Program Review/Assessment

Program Name: Wind Energy Technology, AAS (CIP Code: 23150403) and CAS (CIP Code: 22150403)

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Contents

Section I. Overview of Program Assessment/Guidelines

1. Mission of Program Assessment

Program assessment at Eastern is a systemic process geared towards achieving the following goals:

- Instituting a cyclic process of curricular review that examines the appropriateness of Program Learning Outcomes (PLOs), Course Learning Outcomes (CLOs), and Program Goals (PG) to ensure that the academic Program is reflective of the current needs within the respective academic realm.
- Establishing a systematic process for the collection of student learning outcomes and program data that can be used for the continual improvement in teaching, learning, student retention, and student success.

2. Program Assessment Process (Steps)

Every 4 years, academic programs will complete the program assessment packet with the required information. As part of the 5-year cycle, all programs will:

1. Examine and, if needed, update Program Learning Outcomes (PLOs) and Course Learning Outcomes (CLOs) to guarantee their measurability and relevance in achieving program objectives. As part of this review process, it is essential to align CLOs with the overarching PLOs, allowing for the selection of specific CLOs from certain courses to assess the attainment of PLOs.
2. Provide a copy of the PLO course program matrix identifying which courses the PLOs are covered in the Program.
3. Identify in program syllabi which General Education Learning Outcomes (GELOs) are covered and assessed in program courses and map the GELOs to courses in the matrix.
4. As part of the 5-year review cycle, set up the order in which you will assess the Program Learning Outcomes (PLOs) within the Program. For instance, if a program comprises 8 PLOs, a practical strategy is to conduct assessments on 2 PLOs each year. By following this approach over the span of 5 years, all PLOs will have undergone evaluation.
5. As Course Learning Outcomes (CLOs) should be appropriately harmonized with Program Learning Outcomes (PLOs), programs have the flexibility to select CLOs from specific courses for assessing the level of student learning achievement and the effectiveness of teaching methods. The choice of which CLOs to assess, as an indication of student and program fulfillment of PLOs, relies on the Program's investigative approach.

<u>Here are some suggestions for selecting CLOs:</u>

a. Focus on CLOs that are typically challenging for students to grasp.

b. Consider CLOs where different teaching methods have been employed to convey the material.

c. Take into account program outcome data, such as results from national certifications or standardized exams, which may reveal areas where program graduates encounter difficulties in specific learning domains.

d. Assess revised or new Course Learning Outcomes that have not been previously evaluated.

e. To assess student achievement of Course Learning Outcomes, it is essential to establish a robust foundation in assessment processes and utilize a diverse range of methods for evaluating learning. More specifically, data collection methods that capture individual and group learning achievements, aligned with CLOs, provide invaluable insights. Rubrics, in particular, offer data that not only reveals the extent of student learning but also pinpoints specific areas of strengths and weaknesses in relation to the learning objectives. Furthermore, the use of rubrics assists students in gaining a clear understanding of the assessment criteria and objectives against which their work will be judged. Both formative and summative assessment techniques can also serve as valuable sources of information for making well-informed decisions.

f. Incorporating formative assessments at regular intervals within courses serves as a valuable means of continually gauging the extent of student learning. It offers instructors the chance to provide feedback and adapt their teaching methods to enhance student learning. Additionally, formative assessment data can be harnessed to report on student progress, illustrating the collective advancement in particular Course Learning Outcomes (CLOs).

g. Traditionally, instructors have often relied on reporting the exam or class average as a measure of student learning. However, presenting only the average grade or percentage from summative or end-of-course assessments is insufficient unless the Course Learning Outcomes (CLOs) have been properly

aligned with the assessment, allowing for a detailed individual analysis of CLO achievement. For instance, stating that the class achieved an overall average of 76% on an exam leaves questions about the 24% of information or content areas that students didn't grasp. Similarly, reporting that the class's average final grade was a "C," prompts inquiries about the 25% of content within the class that students weren't able to master.

Instructors should develop a method that delves into varying degrees of learning, enabling them to ascertain which CLOs students are mastering effectively and which ones they are struggling with. CLO alignment methods should also offer insights into individual student achievements and class-level aggregates.

h. The ultimate aim of program assessment is to consistently enhance both student achievement and instructional methods. To attain this objective, it is essential to employ regular, valid, and dependable assessment approaches throughout the course delivery.

Section II. Program Goals, Degrees/Certificates, PLO's

1. Program Goals: These goals are designed to reflect the primary outcomes of the Wind Energy Technology (WTT) programs while aligning with Eastern's revamped program review criteria, focusing on viability and consistency with the mission, and integration of annual assessments of student learning outcomes into the program review cycle.

Program Goals for the WTT Programs:

1. **Educational Excellence and Relevance:** To provide comprehensive technical education in Wind Energy Technology that utilizes industry-recognized maintenance practices across electrical, pneumatic, hydraulic, and mechanical systems, as well as computer control, data acquisition, and periodic and predictive maintenance. This goal aims to ensure the curriculum remains current and reflective of industry standards and advancements.

2. **Workforce Preparedness and Technical Proficiency:** To prepare graduates for immediate employment and career advancement in the wind industry and related fields by equipping them with the necessary technical skills, including the ability to troubleshoot, repair, and maintain wind power generation and distribution systems, as well as hydraulic controls used in the wind industry.

3. **Safety and Environmental Awareness:** To instill a deep understanding of general industry and wind-specific OSHA safety standards and regulations, coupled with environmental awareness and job hazard assessment/mitigation strategies, ensuring that graduates can apply these principles practically in the field.

