineering, Master of Science and Doctor of Philosophy. The Master of Electrical Engineering degree is designed to prepare the graduate for the practice of the engineering profession and is distinguished by the incorporation of an internship program to give students practical engineering design experience before graduation. This degree is accredited by the Engineering Accreditation Commission of the Accrediting Board for Engineering and Technology (ABET) as an advanced level professional degree.

The Master of Science degree is designed for students interested in careers in industry and government service that emphasize advanced design, development, and research methods for high technology. This degree incorporates additional advanced course work and on-campus creative activities.

The Doctor of Philosophy degree is designed to prepare the student for high-level research/development positions in industry and government and for the teaching profession in engineering and is distinguished by the emphasis on research and by the incorporation of a doctoral thesis.

Students may select course work and participate in research and design projects in the following areas: computer engineering, energy systems, control theory, communications, electromagnetics, electronics, network theory, solid-state devices

In addition, students may elect a multidisciplinary program that crosses departmental lines and emphasizes the application of electrical engineering and systems theory to complex problems involving the interaction of engineering systems and technology with social, economic and environmental processes.

Admission Requirements. Admission to the Graduate College, as described under "General Regulations" in the "Graduate College" section is the first step for those students proceeding toward advanced degrees. Graduation from an

electrical engineering curriculum accredited by the Accreditation Board for Engineering and Technology with high scholastic performance qualifies the student for admission to the School of Electrical and Computer Engineering as a candidate for any of the three advanced degrees offered.

Graduates from non-engineering fields such as mathematics, physics and computer science are also admitted to Electrical Engineering M.S. and Ph.D. graduate programs if an evaluation of their transcripts indicates they are prepared to take graduate-level course work in electrical engineering, or can be expected to do so after a reasonable amount of remedial course work. This condition also applies to graduates of unaccredited engineering programs and engineering technology programs.

Admission to the Master of Electrical Engineering program is permitted for students who meet the minimum prerequisites as stated in the section "Master of Engineering." Students may enter the program at any level for which they are qualified; they must at least meet the minimum admission criteria and be accepted by the School of Electrical and Computer Engineering.

Degree Requirements. The Master of Electrical Engineering degree is awarded to those who complete 32 hours of credit meeting Graduate College requirements for a Plan III master's degree program. The plan of study for this program must include at least 24 hours of course work, with more than half in electrical engineering at the 5000 level or above, and six to eight hours of credit for the internship practice. Flexibility is permitted in selecting courses to achieve specific program objectives.

The Master of Science degree is awarded to those students who successfully complete an approved plan of study under one of two possible options. If a thesis is written, 30 semester credit hours are required, including six hours credit for the thesis. If no thesis is written, 32 semester credit hours are required, including two hours credit for a creative activity. To be approved, a plan of study will include, as a minimum, 18 hours of 5000-level courses in electrical and computer engineering. Most plans of study include additional 5000-level courses, depending upon the background and particular educational goals of the student, and the minimum stated above is allowed only when a specific interdisciplinary plan of study is approved by the faculty. Each student is encouraged to include courses in supporting disciplines such as mathematics, computer science, statistics, business or other engineering fields. In certain cases, remedial work in undergraduate electrical and computer engineering will be required in addition to the 30-32 hours specified above.

The Doctor of Philosophy degree is granted in recognition of high achievement in scholarship in course work selected from the broad field of electrical engineering, and an independent investigation of a research problem in a chosen field of specialization that leads to a contribution to knowledge, as presented in a dissertation. For this degree the Graduate College requires a minimum of 90 credit hours for acceptable academic work beyond the bachelor's degree, including credit for the dissertation,

General Engineering

Professor and Head Bennett L. Basore,
Sc.D., P.E.

For the student with interests that do not conform to any one of the traditional engineering disciplines, OSU offers a structured interdisciplinary program that continues the breadth developed in all engineering students in the engineering sciences course work, and has considerable depth.

