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ABET Accreditation for a Bachelor of Science in Engineering Technology Degree – Preparation for Readiness Review

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ABET Assessment Program for a Bachelor of Science in Engineering Technology Degree – Preparation for Readiness Review

Background

This is a full paper based on the implementation of an ABET (Accreditation Board for Engineering and Technology) assessment program and the preparation of the readiness review document for a new Bachelor of Science in Engineering Technology degree offered at a large midwestern university. The degree program is offered by the College of Engineering at the university's regional campuses. The program was launched in response to a high demand for manufacturing occupations that require strong technical and management skills. The curriculum was developed by involving industry partners from the manufacturing workforce for guidance. An effective ABET assessment process will help build a curriculum that meets the standards necessary to prepare graduates to enter industrial manufacturing fields in the global workforce. A curriculum development and assessment committee was formed in the first year the program was launched. The committee was charged with preparing a plan for measuring student learning outcomes and implementing a robust framework utilizing the university's learning management system (LMS). The data and results collected from this learning management tool will help in decision-making for curriculum revisions and continuous improvement. Three papers have been presented in the previous years that introduced the framework developed for this program; this is the fourth paper in the sequence. With this paper, the authors hope to share the implementation of the assessment process and assessment results from the first four years of the program as the first cohort graduated recently. The authors also hope to share the best practices as the team prepares for the readiness review.

Introduction

ABET Accreditation offers guidance for collegiate programs to meet essential standards necessary to prepare graduates for successful careers in STEM fields. Employers recognize the importance of the robust assessment process for the ABET-accredited programs and trust that the graduates are prepared for the industry standards and are capable of meeting expectations. Since its establishment in 1932, ABET has accredited approximately 4,773 programs across 930 colleges and universities in 42 countries and regions [1, 2]. While ABET provides a detailed and comprehensive set of requirements for accrediting programs, it does not prescribe a specific approach to measuring the attainment of learning outcomes. Instead, programs are required to use a personalized approach for their programs and describe their assessment process. Creating a new program that meets ABET's standards is a significant task for both the administration and faculty, as it involves developing the curriculum and assessment tools needed to align with both programmatic and institutional goals. This paper will explore the implementation of the assessment process and the preparation for the readiness review to determine if the program is prepared for the ABET accreditation review. The accreditation guidelines and standards for the bachelor's program are provided by the Engineering Technology Accreditation Commission (ETAC) of ABET. The program is offered at the regional campuses of a large Midwestern university.

The need for industrial automation and robotics has surged in recent years with rapid technological growth. According to the U.S. Bureau of Labor Statistics, employment in manufacturing has been recovering since the pandemic, with recent data showing increases in both hourly and annual earnings for jobs commonly found in the sector [3]. However, a major concern remains the shortage of highly skilled workers to fill positions in manufacturing facilities. These facilities have long struggled with a "skills gap" due to low unemployment rates and the growing logistics and automobile manufacturing sectors. As advancements in industrial automation, robotics, and networking continue, the demand for well-trained workers has intensified. This shortage of qualified candidates can be attributed to the limited availability of engineering technology programs in the region. To address this critical need for skilled workers, The Ohio State University has launched a manufacturing engineering technology program. A unique aspect of the program is the partnership with local community and technical colleges, which enables resource sharing, curriculum alignment, and the integration of academic learning with hands-on work experience. The regional campuses are co-located with area technical schools, providing a unique infrastructure for offering an undergraduate engineering technology program. The purpose of this paper is to: a) continue the previous work of communicating the implementation of an effective assessment program for ABET ETAC accreditation; b) share the results of the assessment and c) discuss best practices for preparing and planning for the readiness review.

This paper is organized in the following order: I. Curriculum and Coursework, II. Program Objectives and Student Learning Outcomes, III. Program Constituents and Administration, IV. Assessment and Evaluation, V. Lessons Learned and Best Practices for Readiness Review. The paper concludes with acknowledgments and a summary and recommendations for future work.