4. **Application of Technology and Data Analysis:** To enhance graduates' abilities to employ computers and software applications for monitoring, troubleshooting, remote control, and report writing specific to the wind industry, promoting efficiency and innovation in maintenance planning and operations.

5. **Communication and Collaboration:** To develop graduates' communication and teamwork skills, enabling them to work collaboratively and effectively in diverse, wind-related industrial settings. This includes the ability to communicate technical information clearly and demonstrate global awareness and understanding of human diversity.

These goals aim to address both the technical competencies required by the industry and the soft skills essential for success in the workplace, ensuring the programs' viability and alignment with Eastern's mission and the broader needs of the community and industry.

2. Degrees and Certificates Awarded: The WTT programs at Eastern have shown variability in graduation rates from Fall 2019 through Spring 2024. The one-year Certificate in Applied Science (CAS) Program experienced fluctuations in graduate numbers, with a noticeable peak in Spring 2020. Following this, the Program saw periods of lower completion rates, including several semesters with no graduates, before observing a slight increase in Spring 2023. Similarly, the Associate in Applied Science (AAS) program demonstrated variability, with a notable increase in Spring 2021 and a positive uptick in Spring 2024, suggesting a growing interest or improved retention strategies in the Program. These

trends reflect the "dynamic" nature of enrollment and completion rates and underscore the importance of ongoing assessment and adaptation to meet student and industry needs effectively.

Graduate Chart with Totals:

Semester	CAS Graduates	AAS Graduates
Fall 2019	0	2
Spring 2020	8	1
Fall 2020	2	0
Spring 2021	4	6
Fall 2021	0	1
Spring 2022	0	2
Fall 2022	1	1
Spring 2023	5	2
Fall 2023	1	0
Spring 2024	1	4
Total	**22**	**19**

3. List your Program Learning Outcomes:

Both the CAS and AAS programs share the same Program Learning Outcomes (PLOs):

1. Demonstrate knowledge of electrical, mechanical, and fluid power equipment and discuss how to troubleshoot, repair, and maintain them along with power generation and distribution systems specific to wind energy.

2. Develop an understanding of both general industry and wind-specific OSHA safety standards and regulations and how they apply in the field using specific examples.

3. Use diagnostic tools and resources, including schematics and operating manuals, for wind system analysis and troubleshooting.

4. Integrate environmental awareness and job hazard assessment and mitigation strategies into wind energy operations.

5. Employ computers and software applications for monitoring, troubleshooting, communicating/remote control, and report writing specific to the wind industry.

6. Demonstrate knowledge of various simple and complex electromechanical components pertaining to their function in a system with hands-on coursework.

7. Perform basic calculations to measure and calculate voltage, amperage, resistance, continuity, voltage drop, pressures, and temperatures using multimeters and other measuring tools.

8. Demonstrate an understanding through discussion of what goes into routine wind turbine maintenance and repair along with the tooling needed to do so.

4. Have you revised any of your Program Learning Outcomes (PLOs) since your last program assessment? If yes, list which ones below. Show previous outcomes and revised outcomes. Explain rationale for revising PLOs.

Former Program Learning Outcomes for CAS in Wind Energy Technology:

1. Demonstrate basic knowledge of electrical equipment and operations

2. Demonstrate basic knowledge of mechanical equipment and operations

3. Demonstrate basic knowledge of fluid power equipment and operations

4. Demonstrate safety practices common to the wind industry

5. Troubleshoot, repair, and maintain electrical systems common to wind power generation

6. Troubleshoot, repair, and maintain distributive power systems common to wind power generation

7. Troubleshoot, repair, and maintain hydraulic controls used in the wind industry

8. Use commonly available instruments to analyze and troubleshoot systems

9. Use schematics, operating manuals, and troubleshooting guides to troubleshoot equipment commonly used in the wind industry

10. Demonstrate climbing, rescue, and emergency medical techniques and procedures necessary for the wind industry

11. Apply safety procedures in the industrial environment including those applicable to hand and power tools

12. Demonstrate job hazard assessment and resolution to hazards

Former Program Learning Outcomes for AAS in Wind Energy Technology:

1. Demonstrate knowledge of electrical equipment and operations

2. Demonstrate knowledge of mechanical equipment and operations

3. Demonstrate knowledge of fluid power equipment and operations

4. Demonstrate safety practices common to the wind industry

5. Troubleshoot, repair, and maintain electrical systems common to wind power generation

6. Troubleshoot, repair, and maintain distributive power systems common to wind power generation

7. Troubleshoot, repair, and maintain hydraulic controls used in the wind industry

8. Use commonly available instruments to analyze and troubleshoot systems

9. Use schematics, operating manuals, and troubleshooting guides to troubleshoot equipment commonly used in the wind industry

10. Demonstrate climbing, rescue, and emergency medical techniques and procedures necessary for the wind industry

11. Apply safety procedures in the industrial environment including those applicable to hand and power tools

12. Demonstrate job hazard assessment and resolution to hazards

13. Apply computers in troubleshooting, maintenance planning, and report writing using application software relevant to the wind industry

14. Demonstrate proficiency in wind turbine troubleshooting, maintenance, and repair

15. Demonstrate proficiency in airfoil composite and repair

Rationale for Revising PLOs:

The revision from the previous PLOs to the streamlined list in December 2023 was driven by the goal of enhancing the programs' focus on measurable, directly assessable outcomes. This decision was made to:

- Reduce Complexity: Conflating the original PLOs into a more concise list for ease of assessment over the program's five-year cycle.
- Improve Assessability: Focus on PLOs that could be clearly measured and assessed, eliminating those that were less tangible or harder to quantify.
- Align with Course Outcomes: Ensure a closer crosswalk between PLOs and Course Level Outcomes (CLOs), facilitating an efficient and systematic assessment of PLOs on an annual basis.
- Enhance Program Quality: By concentrating on core competencies and eliminating redundancies, the program aims to maintain a high standard of education that is aligned with industry needs and educational best practices.