General engineering embodies the fundamentals of four major engineering disciplines (civil, electrical, industrial and mechanical), to develop in basic science and engineering fundamentals regardless of the context in which these concepts are applied.

As a professional with an interdisciplinary background, the general engineer is prepared to analyze, design and synthesize solutions in a technically expedient manner, while considering the economics of design or process, as well as the humanistic requirements for utilization and operation. The student may choose to follow a professional practice within one of the four disciplines; he or she may look to a career in research and development, particularly of an interdisciplinary nature; he or she may choose the avenues of development in professional consultation or individual proprietorship; or finally, because of his or her background and perspective, he or she may choose a career in the management circles of government or industry.

The resources of the College, both faculty and laboratory facilities, are available to the general engineering student who pursues course work alongside majors in each of their traditional disciplines.

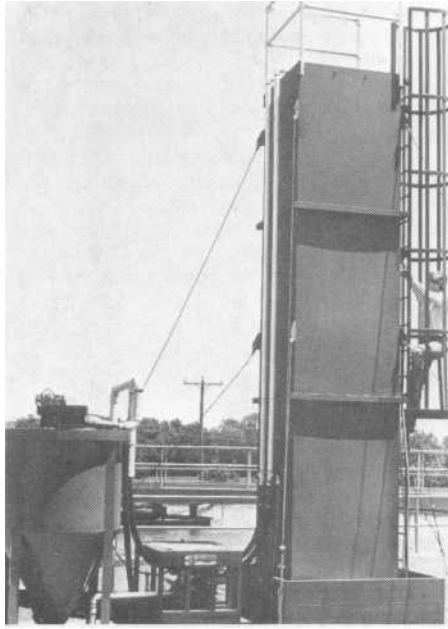
Because the general engineer can expect to be called upon to perform at a professional level in any or all of the disciplines covered by the curriculum, each student is encouraged to plan a program leading to a master's degree, which will assure a more competitive level of competence in all four of the engineering disciplines.

Graduate Programs

The School of General Engineering offers three programs leading to post baccalaureate degrees: the Master of General Engineering degree, the Master of Science degree in general engineering, and the Doctor of Philosophy degree. The Master of General Engineering degree is distinguished by its increased emphasis on professional practice and design through a broad spectrum of technical, management and economic studies and the incorporation of an internship program to provide actual engineering experience before graduation. The Master of Science degree is characterized by a higher degree of technical specialization. The Doctor of Philosophy degree is a research-oriented degree designed to prepare the candidate for a career in teaching or research.

Major areas of study in general engineering follow the undergraduate pattern of combining course work from civil, electrical, industrial and mechanical engineering. Research is pursued with the option of limiting studies to one of the cooperating areas or of combining the areas.

Admission Requirements. Admission to either the Master of Science or Doctor of Philosophy degree program requires graduation preferably



from an engineering curriculum accredited by the Accreditation Board for Engineering and Technology. Graduates from unaccredited engineering curricula or from curricula in chemistry, physics, and mathematics should submit transcripts to the head of the School of General Engineering for evaluation.

Admission to the Master of General Engineering degree program is permitted for students who meet the minimum prerequisites stated in "Master of Engineering." A student may enter the program at any level for which he or she is qualified provided the minimum admission criteria have been met and the student has been accepted by the head of the School of General Engineering.

Degree Requirements. An approved plan of study is developed for each student. All programs are characterized by the flexibility available in a study plan that is designed to satisfy the particular needs of the student, while conforming to the general requirements for the degree as specified by the University and as implied by the title of the degree.

The Master of General Engineering degree requires about three years of study beyond the pre-engineering requirements and involves not fewer than 98 semester credit hours of course work including an internship period. The plan of study for the graduate professional (third) year should include three semester credit hours of mathematics or statistics and probability; eight semester credit hours of internship/professional practice; 12 semester credit hours in an area of interest; and three semester credit hours of humanities. At least 32 semester credit hours must be included in the graduate professional study plan, and of these, 12 or more semester credit hours must be in design, as defined by the Accreditation Board for Engineering and Technology, and 21 semester credit hours shall be in 5000-level courses or above. Any remaining course work may consist of specified courses to meet the objectives of the student and the curriculum.