I. Curriculum and Coursework

As noted earlier, there has been a growing demand for skilled workers to fill manufacturing positions in the state. To address this, regional focus groups were established to assess the current and future engineering technology skills needed by manufacturers. In 2019, a steering committee was formed to brainstorm ideas for creating a four-year engineering technology degree program with an emphasis on management and leadership skills [4]. The program's educational objectives, learning outcomes, and competencies were developed in alignment with ABET accreditation standards. To fulfill the institution's mission of serving the community, it was proposed to offer the program in areas with high manufacturing demand, which led to the selection of regional campuses as the program's location. Faculty members, administrative staff, industry advisors, and students worked together to design a distinctive program. Various university resources, including the Manufacturing Institute, Course Design Institute, Office of Technology and Digital Innovation, Center for Design and Manufacturing Excellence, and Teaching and Learning Resource Center, were utilized to develop the program's curriculum. Students and their families were excited about the opportunity to pursue a four-year degree at the regional campuses. With lower tuition and living costs, students are more likely to stay for the entire degree program. This is the first technical degree offered at the regional campuses. Manufacturers emphasized the need for graduates to possess essential skills such as critical thinking, problem-solving, adaptability, communication, and other soft skills.

A distinctive feature of this program is that it is exclusively offered at regional campuses, unlike other engineering technology programs nationwide, where such programs are typically available at central campuses. This arrangement was made to address the workforce needs of industries in the local areas surrounding the regional campuses. Additionally, the central campus lacks the space and infrastructure to support this program. Although the program is hosted at the regional campuses, it is part of the College of Engineering and receives the same resources and support as any other engineering program within the college. The program was launched in Autumn 2020 at three campuses, with a fourth campus joining in Autumn 2023. While the fourth campus began offering the program three years later, it follows the same curriculum as the other three campuses.

