

UCC Program Review Committee Summary of Review

Program: Engineering Technology and Management

Date of last review: AY 2014-2015

Date of this review: AY 2021-2022

The program offers the following degrees, minors, and certificates:

- Bachelor of Science in Engineering Technology and Management
- Associate of Applied Science in Engineering Technology

Recommendation: This program is found to be viable.

See report for commendations, concerns, and recommendations.

The report was forwarded to the program director and college dean. Their joint response is attached.

**Committee Report on the Program Review for the following programs
in the Department of Engineering Technology and Management at Ohio University:**
Bachelor of Science in Engineering Technology and Management (BS ETM)
Associate of Applied Science in Engineering Technology (A.A.S. ENGT) (OU-Lancaster)

Site Visit: February 8-9, 2022

Evaluators

- Ahmad Zargari, PhD (External Reviewer), Professor, School of Information and Information Systems, Morehead State University (Kentucky)
- Miriam Shadis, PhD, Associate Professor, Department of History, Ohio University
- Kimberlee Orben, MA, Associate Clinical Professor, College of Health Sciences & Professions, Ohio University (Dublin Center)
- Timothy G. Anderson, PhD, Associate Professor, Department of Geography, Ohio University

Summary

The Department of Engineering Technology and Management, together with the Associates degree in Engineering Technology at OU-Lancaster, underwent an external/internal program review in February 2022. The Academic Program Review committee was comprised of Ahmad Zargari (External Reviewer, School of Information and Information Systems, Morehead State University) and three internal reviewers, Miriam Shadis, (History), Kimberlee Orben (College of Health Sciences & Professions, Dublin Center), and Timothy Anderson (Geography).

Under the university's One OHIO initiative, the ENGT program at the Lancaster campus is now part of the ETM program on the Athens campus. As such, the review committee was asked to prepare one report that includes both programs.

The Department of Engineering Technology and Management has one program, a Bachelor of Science in Engineering Technology and Management (BS ETM), which combines technical courses with a business minor, quantitative sciences, natural sciences, and general education to prepare graduates for technical, management, and/or applied engineering positions in business and industry. The ETM program is accredited by the Association of Technology, Management, and Applied Engineering. The re-accreditation review of the ETM program by ATMAE was completed in 2020, and the ETM program has been awarded full accreditation for another six years (2020 - 2026). The Engineering Technology (ENGT) program at OU-Lancaster is designed to offer students a technical foundation needed to help solve complex problems by exposing them to real-world applications using hands-on lab courses. Students are taught a variety of manufacturing processes and their related materials, as well as skills in quality analysis tools, Lean systems, occupational safety, and electronics. A large focus within the program is on the importance of automated equipment use and maintenance.

Concentration is on programming and troubleshooting computer numerical control (CNC) equipment, programmable logic controllers (PLC's), and robotic systems.

The committee met with Mei Wei, Dean of the Russ College of Engineering and Technology, Jarrod Tudor, Dean of OU-Lancaster, Todd Myers, Chair of the Department of Engineering Technology and Management, affiliated faculty, staff, and students, as well as members of the department's Industrial Advisory Board. Due to the ongoing COVID-19 pandemic, all meetings were conducted virtually via TEAMS.

The overall judgement of the committee is that both programs (BS ETM; A.A.S. ENGT) are viable. However, with the resignation of the ENGT program's current primary administrator at the end of AY 2021-2022, the ENGT associates degree at the Lancaster campus will not have sufficient number of faculty to maintain the program going forward. If the current plan to replace the ENGT primary administrator with multiple adjunct faculty teaching classes, the AAS-ENGT program will not be viable.

Areas of concern

Engineering Technology and Management:

The program has labs with outdated equipment and deferred maintenance that impacts the student experience and marketing and recruiting efforts.

Engineering Technology (OU-Lancaster):

Low student enrollment and insufficient faculty and administrative personnel remain issues of major concern that must be addressed. While the program has significant growth potential, investments in marketing and faculty will be needed to achieve this.

The program has labs with outdated equipment and deferred maintenance that impacts the student experience and marketing and recruiting efforts.

The program enjoys support from local and regional industries but does not have a centralized administrative and academic unit. The Department of Engineering Technology & Management (ETM) does not have total management responsibilities over the ENGT program at Lancaster. The department only oversees the curriculum of the program, but currently does not have any control over resources, personnel, budget, strategic planning, and other aspects of the program.

