College of Engineering,Technology and Architecture

Kenneth A. McCollom, Ph.D., P.E., *Dean*

Robert L. Swaim, Ph.D., P.E., Associate *Dean*

Bill L. Cooper, Ed. D. *Director of Extension*

Raymond E. Chapel, M.S., P.E., *Director of Research and Budget*

Larry D. Zirkle, Ph.D., P.E., *Director of Student Services*

School Heads

Agricultural Engineering, C. *Thomas* Haan, *Ph.D., P.E.*

Chemical Engineering, *Billy L. Crynes, Ph.D.*

Civil Engineering, James *V. Parcher, Ph.D., P.E.*

Electrical Engineering, *Charles M.* Bacon, *Ph.D., P.E.*

General Engineering, *Bennett* *L.* Basore, *Sc.D., P.E.*

Industrial Engineering and Management, *Kenneth E.* Case, *Ph.D., P.E.*

Mechanical and Aerospace Engineering, *Karl N. Reid, Sc.D., P.E.*

School of Architecture, *John H. Bryant M.Arch., A.I.A., Head*

School of Technology, *J.E.* ***Bose, Ph.D., P.E., Director***

The Schools of Engineering, Technology and Architecture offer a complete spectrum of educational opportunities designed to give graduates the capability and the flexibility to meet the ever-changing requirements ofour society-a society heavily committed to technological innovation. To be prepared to make continuing contributions, engineers, technologists and architects 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, technologist or architect must also be schooled in the social sciences and humanities that provide the understanding of non-technical factors that must shape technological innovation.

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 with 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 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, technology or architecture while at Oklahoma State University.

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 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, Technology and Architecture culminate in the following dcgrees:

Schools of Engineering:

Bachelor of Science in Agricultural Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, General Engineering, Industrial Engineering and Management, Mechanical Engineering, and Mechanical Engineering (aerospace major).

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

Master of Science in agricultural engineering, bioenvironmental engineering, chemical engineering, civil engineering, electrical 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 mechanical engineering.

School of Technology:

Associate Degree
Bachelor of Science in Engineering Technology.

School of Architecture:

Bachelor of Science in Architectural Studies
Master of Architecture.
Master of Architectural Engineering.

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 the College of Engineering, Technology and Architecture 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.

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 specialities 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 sixty 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 a4.00 scale, computed taking the last grade in any repeated course or courses, and 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 minimum 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.

A common preprequisite 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 of competence will be evaluated on an individual basis by the head of the School or his designated representative.

Co-op Program. The College of Engineering, Technology and Architecture offers a Cooperative Education Program (Co-op) in the form of alternating semesters of work and study. The Co-op is voluntary, with the first work assignment following the sophomore year; transfer students must successfully complete one semester at OSU prior to their first placement. Under this plan, students attend classes every other semester, alternating with periods of paid employment in industry, private firms or government agencies. The Co-op Program combines classroom education at OSU with on-the-job experience, and one graduates with a bachelor's degree and asignificant amount of work experience. Students may obtain further information about the program from the coordinator of the Cooperative Education Program, Room 101, 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 Architecutre Honors students and at least 26 for Technology Honors students.

All other OSU students and transfer students who are classified as freshman (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 Bachelors, 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 studey. (4) Acquisition and submission of a formal application for the Honors degree within two weeks after the beginning of the final semester.

Bachelor of Science Degree. At the end of approximately four years of combined pre-engineering and professional school study, a student who has met the minimum criteria stated below may be awarded the Bachelor of Science degree in a designated field of engineering. The criteria for these degrees in amplification of University requirements are as follows:

(a) Completion of all pre-engineering requirements.

(b) Admission to and completion of the upper-division curriculum of one of the professional schools, including approximately one semester of courses common to all the professional schools, and 48 to 52 semester hours of course work specified by the professional school.

(c) A grade-point average (as computed by the office of the Registrar) of 2.00 (on a 4.00 scale) or better in all upper-division engineering courses listed on the degree requirement sheet.