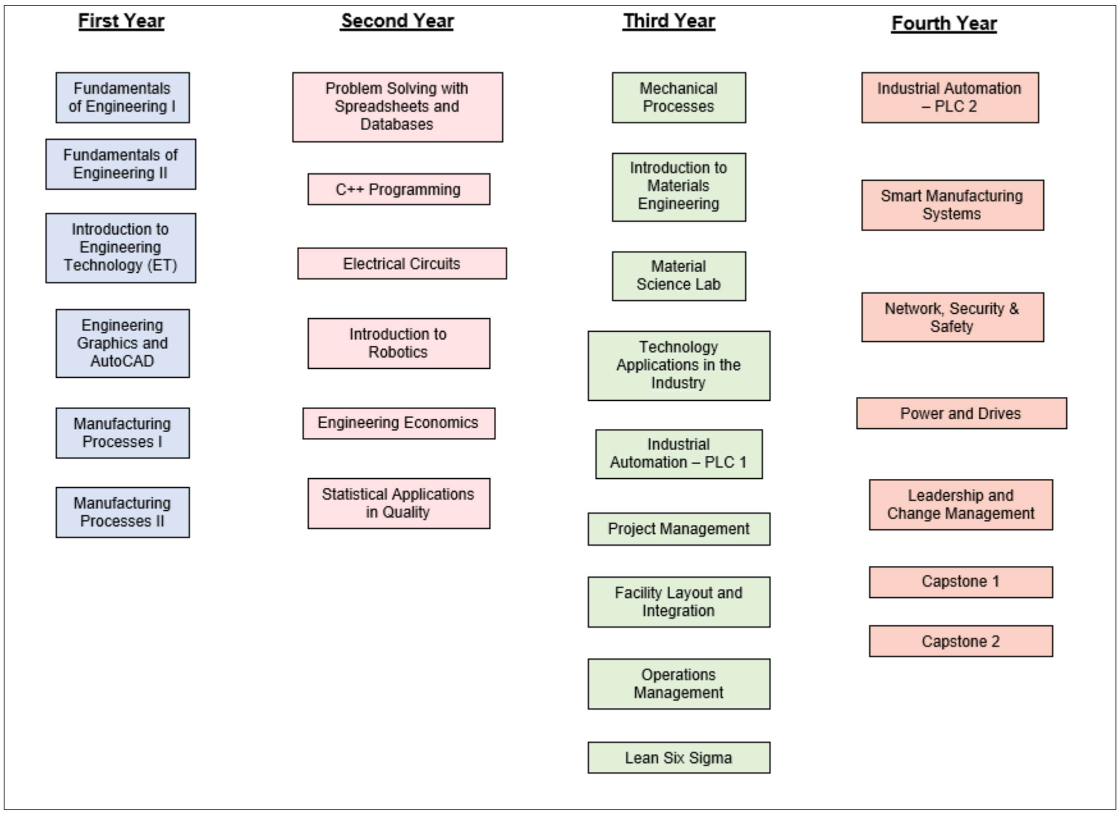

Figure 1: <u>Curriculum for the Engineering Technology Program</u>

Students must complete 121 credits of undergraduate coursework, including a one-year capstone project in their final year. The curriculum incorporates various hands-on and project-based learning experiences. A sample of the four-year coursework is presented in Figure 1. All students are required to take courses in the following key areas: First-Year Engineering Technology Experience, Programming Basics, Manufacturing and Material Sciences, Electrical and Electronics, Industrial Automation and Robotics, Network Security and Technology Applications, Operational Excellence and Leadership, and the Capstone Sequence. In addition to these core courses, students also take Chemistry, Physics I and II, and Calculus I and II, which are offered through the College of Arts and Sciences. Since the authors' previous publication on the program, the curriculum has been adjusted to better meet the needs of all regional campuses. Given that the program is offered across multiple locations, it requires greater collaboration, resources, and support to ensure consistency in course delivery. Most core courses are taken in the second and third years of the program. Technical core courses include Introduction to Electrical Circuits, Industrial Automation with Programmable Logic Controllers (PLCs), Mechanical Processes, Manufacturing Processes, Robotics, Network Security, and Safety. Project Management courses, such as Operations and Change Management, Facility Layout and Integration, and Lean/Six Sigma with Black Belt training, are also part of the curriculum, providing students with essential administrative and managerial skills.

Students transferring from community colleges and technical schools must submit a transfer request, which will be reviewed by the Curriculum Development and Assessment (CDAC) committee to determine how their credits will be applied as they progress to the next level. Collaboration with local technical schools helps the campuses attract talent and establish pathways for advanced careers in the manufacturing industry.

All regional campuses collaborate by co-listing certain courses that can be delivered remotely. Resources such as faculty workloads, course materials, software licenses, laboratory equipment, and facilities are shared across campuses to support the program's sustainability. Faculty members work together on course revisions and class schedule preparation and are responsible for assessing learning outcomes. This collaborative approach is a key component of the ABET accreditation process, ensuring full faculty involvement in developing assessment tools, evaluating results, and providing feedback and recommendations for ongoing improvement.

II. Program Objectives and Student Learning Outcomes

Accreditation agencies require all programs to assess student performance to attain and maintain accreditation, though they do not provide strict guidelines on how performance should be assessed. Accreditation can be defined as a process that evaluates whether an educational institution or program meets specific standards of quality, based on professional judgment [5]. The assessment process that meets the guidelines for Criterion 3: Student Outcomes and Criterion 4: Continuous Improvement defines the basis for accreditation. A well-designed assessment plan that incorporates feedback from all stakeholders increases the likelihood of the program receiving accreditation. Conversely, concerns about the assessment plan or the evaluation of assessment data can jeopardize accreditation. It is crucial to show that the program’s objectives and outcomes are being effectively measured and achieved. ABET requires that the program's educational objectives align with the university’s mission and be periodically reviewed to ensure ongoing consistency. These objectives must be communicated to all stakeholders and mapped to the curriculum and learning outcomes to enhance awareness. After several rounds of revision and discussions with the Industrial Advisory Council and feedback from faculty, these prior objectives were revised.

Within three to five years after graduating, successful alumni will:

- **Objective 1**: *Knowledge, Skills, Problem Solving* - Be employed in industry or academia utilizing engineering technology knowledge and tools to solve technical problems, design products and improve processes within systems of equipment, controls, and people.

- **Objective 2**: *Professional Learning/Communication* - Utilize formal and informal continuous learning to maintain and enhance technical and business excellence and professional growth.
- **Objective 3**: *Leadership and Management* - Become successful professionals and leaders in their fields.

The quality of assessment is the most critical factor in the success of a program. Programs that implement Continuous, Consistent, and Complete (C3) assessment processes are recognized with accreditation and serve as models for others in the community. Since much of the work involved in Self-Study reports focuses on Criterion 3 and Criterion 4, the assessment teams or committees overseeing these processes carry significant responsibility. ABET broadly defines Student Learning Outcomes (SLOs) and expects documentation of their periodic review and revision as part of continuous improvement. For baccalaureate degree programs, there are five (5) SLOs outlined under the general criteria as shown in Table 1. Typically, courses within the program have predefined course goals and outcomes developed during the content creation process. Linking these outcomes to the program's overall goals and demonstrating that they have been achieved through assessment is essential for closing the loop.

SLO 1	An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;
SLO 2	An ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;
SLO 3	An ability to apply written, oral, and graphical communication in broadly-defined technical and non-technical environments; and an ability to identify and use appropriate technical literature;
SLO 4	An ability to conduct standard tests, measurements, and experiments and to analyze and interpret the results to improve processes; and
SLO 5	An ability to function effectively as a member as well as a leader on technical teams.