This rationalization of PLOs reflects a commitment to continuous improvement, ensuring that the WTT programs remain relevant, focused, and aligned with the evolving demands of the wind energy sector and the broader field of renewable energy.

5. Provide a copy of the most current PLO mapping to Course Grid to show alignment of PLOs to courses in the curriculum. Provide a copy of the most current General Education Learning Outcomes (GELOs) mapping to Course Grid to show where GELOs are covered in the curriculum (include link below)

https://ewvctc.sharepoint.com/:x:/s/EWVShare-Academics/EVX3olU4ZPtNlOzxRBHhgh8BlHy31rmGQlT7w2bzz9hPPg?e=dXiYzI

Section III. PLO Cycle of Assessment

1. For this cycle of program assessment, use the table below to show which PLOs will be assessed each year. Note: All PLOs must be assessed over the 5-year period.

PLO Cycle of Assessment for Wind Energy Technology Programs

Cycle	Program Learning Outcomes Assessed
Year 1	**PLO #1:** Demonstrate knowledge of electrical, mechanical, and fluid power equipment and discuss how to troubleshoot, repair, and maintain them along with power generation and distribution systems specific to wind energy. **PLO #5:** Employ computers and software applications for monitoring, troubleshooting, communicating/remote control, and report writing specific to the wind industry.
Year 2	**PLO #2:** Develop an understanding of both general industry and wind-specific OSHA safety standards and regulations and how they apply in the field using specific examples. **PLO #6:** Demonstrate knowledge of various simple and complex electromechanical components pertaining to their function in a system with hands-on coursework.
Year 3	**PLO #3:** Use diagnostic tools and resources, including schematics and operating manuals, for wind system analysis and troubleshooting. **PLO #7:** Perform basic calculations to measure and calculate voltage, amperage, resistance, continuity, voltage drop, pressures, and temperatures using multimeters and other measuring tools.
Year 4	**PLO #4:** Integrate environmental awareness and job hazard assessment and mitigation strategies into wind energy operations.
Year 5	**PLO #8:** Demonstrate an understanding through discussion of what goes into routine wind turbine maintenance and repair along with the tooling needed to do so.

Rationale for the Cycle:

Year 1: Starting with PLO #1 and PLO #5 allows for an assessment of students' initial grasp of electrical, mechanical, and fluid power equipment and their ability to employ computers and software for industry-specific tasks. These foundational skills are crucial as students begin their technical education.

Year 2: Building on safety and more in-depth technical skills (PLO #2 and PLO #6) corresponds with students gaining more specialized knowledge and preparing for more complex troubleshooting and repair tasks.

Year 3: Focusing on diagnostic tools and basic calculations (PLO #3 and PLO #7) mid-program supports the practical application of skills in diagnosing and troubleshooting wind turbine systems.

Year 4: Assessing environmental awareness and safety strategies (PLO #4) ahead of capstone experiences ensures that students are well-prepared to apply these considerations in real-world settings.

Year 5: Concluding with an assessment of maintenance and repair understanding (PLO #8) aligns with the practical application of cumulative program knowledge in internships or capstone projects, providing a comprehensive review of readiness for the workforce.

This cycle supports a systematic and phased assessment of all PLOs, aligning with course sequencing and the skill development of students in both the CAS and AAS programs. It ensures that each outcome is not only taught but assessed for effectiveness and impact on student learning, facilitating continuous program improvement.

Section IV. Course Learning Outcomes Assessment

1. **In this section, identify the CLOs for the yearly cycle that were assessed to determine student achievement of aligned PLOs.**

2. **Provide assessment data that includes rubric reports, graphs, or other data that reflects group performance on meeting selected CLOs. Reporting just a class average is unacceptable.**

3. **In the section for each annual assessment, provide an explanation of the assessment data findings.**

4. **Based on the assessment findings, provide planned improvements to teaching and learning to address any deficiencies in student learning outcomes.**

Alignment Overview

The alignment process in curriculum development and program review is a critical step in ensuring that educational programs meet the needs of students, industry standards, and accreditation requirements. The "WTT AAS/CAS Program Alignment Matrix" (link provided on page 8) serves as a foundational document in this process, illustrating the direct relationships between Program Learning Outcomes (PLOs), Course Learning Outcomes (CLOs), and General Education Learning Outcomes (GELOs).

This process involves a detailed review of how each course within the WTT AAS and CAS programs contributes to the overarching program outcomes. By mapping each CLO to specific PLOs, the matrix highlights where students are expected to demonstrate their acquired skills and knowledge. Similarly, the alignment of GELOs with PLOs ensures that the program not only focuses on technical competencies but also on broader educational goals, such as technological competency and scientific reasoning.

The use of the program alignment matrix is particularly important in the context of the upcoming program review cycle for 2024-2029. It sets the stage for a systematic review and potential curriculum adjustments, ensuring that the program remains relevant and responsive to both student and industry needs.