Further details, including specific course requirements for each of the undergraduate degrees offered at OSU, can be found in the publication *Undergraduate Programs and Requirements,* published annually at OSU and available in the offices of counselors in high schools and junior colleges throughout Oklahoma. Details associated with advanced degrees can be found in the *Graduate Catalog* issued by the University.

High School Preparation. Enrollment in chemistry and mathematics for an entering student in the College of Engineering, Technology and Architecture is determined by his score on placement tests and/or on the amount of mathematics or chemistry completed in his high school program. Where credit has been obtained by advanced standing examination or by CLEP tests, the student may be permitted to enroll in more advanced course work.

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 continues to offer course work in algebra, trigonometry and preparatory chemistry 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 listed for the B.S. degrees.

Assistance to high schools in the form of career guidance materials and qualified speakers on subjects related to academic programs and careers in the College of Engineering, Technology and Architecture can be obtained through the Director of Student Services for the College.

Transfers. Much, if not all, of the pre-engineering program made up of approximately two years of academic work in the lower division can be satisfactorily completed at junior colleges and other institutions of higher learning. The College of Engineering, Technology and Architecture sends faculty visitors to many of these institutions every year to provide students and pre-engineering advisers with information to help achieve the most satisfactory progress of the student. With this guidance, students can take courses directly applicable to the several engineering programs at OSU.

For those courses in pre-engineering not readily available at an institution prior to transfer to OSU, summer courses in each area of mathematics, sciences and the engineering sciences are always conducted. This helps a student to complete his or her pre-engineering program and enter the professional school curriculum on schedule the following fall semester.

Advisement. The College's Director of Student Services advises all pre-engineering students and first-year students in Architecture. (Consult the heading ***School*** *of Technology* for specific information regarding advisement, etc., for students in Technology programs.) The Officeof Student Services also administers placement examinations in mathematics and chemistry for entering freshmen, and can provide information regarding aptitude and advanced-standing examinations administered by the University Bureau of Tests and Measurements.

In support of the guidance function of his office, the Director of Student Services also arranges for industrial representatives to interview students for employment opportunities. Appointments are made through his office.

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 make satisfactory progress in the term during which he or she is in probationary status. When a student does not meet the terms of probation, he may be suspended from the College of Engineering, Technology and Architecture. 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 Director of Student Services.

Concurrent Enrollment. If a student expects to use credits toward a degree at OSU to be earned at another institution or through correspondence or extension, while enrolled in one of the programs of the College of Engineering, Technology and Architecture, 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. By the time of enrollment in the first engineering science course, an engineering or architecture student is expected to be equipped with an appropriate calculator. 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.

Agricultural Engineering

PROFESSOR AND HEAD
C. T. Haan, Ph.D., P.E.

PROFESSORS
D. G. Batchelder, M.S., P.E.
P. D. Bloome, Ph.D., P.E.
Wendell Bowers, M.S., P.E.
G. H. Brusewitz, Ph.D., P.E.
B. L. Clary, Ph.D., P.E.
F. R. Crow, M.S., P.E.
J. E. Garton, Ph.D., P.E.
Jay G. Porterfield, M.S., P.E.
L. O. Roth, Ph.D., P.E.
D. P. Schwab, M.S., P.E.

ASSOCIATE PROFESSORS
A. D. Barefoot, M.S., P.E.
G. E. Cook, M.S.
W. R. Gwinn, Ph.D., P.E.
A. P. Lewis, M.S.
G. W. A. Mahoney, Ph.D., P.E.
C. E. Rice, Ph.D., P.E.
W. E. Taylor, M.S., P.E.
Richard W. Whitney, Ph.D., P.E.

ASSISTANT PROFESSORS
H. W. Downs, M.S.
Joseph F. Gerling, M.S.
R.L. Huhnke; Ph.D., P.E.
L. K. Jones, M.S.
D. E. Temple, M.S.

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 handling 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. The agricultural engineering program is accredited at the basic level by the Engineering Accreditation Committee of the Accrediting Board for Engineering and Technology (ABET).

In the professional engineering program students elect additional engineering and science courses to supplement a program of authentic involve-

ment 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 lab oratory , farm machinery design, light structures, process engineering and waste management.

