

— B. S. in Electrical Engineering —

2024–25 Assessment Report

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1 Introduction

1.1 Background

The BS Electrical Engineering (BSEE) program is offered by the Electrical Engineering & Renewable Energy (EERE) department. The BSEE program is designed to prepare professionals who can perform a wide range of functions within the electrical engineering industry, while also providing solid preparation for students intending to continue to graduate school to pursue master's degrees in engineering, engineering management, MBAs, or JDs. Specifically, the BSEE program lectures and laboratories equip students with a solid theoretical foundation in math, science and engineering, as well as problem solving abilities and immediately useable practical skills.

The engineering topics included in the BSEE program provide students with a strong foundation in the fundamental areas of electrical engineering, including circuits, analog electronics and solid state devices, digital circuits and systems, microcontrollers and embedded systems, linear systems and DSP, communication systems, control systems, and computer programming. To increase flexibility the program includes some technical elective courses. Engineering design is introduced early and emphasized in most engineering courses. The broad education component of the program is provided through the general education curriculum, which includes courses in communication, humanities, social sciences, and management. This helps reinforce some of the program outcomes, such as effective communication with a range of audiences, critical thinking, ability to analyze ethical issues, and a broader understanding of social, economic, and environmental issues in a global context.

The BSEE program culminates with a three-term capstone design project. This year-long project is intended to encompass a major engineering design experience incorporating appropriate engineering standards and multiple constraints, as well as using the knowledge and skills acquired in earlier coursework.

1.2 Program History

The Bachelor of Science in Electrical Engineering (BSEE) program at the Oregon Institute of Technology (Oregon Tech) was launched in Fall 2007. The program was designed as a classical electrical engineering degree, complementing the portfolio of engineering degrees on campus, namely Civil Engineering, Mechanical Engineering, and Renewable Energy Engineering. All engineering programs at Oregon Tech are currently ABET EAC accredited. The BSEE program received its first ABET general review visit and accreditation in 2012. The last ABET general review visit took place in 2022. Based on this review, ABET produced a report in which they identified no deficiencies in the program. Two weaknesses and one concern were identified, which the EERE faculty addressed during AY2023-24. A report detailing the corrective action was submitted to ABET in July 2024. The next ABET comprehensive review visit is scheduled for AY2028-29.

1.3 Program Locations

The BSEE program is located at both Oregon Tech campuses (Klamath Falls and Portland Metro), serving a large portion of rural Oregon and California, as well as the Portland metropolitan area.

The Klamath Falls campus is a residential campus located in Klamath Falls, a city of around 40,000 residents in Southern Oregon. Nestled on the eastern slope of the Cascade Mountains, the 190-acre campus offers spectacular views, an average of 300 days of sunshine per year, and ample opportunities to enjoy the great outdoors. This location also has access to exceptional natural energy resources, such as solar and geothermal. The Oregon Renewable Energy Center (OREC) and the affiliated Geo-Heat center are located here, providing exceptional opportunities for students to gain hands-on experience in the fields of power, energy, and renewable energy.

The Portland Metro campus is an urban non-residential campus located in Wilsonville, on the south of the greater Portland metro area, 15 miles south of downtown Portland. The campus is situated in a wooded business park setting among several technology companies, and offers excellent access to internships and other technological collaborations with the Silicon Forest (as the semiconductor industry in the Portland metropolitan area is known).

1.4 Program Constituencies and Industry Relationships

To maintain a program that is current with the needs of industry and of sufficient technical rigor requires input from many different constituents. Some of the constituents are industrial and some academic. The various constituents that are used in the program assessment process include BSEE graduates and students, Industry Advisory Board (IAB) members and faculty. Input from these constituents is gathered and reviewed in a periodic manner to ensure the program educational objectives and student outcomes remain aligned with the direction of industry, as well as the university's mission and resources.

The IAB and the program faculty meet once or twice per year (typically Fall and/or Spring terms). At these meetings, faculty have an opportunity to provide an update on the state of the department and its programs, as well as to collect input and feedback from the IAB on any new departmental initiatives in light of the current industry trends and needs. The IAB periodically reviews the program PEOs and SOs to ensure they remain relevant and responsive to the needs of industry. Program changes are also reviewed by the IAB before implementation.

1.5 Program Enrollment and Graduation Data

Table 1 presents the BSEE program enrollment from Fall 2019 to Fall 2023. Table 2 presents the number of BSEE degrees awarded over the same time span.