The Master of Science degree program is based on an integrated plan of study with a specific objective for each candidate. The Master of Science degree requires the completion of

approximately 30 semester credit hours beyond the bachelor's degree including a research thesis of six semester credit hours. Students from disciplines other than general engineering will be required to follow study plans designed to produce the breadth expected of a general engineer, and will require 32 semester credit hours if no thesis is pursued.

The Doctor of Philosophy degree in general engineering requires the completion of not fewer than 90 semester credit hours, including credit for a research dissertation. In the plan of study, the mathematics and technical engineering courses are directed toward and support the proposed area of research. Emphasis may be placed on one or more areas of concentration which support the research and dissertation. The plan of study should generally include: 18-20 credit hours of mathematics above the bachelor's degree or bachelor's certification, six credit hours of humanities, and 20-25 credit hours of research. The semester credit hours remaining to complete the plan of study should be selected to satisfy all requirements of the Graduate College, and to supplement the student's academic background. The overall plan of study is subject to the approval of the advisory committee.

Industrial Engineering and Management

Professor and Head Allen C. Schuermann,
Ph.D., P.E.

Industrial engineering is one of the five major engineering disciplines and is concerned with designing, analyzing and operating a wide range of systems that include people, materials, money and equipment. Industrial engineering is the only engineering discipline which is specifically concerned with the role of the human being in the processes by which goods and services are produced and as such is often called the "people-oriented engineering discipline."

Productivity and effective utilization of resources, including energy conservation and management, are principal concerns of practicing industrial engineers. The industrial engineer may follow a career in almost any type of enterprise; manufacturing companies, service organizations such as insurance companies, banks and hospitals, and government agencies, including city, state and federal government functions. The industrial engineer's position in an organization is usually as a management adviser in contact with every phase of the organization. Because of the breadth of his or her background, the industrial engineer is especially well qualified to rise to positions of leadership and authority within the organization.

The curriculum blends a basic group of common engineering science courses with specialized courses in the major areas of industrial engineering—design of human/machine systems, design of management control systems and improvement of operations (both manufacturing and service). The course offerings stress mathematical and statistical techniques of industrial systems analysis, quantitative methodologies of operations research, computers as a tool for problem solving and simulation, economic considera-

tions of alternatives, control of product or service quality and quantity, specifications of the manufacturing process including equipment and tooling, planning, scheduling and control of work flow, and behavioral sciences in the organization and management of human endeavor.

Prospective students are encouraged to write directly to the School of Industrial Engineering and Management for career guidance information.

Graduate Programs

The School of Industrial Engineering and Management offers graduate programs leading to the Master of Industrial Engineering and Management degree, the Master of Science degree, and the Doctor of Philosophy degree.

The Master of Industrial Engineering and Management degree is a graduate professional degree with increased emphasis on professional practice, incorporating an engineering design experience during the final year of study.

The Master of Science degree is characterized by a higher degree of technical specialization in a particular field of study. This degree program is designed to prepare men and women for technical positions such as research and consulting, as well as professional practice, in various kinds of organizations.

The Master of Science degree and the Master of Industrial Engineering and Management degree are intended to be especially attractive to all engineering graduates, including non-industrial engineers, and to many science majors. The two degree programs include a strong, technical component and an orientation to business and management which is complementary to other technical backgrounds.

The Doctor of Philosophy degree is designed to carry the student to the leading edge of knowledge in the profession of industrial engineering and management. It is intended to prepare men and women for highly specialized positions, such as research and consulting in industry, government and service organizations, and for teaching and research positions in colleges and universities.

The basic consideration in graduate education in industrial engineering and management at this institution is the most effective and efficient utilization of human, physical, and economic resources. Instruction in management embraces both qualitative and quantitative concepts, including analytical methodologies and social considerations pertinent to organizations of many kinds.