Table 1: Student Learning Outcomes for the Engineering Technology Program

Program-specific criteria do not apply to engineering technology degree programs since there is no specialization. However, the program focuses more on manufacturing technology. Our degree focuses on manufacturing engineering and industrial systems. Leadership skills are essential for maintaining manufacturing competitiveness and for pursuing careers in the manufacturing sector. For this study, the ABET student outcomes from the general criteria are numbered 1 through 5. Each learning outcome has defined performance indicators that are measurable and help determine the level of achievement. These performance indicators are mapped to introductory, intermediate, and advanced courses.

A section of the mapping for this program is displayed in Table 2. As the degree focuses on manufacturing, the objective is to equip graduates with technical, management, and leadership skills in system design, operations, and maintenance.

Engineering Technology Courses	ABET SLOs				
	1	2	3	4	5
Manufacturing Processes I and II		x		X	
Intro. to Engineering Technology Topics			x		
Engineering Graphics			x		
Electric Circuits	x		x	X	
Intro. to Robotics	x	x			
Problem-Solving - Spreadsheets & Databases	x				
Material Science with Applications			x	X	
Project Management	x	x	x		x
Statistics with Applications in Quality	x			X	
Mechanical Processes				X	
Industrial Automation PLC 1 and 2	x	x	x	X	x
Power and Drives	x		x		x
Facility Layout Integration	x	x	x		
Leader/Change Management			x		x
Lean/Six Sigma	x	x	x		x
Capstone 1	x	x	x		
Smart Manufacturing Systems	x	x	x	X	x
Technology Applications in Industry	x	x			x
Capstone 2			x	X	x

Table 2: <u>Mapping Courses to ABET Student Learning Outcomes</u>

Coursework including homework assignments, quizzes, lab assignments, project reports and presentations, team evaluations, and exam questions are used for the assessment of student learning outcomes. Faculty from all four regional campuses regularly collaborate to map outcomes and plan assessments using planning guides. The assessment team has created a guide to train faculty on ABET terminology and assist in mapping learning outcomes to the relevant course assignments. Each course is assigned a coordinator who ensures content consistency, oversees its delivery, and provides faculty support. The course coordinator meets with the ABET team every semester the course is offered to review mappings, complete the planning guide, and gather feedback from instructors.

III. Program Constituents and Administration

The steering committee and assessment team worked on identifying the educational objectives and constituencies of the program, while also brainstorming assessment methods and tools [6]. As a state-funded academic institution, our program has a wide range of stakeholders or constituents. The following constituencies have been identified for our program:

- Industry and Employers of Program Graduates – Graduates should be able to make significant contributions to the success of their employers. The Industry Advisory Council (IAC) has been established as an external constituency with representatives from all the manufacturing facilities within the geographic areas of regional campuses. The members of the IAC are leaders in their respective fields.

- Alumni - Our graduates must be prepared with the knowledge and skills for successful engineering technology careers or advanced studies.
- Faculty - Faculty play a critical role in identifying the needs of students and building mechanisms to help students flourish in their courses. The faculty collaborate on a different level since they belong to different campuses, they all come together as a team to bridge the gap due to geographical constraints and ensure the program accomplishes its goals.

In addition to the above constituents, the undergraduate students are involved in discussions related to the curriculum and assessment of the learning outcomes. Administrative staff including academic advisors work with the deans of each regional campus to ensure students are advised based on the curriculum plan. The CDAC provides guidance on organizing curriculum, managing alignment of faculty, enrollment, advising, transfer credits, career services and support student success.

The program governance was established recently to ensure the program runs smoothly across all regional campuses. A portion of the governance chart was adopted by our program. Since the program is offered at four regional campuses, the above governance chart helps everyone navigate through the process and continue executing their respective tasks. It also becomes necessary to document the responsibilities of each role to ensure accuracy and avoid any conflict. A short explanation of the roles and responsibilities is provided in Table 3 below.

Roles	Responsibilities
Regional Campus Deans	Serve on the Steering Committee, liaison to University's Academic Affairs Committee, lead and support faculty assignments and schedules, support advancement/development opportunities and conduct faculty hiring
Program Academic Directors	Organize curriculum and ensure consistency of program across all regional campuses, manage alignment of faculty, enrollment, advising, career services, etc., support student success and collaborations with industry and supervise regional campus leads
Regional Campus Faculty Leads and Course Coordinators	Coordinate courses to ensure consistency across campuses and programs, manage class schedules and maintain lab inventory
ABET Planning & Deployment Team	Manage ABET accreditation process, oversee the planning, deployment, data collection and evaluation of assessment results
Enrollment and Advisors	Student recruitment and advising students
Curriculum Development & Assessment Committee (CDAC)	Review and approve course development and revisions, review and approve credit transfer requests, ABET oversight and planning
Career Services	Coordinate internships and oversee industry collaborations
Marketing & Communications	Support program messaging, promotional prints, social media and other communication channels, website development and interview students and compile testimonials
Outreach & Community Engagement	Coordination of advancement efforts, marketing & communications to local schools, career services, enrollment, retention and other advising functions
Student Ambassadors	Outreach, "Hometown ambassadors" to K-12 schools and technical schools