Table 1: BSEE enrollment in the last five academic years (headcount of both full and part-time students in week 4 of the Fall term)

	2020-21	2021-22	2022-23	2023-24	2024-25
Klamath Falls	76	58	60	62	66
Portland Metro	85	63	58	50	47
Total	161	121	118	112	113

Table 2: BSEE degrees awarded for the last five academic years.

	2020-21	2021-22	2022-23	2023-24	2024-25
Klamath Falls	16	14	10	12	11
Portland Metro	17	12	11	11	14
Total	33	26	21	23	25

Employers of BSEE graduates include research and development laboratories, electronic equipment manufacturers, public utilities, government agencies, medical laboratories and hospitals, electronic equipment distributors, and semiconductor companies, among others. The program also provides a solid preparation for students intending to continue to graduate school to pursue master's degrees in engineering, engineering management, MBAs, and JDs.

2 Program Mission, PEOs and SOs

2.1 Program Mission

The mission of the Electrical Engineering Bachelor of Science degree program is to provide a comprehensive program of instruction that will enable graduates to obtain the knowledge and skills necessary for immediate employment and continued advancement in the field of electrical engineering. The program will provide high-quality career-ready candidates for industry as well as teaching and research careers. Faculty and students will engage in applied research in emerging technologies and provide professional services to their communities.

2.2 Program Educational Objectives

In support of this mission, the Program Educational Objectives (PEOs) for the BSEE program are:

1. The graduates of the BSEE program will possess a strong technical background as well as analytical, critical-thinking, and problem-solving skills that enable them to excel as professionals contributing to a variety of engineering roles within the various fields of electrical engineering and the high-tech industry.
2. The graduates of the BSEE program are expected to be employed in electrical engineering positions including (but not limited to) design engineers, test engineers, characterization engineers, applications engineers, field engineers, hardware engineers, process engineers, control engineers, and power engineers.
3. The graduates of the BSEE program will be committed to professional development and lifelong learning by engaging in professional or graduate education in order to stay current in their field and achieve continued professional growth.
4. The graduates of the BSEE program will be working as effective team members possessing excellent oral and written communication skills, and assuming technical and managerial leadership roles throughout their career.

2.3 Relationship between PEOs and Institutional Mission

The Oregon Tech mission statement is as follows: “Oregon Institute of Technology (“Oregon Tech”), Oregon’s public polytechnic university, offers innovative, professionally-focused undergraduate and graduate degree programs in the areas of engineering, health, business, technology, and applied arts and sciences. To foster student and graduate success, the university provides a hands-on, project-based learning environment and emphasizes innovation, scholarship, and applied research. With

a commitment to diversity and leadership development, Oregon Tech offers statewide educational opportunities and technical expertise to meet current and emerging needs of Oregonians as well as other national and international constituents.”

The mission statement was approved by the Oregon Tech Board of Trustees on May 30, 2019 and reviewed by the Higher Education Coordinating Commission (HECC) on August 8, 2019.

The BSEE PEOs are in alignment with the university’s mission. Specifically, PEO1 relates to graduates having a strong technical background in electrical engineering, as well as analytical, critical-thinking and problem solving skills that will allow them to succeed as professionals, whereas This links to the university’s mission of offering “innovative, professionally-focused degree programs” in engineering, with an emphasis on “hands-on education”.

PEO2 specifies the types of careers and engineering positions that graduates of the program should be ready to fulfill, which are consistent with the needs of the electrical engineering industry in the state of Oregon and nationwide. PEO3 has a focus on professional development and lifelong learning so that graduates will stay current in the evolving field of electrical engineering. These PEOs are in alignment with the universtiy’s mission to meet “current and emerging needs”.

PEO4 focuses on graduates being effective collaborators and communicators, assuming technical and managerial leadership roles throughout their careers. This is consistent with the university’s mission to be committed to leadership development.

2.4 Program Student Outcomes

The student outcomes (SOs) of the BSEE program correspond to the ABET EAC (1)-(7) student outcomes. At the time of graduation, BSEE students must demonstrate:

1. **(Problem Solving)** an ability to identify, formulate, and solve engineering problems problems by applying principles of engineering, science, and mathematics
2. **(Design/Broader Factors)** an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. **(Communication)** an ability to communicate effectively with a range of audiences
4. **(Ethics)** an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. **(Teamwork)** an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

6. (**Experimentation**) an ability to develop and conduct appropriate experimentation, interpret data analyze and interpret data, and use engineering judgement to draw conclusions
7. (**Independent Learning**) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

2.5 Relationship between PEOs and SOs

The mission and program educational objectives (PEOs) describe the capabilities of the graduates after they have entered their chosen career. The student outcomes (SOs) are used to develop the necessary foundation of knowledge and skills that a graduate will need to accomplish these objectives as they mature in their disciplines. It is the student outcomes that allow graduates to excel at the educational objectives.