Staff and facilities are available for the study and practice of several phases of industrial engineering. Advanced degree programs may be arranged with major emphasis in fields of interest such as industrial management, management systems analysis and design, operations research, production control, quality assurance, economic analysis, methods engineering, energy management and other qualitative and quantitative facets. Students may complement industrial engineering and management courses with work in several other branches of engineering, as well as economics, business administration, computer science, statistics, mathematics, psychology, and sociology.

Admission Requirements. Graduation from an accredited engineering curriculum with scholastic performance distinctly above average qualifies the student for admission to the Master of Science Jr Doctor of Philosophy degree programs. Applicants not meeting these criteria should submit transcripts to the head of the School of Industrial Engineering and Management for evaluation.

Admission to the Master of Industrial Engineering and Management degree program is permitted for students who meet the minimum prerequisites as stated in "Master of Engineering." A student may enter the program at a point for which he or she is qualified provided the minimum admissions criteria are met and the student is accepted by the School of Industrial Engineering and Management.

Degree Requirements. The Master of Industrial Engineering and Management degree requires the completion of approximately three years of study beyond the pre-engineering requirements, for a total of 157 semester credit hours, including the internship or professional practice.

The Master of Science degree in industrial engineering and management requires the completion of at least 30 semester credit hours beyond the bachelor's degree, including a research thesis of six semester credit hours. A **32 semester credit hour option** is also permitted and must include three to five hours of independent study.

The Doctor of Philosophy degree requires the completion of at least 90 semester credit hours of course work beyond the bachelor's degree or 60 semester credit hours of course work beyond the master's degree, including normally about 20 semester credit hours for a research thesis. In addition, the candidate must complete six semester credit hours of course work in an area such as mathematics, statistics, experimental techniques, or research methodology (as specified by the advisory committee).

Mechanical and Aerospace Engineering

Lecturer and Interim Head Howard E. Conlon, M.S., P.E.

Mechanical engineering and aerospace engineering are professional disciplines which involve the invention, design, and manufacture of devices, machines and systems that serve the ever-changing needs of modern society.

Mechanical engineering is an exceedingly diverse field which is not identified with or restricted to any particular vehicle, device or system. Mechanical engineers are vitally concerned with all forms of energy production, utilization and conservation. They deal with everything mechanical, whether it is small or large, simple or complex—from power lawn mowers to automobiles, fuel cells to nuclear power plants, gas turbine engines to interplanetary space vehicles, artificial limbs to life support systems, robotic manipulators to complex automatic packaging machines, precision instruments to construction machinery, household appliances to mass transit systems, and heating and air-conditioning systems to off-shore drilling platforms. In virtually every organization where engineers are employed, mechanical engineers are included.

Aerospace engineering is that particular part of mechanical engineering which is concerned with the science and technology of flight, and the design of air, land and sea vehicles for transportation and exploration. This exciting field has already led man to the moon and continues to lead in the expansion of man's frontiers deeper into

space and into the ocean's depths. Because of their unique backgrounds in aerodynamics and lightweight structures, aerospace engineers are becoming increasingly involved in solving some of society's most pressing and complex problems—such as high-speed ground transportation and pollution of the environment.

The broad background and problem-solving ability of mechanical and aerospace engineers make them suited to engage in one or more of the following activities: research, development, design, production, operation, management, technical sales, patent law and private consulting. *Versatility* is their trademark. A bachelor's degree in mechanical or aerospace engineering is also an excellent background for entering other professional schools such as medicine, dentistry, law or business (M.B.A.). A formal premedical option is available for students wishing to follow this avenue of approach to medical school. A petroleum engineering option is also available.