*Table 3: **Roles and Responsibilities***

IV. Assessment and Evaluation

The Engineering Technology programs accredited by ABET share best practices through conferences and workshops, and our program continues to adopt best practices from peers to create an assessment and evaluation plan that effectively serves our constituents [7]. The goal of our plan is to ensure that engineering faculty are equipped to design, maintain, and monitor student performance of the Student Learning Outcomes (SLOs). As previously noted, faculty involvement is a crucial aspect of the assessment and evaluation process.

Once the Curriculum Development and Assessment Committee (CDAC) was established, the responsibilities for ABET accreditation and assessment were incorporated into this governing body, along with tasks related to curriculum revisions, credit transfers, and other matters. The primary responsibilities of the assessment team include:

- Organizing course coordinator and faculty meetings at the beginning of each semester
- Planning, scheduling, and conducting assessment-focused training for faculty, especially new instructors
- Updating the assessment and evaluation plan as necessary
- Administering faculty and student surveys
- Documenting feedback and recommendations for reporting to the CDAC committee
- Preparing Readiness Review documents and the Self-Study report

At this institution, OneDrive, a Microsoft Office application, is used for file hosting, storage, and sharing. Shared folders are created to store not only student artifacts and assessment results but also accreditation-related supporting documents. Information regarding program development, course offerings, schedules, faculty CVs, syllabi, assessment results, and more is stored in the cloud. Given the presence of four regional campuses, it is essential to organize the data relevant to each campus efficiently. Since this is the university's first engineering technology program, it will be seeking initial accreditation, which may require a readiness review. To facilitate this, a strategy has been developed to follow the Self-Study template for ETAC to organize the content for each campus. By the readiness review document, folders are systematically created and organized. Instructors are granted access only to the shared folder designated for storing student artifacts and assessment results.

An effective assessment process, regular review of student learning outcomes and educational objectives, and proper documentation are essential for programs seeking initial accreditation. In recent years, both direct and indirect assessments of student outcomes and program objectives have become the standard for engineering and engineering technology programs. Direct assessment involves linking student learning outcomes to tests, homework assignments, projects, and other course assessments, as well as collecting student submissions. It also includes analyzing and interpreting the results to provide recommendations for course improvements. To carry out the direct assessment, the team began scheduling meetings with faculty to map out the student learning outcomes. Since third- and fourth-year courses were recently developed, course developers were required to integrate ABET student learning outcomes into the syllabi and align them with course assessments.

Previous work on ABET accreditation and the assessment of student learning outcomes outlines performance criteria, vectors, and indicators as guidelines for measuring student performance [8, 9]. For this program, the assessment team developed measurable performance indicators to evaluate competencies, which were discussed in earlier publications [10, 11]. Another unique feature of this program is that all engineering and engineering technology students take common introductory courses, such as Fundamentals of Engineering I and II, which enables students to transfer in and out of the program without losing credits. Consequently, it was important to identify and separate engineering technology students for assessment purposes. The assessment team identified these students using enrollment data and shared this information with the faculty to ensure that assessments were conducted only for those students.

Performance indicators were mapped to at least three courses within the program to ensure statistically significant results for measuring the attainment of the outcome. This approach was intentionally designed to address the lack of data for assessment during the first few years and to monitor student progress. In the event of a course cancellation, data from another course could be used to assess the competence of the outcome or indicator. Additionally, this mapping will be updated based on faculty feedback following the initial course offerings. Along with defining measurable indicators, faculty can use the descriptions of these indicators within the rubrics set up in the Learning Management System (LMS).

Most courses at the regional campuses use the Learning Management System (LMS) to deliver course content. Canvas serves as the LMS for assessing performance indicators and, ultimately, student learning outcomes. Curriculum development experts have provided support to faculty in developing engineering technology courses and establishing the framework in Canvas. In addition to creating assignments, quizzes, and exams within the system, rubrics are also developed to simplify the outcomes assessment process.