Although the student learning objectives and course content of the nationally accredited (ATMAE) ETM program is different from that of the ENGT, the program joined the department about 1.5 years ago during the pandemic. The ETM faculty and staff are already fully involved with teaching, research, service, and/or administrative responsibilities of their existing ATMAE accredited program, and there has been no support from the College or University in terms of faculty/administrative and financial resources to support the ENGT program. The AAS ENGT

program and the BS ETM program's mission are quite different and have different program goals, objectives, program competencies, student learning outcomes, targeted student populations, assessment procedures, and physical locations.

Although some of the AAS-ENGT graduates may serve as feeder to the BS-ETM program, the Department does not have sufficient funds, faculty and administrative resources to help realize the potential growth and development of the ENGT program in the future. Without resources, the department does not have the potential to support the ENGT program.

Recommendations

Both programs would benefit from clarification on the goals (short and long term) for the relationship between the AS ENGT program and the BS ETM program from the university, with focus on the faculty time needed to achieve any new roles/responsibilities.

Engineering Technology and Management:

The program would benefit from additional marketing to attract students, however increased enrollment would require additional faculty.

Investments in new laboratory equipment and maintenance of current equipment would improve student experience and marketing and recruitment efforts.

Explore what resources the program would need to expand their automation track.

Engineering Technology (OU-Lancaster):

For the program to be viable, the program must replace the current faculty member who is resigning with a faculty member, not adjuncts. This role currently provides all administrative functions for the program.

Investments in new laboratory equipment and maintenance of current equipment would improve student experience and marketing and recruitment efforts.

Develop a clear marketing plan to ensure program enrollment grows and reaches its potential.

Continue to explore and grow certificate and professional development opportunities.

The external reviewer also suggested that it may be worthwhile to conduct an internal SWAT analysis of the AAS-ENGT program and determine if this program "fits" the university's mission. If there is a desire to won and maintain this program, its mission, goals, objectives, content and deliver of courses must be reviewed and updated.

Commendations

Engineering Technology and Management:

The ETM program graduates students who are in demand in industry and prepared to meet the expectations of employers. Students commend the dedication faculty have to the students and the benefits of the skills learned in through their lab experiences and faculty mentoring. Students also highlighted the value of the Business Minor they receive.

The ETM program has leveraged relationships with industry to provide unique student experiences and lab equipment donations.

Graduates of the program are looking to give back to the program and promote success of the program and current students.

ETM faculty have designed a strong curriculum that builds students skills, culminating in the completion of their Capstone project.

Engineering Technology (OU-Lancaster):

The ENGT has, in the past two decades, served the region's industries well by preparing individuals who are interested in practical skills for employment in manufacturing and production organizations. The program has support from local/regional industry and the government. Students highlight the support and mentoring provided by the faculty member, both during the program and after.

The following sections, organized as requested by the Academic Program Review Committee/University Curriculum Council, detail our findings.

1. The programs as a whole

a. Is the current number and distribution of faculty sufficient to carry out the broad overall mission of the Department (Teaching; Research, Scholarship and Creative Activity; Service)?

Engineering Technology and Management:

The department is currently comprised of eleven full-time faculty members and one part-time (emeritus) faculty member, including two full professors, five associate professors, two assistant professors, and two instructors. Five of these faculty members joined the program since the last program review in 2013/14. Given the current number of majors (about 200), the current structure of the program's curriculum, and the teaching and research specialties of the faculty, the current number and distribution of the faculty **is sufficient to carry out the overall mission of the Department**. The department's Teaching-Research-Service distribution is 70% teaching, 20% research, and 10% service. The review committee finds that faculty performance in each of these categories is exemplary.

Engineering Technology (OU-Lancaster):

At the time of the last review, the program had one tenure-track, one part-time retired tenure-track, and one Group II instructional faculty. As of AY 2021-2022, the entire program is administered by two instructional faculty members and four adjunct, part-time instructors. The current instructional faculty member who has headed the program for a number of years recently has notified the Dean that they will be resigning at the end of the current academic year. Currently, the program suffers from a lack of sufficient qualified faculty and has a very limited number of students (typically five to seven graduates per year), most of whom are employed full- or part-time in local industry and are seeking skills to advance their careers. **As such, the current number of faculty is not sufficient to maintain this program after the end of the current academic year.**

The program does, however, receive significant local and regional financial support. The program recently received \$500,000 in Ohio Statehouse Bill funds to procure new advanced

manufacturing lab equipment and to promote manufacturing workforce training in the area. This funding was received in partnership with the Fairfield County Workforce Center (FCWC), where the new labs are located. It should be noted that the physical location of this equipment is in Fairfield County Workforce Center, located approximately five miles from the Lancaster campus. Some ENGT classes have been relocated to the Workforce Center for access to the new equipment and to offer related courses to non-degree seeking students as a workforce development effort.

b. Is the level of the Department's RSCA appropriate for the program given the size of the faculty and the resources available to the Department? Is the Department's level of external funding at an appropriate level?