School of Architecture

PROFESSOR AND HEAD
John H. Bryant, M.Arch., A.I.A.

PROFESSORS
Louis O. Bass, M.Arch.Engr., P.E.
Geo. W. Baumiller, M.S.Arch.
Lester L. Boyer, Ph.D., P.E.
W. **George** Chamberlain, M. Arch., A.I.A.
James F. Knight, M.Arch., A.I.A.
Arlyn A. Orr, M.Arch.Engr., P.E.

ASSOCIATE PROFESSORS
Alan Brunken, M.Arch., A.I.A.
A. **E. Erdely,** Dip.Arch.
Bob E. Neatly, M.Arch.
Robert Wright, M. Arch.

ASSISTANT PROFESSORS
Walter E. Grondzik, B.Arch.Engr.
David Hanser, M. Arch.
John O. **Houston,** M.Arch.
A. David Jones, M.Arch.
Jack McSorley, B.Arch., A.I.A.

INSTRUCTOR
J. N. Worrell, B.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 elements 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 first four years of study lead to a preprofessional degree of Bachelor of Science in Architectural Studies. This degree allows students to move into one of the two accredited professional (graduate) programs in architecture or in architectural engineering. The architectural base of the B.S. program can also be used for allied studies in art, social or behavioral sciences, planning, interior design, law, business, etc.

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 preprofessional program. The minimum requirements for admission to the upper division (third year) of the preprofessional 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.

Preprofessional Degree. Unlike the Schools of Engineering, and many other bachelor's programs, the B.S. in Architectural Studies is a preprofessional degree and does not lead directly to licensing as an architect or architectural engineer. The professional architectural and architectural engineering curricula are each six years in length, modeled closely on the instruction patterns of pre-law/law and pre-medicine/medicine, and lead to professionally accredited degrees, Master of Architecture and Master of Architectural Engineering. Upon completing the B.S. degree, all qualified students are expected to continue their studies in one of the two professional curricula. These programs each require two years and 64 credit hours of studies. (See *Graduate Catalog* for details.) The Master of Architecture program is accredited by the National Architectural Accrediting Board (NAAB), and the Master of Architectural Engineering program by the Engineering Accreditation commission of the Accrediting Board for Engineering and technology at the advanced level.

Transfers. Due to the six-year 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 between 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.

Chemical Engineering

PROFESSOR AND HEAD
Billy L. Crynes, Ph.D.

PROFESSORS
Kenneth J. Bell, Ph.D., P.E.
John H. Erbar, Ph.D., P.E.
Robert N. Maddox, Ph.D., P.E.
Robert L. Robinson, Jr., Ph.D., P.E.

ASSISTANT PROFESSORS
Gary L. Foutch, Ph.D.
Archibald **G.** Hill, Ph.D.
M. **Seapan,** Ph.D.
Jan Wagner, Ph.D., P.E.

Chemical engineering is a profession which gives practitioners the background and opportunity to contribute to society in the broadest possible context. From research to sales, and from alternative energy sources to waste disposal, chemical engineers have the background to apply their creative talents.

Chemical engineers use and control chemical and physical changes to produce materials and energy for the benefit of people. Societal problems such as the development and production of new materials, new energy resources and the control of pollution will be solved through the application of chemical engineering principles and practice. Many commonplace materials, such as antibiotics, synthetic fibers, plastics and synthetic rubber were unknown a few years ago. Today these are manufactured in plants designed, built and operated by chemical engineers. Chemical engineers are making contributions in many developing areas of medicine including artificial hearts, kidneys and bone implants. Exciting opportunities are available in the rapidly expanding energy sector. Chemical engineering expertise is used in coal, oil shale and tar sands processing and modification, utilizing the energy of the sun, harnessing ocean thermal gradients, and developing many other nonconventional energy sources.

Within such a wide range of opportunities, chemical engineers are called upon for research and development leading to new products and new processes, the design of equipment and plants to make these products, efficient operation of the plants and technical assistance to the consumers of the products.

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. Fundamental professional courses follow to provide the student an opportunity to apply the basic science 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.