Summary of Course Assessments

Course assessments have been an ongoing activity, focusing on evaluating how well current courses meet designated learning outcomes. These assessments have highlighted areas of strength and opportunities for improvement within individual courses and the program at large.

As we transition to a new process in the future, highlighted by the structured approach in the program alignment matrix, it is crucial to build on these assessment activities. The summary of past course

assessments indicates a commitment to continuous improvement and sets a baseline for future enhancements but needs improvement. This historical data is valuable in informing the alignment process, ensuring that revisions to the curriculum are evidence-based and aligned with both programmatic and general education goals.

Moving Forward

As Eastern embarks on this alignment review process, the goal is to create a more integrated and coherent curriculum that aligns with the strategic objectives of the WTT programs and the broader educational goals of the institution. This process is a vital step in preparing our students for successful careers in the renewable energy sector and beyond.

The forthcoming program review report for 2024-2029 will reflect not only the outcomes of this alignment process but also a commitment to excellence and continuous improvement in our educational programs.

CLO and PLO Alignment in Wind Energy Technology Programs

The alignment of CLOs with PLOs covers all essential aspects of wind energy technology, from technical skills to safety, professional communication, and environmental awareness. Here's a summary table reflecting this alignment:

Summary of CLO to PLO Alignments

Course Code	Course Title	CLOs Aligned to PLOs
ELM 121	Fundamentals of Hydraulics and Pneumatics	**PLO 1:** CLOs 1-6; **PLO 6:** CLOs 3-6
ENL 115	Technical Communication	**PLO 5:** CLOs 2C, 2D
WTT 110	Wind Safety and OSHA	**PLO 1:** CLOs 1-6; **PLO 4:** CLOs 1, 3, 6
WTT 120	DC/AC Circuits	**PLO 1:** CLOs 1-6; **PLO 6:** CLOs 1-4; **PLO 7:** CLOs 5-6
ELM 217	Industrial Maintenance Fundamentals	**PLO 1:** CLOs 1-9; **PLO 8:** CLOs 1, 3, 4, 5, 6, 8
WTT 150	Industrial Motor Controls	**PLO 1:** CLOs 1-5
WTT 160	Power Generation and Transmission	**PLO 5**: CLOs 3, 5; **PLO 6:** CLO 6; **PLO 7:** CLO 5
ELM 210	PLC Fundamentals	**PLO 5:** CLOs 1, 3, 4, 7; **PLO 6:** CLOs 1, 2, 5
ELM 218	Maintenance Applications	**PLO 1:** CLOs 2-7; **PLO 5:** CLO 1
SSC 147	Understanding Human Diversity	**PLO 4:** CLOs 1, 6, 7

Course Code	Course Title	CLOs Aligned to PLOs
WTT 211	Wind Turbine Mechanical Systems	**PLO 1:** CLOs 4, 5, 6, 7, 8, 10, 11, 12, 14, 15; **PLO 2:** CLOs 2, 13; **PLO 3:** CLOs 1, 3, 9, 14; **PLO 8:** CLO 3
WTT 230	Supervisory Control and Data Acquisition	**PLO 3:** CLOs 5, 6; **PLO 5:** CLOs 1-4
WTT 261	Wind Turbine Electromechanical Systems & Troubleshooting II	**PLO 1:** CLOs 1-15; **PLO 2:** CLOs 2, 12, 15; **PLO 3:** CLOs 8, 9, 13, 14; **PLO 6:** CLOs 3, 4, 5, 6, 7; **PLO 8:** CLOs 5, 8, 10, 11, 15
WTT 278/ELM 276	Wind Technician Internship II	**PLO 1:** CLO 1; **PLO 6:** CLO 3; **PLO 8:** CLOs 1, 2, 3, 4, 5, 11

GELO and PLO Alignment

The integration of General Education Learning Outcomes (GELOs) with Program Learning Outcomes (PLOs) in the WTT programs at Eastern represents a strategic approach to crafting a holistic educational experience for students. This integration is designed to ensure that students gain the technical proficiency required in Wind Energy Technology and develop a well-rounded set of skills essential for lifelong learning.

The alignment between GELOs and PLOs facilitates the development of a comprehensive skill set where general education objectives complement and enhance the specialized learning outcomes of the WTT programs. For example:

Technological Competency (GELO) aligned with PLO #5 ("Technical Proficiency"): This alignment underscores the importance of leveraging technological resources and tools effectively, a skill that is foundational for success in the technologically intensive field of wind energy. Students learn not only the technical aspects of wind turbine operation and maintenance but also how to approach technological challenges creatively and innovatively.

Scientific and Quantitative Reasoning (GELO) aligned with PLO #7 ("Analytical Skills and Problem-Solving"): By aligning scientific and quantitative reasoning with analytical skills and problem-solving, the Program ensures that students are well-equipped to interpret data, analyze problems, and devise effective solutions based on sound scientific principles. This competency is critical for diagnosing and troubleshooting issues within wind turbine systems and for engaging in evidence-based decision-making.

The Institutional Effectiveness Plan (IEP) outlines a comprehensive approach to measuring and improving General Education Learning Outcomes (GELOs) across the college. A pivotal strategy in enhancing the assessment of GELOs is the adoption of standardized rubrics for evaluating student performance in relation to each of the seven GELO domains. This systematic approach is geared towards streamlining the assessment process, making it more effective and aligned with contemporary educational demands.