In the professional school, mechanical and aerospace engineering students extend their study of the engineering sciences and consider applications of fundamental principles and analysis tools to the solution of real technological problems of society. Students make extensive use of modern electronic digital computers in virtually every course in their program. Design courses involve students in the solution of authentic, current and significant engineering problems provided by industrial firms, such as Ford, Fisher Controls, IBM, Whirlpool, Conoco, Phillips, Halliburton, Procter and Gamble, Mobil, Texas Instruments, Magnetic Peripherals, 3M, General Dynamics and Boeing. These industrial firms also are representative of those hundreds of firms that employ mechanical and aerospace engineers.

The student designs, with the guidance of an adviser, an individualized program of study consistent with his or her interests and career plans. Some students terminate their studies with a bachelor's degree, while others receive one of several graduate degrees.

Graduate Programs

The School of Mechanical and Aerospace Engineering offers programs leading to the Master of Mechanical Engineering degree, Master of Science degree, and the Doctor of Philosophy degree.

The Master of Science degree and the Doctor of Philosophy degree prepare the graduate for research/development positions in industry and government, or for the teaching profession in engineering. These degrees are distinguished by the incorporation of a research component.

The Master of Mechanical Engineering degree prepares the graduate for engineering practice and is distinguished by its incorporation of an off-campus internship in industry to give the student engineering design experience before graduation.

Students may select course work and participate in research or design projects in the following areas: fluid mechanics and aerodynamics, thermal and environmental sciences, engineering acoustics and vibrations, mechanisms and systems design, energy conversion and utilization, solid mechanics and materials behavior, system dynamics and automatic control, fluid control systems, and biomechanics. Students are encouraged to take courses in mathematics and science and in other fields of engineering which fit into their programs.



Admission Requirements. Admission to the Graduate College is required of all students pursuing the M.Mech.E., M.S., or Ph.D. degree. Graduation from a mechanical or aerospace engineering curriculum accredited by the Accreditation Board for Engineering and Technology, with scholastic performance distinctly above average, qualifies the student for admission to the School of Mechanical and Aerospace Engineering as a candidate for the M.S. and Ph.D. degrees. Graduates from disciplines other than mechanical or aerospace engineering may be admitted if an evaluation of their transcripts by the School of Mechanical and Aerospace Engineering indicates they are prepared to take graduate-level course work in mechanical engineering, or can be expected to do so after a reasonable amount of prerequisite work.

Admission to the Master of Mechanical Engineering degree program is for students who meet the prerequisites stated under "Master of Engineering." A student may enter the program at any level for which the individual is qualified provided he or she meets the minimum admission criteria and is accepted by the School of Mechanical and Aerospace Engineering.

Degree Requirements. All degree programs follow an approved plan of study designed to satisfy the individual goals of the student, while conforming to the general requirements of the School of Mechanical and Aerospace Engineering and the Graduate College.

The Master of Mechanical Engineering degree requires 24 semester hours of approved graduate-level course work and a prescribed internship. As a result of the internship, a written report acceptable to the faculty must be submitted for completion of the degree requirement.

The Master of Science degree program with the thesis option requires 24 semester credit hours of approved graduate-level course work, and a suitable research thesis of six semester credit hours. The non-thesis option requires 32 semester credit hours of which three to five must be for an acceptable, individually directed creative activity which results in a written and oral report to the faculty.

The Doctor of Philosophy degree requires a minimum of 90 semester credit hours beyond the bachelor's degree, including a dissertation for which no more than 30 semester credit hours may be awarded.

Division of Engineering Technology

Professor and Director **James E. Bose,**
Ph.D., P.E.

Engineering technology education is concerned with the practical application of engineering achievement with emphasis upon the end product rather than the conceptual process. Whereas the development of new methods is the mark of the engineer, effective use of established methods is the mark of the technologist. Often the technologist will be expected to achieve what the engineer conceives.

Engineering technology education is designed to educate two-year, associate degree *technicians* and four-year, bachelor's degree *technologists*, either to assist engineers or to provide independently the support for engineering activities. The bachelor's degree *technologist* receives a more intensive education than the *technician* in his or her technical specialty and great depth in mathematics and technical sciences. Further, the additional two years provide more breadth in related technical, communication and socio-humanistic studies. A "master of detail," he or she is capable of independent action in performance of technical activities and is frequently involved as a coordinator, expeditor or supervisor of other technical personnel. His or her capability in technical sales and other public-contact positions is enhanced by his or her background in selected liberal studies.