Upon completing the B.S. studies the qualified student is encouraged to continue in one of two master's programs. The M.S. degree in chemical engineering is the traditional program integrating additional course work with a thesis or special project as the significant creative component of study. The Master of Chemical Engineering (M.Ch.E.) incorporates a summer internship and an additional graduate-professional year. During the graduate professional year actual experience in solving an engineering problem combined with more in-depth studies prepare the student for the practice of engineering.

A selection of engineering, science and mathematics electives allow the professional engineering program to be tailored to the special requirements and interests of each individual student.

This program is accredited at the M. Ch. E. level by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Civil Engineering

PROFESSOR AND HEAD
James V. Parcher, Ph.D., P.E.

PROFESSORS
M. A. Abdel-Hady, Ph.D., P.E.
W. P. Dawkins, Ph.D., P.E.
R. N. DeVries, Ph.D., P.E.
T. A. Haliburton, Ph.D., P.E.
A. E. Kelly, Ph.D., P.E.
D. F. Kincannon, Ph.D., P.E.
P. G. Manke, Ph.D., P.E.
G. D. Oberlender, Ph.D., P.E.

ASSOCIATE PROFESSORS
Marcia Bates, Ph.D., P.E.
J. W. Harvey, Ph.D., P.E.
J. P. Lloyd, Ph.D., P.E.
J. F. B. Shaw, Ph.D., P.E.
D. R. Snethen, Ph.D., P.E.
E. L. Stover, Ph.D., P.E.
A. K. Tyagi, Ph,D,. P.E.

ASSISTANT PROFESSORS
S.A. Ahmed, Ph.D.
T. D. Jordan, Ph.D.
V. A. Mast, Ph.D.
J. N. Veenstra, Ph.D.

INSTRUCTOR
R. A. Padorr, B.S.C.E., M.B.A., P.E.

Civil engineering was the first engineering curriculum established to serve civilian needs. 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, altera-

tion 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. This program is accredited at the basic and advanced levels by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

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, soils 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 Mechanical and Aerospace Engineering, Industrial Engineering and Management, Agronomy, Geology, Chemistry and Microbiology.

Electrical Engineering

PROFESSOR AND HEAD
Charles M. **Bacon,** Ph.D., P.E.

PROFESSORS
H. **Jack** Allison, Ph.D., P.E.
Bennett L. **Basore,** Sc.D., P.E.
Hans R. Bilger, Ph.D.
William L. Hughes, Ph.D., P.E.
D. D. **Lingelbach,** Ph.D., P.E.
Kenneth A. McCollom, Ph.D., P.E.
Robert J. Mulholland, Sc.D.
R. G. **Ramakumar,** Ph.D., P.E.
Ronald P. Rhoten, Ph.D., P.E.
J. R. Rowland, Ph.D., P.E.
K.Rao Yarlagadda, Ph.D., P.E.

ASSOCIATE PROFESSOR
Richard L. **Cummins, Ph.D., P.E.**

ASSISTANT PROFESSORS
Louis G. Johnson, Sc.D.
David L. **Soldan,** Ph.D.

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 engineering may be an excellent and exciting choice.

By selecting electrical engineering as a profession, the student enters vital engineering field. No other engineering profession permeates our everyday lives in such a revolutionary way as does electrical engineering. All around us 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. A young man or woman who seeks a challenging and rewarding role in this continuing electronic revolution should consider electrical engineering as a career.

The undergraduate electrical 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 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 Engineering at OSU. 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.

The School of Electrical Engineering offers excellent laboratory facilities for both instruction and 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 Engineering at Oklahoma State University offers a full range of undergraduate and graduate program options. The undergraduate program leading to the Bachelor of Science degree and the graduate program leading to the Master of Electrical Engineering degree are accredited, repectively, at the basic and advanced levels by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. Graduate programs leading to the Master of Science degree and the Ph.D. degree are also offered. A degree in electrical 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 electrical engineering. For more information on either the electrical engineering or computer engineering programs at Oklahoma State University, contact the School of Electrical Engineering at (405) 624-5151.

General Engineering

HEAD
Bennett L. Basore, Sc.D., P.E.