The process of curriculum mapping executed in Fall 2023 played a crucial role in integrating PLOs and GELOs into the curriculum. This mapping is essential for the subsequent phases, which include the deployment of rubrics tailored to each GELO and establishing a new assessment schedule that integrates seamlessly with Eastern's learning management system, Brightspace. This integration aims to expedite the collection of assessment data across various programs and courses, fostering a more efficient evaluation process.

The significance of utilizing standardized rubrics lies in their ability to provide a uniform and systematic method for scoring and analyzing student artifacts. This not only ensures consistency across the assessment of different GELOs but also offers a straightforward tool for educators to evaluate student work. This approach enables the college to dissect the assessment data for each educational goal, offering insights into areas of strength and those requiring improvement. By simplifying the assessment process, the college can more accurately reflect the attainment of general education skills among its students.

2019 – 2024 Course Assessments Summary

In the process of evaluating the WTT programs' effectiveness and the alignment of course content with Program Learning Outcomes (PLOs), a detailed review of course assessment reports was undertaken. These assessments provide valuable insights into the current state of the program and opportunities for improvement. The assessment reports reviewed for this summary include the following:

- ELM 218 (Maintenance Applications) Fall 2020 Course Assessment Report
- WTT 120 (DC/AC Circuits) Fall 2020 Course Assessment Report
- WTT 160 (Power Generation and Transmission) Spring 2019 Course Assessment Report
- WTT 230 (Supervisory Control and Data Acquisition) Spring 2019 Course Assessment Report
- WTT 261 (Wind Turbine Electromechanical Systems & Troubleshooting II) Spring 2019 Course Assessment Report
- MTH 117 (Math for Technicians) Spring 2019 Course Assessment Report
- CIS 114 (Introduction to Computers and Information Systems) Spring 2022 Course Assessment Reports for sections A12 and HY1
- SSC 147 (Understanding Human Diversity) Spring 2021 Course Assessment Report
- GSC 120 (Physical Science) Fall 2019 Course Assessment Report

These reports cover a wide range of courses within the program, offering a view of the learning outcomes achieved, methodologies employed, and the effectiveness of the assessment processes used. They form the basis for the following summary, which highlights key findings from the assessments and outlines the transition to a new, more streamlined assessment process.

The following chart provides a summary of the course assessment outcomes from the reviewed reports, indicating which CLOs were successfully met, partially met, or not met:

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Course	Outcomes Met	Outcomes Partially Met	Outcomes Not Met
ELM 218 (Maintenance Applications)	CLOs 2, 4, 5, 7	CLOs 1, 3, 6	None reported
WTT 120 (DC/AC Circuits)	CLOs 1-6	None	None reported
WTT 160 (Power Generation and Transmission)	CLOs 1, 3, 5, 6	CLOs 2, 4	None reported
WTT 230 (Supervisory Control and Data Acquisition)	CLOs 1-6	None	None reported
WTT 261 (Wind Turbine Electromechanical Systems & Troubleshooting II)	All CLOs met	None	None reported
MTH 117 (Math for Technicians)	CLOs 1-4	None	CLO 5
CIS 114 (Introduction to Computer Applications and Concepts)	CLOs 1-3, 5	CLO 4	None reported
SSC 147 (Understanding Human Diversity)	All CLOs met	None	None reported
GSC 120 (Concepts in Environmental Science)	CLOs 1, 2, 4, 5	None	CLO 3

Strengths:

High Performance in Key Competencies – Courses such as ELM 218 (Maintenance Applications) and MTH 117 (Math for Technicians) showcased high student performance in critical skill areas relevant to the WTT programs. For instance, in ELM 218, students demonstrated a strong grasp of maintenance troubleshooting principles, which is crucial for their future roles in industrial systems maintenance.

Effective Course Delivery and Assessment Methods – Various modalities, including online assignments, lab exercises, written tests, and final exams, have been effectively utilized to assess and reinforce learning. The use of platforms like Brightspace and MyMathLab facilitated immediate feedback and tutorials, enhancing the learning experience.

Opportunities for Improvement:

Areas Requiring More Focus – Some courses identified specific learning outcomes where student performance did not meet the set standards. For example, in MTH 117, the application of trigonometry in solving applied problems involving right and oblique triangles saw a lower percentage of correct responses, indicating a need for more targeted instruction in these areas.

Engagement and Instructional Strategies – The assessments pointed out the necessity of emphasizing important topics more effectively during lectures. There is also a call for more detailed action plans addressing specific shortcomings, suggesting a need for continuous improvement in teaching strategies and course content relevance.

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Transition to New Assessment Process:

The current program review cycle's assessments will serve as a foundational reference as the WTT programs transition to a new and improved assessment process. The findings from these assessments underline the importance of aligning course content with PLOs more closely and ensuring that teaching methods effectively address all learning outcomes.

The implementation of standardized rubrics across the college to measure General Education Learning Outcomes GELOs and the introduction of an assessment matrix or course map are steps towards a more streamlined and efficient course assessment process. The use of Brightspace Mastery for future assessments aims to further enhance the quality and effectiveness of course evaluations, ensuring a more integrated and comprehensive approach to assessing student learning and program effectiveness.

For each year of the WTT programs' five-year assessment cycle, PLOs will be evaluated to ensure student proficiency and alignment with industry standards. These yearly focuses allow for a targeted review of CLOs across a range of courses. Here is how the cycle is structured to address distinct areas of competency:

Year 1 Program Assessment (2024-2025)

PLO #1: Demonstrate knowledge of electrical, mechanical, and fluid power equipment and discuss how to troubleshoot, repair, and maintain them along with power generation and distribution systems specific to wind energy.

