

# DEPARTMENT OF ENGINEERING AND INDUSTRIAL PROFESSIONS

The Department of Engineering and Industrial Professions (E&IP) offers a Bachelor of Science in **Engineering Technology** (BSET) degree that provides a fundamental background in general science as well as a comprehensive background in both traditional and evolving engineering and industrial technologies. The department also offers an Occupational Health Science degree where students can get a bachelor of science or bachelor of arts. Areas of focused study for Engineering Technology include electrical and mechanical engineering technology, chemical engineering technology, bio-engineering technology, and power generation engineering technology. The program is designed to prepare graduates for positions in emerging technologies, industrial operations, and general management that require a strong knowledge in engineering principles. Emerging technological areas include sustainable energy solutions, advanced fabrication and manufacturing processes, robotics, industrial chemical processes, and next-generation solutions in the medical, agricultural, and environmental fields. Graduates benefit from the combination of an engineering-based theoretical education with a practical "hands-on" development of industry-ready skills and knowledge.

The technical knowledge-base is supplemented with a foundation in project management, finance, safety and ethics to prepare graduates for advancement into management positions or further graduate education. All options benefit from shared core classes in economics and statistics as well as an option-appropriate capstone project course.

The BSET program offers four options:

- **Bio-Engineering Technology:** Students develop knowledge and competencies in biochemical- and life science-based systems geared toward the design, development, and manufacture of biologically-inspired products and processes. Fundamental topics in this option include molecular biology, genetics, bioprocess engineering, bioinformatics, and bioreactors. This option will appeal to those who desire a career in high-tech manufacturing of pharmaceuticals, advanced agricultural and food products, alternative energy sources, and environmental remediation solutions.
- **Chemical Engineering Technology:** Students learn to conceive and design processes to produce, transform, and transport materials, chemicals, microorganisms, and energy into useful forms and products. Fundamental topics in this option include materials science, mass and energy balances, fluid mechanics, heat transfer, chemical reactors and separators, and process modeling and simulations. Employment opportunities include traditional manufacturing environments as well as petroleum, agricultural, environmental, and pharmaceutical industries.
- **Electro-Mechanical Engineering Technology:** Students develop knowledge and competencies in the design, operation, and control of modern advanced manufacturing systems and processes with a focus on robotics, automation, instrumentation, and product design. Fundamental topics include computer-aided design and drafting, solid modeling, manufacturing processes, materials science, statics, strength of materials, power transfer technology, electrical circuits/devices, digital electronics, robotics, PLC programming, and automated manufacturing. This option is well suited for students

with career interests in automotive, aerospace, electronics, and consumer product manufacturing industries.

- **Power Generation Engineering Technology:** Students will be prepared to succeed in careers in the rapidly evolving energy sector, including solar, wind, hydro, nuclear, and traditional power industries. Fundamental topics include power plant equipment and instrumentation, transmission/distribution/grid systems, safety, thermodynamics, fluid mechanics, heat exchange, reliability, and maintenance. Graduates who complete this option may have an interest in a career with a large power company, regional electric co-op, municipal utilities department, alternative energy provider, or manufacturing facility that produces its own power

Graduates of our BSET program have begun careers as Improvement Engineers, Design Engineers, Electrical Engineers, Manufacturing Engineers, Process Engineers, Product Engineers, Project Engineers, Project Managers, Quality Engineers, Reliability Engineers, Software Engineers, Research and Development Engineers, Engineering Technicians, and CNC Programmers.

The B.S. degree in Engineering Technology is accredited by the Engineering Technology Accreditation Commission of ABET, <http://www.abet.org> (<http://www.abet.org/>).

The major in **Occupational Health Science** was first accredited by the Applied Science Accreditation Commission (ASAC) (now known as ANSAC-Applied and Natural Science Commission) of ABET, Inc. in 2001 and is designed to prepare students for direct entry into positions in industry, government, and other organizations as industrial hygienists and for entry into graduate programs in environmental health and safety. Major field preparation is directed to the recognition, evaluation, and control of health hazards in the workplace from biological, chemical, and physical sources and combines primary study in chemistry and in industrial hygiene with supporting coursework from biology, mathematics, and physics. Students with majors in occupational health science as a teaching field for education certification are required to take an exit examination for graduation.

## The Cooperative Education and Internship Program in Occupational Health Science

In conjunction with several industries and governmental laboratories, the University provides opportunities for a cooperative education (co-op) and internship program in chemistry and occupational health science. The program involves the option of alternating co-ops or pre-professional internships. Under the alternating co-op option, students work full-time one semester and attend classes full-time the following semester for a rotation of three semesters, equaling 52 weeks of work experience. Under the pre-professional internship option, students work a minimum of 150 contact hours during one regular semester or regular summer term. Eligible students must be in good standing (unrestricted admission status and without academic and non-academic holds) and have attained a minimum 2.5 cumulative GPA with the following classifications: sophomores or juniors for co-ops and seniors for internships. Students should consult the department chair for detailed information and applications.

For those students interested in entering the booming regional manufacturing sector without committing to a 4-year degree, the E&IP Department also offers an Associate of Science degree in **Mechatronics**, including certification options in **Controls Systems**, **Mechanical Systems**, and **Systems Operations**. These Mechatronics programs are designed to prepare students to combine knowledge with modern tools to solve

real-world interdisciplinary technical problems related to advanced automation systems. With an emphasis on acquiring industry standard skills and techniques, graduates will be well prepared to enter the workforce or continue their education in a related baccalaureate program.

## Majors

- Associate of Science in Mechatronics (<https://catalog.una.edu/undergraduate/colleges-programs/arts-sciences/school-science-engineering-mathematics/engineering-industrial-professions/as-mechatronics/>)
- BA/BS Major in Occupational Health Science (<https://catalog.una.edu/undergraduate/colleges-programs/arts-sciences/school-science-engineering-mathematics/engineering-industrial-professions/ba-bs-ohs/>)
- BS in Engineering Technology (<https://catalog.una.edu/undergraduate/colleges-programs/arts-sciences/school-science-engineering-mathematics/engineering-industrial-professions/bs-engineering-technology/>)

## Certificates

- Certificate in Controls Systems (<https://catalog.una.edu/undergraduate/colleges-programs/arts-sciences/school-science-engineering-mathematics/engineering-industrial-professions/cert-controls-systems/>)
- Certificate in Mechanical Systems (<https://catalog.una.edu/undergraduate/colleges-programs/arts-sciences/school-science-engineering-mathematics/engineering-industrial-professions/cert-mechanical-systems/>)
- Certificate in Systems Operations (<https://catalog.una.edu/undergraduate/colleges-programs/arts-sciences/school-science-engineering-mathematics/engineering-industrial-professions/cert-systems-operations/>)