General engineering is an integrated combination of communicative and

mathematical skills, the cultural, social and physical sciences, with the logical and analytical ability gained from engineering education, for the purpose of bringing to focus broad engineering fundamentals upon the problems and consequences of our expanding technology in order to realize greater living satisfaction for mankind.

General engineering embodies the fundamentals of four major engineering disciplines (civil, electrical, industrial and mechanical), in a broad curriculum a assuring proficiency in basic science and engineering fundamentals .egardless of the area in which these concepts are to be applied.

As a professional with an interdisciplinary background, the general engineer is prepared to solve problems and to bring his or her broad knowledge to bear upon the systems of nature. The student can 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 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.

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, the student is encouraged to plan on a program leading to a master's degree, and with it a competitive level of competence in more than one engineering discipline.

The resources of the College, both faculty and laboratory facilities, are available to the general engineer. This course of study is most applicable to the student having a broad interest in the problems facing mankind and wishing to prepare for the future solution of those problems.

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, the student is encouraged to plan on a program leading to a master's degree, and with it a competitive level of competence in more than one engineering discipline. The Master of Engineering degree is accredited as the first professional degree in General Engineering by the Engineering Accreditation Board for Engineering and technology.

Industrial Engineering and Management

PROFESSOR AND HEAD
Kenneth E. Case, Ph.D., P.E.

PROFESSORS
Hamed K. Eldin, Ph.D., P.E.
Carl **B.** Estes, Ph.D., P.E.
Earl J. Ferguson, Ph.D., P.E.
Joe H. Mize, Ph.D., P.E.
James E. Shamblin, Ph.D., P.E.
M. Palmer Terrell, Ph.D., P.E.
Wayne C. Turner, Ph.D., P.E.

ASSOCIATE **PROFESSOR**
Philip M. Wolfe, Ph.D., P.E.

ASSISTANT PROFESSORS
John W. Nazemetz, Ph.D.
D. **Scott** Sink, Ph.D.

INSTRUCTOR
John **B.** Keats, Ph.D., P.E.

Industrial engineering is the newest of the five major engineering disciplines and is gaining most rapidly in popularity. It 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."

Enterprises of all types are finding that the industrial engineer provides an essential service to the organization. The projected demand for industrial engineers far exceeds the expected supply for the foreseeable future.

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 considerations 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.

The industrial engineering program at OSU is ranked among the top ten in the nation and the best in this part of the country. Prospective students are encouraged to write directly to the School of Industrial Engineering and Management for career guidance information. Both the undergraduate (B.S.) and graduate (M.I.E.) programs are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

Mechanical and Aerospace Engineering

PROFESSOR AND HEAD
Karl N. Reid, Sc.D., P.E.

PROFESSORS
James H. Boggs, Ph.D.
Raymond E. Chapel, M.S., P.E.
E. C. Fitch, Jr., Ph.D., P.E.
Richard L. Lowery, Ph.D.,P.E.
Dennis K. McLaughlin, Ph.D., P.E.
Faye C. McQuiston, Ph.D., P.E.
Peter M. Moretti, Ph.D., P.E.
Jerald D. Parker, Ph.D., P.E.
C. Eric Price, Ph.D., P.E.
Atmaram H. Soni, Ph.D., P.E.
Robert L. Swaim, Ph.D., P.E.
John A. Wiebelt, Ph.D., P.E.

ASSOCIATE PROFESSORS
Lynn R. Ebbesen, Ph.D., P.E.
David G. Lilley, Ph.D., C. Eng.
Troy D. Reed, Ph.D., P.E.
James H. Taylor, Ph.D., P.E.
Larry D. Zirkle, Ph.D., P.E.

INSTRUCTORS
Gary **B.** Ferrell, M.S.
James K. **Good,** M. M. 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 be 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, typewriters 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 pre-medical option is available for students wishing to follow this avenue of approach to medical school.

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, Western Electric, Texas Instruments, Magnetic Peripherals, and 3M.