Table 3 shows a map of the BSEE student outcomes to the program education objectives. As the table indicates, the student learning outcomes correlate strongly with the education objectives, with each SO mapping to at least one PEO.

Table 3: Mapping between BSEE SOs (1)–(7) and PEOs

Student Outcome	PEO1	PEO2	PEO3	PEO4
(1) Problem Solving	•	•		
(2) Design/Broader Factors	•		•	
(3) Communication				•
(4) Ethics	•	•		•
(5) Teamwork		•		•
(6) Experimentation	•	•		
(7) Independent Learning			•	

2.6 Process for Establishment and Revision of PEOs and SOs

The PEOs were developed by the program faculty in consultation with the IAB. The BSEE student outcomes were set in accordance to the current ABET criteria (Criterion 3) for accrediting engineering programs. The BSEE SOs include ABET EAC outcomes (1)-(7), which are the general outcomes for all baccalaureate engineering programs.

The PEOs and SOs are periodically reviewed to ensure they stay relevant. The revision process

involves different constituents. In the Fall term, the EERE faculty have an opportunity to review the PEOs and SOs for each program in light of the results from the assessment activities conducted the previous year (i.e., direct assessments collected in program courses, as well as indirect assessment from senior exit survey), results of graduate surveys provided by Career Services, the input gathered from IAB members and employers during the previous academic year, as well as any changes to the institutional or college mission, or the ABET criteria (if any have occurred). Based on the discussion, the EERE faculty may approve to make no changes to the program SOs or make recommendations for proposed changes. The results are determined by a simple majority vote.

During the academic year, one or two meetings are held with the IAB (typically Fall and/or Spring). These meetings provide an opportunity for faculty to present program updates, assessment results, etc., as well as gather input from the IAB to inform strategic direction of the program. If changes to the SOs have been proposed by the faculty at the Fall Convocation meeting, these are discussed with the IAB members. The IAB members may approve the changes or propose alternative changes. The results are determined by a simple majority vote.

As part of the assessment cycle, the BSEE program faculty have a Closing-the-Loop meeting. This meeting is typically scheduled in the Fall term, prior to 31 October. At this meeting, the program faculty discuss the results of the assessment activities carried out during the previous academic year and have an opportunity to review the SOs. If any changes to the SOs have been approved by the faculty and the IAB, these are announced at the Closing-the-Loop meeting and included in the annual Assessment Report, which is submitted to the Director of Assessment for the university, and if approved, the new SOs are published on the BSEE program website and submitted for inclusion in the catalog for the following academic year. Table 4 summarizes the process for review of the BSEE program student outcomes.

Table 4: BSEE PEO and SO Review Process

Event	Task
Fall term	EERE faculty review PEOs and SOs in light of assessment data and other feedback collected in previous academic year. Faculty may propose and approve changes to PEOs or SOs
IAB meeting	If changes to PEOs or SOs have been proposed and approved by EERE faculty, they are presented to IAB for consideration and approval or revision.
Closing the Loop (CTL) meeting	If PEO or SO changes have been approved by EERE faculty and IAB, they are announced and included in Assessment Report. New PEOs or SOs are submitted for update on the website and catalog for the following academic year.

2.7 Institutional Assessment and ISLOs

In addition to program-level student outcomes, Oregon Tech has defined and regularly assesses university-wide student outcomes. These are commonly referred to as Institutional Student Learning Outcomes (ISLOs) and are linked to the general education requirements which are common to all majors. A description of the ISLOs can be found at <https://www.oit.edu/academic-excellence/GEAC/essential-studies/Institutional-student-learning-outcome>.

Oregon Tech's ISLOs support the university's mission. They reflect the common expectations about the knowledge, skills, and abilities that Oregon Tech students will acquire and are reflected in the General Education requirements that lay the foundation upon which the major curricula build. Engaging in these ISLOs will support Oregon Tech graduates in developing the habits of mind and behaviors of professionals and lifelong learners.

Institutional Student Learning Outcomes: Oregon Tech students will

- (ISLO1) **communicate** effectively orally and in writing;
- (ISLO2) engage in a process of **inquiry and analysis**;
- (ISLO3) make and defend reasonable **ethical judgements**;
- (ISLO4) collaborate effectively in **teams** or groups;
- (ISLO5) demonstrate **quantitative literacy**;
- (ISLO6) explore **diverse perspectives**.

