

Contact: Rachel Boon

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

Action Requested: Consider approval of the request by the University of Northern Iowa for a Bachelor of Science in Automation 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. Automation Engineering Technology (AET) is an applied program that will provide industry-relevant training and hands-on experience for students to apply automation engineering technology knowledge to industry and manufacturing for process control and system review. Students will be trained on sensors, instrumentations, electrical power, computer programming for controllers, process control, pneumatics and hydraulics, and mechanical systems to solve engineering and technology problems. Students will have a chance to work with industry level state-of-the-art equipment to apply their theoretical knowledge as well as programming industry level controllers to implement Industry 4.0 standards.

Academic objectives. Students will:

- understand automation processes in industrial and manufacturing environments
- adapt digital and analog control methods effectively for better manufacturing process
- plan, design and troubleshoot industrial control circuits.
- program industrial level robots and their controllers
- install, calibrate, troubleshoot sensors and controllers
- discuss prints and diagrams used in manufacturing and electrical industries
- interpret and analyze data collected from sensors and controllers
- gain hands-on experience in data acquisition, control and programming
- show effective leadership and communication skills

Need for program. Automation is one of the fastest growing areas of technology especially with the Industry 4.0 revolution. The need for technologists who have knowledge of both mechanical and electrical systems has become more critical for the manufacturing industries. Factory and warehouse automation, automotive industry, foundry industry and energy industry can be listed as examples of industries using and requiring automation. There is an increasing demand for technologists who understand the manufacturing process requirements and apply process control methods for automated systems. This new trend requires personnel with abilities of integrating robotics for automation, human-machine interaction for process control, computers for programming, and analyzing data for effective manufacturing. The Department of Technology has recently collected input from various stakeholders during the department strategic planning exercise. Industry representatives have expressed interest and provided direction for the Department of Technology to explore a BS degree in Automation Engineering Technology (AET) as well as incorporating more information and approaches to include in the curriculum regarding Industry 4.0. Industry currently has a large need for more automation expertise and understanding of Industry 4.0 strategies and techniques.

The department has also been exploring a partnership with CESMII (Clean Energy Smart Manufacturing Innovation Institute) for the training and implementation of Industry 4.0 for local industry. This will allow the AET program to interact with the industry.

The department currently has two programs that contain the needed courses for the AET program: manufacturing engineering technology and electrical engineering technology. Utilizing a mix of courses from each of these programs -- no additional courses are needed for development of the AET program.

Relationship to existing programs at the institution. The proposed AET does not duplicate any existing program but instead combines the fundamentals of two existing programs; electrical engineering technology and manufacturing engineering technology. Automation Engineering Technology requires knowledge on both electrical and mechanical systems. Students will have classes from the two existing programs to gain this knowledge. This will also provide an opportunity for the students in both current programs to obtain double degrees, e.g. EET and AET or MET and AET.

Relationship to existing programs at other colleges and universities. The proposed AET program will be the only four-year BS in Automation Engineering Technology program in Iowa. There is no similar degree at other Regents Universities. Hawkeye, Kirkwood, and Eastern Iowa Community Colleges have two-year degree programs in automation engineering technology. UNI will establish articulation agreements with these community college programs.

Resources to establish a high-quality program. The University of Northern Iowa has a strong Department of Technology dedicated to applied engineering with technical and hands-on learning. The EET and MET programs in the department already have a solid background with robotics, mechanical and electrical laboratories. The AET program will utilize these resources that already exist. Upcoming facility renovations will provide growth opportunities.

Several industries in the cedar valley have upgraded to automated systems, so the students will have ample internship opportunities.

Student demand. With the growing influence of automation in a variety of industries, the major is in high demand. The major is being developed without adding any new course, this will not increase the budget and will increase the enrollment in the existing courses selected for the AET.

Workforce need/demand. Manufacturing accounts to about 11.39% of the national output (2019 United States Manufacturing Facts | NAM). Industries are in the process of adopting newer technologies for increased production rates and lower costs. Automation fits-in perfectly in this evolution.

Several universities are offering courses/programs related to automation in order to support the needs of industry. However, most of the programs are engineering based. The current program proposed by the department of technology has more emphasis on hands-on learning than theoretical aspects.

Funding and Cost. The existing mechanical and electrical engineering technology faculty, equipment and facilities should be sufficient for the AET major. A small amount of start-up funding will assist with printing, branding and marketing materials to use for recruitment.

	Total Costs
Year 1	\$1,500

Projected student enrollment.

	Y1	Y 2	Y3	Y4	Y5	Y6	Y7
Undergraduate	8	15	30	35	50	50	50

Most students in the program are expected to be new to UNI, either direct from high school or transfers from the associates programs at community colleges. A smaller number will be internal double majors, adding AET to their EET or MET degrees. The ability to double major will, itself, be a recruitment incentive, especially for transfer students.

Accreditation. After four years the program can apply for ABET accreditation, since at least one student needs to graduate from the AET program prior to applying.

Evaluation plan. This program will be evaluated in accordance with the university's academic program review schedule and policies.

Date of implementation. Summer 2022.