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 with a bachelor's degree, while others receive one of several graduate degrees. The academic programs are accredited at the basic level (mechanical and aerospace) and at the advanced level (mechanical), by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

School of Technology

James E. Bose, Ph.D., P.E., ***Director***
Craig B. Robison, M.S., ***Coordinator of Academic*** **Services**

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 greater 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, expediter 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 each 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. This student particularly appreciates 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 School of 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	Bachelor of Science Degree
Two-Year Technical Programs	*Engineering Technology Programs*
Construction	**Construction Management**
Electronics	**Electrical Power**
Fire Protection and Safety	**Electronics**
Mechanical Design	**Fire Protection and Safety**
Mechanical Power	**General**
Petroleum	**Manufacturing**
	Mechanical Design
	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 128 credit hours.

The accreditation status of each of these programs is given in the sections devoted to them below. The responsible agency is the Technology Accreditation Commission of the Accrediting Board for Engineering and Technology.

Construction Management

PROFESSOR AND CHAIRMAN
Garold D. Oberlender, Ph.D., P.E.

ASSOCIATE **PROFESSOR**
Jerrold F. Bradley, M.S., P.E.

ASSISTANT **PROFESSORS**
Jeremiah P. Allen, M.S., P.E.
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, 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.

Students with an interest in architectural structures may select courses in the "building option" of construction management which provide 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 provide 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.

This program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.

Electrical Power

PROFESSOR AND CHAIRMAN
Perry R. McNeill, Ed.D., P.E.

ASSISTANT PROFESSORS
Samuel I. Kraemer, B.S.
James K. Shelton, B.S., P.E.

The electrical power upper-division curriculum prepares graduates for technical careers throughout the electrical power industry. This industry includes utilities, electrical equipment manufacturing companies and industries using electrical power for operations.

The work of the electrical power technologist will range from working with product development groups through supervision of manufacturing to field installation and service of complex equipment. The program prepares graduates for advancement to positions of increasing responsibility throughout their careers.

The electrical power program is based on mathematics and science with emphasis on using accepted engineering practices in problem analysis and solution. The upper-division study of electrical power is designed to build on the background students bring to the program. Graduates will be competent in more than a single discipline, ensuring a versatility highly desirable in industry.

Holders of associate degrees in electrical, electronics, mechanical and electromechanical technologies as well as other technical disciplines will find that this program builds directly on their backgrounds. Holders of associate degrees in nontechnical fields will be considered for admission on an individual basis.

Electronics

PROFESSOR AND CHAIRMAN
Perry R. McNeill, Ed.D, P.E.

ASSOCIATE PROFESSORS
Joseph R. Cleveland, Ph.D.
Rodney B. Faber, M.S.
Russell L. Heiserman, Ed.D., S.E.T.
Larry D. Jones, Ed. D.
Neal A. Willison, Ed.D., C.E.T.

ASSISTANT PROFESSORS
Peter C. Burton; M.S.
Samuel I. Kraemer, B.S.
James K. Shelton, B.S., P.E.
Fred V. Martin, Ed.D.

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 and government which depend upon electronics for control, communications or computation.

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

To meet these diverse needs the program is 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. This program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.

Fire Protection and Safety

ASSOCIATE PROFESSOR AND ACTING CHAIRMAN
James E. **Bose,** Ph.D., P.E.

ASSOCIATE PROFESSOR
Howard M. Johnson, Ph.D.

ASSISTANT PROFESSORS
Larry Borgelt, M.S., C.S.P., C.E.T.
Pat D. Brock, B.S., P.E.
Laurence G. Lee, M.E., C.I.H.

The nuclear/electronic/aerospace revolution, in conjunction with increased ecological awareness, has created an economic and moral responsibility within our nation 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.

The bachelor's degree program is accredited buy the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.

General

PROFESSOR AND CHAIRMAN
James E. Bose, Ph.D., P.E.

ADVISER
Craig B. Robison, M.S.

The general technology curriculum is designed to provide a bachelor's degree program that will prepare young men and women for employment as engineering technologists in more than one specific area. Normally, there are two classes of students who enroll in this program: (1) those who have an associate degree in one of the traditional technology specialties, but desire more diversification than continuing on in the same specialty; (2) 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

PROFESSOR AND CHAIRMAN
Raymond F. Neathery, Ph.D., P.E.