The engineering technology graduate is qualified to select from a broad array of positions. In research and development, he or she may serve as a laboratory technician or engineering assistant in the performance of experiments, evaluation of data, or prototype development. In production, typical positions are engineering aide, process specialist, quality control technician, materials specialist, design technician, technical writer and production supervisor. In the field, he or she will often be identified as a technical representative, technical salesperson, field test technician or technical consultant.

The Bachelor of Science in Engineering Technology program is composed of the following curricular subdivisions:

Mathematics and science-algebra, trigonometry, applied calculus, general physics, and chemistry or other science

Technical specialty-technical science and related technical courses.

Communication-English composition, and business or technical communication.

Social sciences and humanities-history, government, religion, literature, art, music, etc.

Electives-controlled and general.

High School Preparation and Counseling Information

At least two semesters of high school algebra and a course in plane geometry are recommended for entering students. One year of high school credit in physics and/or chemistry is desirable.

Those less intrigued with theoretical concepts but who have the interest and aptitude toward applications are likely engineering technology majors. These students particularly appreciate the engagement of technical specialty courses beginning with the first semester and continuing throughout the course of study. The relevance of the technical science and related technical courses adds further satisfaction.

Transfer Students

An important, contemporary educational development is the "two-plus-two" bachelor's program. Those completing an associate degree in technology-oriented curricula at other institutions are generally admissible to the junior year with a minimum loss of academic time. The "two-plus-two" concept provides the attractive feature of two occupational-entry levels-technician or technologist.

Curricula

The curricula of the Division of Engineering Technology provide the "two-plus-two" program. Thus, the associate degree requirements satisfy the lower-division requirements for the Bachelor of Science degree in Engineering Technology without loss of credit.

Associate Degree

Two-year technical programs

Electronics

Fire Protection and Safety

(Mechanical) Design option

Mechanical Power

Petroleum

Bachelor of Science Degree

Engineering Technology Programs

Construction Management

Electronics

Fire Protection and Safety

General

Manufacturing option

(Mechanical) Design option

Mechanical Power

Petroleum

The associate degree credit hour requirements vary from 61 to 66 hours, while the Bachelor of Science in Engineering Technology extend from 126 to 129 credit hours.

Construction Management Technology

Associate Professor and Head K. Dean Imel, M.S., P.E.

The construction industry is the largest industry in the world. Leadership in this field requires a broad knowledge of labor, materials, equipment, capital and construction procedures. The interdisciplinary approach of the construction management program offers the student specialized course work in all phases of construction, designed to prepare him or her for responsible positions in industry.

The modern constructor must have a great deal of technical knowledge to keep abreast with rapidly changing materials and methods of construction. Specialized courses in estimating, surveying, structures, construction planning and scheduling, construction law and insurance, field and office management and construction procedures provide students with the background necessary for today's construction industry. These specialized courses, in addition to a blend of the basic sciences, business, and general studies, produce a well-balanced curriculum for students in construction. Special attention is given to computer application in construction estimating.

Students with an interest in building structures may select courses in the "building" option of construction management which provides him or her with a knowledge in working drawings, mechanical and electrical equipment of buildings, and other course work for a career in building construction.

Students with an interest in civil engineering structures may select courses in the "heavy" option of construction management which provides him or her with a knowledge in highways, soils, foundations and other course work for a career in the heavy and industrial construction industry.

Graduates of construction management have shown the curriculum to be successful in their development as productive members of the construction industry, holding responsible positions as project managers, estimators, material and equipment salespersons, labor management and construction managers.

Electronics and Computer Technology

Professor and Head Perry R. McNeill, Ed.D., P.E.