An initial comparison of the ISLOs to the BSEE SOs reveals good alignment between the two sets of outcomes. Both the program level and institutional level outcomes support and complement each other in a synergistic manner. This also facilitates the coordination of assessment and continuous improvement efforts at the program and institutional level. Table 5 shows a tentative map of the BSEE student outcomes to the ISLOs. As the table indicates, the student learning outcomes correlate strongly with the ISLOs, with each SO mapping to at least one ISLO.

Table 5: Mapping between BSEE SOs (1)–(7) and ISLOs

Student Outcome	ISLO1: Communication	ISLO2: Inquiry and Analysis	ISLO3: Ethical Judgements	ISLO4: Teamwork	ISLO5: Quantitative Literacy	ISLO6: Diverse perspectives
(1) Problem Solving		•				
(2) Design/Broader Factors						•
(3) Communication	•					
(4) Ethics			•			
(5) Teamwork				•		
(6) Experimentation					•	
(7) Lifelong Learning		•				

2.8 Mapping of BSEE Curriculum to SOs and ISLOs

The table below shows the mapping of the BSEE curriculum to the student outcomes (SOs) (1)-(7), as well as the institutional ISLOs. For each course, the table indicates whether the outcome is covered at the foundational (F), practice (P), or capstone (C) level. In the case of electives, the student outcomes covered are dependent on the specific elective course selected by the student. They have been marked with X.

Table 6: Mapping between BSEE courses and student outcomes

BSEE Student Outcomes	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ISLOs	ISLO2	ISLO6	ISLO1	ISLO3	ISLO4	ISLO5	ISLO2
Communication							
SPE 111: Public Speaking	F		F				
SPE 321: Small Group & Team Comm.			P		F		
WRI 121: English Composition	F		F				
WRI 227: Technical Report Writing	P		P				

Table 6: Mapping between BSEE courses and student outcomes

BSEE Student Outcomes	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ISLOs	ISLO2	ISLO6	ISLO1	ISLO3	ISLO4	ISLO5	ISLO2
WRI 3xx/4xx: Adv. Writing Elective	P		C				
Math/Science							
CHE 201/4: General Chemistry & Lab	F				F	F	
MATH 251: Differential Calculus	F					F	
MATH 252: Integral Calculus	P					P	
MATH 253: Sequences and Series	P					P	
MATH 254: Vector Calculus I	C					C	
MATH 321: Applied Differential Eq. I	C					C	
MATH 341: Linear Algebra I	C					C	
MATH 465: Mathematical Statistics	C					C	
PHY 221: General Physics w/ Calculus	F				F	F	
PHY 222: General Physics w/ Calculus	P				F	P	
PHY 223: General Physics w/ Calculus	C				F	C	
Math/Science Elective	P					P	
General Engr. & Programming							
CST 116: C++ Programming I	F					F	
ENGR 101: Intro. to Engineering I	F	F	F	F	F		F
ENGR 102: Intro. to Engineering II	F	F	F	F	F		F
ENGR 267: Engineering Programming	P					P	
Electrical Engineering							
EE 131: Digital Electronics I	F	F			F	F	F
EE 133: Digital Electronics II	F					F	F
EE 221: Circuits I	F		F		F	F	F
EE 223: Circuits II	F		F		F	F	F
EE 225: Circuits III	P		P		P	P	P
EE 321: Electronics I	P	F	P		P	P	P
EE 323: Electronics II	P	F	P		P	P	P
EE 325: Electronics III	C	P	C		C	C	C
EE 331: Digital Sys. Design w/ HDL	P					P	P

Table 6: Mapping between BSEE courses and student outcomes

BSEE Student Outcomes	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ISLOs	ISLO2	ISLO6	ISLO1	ISLO3	ISLO4	ISLO5	ISLO2
EE 333: Microcontroller Engineering	P					P	P
EE 335: Adv. Microcontroller Engr.	C	P	P	P	C	C	C
EE 341: Elec. and Mag. w/ Trans. Lines	P					P	P
EE 343: Solid-State Electronic Devices	P					P	P
EE 401: Communication Systems	C	C				C	C
EE 430: Linear Systems & DSP	C	C			C	C	C
EE 461: Control Systems Design	C					C	C
Engineering Electives (varies)	X	X	X	X	X	X	X
ENGR 465: Capstone Project	C	C	C	C	C	C	C
Business and General Education							
MGT 345: Engineering Economy		F		P		F	
Humanities Electives (varies)	X	X	X	X	X	X	X
Social Science Electives (varies)	X	X	X	X	X	X	X

3 Cycle of Assessment of Student Outcomes

3.1 Introduction, Methodology, and the Assessment Cycle

The BSEE faculty conducts periodic assessment of student outcomes. Assessment of program student outcomes is conducted over a three (3) year cycle, which is shown in Table 7. For each outcome, assessment data is collected via direct and indirect assessment measures.