Rubrics were created using a standard 5-point Likert scale, with the following ratings: 5 for "Consistently Exceeds Expectations," 4 for "Exceeds Expectations," 3 for "Meets Expectations," 2 for "Needs Improvement," and 1 for "Inadequate." Since the rubrics for performance indicators were developed outside of Canvas, the scale was consolidated into four main categories: 5-4 for "Exceeds Expectations," 3 for "Meets Expectations," 2-1 for "Needs Improvement," and 0 for "Inadequate."

Instructors at each regional campus are responsible for assessing the Student Learning Outcomes (SLOs) in their courses. This ensures that assessment results reflect the instructors' observations of students and their classroom performance. The assessment process must be conducted periodically to facilitate continuous improvement, and it must be managed by the instructors themselves. This program follows two assessment cycles: Cycle A for odd academic fiscal years (2021, 2023, etc.) and Cycle B for even academic fiscal years (2020, 2022, etc.). Any outcomes not achieved in a particular cycle will be reassessed in the subsequent cycle. To promote continuous improvement, feedback from instructors and student evaluations is incorporated into future course offerings. These changes will be documented in the Self-Study report, and the planning guides will be updated accordingly. Course coordinators are responsible for ensuring that all instructors approve the recommendations before they are submitted to the ABET team and, eventually, to the CDAC committee.

The core objective behind the continuous improvement process is to determine whether the program can demonstrate its effectiveness in preparing students for the careers they aim to pursue. The assessment results of Student Learning Outcomes (SLOs) help identify both the strengths and weaknesses of the program and its operational processes. Assessment processes that focus on continuous improvement generate results that can be systematically utilized by faculty and administration in meaningful and impactful ways.

Our assessment process demonstrates how the results are used to drive improvements in the program. A periodic, regular and sustainable assessment process is needed for ABET accreditation. Documentation plays a crucial role in the assessment, particularly for program evaluators and program chairs during site visits. As part of the outcomes assessment, instructors receive training on the Learning Mastery Gradebook and Rubrics features in the Canvas LMS. Throughout the semester, instructors assess student learning outcomes and download the learning mastery results from Canvas at the end of the term. Any recommendations for improvement, whether from the course instructor or the assessment team, are carefully documented.

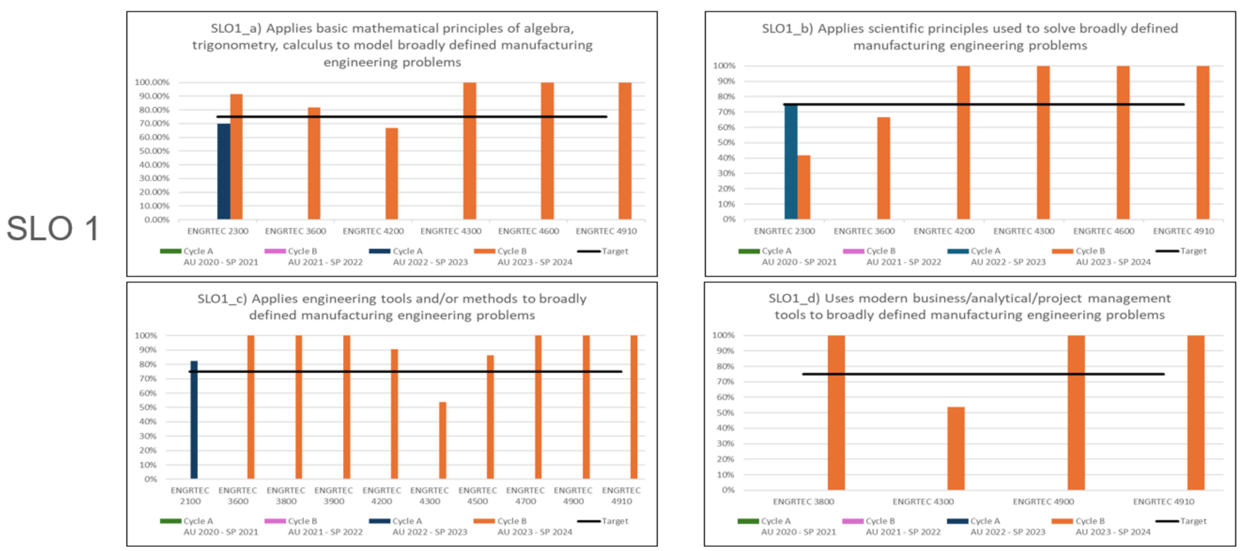

Figure 2: <u>Assessment Results for each of the performance indicators for SLO 1</u>

Assessment results from each campus are gathered from the Learning Mastery Gradebook in Canvas LMS, and average scores are calculated across all four campuses. Figure 2 and 3 present the results from the assessment of courses for the first four years. Since there are multiple performance indicators per outcome, the results from each performance indicator are shared. Figure 2 is for SLO 1 and Figure 3 is for SLO 5.