ASSOCIATE **PROFESSOR**
Gary G. Hansen, Ph.D.

ASSISTANT PROFESSORS
Dan D. Ashcraft, B.S.
John C. Scheihing, B.S.

The flow of affordable goods and products from producer to consumer is a major cornerstone of the free enterprise system that we enjoy 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 industrise 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 evalution and control plant operations product design and development and manufacturing methods.

The manufacturing technology option provides educational experiences

in the core areas of manufacturing processes, industrial materials, graphic communcation and technical science, as well as an opportunity to develop an area of specialization. This option is only available for the bachelor's degree. Manufacturing courses are cncentrated in the last two years allowing for efficient transfer from other OSU programs or from other colleges or universities.

Mechanical Design

PROFESSOR AND CHAIRMAN
Raymond F. Neathery, Ph.D., P.E.

ASSOCIATE PROFESSORS
D. Jack Bayles, Ph.D., P.E.
Ralph D. Brumfield, M.S., S.E.T.
Gary G. Hansen, Ph.D.
Gerald R. McClain, M.S., C.E.T.

ASSISTANT PROFESSORS
Dan D. Ashcraft, B.S.
John E. Harvey, M.S., S.E.T.
John C. Scheihing, B.S.

Mechanical design is an activity necessary for existence of the modern world. All the conveniences of today's world have passed through the designer on their way to being useful products. Mechanical design is applied in agriculture, chemistry, transportation, energy production, mining, oceanography, space exploration, food processing, electronics, steel, petroleum-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 in the product's creation.

The associate degree is available upon satisfactory completion of the freshman and sophomore requirements. Students wishing to terminate their education at this point usually accept positions with industry in the design drafting category.

After completion of the first two years' requirements, the bachelor's degree can be pursued without a break in training. The junior and senior years provide additional training in design principles, processes and other related areas necessary for more complex aspects of mechanical design. Bachelor of science graduates usually find employment in areas related to product design and production.

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 includes a 12 credit hour design option in which the student may emphasize design graphics, design analysis or manufacturing processes. Companies utilizing the talents of designers and design draftsmen 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. This technology program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology and by the American Institute for Design and Drafting.

Mechanical Power

PROFESSOR AND CHAIRMAN
Marvin D. Smith, Ph.D., P.E.

PROFESSOR
Richard **G.** Murray, Ph.D., P.E.

ASSOCIATE **PROFESSORS**
Eugene K. Buchholz, Ph.D., P.E.
Franklin E. Eckhart, M.S., P.E.
Samuel O. Powers, M.S., S.E.T.

The mechanical power technology educational program prepares the graduate for entry into one of the most promising areas of the industrial world. Mechanical power itselfis the most important building block of civilization. So long as energy is utilized you will find that demanding and challenging positions in the area of mechanical technology are abundant.

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. The graduate will be equally well qualified to work for a steam power generating facility, a research laboratory, an automotive manufacturer, or the petroleum industry. .

This program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.

Petroleum

PROFESSOR AND CHAIRMAN
Marvin D. Smith, Ph.D., P.E.

PROFESSOR
Don Adams, Ph.D.

ASSISTANT PROFESSOR
James **G.** Mayberry, M.S.

High energy costs, fuel shortages and environmental concerns have brought the petroleum industry into focus in recent years. These factors, along with others, have caused an increase in activities in this vast industry. Retriev-

ing petroleum from adverse environments, such as offshore and Arctic regions, and retrieving more of the reserves from established fields are examples of the technical challenges facing the industry. Thus, the student will find long and challenging careers in the area of petroleum technology.

This program is designed to provide the graduate with both the theoretical and the practical knowledge required for employment and advancement in the diverse petroleum industry and related energy industries. It is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology.

The graduate of this curriculum is prepared for employment as a petroleum technologist in the areas of drilling and well completion, and in production, recovery, transportation, and processing of petroleum and related products. The graduate is capable of independent technical activities and of assuming responsibility as a coordinator or supervisor of other technical personnel.