In addition to the program outcomes scheduled for a particular year, assessment is also performed for Oregon Tech’s Institutional Student-Learning Outcomes (ISLOs) that are scheduled for that particular year by the Executive Assessment Committee. More information on institutional assessment was presented in section 2.7 (Institutional Assessment and ISLOs).

The correspondence between programmatic student outcomes (1)-(7) and institutional ISLOs is presented in Table 7. In order to streamline the assessment process, effective 2022-23 the BSEE program assessment was modified to match the current university ISLO assessment cycle. Table 7 shows the three-year assessment cycle, with the BSEE SO outcome assessment (shown as (•)) overlaps with the ISLO outcome assessment (shown as (x)). Effective 2024-25, the cycle was modified slightly to balance out the number of assessments per year, as shown in the table.

Table 7: BSEE Outcome Assessment Cycle. Year of current report is shaded. Bullets (•) indicate BSEE SO (1)-(7) assessment cycle. Crosses (x) indicate ISLO assessment cycle.

Student Outcome	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
(1) Problem Solving ISLO2 Inquiry & Analysis			• x			• x
(2) Design/Broader Factors ISLO6 Diverse Perspectives		• x			• x	
(3) Communication ISLO1 Communication	• x			• x		
(4) Ethics ISLO3 Ethical Reasoning	• x				• x	
(5) Teamwork ISLO4 Teamwork	• x			• x		
(6) Experimentation ISLO5 Quantitative Literacy	•		• x			• x
(7) Independent Learning ISLO2 Inquiry & Analysis			• x			• x

3.2 Methodology for Assessment of Student Outcomes

At the beginning of Fall term, an **assessment plan** is generated by the Assessment Coordinator in consultation with the faculty. This plan includes the outcomes to be assessed during that assessment cycle (refer to Table 7), as well as the courses and terms where these outcomes will be assessed. For each outcome, two direct assessment activities are typically planned from two different campus locations.

Direct assessment of student outcomes is performed as part of the course curriculum by means of assignments, exams and course projects. A systematic, rubric-based process is then used to assess the level of attainment of a given program outcome, based on a set of performance criteria. The work produced by each student is evaluated according to the different performance criteria, and assigned a level of 1-developing, 2-accomplished, or 3-exemplary.

Indirect assessment of the student outcomes is performed on an annual basis through a senior exit survey.

The results of the direct and indirect assessment are reviewed by the faculty at the annual closing-the-loop meeting, which takes place at the beginning of Fall term in the following academic year. The standard acceptable performance level is to have at least 80% of the students obtain a level of accomplished or exemplary in each of the performance criteria for any given program outcome. It has been accepted in past closing-the-loop meetings that faculty can set a different threshold if required by the type of assignment or outcome, but must do so prior to the assessment.

If the assessment data indicates performance below the established level for any student outcome, that triggers the process of continuous improvement. Based on the evidence, the faculty decides on an adequate action plan. The possible courses of action are:

- Collect more data (if there is insufficient data to reach a conclusion as to whether the outcome is being attained or not); this may be the appropriate course of action when assessment was conducted on a class with low enrollment, and it is recommendable to re-assess the outcome on the following year, even if it is out-of-cycle, in order to obtain more data.
- Make changes to the assessment methodology (if the faculty believe that missing the performance target on a specific outcome may be a result of the way the assessment is being conducted, and a more proper assessment methodology may lead to more accurate numbers); for example, this could be the suggested course of action if an outcome was assessed in a lower-level course, and the faculty decide that the outcome should be assessed in a higher-level course before determining whether curriculum changes are truly needed.
- Implement changes to the curriculum (if the faculty conclude that a curriculum change is needed to improve attainment of a particular outcome). A curriculum change will be the course of action taken when the performance on a given outcome is below the target level, and the evidence indicates that there is sufficient data and an adequate assessment methodology already in place, and therefore there is no reason to question the results obtained.

Degree completion and retention data are also reported and annually reviewed by the program faculty. This is done through the use of the university's retention and graduation dashboards, which allow to track the 6-year graduation rates as well as the 1-year retention rates, and sort this data by categories such as program and location.