SLO 5

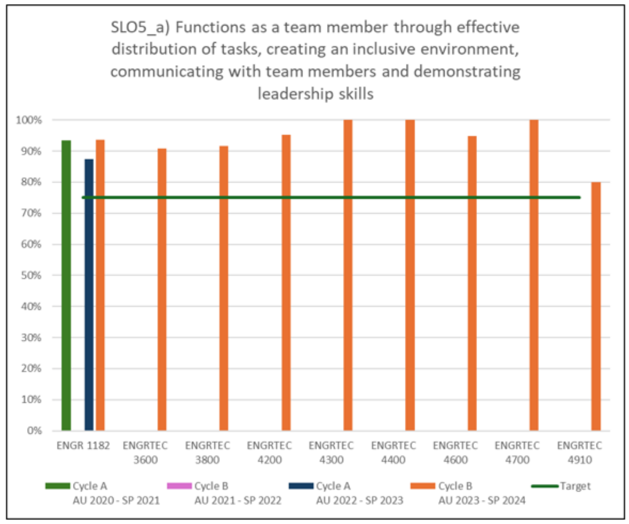

Figure 3: ***<u>Assessment Results for each of the performance indicators for SLO 5</u>***

In each case, the results meet the 75% attainment target for each assignment. However, if assessment scores are lower, instructors are required to document any issues or concerns regarding the assignment or performance indicators. Based on discussions with course coordinators, assignments may be revised to clarify instructions or another assignment may be mapped to the outcome. The assessment team collaborates with course coordinators to finalize recommendations for approval by the CDAC committee in the next cycle. This process provides valuable insights into the assessment process and the curriculum history for the ABET Self-Study report. A course planning guide is developed for indirect assessment and has been distributed to the course coordinators to be completed at the end of each semester. Student evaluation of the course at the end of each semester is used as feedback on course delivery and instruction. Other feedback from course coordinators is compiled in the planning guides which helps gather more evidence-based evaluation and offer recommendations for improvement.

V. Lessons Learned and Best Practices for Readiness Review

Assessment results and recommendations from faculty are incorporated into the decision-making for course revisions and review of outcomes mapping. The CDAC members believe that these strategies will help the new programs get ready for ABET accreditation. Although several changes are being implemented at the time the paper is compiled, it is our responsibility to share what we learned with the engineering technology community.

ABET requires a preliminary Self-Study Report from all programs seeking initial accreditation since the university did not offer ABET-accredited programs in the ETAC commission before this program. After a review of this preliminary Self-Study Report, which is the Readiness Review, ABET will determine whether or not an institution is ready to submit a formal Request for Evaluation (RFE) for that program. In the preparation of the Readiness Review, the CDAC committee worked closely with faculty to complete all the required criteria during the summer semester before submitting the RFE. The following are some of the best practices for the preparation of the review.

- *Use of University-Managed Cloud Systems for Assessment Documentation*: One of the strategies to store student artifacts is to utilize a university-managed system due to the confidentiality of the information. Information such as class rosters, student IDs, names, grades, and faculty names is possibly included in the assessment records. Therefore, relying on a university-managed system is an effective approach. It has become a practice for program evaluators (PEVs) to request the materials from the program before the site visit to learn about the program and come prepared. This has enhanced the ability of all institutions to use these systems for assessment data. It is recommended that the programs utilize the Self-Study templates as a guide to organizing the folders on the cloud system. For instance, Criterion 2 requires documentation for program educational objectives (PEOs) and the review process. Therefore, the assessment team organized the folders based on ABET criteria. Instructor feedback, evaluation of assessment data and other relevant information are also stored in sub-folders for Criterion 4 based on action items. Instructors must be granted access to the "Student Archive" folder so that they can upload artifacts from the LMS. It is recommended that institutions follow the same approach for easy access to the material.
- *Utilizing LMS as an assessment tool:* Competencies/rubrics are developed to assess learning outcomes using measurable performance indicators. Utilizing the learning management system used by the university (Canvas) is used as an effective assessment tool, especially for our program, because the content is delivered through the LMS. The assessment team has created rubrics in Canvas for each course of the program. All the faculty is granted access to the master shells of the courses which include rubrics and outcomes which can be imported into their course shells. Assessment team discusses the mappings with the faculty and imports the rubrics into the assignments to facilitate the instructors in completing their assessments. Another use of the LMS is to prepare assessment reports. Most LMS allows a report to be exported that shows the outcomes, performance indicators and assessment results. Once exported, these could be used for evaluation and discussion for continuous improvement.
- *Effective Communication*: Faculty and staff collaborate across the campuses for a successful and effective program. The accreditation process demands effective communication of the objectives and expectations of the program from all stakeholders. Accreditation of the program not only grants credibility to the program but also acknowledges the faculty and administration for their academic excellence. For programs offered at multiple locations, this is the most challenging part of the accreditation process. The administration plays a huge role in setting expectations and guidelines for each of the constituents. Instructors must be informed about the expectations and time commitment for the assessment of learning outcomes. For programs like these, which are offered at different campuses, faculty interactions will result in an inclusive environment that fosters teamwork and growth. Building collaborations with industry partners and interacting with the industrial advisory council regularly allows faculty to explore new topics and create projects to incorporate into their courses.
- *Subject Matter Experts/Coordinators*: An authoritative role for each subject is necessary to ensure consistent and periodic assessment. Assigning a faculty member who is a subject