PLO #5: Employ computers and software applications for monitoring, troubleshooting, communicating/remote control, and report writing specific to the wind industry.

Course Code	Course Title	CLOs Aligned to PLO #1	CLOs Aligned to PLO #5
ELM 121	Fundamentals of Hydraulics and Pneumatics	CLOs 1-6	
WTT 120	DC/AC Circuits	CLOs 1-6	
ELM 217	Industrial Maintenance Fundamentals	CLOs 1-9	
WTT 150	Industrial Motor Controls	CLOs 1-5	
ELM 218	Maintenance Applications	CLOs 2-7	CLO 1
WTT 211	Wind Turbine Mechanical Systems	CLOs 4, 5, 6, 7, 8, 10, 11, 12, 14, 15	
WTT 261	Wind Turbine Electromechanical Systems & Troubleshooting II	CLOs 1-15	
WTT 278/ELM 276	Wind Technician Internship II	CLO 1	

Course Code	Course Title	CLOs Aligned to PLO #1	CLOs Aligned to PLO #5
ENL 115	Technical Communication		CLOs 2C, 2D
WTT 160	Power Generation and Transmission		CLOs 3, 5
ELM 210	PLC Fundamentals		CLOs 1, 3, 4, 7
WTT 230	Supervisory Control and Data Acquisition		CLOs 1-4

Year 2 Program Assessment (2025-2026)

PLO #2: Develop an understanding of both general industry and wind-specific OSHA safety standards and regulations and how they apply in the field using specific examples.

PLO #6: Demonstrate knowledge of various simple and complex electromechanical components pertaining to their function in a system with hands-on coursework.

Course Code	Course Title	CLOs Aligned to PLO #2	CLOs Aligned to PLO #6
WTT 110	Wind Safety and OSHA	CLOs 1-6	
WTT 211	Wind Turbine Mechanical Systems	CLOs 2, 13	
WTT 261	Wind Turbine Electromechanical Systems & Troubleshooting II	CLOs 2, 12, 15	CLOs 3-7
ELM 121	Fundamentals of Hydraulics and Pneumatics		CLOs 3-6
WTT 120	DC/AC Circuits		CLOs 1-4
WTT 160	Power Generation and Transmission		CLO 6
CIS 114	Introduction to Computer Applications and Concepts		CLOs 1, 2, 5
WTT 278/ELM 276	Wind Technician Internship II/Electromechanical Capstone		CLO 3

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Year 3 Program Assessment (2026-2027)

PLO #3: Use diagnostic tools and resources, including schematics and operating manuals, for wind system analysis and troubleshooting.

PLO #7: Perform basic calculations to measure and calculate voltage, amperage, resistance, continuity, voltage drop, pressures, and temperatures using multimeters and other measuring tools.

Course Code	Course Title	CLOs Aligned to PLO #3	CLOs Aligned to PLO #7
WTT 211	Wind Turbine Mechanical Systems	CLOs 1, 3, 9, 14	
WTT 230	Supervisory Control and Data Acquisition	CLOs 5, 6	
WTT 261	Wind Turbine Electromechanical Systems & Troubleshooting II	CLOs 8, 9, 13, 14	
WTT 120	DC/AC Circuits		CLOs 5-6
WTT 160	Power Generation and Transmission		CLO 5

Year 4 Program Assessment (2027-2028)

PLO #4: Integrate environmental awareness and job hazard assessment and mitigation strategies into wind energy operations.

Course Code	Course Title	CLOs Aligned to PLO #4
WTT 110	Wind Safety and OSHA	CLOs 1, 3, 6
SSC 147	Understanding Human Diversity	CLOs 1, 6, 7

Year 5 Program Assessment (2028-2029)

PLO #8: Demonstrate an understanding through discussion of what goes into routine wind turbine maintenance and repair along with the tooling needed to do so.

Course Code	Course Title	CLOs Aligned to PLO #8
ELM 217	Industrial Maintenance Fundamentals	CLOs 1, 3, 4, 5, 6, 8
WTT 211	Wind Turbine Mechanical Systems	CLO 3
WTT 261	Wind Turbine Electromechanical Systems & Troubleshooting II	CLOs 5, 8, 10, 11, 15

Course Code	Course Title	CLOs Aligned to PLO #8
WTT 278/ELM 276	Wind Technician Internship II	CLOs 1, 2, 3, 4, 5, 11

Section V. Program Assessment Summary

In this section, provide an overall summary of findings for the 5-year cycle. Include in your summary any curricular changes that have been made based on assessment results, changes to course syllabi, and changes in teaching methods to improve student learning. Also include any program recommendations for enhancing the Program (equipment, teaching aids, staff resources/training and professional development requests directed at improving teaching and learning).

The initiation of the 5-year program review cycle for the WTT programs will mark a significant period of assessment and enhancement aimed at elevating the educational quality and relevance of the curriculum to industry standards. Notably, under the leadership of a new WTT instructor/program coordinator who joined in Fall 2023, the programs have undergone substantial curricular revisions. These changes were primarily focused on streamlining the PLOs in December 2023 to make them more attainable and relevant to current industry needs, as well as reworking course syllabi to foster a more welcoming and student-centered learning environment.