Engineering Technology and Management:

The Department's T-R-S distribution (70-20-10) reflects the distinctiveness of the program, with an applied instructional focus on preparing students for careers in technological management and quality control engineering in manufacturing industries. Given the program's focus and its success placing graduates in successful career trajectories, the Department's T-R-S distribution is wholly appropriate. Given the department's focus on teaching, the level of research funding via external grants is impressive, with industry contracts comprising a significant proportion of the total funding. Regarding faculty research activities, tenure-track faculty are active in scholarship, with publications in respectable journals and conference proceedings in the field.

Engineering Technology (OU-Lancaster):

The program has been allocated adequate resources, equipment, and funds, but it lacks a central unit with overarching responsibility or authority over the management of the program.

c. Is the level of service, outside of teaching, appropriate for the program given its size and the role that it plays in the University and broader communities it interacts with? Is the Department able to fulfill its service mission?

Engineering Technology and Management:

The level of service – and the quality of that service – performed by the faculty in the program is quite strong. Departmental faculty have served, and currently serve, on several college and university committees. Student advising is very effective, as evidenced by robust faculty involvement in student club and professional society advising.

Engineering Technology (OU-Lancaster):

The role of instructors in this program is limited to instruction – training individuals for jobs in industries. Some graduates have taken advantage of the opportunity to complete a BS degree in ETM on the Athens campus or online.

d. Does the Department have an appropriate level of financial resources, staff, physical facilities, library resources, and technology to fulfill its mission?

Engineering Technology and Management:

The department appears to have reasonable financial resources, physical facilities, library

resources, and technology. The current space plans regarding the new engineering building/facility (WUSOC) would enhance the instruction and research experience for students and faculty. Much of the equipment for the department's seven labs is supplied by donations from local, regional, and national industries, facilitated through the efforts of dedicated faculty and staff. According to faculty and instructors, maintenance of this equipment and deferred maintenance issues (such as painting and basic tools) are the most significant perennial challenges.

Engineering Technology (OU-Lancaster):

The program appears to have the requisite technology and equipment to perform its mission at both of its laboratory facilities on the OU-Lancaster campus and the Fairfield County Workforce Center. The Workforce Center, especially, is equipped with rather new and state-of-the-art instructional equipment and technology, especially regarding PLC controllers and robotic automation. As detailed above, however, the program will no longer have the required human resources (instructional staff) to fulfill its primary teaching mission with the resignation of the program's primary faculty facilitator at the end of the current academic year.

2. Engineering Technology and Management:

a. Is the unit fulfilling its service role, adequately preparing non- majors for future coursework and/or satisfying the needs for general education?

The program does not offer courses for non-majors. Majors fulfill their general education requirements outside of the program. ETM 1130 ("Introduction to Manufacturing") was proposed as a Gen Ed course but the Ohio Transfer Model was not approved at the state level.

b. Is the program attracting majors likely to succeed in the program? Is the number of majors appropriate for the program? Is the program attracting a diverse group of students?

Overall, yes. Students entering the program either in their first year or after having explored other engineering programs are delighted to find themselves in a hands-on learning environment, and are motivated to succeed. Students wish it were easier to transfer from Mechanical Engineering to EMT and lament the perceived disparagement of the program from the College level. The number of majors could grow, although probably not without more faculty. The diversity of the student body is limited but reflects the diversity in the wider College of Engineering.

c. Does the undergraduate curriculum provide majors with an adequate background to pursue discipline-related careers or graduate work following graduation?

Yes, students are adequately prepared to pursue discipline-related careers. A high proportion of graduates find jobs in industry upon graduation, and report strong satisfaction with their preparation. The Business Minor is a key piece of student success in this area.

d. Are the resources and the number of and distribution of faculty sufficient to support the undergraduate program?

The physical labs are badly in need of upgrading, both in terms of the lab space and equipment (with the exception of the Robotics Lab) (one older faculty member recognized equipment from his “undergrad days.”) Faculty is at capacity, with one junior faculty member on leave. The program can call on Daniel Sheets (support staff) to fill in when short-staffed. Interest was expressed in adding faculty with expertise in production design and materials. Students perceived that their faculty could use more Teaching Assistants.

e. Are pedagogical practices appropriate? Are program learning outcomes adequately assessed?