The electronics technology curriculum provides preparation for outstanding career opportunities not only in the electronics industry itself but also in many other areas in modern industry which depend upon electronics for control, communications or computation. Many opportunities exist for graduates to work in the areas of digital electronics, microcomputers and main-frame computers.

The work of the electronics graduate may range from assisting in the design and development of new equipment in the laboratory or applying modern microprocessors in the field, to the operation or supervision of production operations, technical writing, customer service and sales.

The program provides the Bachelor of Science degree in Engineering Technology with an elec-

tronics major. To meet these diverse needs the programs laboratory-oriented and provides a strong foundation of mathematics and science, specialized course work in electronics technology and related technical areas, and courses in the area of communications and the social studies.

The electronics technology-computer option curriculum provides the preparation for graduates to enter the growing and exciting field of computer hardware and software. The demand for graduates having both computer hardware and software skills is quickly developing as the importance of automation, robotics, and artificial intelligence is recognized. Graduates of this program will be prepared for those opportunities in industry requiring considerable knowledge of both computer hardware and software.

The program provides the Bachelor of Science degrees in Engineering Technology with an electronics major-computer option. To meet the diverse needs that graduates will have, the program provides a strong foundation of mathematics, science, specialized courses in the computer field. Related courses in the humanities and social sciences are included to give the graduate an appreciation of the world in which the graduate will live and work.

Graduates will have the opportunity to work for many different kinds of industrial concerns. Computer manufacturers, as well as companies that are incorporating computers into their product will be interested in employing the graduates. Others may choose to seek employment in computer sales or software development.

Fire Protection and Safety Technology

Associate Professor and Head Harold R. Mace, M.S.

The nuclear/electronic/aerospace revolution, in conjunction with increased ecological awareness, has created an economic and moral responsibility to provide a cadre of trained personnel, knowledgeable in current loss-control and risk management techniques. In response to this challenge, the curriculum is designed to familiarize the student with inherent risks in such areas as fire protection, occupational safety and health, radiation hazards, product liability and industrial security. Courses and laboratories are structured to enable the recognition, evaluation and control of existing and potential hazards threatening losses to life, property or proprietary information.

The associate degree curriculum emphasizes fire prevention and control and property protection. The bachelor's degree curriculum is devoted primarily to personnel safety, occupational health and industrial security.

General Technology

Professor and Head James E. Bose, Ph.D., P.E.

The general technology curriculum is designed to provide a bachelor's degree program that will prepare men and women for employment as engineering technologists in more than one specific area. Normally, there are two groups of students who enroll in this program: those who have an associate degree in one of the traditional technology specialties, but desire more diversification than continuing in the same specialty; and those who have an associate degree from another



institution in a technical specialty not offered at Oklahoma State University.

Each student who completes the program must show proficiency in the following areas by completing appropriate courses: technical graphics, machine tool processes, hydraulics, computer programming, electronics, controls, dynamics, supervision and instrumentation.

Manufacturing Technology

Associate Professor and Head Gerald R. McClain, M.S., CMFGT.

The flow of affordable goods and products from producer to consumer is a major cornerstone of the free enterprise system that is enjoyed in the United States. Essential to this system are the manufacturing industries which comprise that segment of our economic society directly responsible for the conversion of raw materials into usable products. Today these industries face numerous and complex challenges, which if met, offer promising careers to men and women who have interests in manufacturing. These career positions include such areas as tool design, cost evaluation and control, plant operations product design and development, and manufacturing methods. Emerging career fields include robotics, computer-integrated manufacturing and automatic assembly.

The manufacturing technology option provides educational experiences in the core areas of manufacturing processes, industrial materials, graphic communication and technical science, as well as an opportunity to develop an area of specialization. This option is available only for the bachelor's degree (an associate degree is not available). Manufacturing courses are concentrated in the last two years allowing for efficient transfer from other OSU programs or from other colleges or universities.

Mechanical Design Technology

Associate Professor and Head Gerald R. McClain, M.S., CMFGT.