The new instructor's approach to teaching has been markedly student-centric, emphasizing flexibility, approachability, and a readiness to engage directly with students to facilitate understanding. This shift has not only made the language of course materials more accessible but also transformed the classroom culture to one that encourages inquiry and hands-on learning. The instructor's commitment to pedagogical improvement is demonstrated through his active engagement with the HOW2 Platform, aimed at adopting evidence-based teaching strategies.

Recognizing the critical importance of aligning educational outcomes with industry needs, the instructor has convened two advisory committee meetings in the 2023-2024 Academic Year. These sessions have been notably successful in bringing together key industry partners, including Clearway – the region's major wind energy provider – and Enbridge, which is embarking on constructing a new wind farm in Hardy County. These meetings serve not just as a platform for dialogue but as a bridge connecting the academic and professional" worlds," ensuring that the curriculum remains responsive to the demands of the wind energy sector.

A particularly exciting development from these discussions is the exploration of new Learn and Earn initiatives. Aimed at enhancing students' practical learning experiences while alleviating the financial burden on employers, these initiatives propose a model where the State of West Virginia subsidizes half of the students' wages during their internships. This approach not only incentivizes employers to offer more internship opportunities but also provides students with a pathway to gain hands-on experience and potentially secure full-time positions post-graduation.

Program Enhancements and Recommendations

Professional Development: The new instructor's participation in the Empowering Faculty and Resources in Education (EFARE) program highlights a proactive approach to professional development. This mentorship program, designed to enhance teaching effectiveness, provides the instructor with valuable insights and strategies to improve student learning outcomes.

Certification and Exit Testing: A significant concern has been the challenges faced with the NIMS certification tests, where no students have achieved passing scores. Recognizing the potential demotivation this poses, the full-time instructor is exploring the adoption of Festo Didactic/NC3 certifications through the National Coalition of Certification Center. This move is anticipated to align better with the programs' learning outcomes and offer students more achievable certification goals.

Program Specialization Tracks: In a move to diversify the programs and cater to varying student interests and career aspirations, the WTT AAS program will introduce emphasis tracks. After acquiring foundational knowledge in their first year, students will have the option to specialize in wind energy, industrial maintenance, or solar energy. This modular approach is expected to not only enhance the program's appeal but also ensure that graduates are well-prepared to meet specific industry demands.

Concluding Recommendations

To further enhance its programs' effectiveness and relevance, it is recommended that the WTT programs consider the following:

Equipment and Teaching Aids: Investment in equipment and resources tailored to the new specialization tracks to ensure that students gain hands-on experience with industry-standard tools and technologies.

Staff Training and Development: Continuous professional development opportunities for WTT faculty to stay abreast of technological advancements and pedagogical strategies in wind and renewable energy education.

Industry Partnerships: Strengthening connections with industry stakeholders to provide students with more internship/apprenticeship opportunities, guest lectures, and real-world project collaborations.

Feedback Mechanisms: Establishing regular feedback channels with alumni and employers to continually refine the curriculum and teaching methodologies based on industry evolution and job market demands.

Section VI. Enrollment

In this section, provide an overall summary of:

1. Enrollment trends within the Program over the past 5 years. Please indicate any efforts to address enrollment declines, including efficiencies/strategies instituted to reduce unnecessary costs.

Over the past five years, enrollment trends within the WTT programs at Eastern have shown fluctuations, with a noticeable dip in the middle years prompting actions to increase interest and participation. Recognizing the need to reverse this trend, the program has spearheaded several initiatives to enhance its visibility and appeal to prospective students.

Key among these initiatives is the partnership with Callie Dayton, External Affairs Manager at Clearway, a leading provider of wind energy in the region. This collaboration has been instrumental in elevating the program's profile both locally and nationally. Through Callie Dayton's efforts, the program has engaged in community outreach and promotional activities aimed at highlighting the benefits and opportunities within the wind energy sector. Her involvement has been pivotal in broadening the program's network and strengthening its ties with industry leaders.

To directly address enrollment declines, the current full-time instructor has adopted a more proactive approach by visiting local middle and high schools. These visits serve not only as recruitment opportunities but also as educational engagements, introducing students to the potential and importance of renewable energy careers early on. Working with the KidWind Project further complements these efforts, integrating wind energy learning modules into the curricula of participating schools and fostering early interest in the field.

The introduction of emphasis tracks within the programs – allowing for specialization in wind energy, industrial maintenance, or solar energy – will be a strategic move to attract a broader array of students. The new instructor's recent training in solar power and active involvement in training signifies the program's commitment to adaptation to the evolving energy landscape.

The analysis of enrollment trends over the last five years indicates a gradual recovery, with the impending introduction of emphasis tracks in the next few years and enhanced industry partnerships marking a positive shift in the program's trajectory. These efforts underscore Eastern's dedication to forging a path toward sustainable growth and development in alignment with industry needs and renewable energy goals.

2. Retention and program data graduation rates.

The WTT programs have demonstrated impressive retention and graduation rates over the past five years, achieving success within the institution and against broader educational benchmarks. With only 3 students not retained and 41 degrees conferred during the five years, the programs have shown a strong commitment to student success and program quality, with the graduation rate for this period being 93%.

Retention rates for both the CAS and AAS are higher than the general college rates, highlighting the effectiveness of program support and engagement strategies. Again, the programs have lost only 3 students in the last five years while conferring 41 degrees, indicating a solid framework for student retention and success.