Pedagogical practices are appropriate, emphasizing experiential learning. Learning outcomes are assessed by students following steps through manufacturing processes and products. Half the courses are dedicated to exposure, and half to foundational skills.

f. Are students able to move into to discipline-related careers and/or pursue further academic work?

Students are fully prepared to move on to careers in manufacturing management, contracting, and business (primarily industrial or engineering sales). Few students seek graduate work immediately after graduation, although some have entered business school or law school.

2. Engineering Technology (OU-Lancaster):

a. Is the unit fulfilling its service role, adequately preparing non- majors for future coursework and/or satisfying the needs for general education?

Overall, this is non-applicable to the Associates Degree program at OU-L.

b. Is the program attracting majors likely to succeed in the program? Is the number of majors appropriate for the program? Is the program attracting a diverse group of students?

Although the faculty and the Dean believe that there is a potential to increase the number of AAS-ENGT students, and graduates are successful in careers, the program has not succeeded in attracting students. Due to low student enrollment, there has been no attempt to sustain qualified faculty/staff. Most students are simultaneously employed while pursuing their degrees, and often take some time to complete the program. Most students succeed in the program eventually. The number of students in the major is small and needs to grow to sustain the program. Gender diversity among the students is good, and there are non-traditional students in the program; otherwise, diversity is generally lacking.

b. Does the undergraduate curriculum provide majors with an adequate background to pursue discipline-related careers or graduate work following graduation?

Yes. There is concern about the concession of welding instruction to Hocking College. Few students move on from their Associates Degree to pursue a Bachelor’s in the short term, but

they should be prepared to enter a program like Engineering Management Technology. Program graduates were satisfied with their placement, career, and promotion on the job and/or their opportunities to pursue higher degrees.

c. Are the resources and the number of and distribution of faculty sufficient to support the undergraduate program?

No. While the Work Force Center facility is a huge upgrade in terms of physical space, equipment upgrades are needed. Imminent loss of one full-time faculty member (see above) places the program in jeopardy. Faculty and supervision resources are not adequate to sustain the program.

d. Are pedagogical practices appropriate? Are program learning outcomes adequately assessed?

Yes. Students have small classes and hands-on, experiential learning. They are assessed through projects, group work, and exams. Pedagogical practices are appropriate for an AAS degree in ET. However, faculty and supervision resources are not sufficient to adequately assess the students' learning outcomes.

e. Are students able to move into to discipline-related careers and/or pursue further academic work?

Yes. Most students move directly into work in their fields (or move up in the jobs they currently have). Few students are engaged in future academic work in the short term. Overall, students are able to move into technical careers and pursue a completed baccalaureate degree.



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April 8, 2022

Ohio University
University Curriculum Council
Chair, Dr. Benjamin Bates

To UCC:

This letter is a department and college response for correction of fact or to provide clarity to the seven-year review report for the BS Engineering Technology and Management (ETM) program located in the Russ College on Athens Campus and the Associate Engineering Technology (ENGT) program located at Ohio University Lancaster Campus and the Fair Field County Workforce Center. We wish first to thank the evaluation team for their time and report in conducting the seven-year review

The evaluation team was comprised of:

- Ahmad Zargari, PhD (External Reviewer), Professor, School of Information and Information Systems, Morehead State University (Kentucky)
- Miriam Shadis, PhD, Associate Professor, Department of History, Ohio University
- Kimberlee Orben, MA, Associate Clinical Professor, College of Health Sciences & Professions, Ohio University (Dublin Center)
- Timothy G. Anderson, PhD, Associate Professor, Department of Geography, Ohio University

The following are responses to the report and indicate the page and paragraph the evaluation team's report that response is to. The ETM program responses are from ETM Department Chair Dr. Todd Myers and the ENGT program responses are from OU-L Dean Jarrod Tudor. Dean Dr. Mei Wei has reviewed and provided edits.

ETM Program:

Page 2 paragraph 4 response by Todd Myers

Out of the 11 undergraduate learning labs associated with the BS ETM Program, three of the learning labs need updates with equipment; the welding and sheet metal lab needs to be updated, and the 3d printing lab needs an update. Grants are being sought for improvements in these labs. A fourth lab, the Parker Hannifin Hydraulics lab, is to receive a \$32k update in electrohydraulic equipment in 2022, thanks to funding from Parker Hannifin. Several labs need lab maintenance with paint peeling from walls and not sufficient space for students. Dean Wei is assessing these items with the Associate Dean of Academics Dr. David Juedes, and a plan will be made for the maintenance of these labs.