The results of the direct and indirect assessment, as well as the conclusions of the faculty discussion at the **closing-the-loop meeting** are included in the annual BSEE **assessment report**, which is reviewed by the department chair and submitted to the Office of Academic Excellence for review by the Executive Assessment Committee. If action plans include suggested changes to the curriculum, these are presented and discussed with all the department faculty, as well as with the Industry Advisory Board. If approved, these changes are submitted to the Curriculum Planning Commission and updated in the catalog for the following academic year.

4 Assessment Data

4.1 Assessment of Program Outcomes

The following student outcomes were assessed in the 2024-25 academic year in the courses indicated:

- **(3) Communication** : EE 323 Electronics II (PM), ENGR 465 Capstone Project (PM and KF)
- **(5) Teamwork** : EE 325 Electronics III (PM and KF), ENGR 465 Capstone Project (PM and KF)

The sections below describe the targeted assessment activities and detail the performance of students for each of the assessed outcomes. Unless otherwise noted, the tables report the percentage of students performing at a 1 - developing level, 2 - accomplished level, and 3 - exemplary level for each performance criteria, as well as the percentage of students performing at an accomplished level or above (i.e., assessed level ≥ 2).

NOTE: The target attainment level for all outcomes is 80% of students at or above a level 2 (Accomplished). All direct assessment was performed using the rubrics in section 6 (Rubrics).

4.1.1 Direct Assessment of Outcome (3) Communication

An ability to communicate effectively with a range of audiences.

This outcome was assessed in EE 323 Electronics II as well as ENGR 465 Capstone Project. The assignment descriptions and assessment data are provided below.

EE323 – Winter 2025, Cristina Crespo (PM)

This outcome was assessed via two separate assignments: (1) a final project report, and (2) an oral presentation for one of the course labs. The final project for the course involved the design and characterization of two multistage transistor amplifier circuits, one using BJT transistors, and the other using MOSFET transistors. In their final project report, students were asked to explain their design methodology, provide plots and tables of their characterization results, and based on their results discuss the differences observed in different performance parameters between the BJT and MOSFET amplifier, and provide some reasoning as to what types of applications each might be best suited for. In their third lab, students had to simulate and characterize a two-stage MOSFET amplifier. Students were asked to deliver a slide presentation in oral form.

The final project report was used to assess the student's ability to communicate in written form as well as graphical form (i.e., through the use of plots properly labelled and formatted to convey technical information). The oral presentation was used to assess the students' oral communication skills. The two assignments also measured the students' ability to adapt to a range of audiences, as the final project report was intended for a technical audience, and the oral presentation was intended for a broader, more general audience.

The results of this assessment are shown in Table 8. **Note:** This assessment was only performed in the PM campus. An additional assessment for SO (3) was performed across both campuses in ENGR 465 (see next section).

Table 8: Results of direct assessment for SO (3) Communication in EE 323

Performance Criteria	1 Developing	2 Accomplished	3 Exemplary	Students ≥2	Outcome Attained?
Portland Metro, EE323, N=7					
3.1 Oral	2	4	1	71.4%	N
3.2 Written	0	3	4	100%	Y
3.3 Graphical	0	2	5	100%	Y
3.4 Audience	0	4	3	100%	Y

ENGR 465 – Spring 2025, Feng Shi (Klamath Falls), Scott Pahl (Portland Metro)

This outcome was assessed in ENGR 465 - Capstone Project. The capstone project is a year- long (three-term) project that students complete in their senior year, which involves a major design experience. Students are encouraged to work in teams of 2-3 people, where each student takes responsibility for a particular portion of the design.

Throughout the year, students are required to complete the definition, design, implementation, and verification of an engineering design project. During the initial stage, students work under the supervision of their capstone project advisor to select a project of adequate scope and submit a project proposal. The proposal includes a background review of the state of art, explanation of the project relevance and problem addressed, a project definition or specification, a proposed design, a timeline with major milestones, a list of resources needed to complete the project, and a projected cost analysis. Once the proposal is approved by the academic advisor, students go through the different phases of design, implementation, and verification of their project. During this time, students have regular meetings with their project advisor to report progress, notify of plan changes if needed, present results, and perform prototype demonstrations.

Each term, students present status updates of their project to the class and answer questions. Once the design, implementation, and verification process is completed, and there is a final working prototype, students are required to generate and present a poster or slide presentation and submit a formal written report. When appropriate, students must show a working prototype of their project. Students are encouraged to present their project at the annual IdeaFest event in Spring term.