Among the graduates, a significant number have transitioned directly into the workforce, with 18 out of 22 finding full-time positions in the wind energy or industrial maintenance fields. This success rate underscores the program's alignment with industry needs and its effectiveness in preparing students for immediate employment. Additionally, one graduate has furthered his education by receiving a bachelor's degree in engineering, showcasing the program's ability to provide pathways for advanced education and career progression.

3. Other program challenges related to enrollment, staffing, equipment/technology needs (if applicable).

In addressing the challenges related to enrollment, staffing, and equipment needs within the WTT programs, several key areas require attention. Firstly, enrollment efforts are being bolstered through the introduction of emphasis tracks, aiming to cater to diverse student interests and needs by offering specializations in wind energy, industrial maintenance, or solar energy. This strategy is anticipated to enhance the program's appeal and encourage higher enrollment numbers.

Staffing remains a significant challenge, particularly in recruiting adjunct faculty. The competitive wages offered by the wind energy and industrial maintenance industries pose a challenge to attracting instructors for adjunct positions due to the lower compensation rates within academia. To mitigate this, the program has reached out to alumni, leveraging their expertise and willingness to contribute back to their alma mater. This approach has facilitated a hybrid teaching model, combining in-person instruction with online components. Utilizing Brightspace and Amatrol's eLearning platforms, the program delivers theoretical concepts effectively, enabling a flexible learning environment that accommodates both instructors' and students' schedules.

Looking ahead, the potential introduction of new emphasis tracks will necessitate additional equipment to support the expanded curriculum. This presents a financial challenge, necessitating strategic planning, investment, and proactive grant-writing efforts to secure funds. These steps are vital to ensure the program remains at the forefront of wind energy and industrial maintenance education, equipping it with the latest technologies and learning resources. By addressing these challenges with innovative solutions and strategic planning, the WTT programs aim to enhance their offerings, attract and retain students, and ensure graduates are well-prepared for successful careers in the industry.

Section VII. Self-Study Statements of Review for Program Viability, Adequacy, Necessity, and Consistency with Mission

This section to be completed by the Vice-President of Academics & Student Services with review by the President and College Board of Governors:

Step 1: Complete Rubric Scoring
Step 2: Make a recommendation for program continuance, program modifications, or Program discontinuance.

SCORING RUBRIC

Criteria	Exceeds Standards (3)	Meets Standards (2)	Fails to Meet Standards (1)	Score
Program Viability	The Program exhibits exceptional sustainability, demonstrating robust enrollment numbers and retention rates well above the college average. It displays strong financial health, innovative approaches, and a proactive response to market demands.	The Program maintains stable enrollment and retention rates in line with the college average. It demonstrates adequate financial health and responsiveness to market trends.	The Program exhibits declining enrollment or retention rates significantly below college averages. It faces severe financial challenges and lacks adaptation to changing market demands.	**2**
Program Adequacy	The Program demonstrates outstanding depth and breadth in curriculum design, aligning with industry standards. It offers extensive resources, exceptional faculty expertise, and comprehensive student support services.	The Program's curriculum meets standard requirements and offers adequate resources. It generally fulfills industry expectations but may lack some depth or breadth in specific areas.	The Program lacks essential resources or offers an outdated or insufficient curriculum. It fails to meet industry standards, and faculty and student support may be inadequate.	**2**

PROGRAM ASSESSMENT				
Criteria	**Exceeds Standards**	**Meets Standards**	**Fails to Meet Standards**	**Score**
Program Necessity	It surpasses expectations by addressing a clear and high demand within the community or industry. The Program's unique contributions and specialized offerings significantly enhance the educational landscape.	The Program fulfills a recognized need within the community or industry and is generally in line with demand. It contributes positively but may not be uniquely positioned or extensively sought after.	The Program fails to address a significant need within the community or industry. It may have low demand or lack relevance, making its continuation questionable.	**2**
Consistency with College Mission	The Program not only aligns perfectly with the college's mission but also serves as a model for embodying its core values. It integrates seamlessly with institutional goals and effectively contributes to the broader educational vision.	The Program aligns well with the college's mission and upholds its core values. While it contributes to institutional goals, there might be occasional deviations or areas for improvement.	The Program significantly deviates from the college's mission and does not align with its core values. It lacks integration with institutional goals and fails to contribute positively to the broader educational vision.	**2**

Recommendation:

☒ program continuance ☐ program modifications ☐ program discontinuance

Justification: (provide narrative below)

The WTT program not only embodies the core mission of our college but also addresses the specific needs and demands within our regional counties. Recognizing the necessity to increase enrollment, the college foresees this program as a cornerstone in attracting and retaining students by offering relevant and innovative educational opportunities.

With the faculty turnover and embarking on a comprehensive review of past curriculum, it becomes evident that revitalizing the educational approach is important. The college is committed to leveraging this transition period to enhance the program's offerings, drawing from the insights collected through assessment and feedback mechanisms.

Furthermore, the college recognizes the evolving landscape of industry demands and the significance of equipping our students with practical skills and recognized credentials. To this end, the college is dedicated to revamping the curriculum and integrating new industrial credentials, ensuring WTT graduates are well-prepared to meet the challenges of the modern workforce.

In summary, the WTT program not only upholds the values and mission of the college but also serves as a channel for growth within our region. By embracing change, refining our strategies, and continuously innovating our curriculum, the WTT program prepared to meet the needs of the students and the community while fostering long-term success and sustainability.

Approved:

Assessment Committee 4/15/24

LOT 4/29/24

Cabinet 5/14/24

BOG 5/15/24