Page 3 paragraph 4 response by Todd Myers

We agree with the review team that increasing marketing/high school engagement would help with bringing enrollment to the targeted 220 students for the BS ETM program. The faculty needed to teach depends on the full portfolio of courses in the ETM Department, including the BS TOM program, the MS Project Management Program, the Master Certificate in Project Management, and the BS TOM program, which will be changing to BS Project Management program. The ETM program over COVID has gone from 240 students

to 178 students. However, we have started as of fall 21-22 an MS Project Management program and enrollment for the 2nd semester is already at 30 students. The new program will use faculty FTE out of the ETM department.

The faculty in the BS and Master programs are not interchangeable with the faculty of the associate's program. The course content taught and desired outcomes are different, as are the skill sets of these faculty groups. The ETM program has been reduced two faculty in AY 21-22. One tenured faculty to direct and teach in the MS PM program and one tenured faculty taking the VSRP. With current staffing and course load, overload contracts will be needed for fall and spring semesters 22-23 to meet the required courses offerings for students in these programs.

Page 4 paragraph 5 response by Todd Myers

The ETM department (not including the ENGT program) is comprised of:

- Two full professors
- Five associate professors out of which one is fully engaged in teaching and administration of the MS PM program, and one has taken the VSRP and leaves May 15, 2022
- One assistant professor
- One assistant professor of instruction
- Two associate professors of instruction
- NO emeritus faculty

Page 6 paragraph 3 response by Todd Myers

The ETM Program does teach a service course for the Mechanical Engineering Department ETM 3700, a three credit hour machining course. This course is offered three times in an academic year, with six associated labs requiring 16 hours of contact time from the ETM faculty.

ENGT OU-L Program Responses by Dean Tudor:

1.) Page 2; A new dean has been hired at OUL to reenergize the program. This includes several activities, including making the program one of the top-of-mind programs to educate those seeking degrees in the area of advanced manufacturing in Central Ohio. Such an approach requires the dean to personally meet with leaders in the manufacturing sector and establish relationships that previously did not exist. Second, the dean has established a connection between the two-year engineering technology program and non-credit education. As students gain skills through non-credit training, they gain confidence and seek the two-year degree. Third, the dean has established new relationships between career centers and Ohio University-Lancaster. Students will be shown a pathway, in partnership with career centers, employers, and OUL, whereby they can gain skills at the career center and later work at an area manufacturer while the latter pays for the student-worker's college education. This pathway is made possible by crafting a partnership among higher education, employers, and career center educators who understand the dire need for well-skilled employees in the advanced manufacturing sector.

2.) Page 2; Ohio University – Lancaster is aggressively seeking new funds to replace older equipment. OUL has recently, in tandem with the Fairfield County Department of Economic Development, asked the state legislature for a state capital appropriation for new equipment for the Engineering Technology program. This new equipment would be placed along side the newer equipment recently purchased through a grant provided by the state of Ohio to create a partnership between Hocking College and OUL. Eventually, any newly-purchased equipment will be placed at the Fairfield County Workforce Center for education and training purposes. As well, Ohio University – Lancaster has put forth a request for a federal earmark for additional equipment.

3.) Page 3; While it is true that the long-time engineering technology faculty member who was largely responsible for the administrative functions associated with the program has resigned, a new full-time faculty member has been hired and can take on these responsibilities.

4.) Page 3; A strategic analysis of the two-year engineering technology program at OUL would be welcomed. The analysis should keep in mind the \$20b investment by Intel in nearby Licking County.

5.) Pages 5/6; Given that engineering technology/advanced manufacturing education and training will become a significant part of OUL's strategy, the dean will take a more active role in its direction. Additional administrative support will be provided to the program once the Pickerington Center is closed. The full-time administrator managing the Pickerington Center will be reassigned to the Fairfield County Workforce Center on a permanent basis.

6.) Page 7; Although the engineering technology program at OUL is not designed for non-majors, the equipment is being used for non-credit training purposes.

7.) Pages 7/8; It is true that it is unlikely that those possessing welding credentials would pursue a four-year degree. However, it is also highly unlikely that the same group of welders will pursue an associate's degree at any institution.

Thanks again to the UCC and the Evaluation Team, and Department Faculty for their time and effort associated with the review of these two programs.



Todd D. Myers Ph.D, M.B.A

Chair, Department of Engineering Technology and Management



Mei Wei Ph.D.

Dean, Russ College of Engineering and Technology