matter expert and has an understanding of the assessment process to serve as a course coordinator became evident. New hires in the program need mentoring to adapt to the university's policies and procedures. So, the course coordinator helps facilitate the training for the new hires. Course coordinators will also manage the content of the master shell in the LMS and grant access to those faculty members teaching the course. It helps streamline the content delivery, systematic grading and assessment of learning outcomes. They are also required to gather feedback and recommendations and forward those to the assessment team for continuous improvement. This is done in the form of planning guides and reports.

- *Building Industry Partnerships*: Partnerships with local industries provide support to undergraduate and graduate programs. An advisory council must be established and members from local industries should be invited to provide feedback on how the program is doing. Their feedback will help shape the future of graduates who will be prepared to tackle current challenges in the industry. In this program, each campus pursues partnerships with local industries on several fronts (freshmen orientations, lunch and learn sessions, professional development workshops and industry seminars). Professionals are also invited to review the curriculum and offer feedback on content and laboratory exercises. The industrial advisory council is encouraged to sponsor projects and assist with internship or co-op experiences. Students are invited to advisory council meetings to network with potential employers. Additionally, funding requests for equipment and lab supplies could be made through these partnerships.

Summary and Future Work

In this paper, the authors present a comprehensive assessment plan being implemented to prepare for the initial accreditation of the engineering technology program. The plan has been successfully utilized to prepare the Readiness Review document. This paper aims to assist new engineering technology programs in developing assessment processes for ABET ETAC accreditation. While ABET provides annual updates on accreditation criteria, there is no standardized process for achieving student learning outcomes, as curriculum, instruction, personnel, facilities, and processes differ between programs. The authors believe this paper will guide institutions with programs across multiple campuses in developing a strong program assessment process. Program Educational Objectives should be aligned with the institution’s mission and vision. Creating measurable performance indicators for each student learning outcome will help ensure coursework aligns with ABET criteria. Indirect assessments, such as course evaluations, faculty surveys, and capstone surveys, can provide valuable feedback for continuous improvement.

In Autumn 2024, the assessment team prepared the readiness review and developed the curriculum review based on the continuous improvement processes. The administrators worked closely with all regional campuses to compile Criteria 1, 2, 5 and 6, which are mandatory for the Readiness Review. At the end of the Spring 2025 semester, the plan is to incorporate the assessment results and demonstrate “closing of the loop” by addressing any concerns from the past cycles and including them into the Self-Study report.

The Industrial Advisory Council (IAC) is also playing a crucial role in curriculum revisions to incorporate industrial standards into the program. Capstone projects are being sponsored by the industry that needs graduates from this program. The assessment team is part of IAC to help bridge the gap between industry professionals and faculty. IAC also reviewed the PEOs and the CDAC has approved the changes. With all these processes in place, the assessment team believes that a cohesive plan has been established for the ABET accreditation process. After attending the annual ABET symposium, the assessment team has begun compiling documents and preparing a Self-Study report for initial accreditation. The authors plan to continue sharing the best practices and lessons learned as this program progresses through the ABET accreditation process. The authors will strive to contribute to the community of ETAC programs offered at multiple campuses and help guide them through the process as they continue to overcome the challenges and build a successful assessment program.

Another initiative in preparation for the site visit would be offering mock visits to prepare the faculty, staff and administrators. Programs having site visits in the upcoming fall semester would benefit from the mock site visits during summer and plan to coordinate efforts across multiple locations.

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