As part of this project, students demonstrate their ability to communicate in different forms (oral, written, graphical), and with a different set of audiences (e.g., a technical supervisor for their status reports, an audience of peers for their in-class presentations, and a broader audience in the IdeaFest event). The final report must include an evaluation of potential ethical issues and impacts of their engineering solution in various contexts (e.g., economic, environmental, societal, etc.) and make informed ethical judgements as necessary. Finally, students must demonstrate their ability to function effectively on a team; they must show leadership by taking responsibility for one aspect or portion of the overall design, as well as collaboration, and ability to formulate an action plan and execute on it by accomplishing the set objectives and meeting the pertinent deadlines.

Table 9: Results of direct assessment for SO (3) Communication in ENGR 465

Performance Criteria	1 Developing	2 Accomplished	3 Exemplary	Students ≥2	Outcome Attained?
Klamath Falls, ENGR 465, N=10					
3.1 Oral	0	2	8	100%	Y
3.2 Written	0	2	8	100%	Y
3.3 Graphical	0	2	8	100%	Y
3.4 Audience	0	2	8	100%	Y
Portland Metro, ENGR 465, N=14					
3.1 Oral	1	2	11	92.9%	Y
3.2 Written	1	2	11	92.9%	Y
3.3 Graphical	1	2	11	92.9%	Y
3.4 Audience	0	3	10	100%	Y

4.1.2 Direct Assessment of Outcome (5) Teamwork

An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

This outcome was assessed in EE 325 Electronics III as well as ENGR 465 Capstone Project. The assignment descriptions and assessment data are provided below.

EE325 – Spring 2025, Cristina Crespo (KF & PM)

This outcome was assessed in the final project for the course, which required the design of an electronic system involving multiple electronic building blocks studied throughout the course. Students were asked to work in teams of two and develop a project proposal to plan the work distribution, resources needed and a timeline with milestones. Students then had to work as effective team members for the design, simulation and test of their circuit, and later for its implementation on a PCB and its final verification. Finally, students were asked to generate a poster presentation to

showcase their work, and deliver an oral presentation of their work, including a live demo of their working circuit.

This assignment required students to function effectively as members of a technical team, involving the distribution of responsibilities, taking leadership for their individual tasks, as well as maintaining continuous communication and collaboration among team members to bring their project from ideation and design to physical implementation and verification.

Table 10: Results of direct assessment for SO (5) Teamwork in EE 325

Performance Criteria	1 Developing	2 Accomplished	3 Exemplary	Students ≥ 2	Outcome Attained?
Klamath Falls, EE325, N=2					
5.1 Leadership	0	2	0	100%	Y
5.2 Collaboration	0	2	0	100%	N
5.3 Planning and Execution	0	0	2	100%	N
Portland Metro, EE325, N=2					
5.1 Leadership	0	2	0	100%	Y
5.2 Collaboration	0	2	0	100%	Y
5.3 Planning and Execution	0	2	0	100%	Y

ENGR 465 – Spring 2025, Feng Shi (Klamath Falls), Scott Pahl (Portland Metro)

This outcome was assessed in ENGR 465 - Capstone Project. The details about the capstone project and how it relates to this assessment were discussed in the previous section dealing with the assessment of outcome (3) Communication.

Table 11: Results of direct assessment for SO (5) Teamwork in ENGR 465

Performance Criteria	1 Developing	2 Accomplished	3 Exemplary	Students ≥ 2	Outcome Attained?
Klamath Falls, ENGR 465, N=10					
5.1 Leadership	0	2	8	100%	Y
5.2 Collaboration	0	2	8	100%	Y
5.3 Planning and Execution	0	2	8	100%	Y
Portland Metro, ENGR 465, N=12					
5.1 Leadership	0	1	11	100%	Y
5.2 Collaboration	0	0	12	100%	Y
5.3 Planning and Execution	0	0	12	100%	Y

4.1.3 Indirect Assessment of Program Outcomes

In addition to direct assessment measures, student outcomes (1)-(7) were indirectly assessed through a senior exit survey of graduating students.

Graduating students are asked to rate their competency in each of the program outcomes on a 4-point scale (0-lowest to 3-highest). The departmental objective is to have at least 80% of participants give a rating of 2 or 3 (adequate or high competency).

Thirteen (out of 28) graduating seniors completed the Senior Exit Survey (46% of the graduating class). The results of this indirect assessment are presented in Figure 1. These results are discussed in the Closing-the-Loop section of the report (see section 5).