Mechanical design is an activity necessary for existence of the modern world. All the con-

veniences of today's world have passed through the designers on their way to being useful products. Mechanical design is applied in robotics, automotive manufacturing, computer-aided drafting and design, computer-aided manufacturing, agricultural machines, petroleum industry, mining, ship building, space crafts, electronics manufacturing, food processing, aircraft, metals and plastics production-nearly the entire spectrum of industry. Every industry requires some type of mechanical design, either directly to produce the product or indirectly to produce the tools, equipment and materials used to manufacture the product.

The computer has had an impact on few areas of technology more than mechanical design. The phrase "computer aided design" or "CAD" means many things from computer drafting or graphics to sophisticated solids modeling and analysis. The mechanical design student is exposed to a range of applications from designing with a computer to manufacturing with a computer. It is the objective of the department that all of its graduates be proficient in using the computer as a problem solving tool both graphically and analytically.

Since engineering technology's philosophy is to provide technical courses from freshman to senior level, the associate degree is awarded upon completion of the first two years. Students wishing to stop their education at this point usually accept positions with industry in the design drafting field, which may lead to computer-aided drafting and design positions.

After completion of the first two years' requirements, the bachelor's degree can be pursued without a break in education. Transfer students with an associate degree in drafting and design may transfer into the program with ease. The junior and senior years provide additional education in design principles, manufacturing processes, computer graphics, and other related areas necessary for more complex aspects of mechanical

design. The mechanical design technologist with in-depth analysis and technical knowledge makes a computer-aided drafting and design work station a design tool rather than just a drafting tool. Bachelor of science graduates usually find employment in areas related to new product design and redesign, or manufacturing equipment design.

The curriculum has been carefully constructed to provide a realistic progression from the basic, or elementary principles, to advanced or more sophisticated techniques. The curriculum has two emphases available. The graphics emphasis requires the courses that would best prepare a graduate to work as a mechanical designer, tool designer, or product designer. The broad emphasis requires greater breadth and allows more flexibility to prepare for the broader fields of mechanical technology, such as, test, evaluation, operation, liaison or sales. Companies utilizing the talents of designers are diversified in their products, as well as geographical location, thus providing a variety of choices in respect to both type of work and place of residence. In addition to ABET accreditation, this technology program is accredited at the Engineering Designer level by the American Institute for Design and Drafting (AIDD).

Mechanical Power Technology

Professor and Head Marvin D. Smith, Ph.D., P.E.

The mechanical power program in Engineering Technology prepares the graduate for entry into a broad spectrum of the industrial world. It is concerned with the utilization of energy, development and transfer of power, and the measurement and control of fluid and mechanical devices.

This program is designed to introduce the student to the broad spectrum of mechanical devices

and skills. It also produces a highly competent technical individual who is capable of immediate employment in diverse industrial, governmental and education institutions. It offers a depth of theoretical knowledge, as well as a breadth in equipment exposure.

A graduate of this program will be thoroughly familiar with the scientific principles and the equipment associated with the generation, transmission and utilization of mechanical power.

Petroleum Technology

Professor and Head Marvin D. Smith, Ph.D., P.E.

The petroleum program in Engineering Technology is primarily concerned with the application of equations and techniques toward effectively drilling for, producing, and processing petroleum fluids. Graduates become involved in predicting recoverable reserves, designing drilling programs, casing designs, selecting completion techniques, designing artificial life systems, and designing lease processing systems and pipelines. They also become involved in well testing, well evaluation, problem well analysis and well treatment.

This program is designed to provide the graduate with both the theoretical and practical knowledge required for employment and advancement in the diverse petroleum industry and related energy industries. Emphasis is placed on the application of equations rather than the derivation of them. Another important aspect is the practical operations and associated equipment required to accomplish the events listed above.

The graduates of this curriculum are prepared in communication skills, computer usage, problem solving techniques and organization. They are capable of independent technical activities and of assuming responsibility for projects.