

Contact: Rachel Boon

REQUEST FOR NEW PROGRAM AT THE UNIVERSITY OF NORTHERN IOWA: BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING TECHNOLOGY

Action Requested: Consider approval of the request by the University of Northern Iowa for a Bachelor of Science in Mechanical Engineering Technology in the College of Humanities, Arts and Sciences.

The Council of Provosts and Board office support approval of this program.

Description of proposed program. Mechanical Engineering Technology is the broad discipline encompassing a variety of areas of employment from manufacturing, to design, to mechanical systems in various industries. More specifically, mechanical engineering technology is the application of engineering principles and technological developments for the creation of useful products and production machinery. A bachelor of science (BS) program eligible for accreditation in mechanical engineering technology prepares graduates with knowledge, problem-solving ability and hands-on skills to enter careers in the design, installation, manufacturing, testing, technical sales, maintenance, and other endeavors typically associated with mechanical components and systems. The program will partner with existing programs to meet the needs of industry in the state of Iowa, especially in the Cedar Valley, and share resources to support sustainability.

Academic objectives. Mechanical engineering technology programs emphasize how things actually work, how they are made, and the realization that most mechanical components and assemblies become parts of complex systems, an important consideration realized at the beginning of the design process. (from ABET 2023 – 2024) Mechanical engineers are design and theory-oriented; mechanical engineering technology focuses on putting ideas into action.

There will be multiple opportunities for internships in the Cedar Valley and across the state of Iowa. Currently, UNI has relationships with a variety of industry partners and others are in development. Some existing courses that will be in the curriculum for this program currently do have the opportunity for community engagement/service learning and there are opportunities for undergraduate research on campus or at the Foundry 4.0 Center in Waterloo.

Need for program. UNI has advisory boards for other technology programs, and in working with them learned of the need for educated workforce in the areas of mechanical technology, automation and robotics.

Relationship to existing programs at the institution. The Manufacturing Engineering Technology program at UNI has been around for years, and this new program will build on it by sharing space, labs, equipment and faculty. The new programs of the Materials Science & Engineering and the Material Science Engineering Technology programs also build on the Manufacturing Engineering Technology specialty. With upgrades to the Applied Engineering Building and the Metal Casting Center it will be state of the art and currently reaches across the world with research involving the Foundry 4.0 Center and Industry 4.0 research and partnerships.

Relationship to existing programs at other colleges and universities. Both ISU and SUI have Mechanical Engineering programs, though neither have a mechanical engineering technology program. UNI contacted the department heads for mechanical engineering at both ISU and SUI and received support from them. A letter of support from the provosts is included below.

There are no other Mechanical Engineering Technology ABET accredited BS degree programs in the state of Iowa.

Resources to establish a high-quality program. When the Applied Engineering Building opens in Fall 2024 adequate lab spaces, classroom and collaboration spaces will be available in order to accommodate this new program in Mechanical Engineering Technology. Staffing replacements due to retirements will need to take place. It is planned that the staffing replacements will serve multiple programs: Material Science & Engineering, Material Science Engineering Technology, Manufacturing Engineering Technology, Mechanical Engineering Technology and possibly Automation Engineering Technology depending on the available candidates.

Student demand. The Bureau of Labor Statistics projects 10% employment growth for the field between 2022 and 2032, adding an estimated 28,500 new jobs in the field. UNI technology programs maintain strong 2+2 articulations with Kirkwood Community College and anticipate this program will increase transfer students from Kirkwood's CAD & Mechanical Technology program. Based on the wide range of career options, there are transfer opportunities with all Iowa community colleges, as well as some Illinois community colleges, to recruit additional students UNI would not have attracted without the Mechanical Engineering Technology program.

Workforce need/demand. Robotics, automation, and mechatronics are considered the most important knowledge and skills that engineers in the manufacturing sector should have in the next 10 years. Mechanical Engineering/Engineering Technology is a widely recognized field of study and is a wide/broad area of employment opportunities in areas like design, HVAC systems, automotive, energy, manufacturing, and construction.

Funding and Cost. Funds for the program are a shared resource with equipment, labs and faculty within the department. The new Applied Engineering Building provides needed laboratory spaces. Most courses are shared with other programs within the departments of physics, chemistry, mathematics and computer science. Retirements within the department will need to be filled with appropriate staffing to fill the vacancies. Faculty have determined that mechanical engineers to complement the current staff expertise will need to be hired to continue the following programs: automation engineering technology, manufacturing engineering technology, material science & engineering, material science engineering technology, technology management and this new program mechanical engineering technology.

Projected student enrollment.

| Undergraduate | Y1 | Y 2 | Y3 | Y4 | Y5 |
|---------------|----|-----|----|-----|-----|
| Majors | 20 | 50 | 75 | 110 | 125 |
| Non-majors | | | | | |

Accreditation. Yes, UNI will apply for ABET Accreditation under the Engineering Technology Commission in Spring 2027. This is the next institutional review time frame.

Date of implementation. August 2024.

Letter of Support



January 17, 2024

To the Board of Regents:

The Council of Provosts discussed the University of Northern Iowa proposal for a Bachelor of Science in Mechanical Engineering Technology and reviewed associated documentation. There is sufficient evidence for the benefits of this program the University of Northern Iowa, as well as workforce benefit in the state of Iowa and throughout the Midwest. It will rely on existing faculty expertise in Applied Engineering & Technical Management and Physics. The plan indicates due diligence, significant engagement with employers and stakeholders at other Iowa universities. Based on the evidence and documentation, this program is likely to benefit the University of Northern Iowa and the state of Iowa.

The Council of Provosts is supportive of the program and wishes UNI the best in its implementation.

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