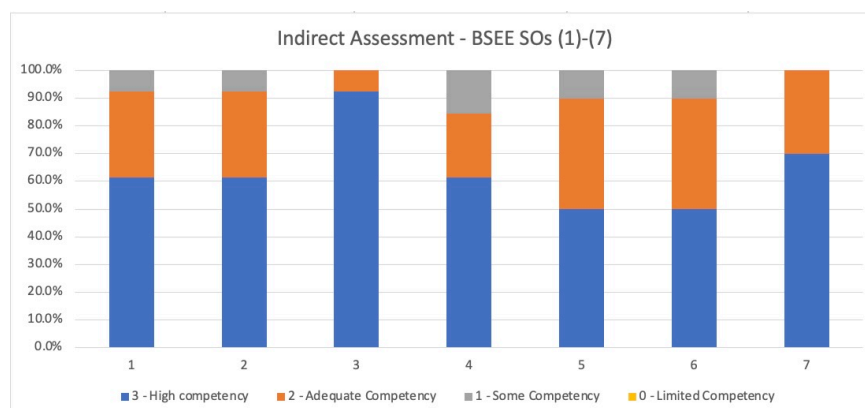


Figure 1: Results of indirect assessment for program SOs (1)-(7) (N=13)

4.2 Assessment of ISLOs

The following ISLOs were assessed in the 2024-25 academic year in the courses indicated:

- **ISLO1 Communication** : EE 323 Electronics II (PM) and ENGR 465 Capstone Project (PM and KF)
- **ISLO4 Teamwork** : EE 325 Electronics III (PM and KF) and ENGR 465 Capstone Project (PM and KF)

The sections below describe the targeted assessment activities and detail the performance of students for each of the assessed ISLOs. *The target attainment level for all outcomes is 70% of students at or above a level 3 (Proficiency). All direct assessment was performed using the ISLO rubrics as described in section 6 (Rubrics).*

4.2.1 Assessment of ISLO1 Communication

ISLO 1 Communication: Oregon Tech Students will communicate effectively orally and in writing

Direct assessment was performed in EE 323 Electronics II (KF: N = 0, PM: N = 9) and ENGR 465 Capstone Project (KF: N=10, PM: N=14). A description of the artefacts used for direct assessment can be found in section 4.1.

In addition to direct assessment measures, ISLOs 1-6 are indirectly assessed through a senior exit survey of graduating students. Students are asked to rate their proficiency in each of the ISLOs on a 4-point scale. Thirteen graduating students completed the survey (N = 13).

The results of the direct and indirect assessments of ISLO 1(a) Written Communication and ISLO 1(b) Oral Communication are presented in Tables 12 and 13.

Table 12: Results of direct assessment for ISLO1(a) - Written Communication

Performance Criteria	1 Limited Proficiency	2 Some Proficiency	3 Proficiency	4 High Proficiency	Students ≥ 3	Outcome Attained?
Direct Assessment, EE 323, N = 9, Attainment Target: 70% of scores ≥ 3						
Audience	0	0	4	5	100%	Y
Organization	0	0	4	5	100%	Y
Documentation	0	2	3	4	77.8%	Y
Style	0	1	4	4	88.9%	Y
Justification*	–	–	–	–	N/A	N/A
Direct Assessment, ENGR 465, N = 24, Attainment Target: 70% of scores ≥ 3						
Audience	1	1	8	14	91.7%	Y
Organization	1	1	7	15	91.7%	Y
Documentation	1	1	7	15	91.7%	Y
Style	1	0	8	15	95.8%	Y
Justification	1	1	8	14	91.7%	Y
Indirect Assessment, N = 13, Attainment Target: 70% of scores ≥ 3						
ISLO1(a)	0	1	4	8	92.3%	Y

Table 13: Results of direct assessment for ISLO1(b) - Oral Communication

Performance Criteria	1 Limited Proficiency	2 Some Proficiency	3 Proficiency	4 High Proficiency	Students ≥ 3	Outcome Attained?
Direct Assessment, EE 323, N = 7, Attainment Target: 70% of scores ≥ 3						
Audience	0	2	5	0	71.4%	Y
Relationships	0	2	5	0	71.4%	Y
Conflict*	–	–	–	–	N/A	N/A
Interaction	0	2	5	0	71.4%	Y
Direct Assessment, ENGR 465, N = 24, Attainment Target: 70% of scores ≥ 3						
Audience	1	0	6	17	95.8%	Y
Relationships	1	0	7	16	95.8%	Y
Conflict	1	0	7	16	95.8%	Y
Interaction	1	0	6	17	95.8%	Y
Indirect Assessment, N = 13, Attainment Target: 70% of scores ≥ 3						
ISLO1(b)	0	1	4	8	92.3%	Y

* This component was not part of the assignment used for assessment and therefore no assessment data was collected with regards to this performance criteria.

4.2.2 Assessment of ISLO4 Teamwork

ISLO 4 Teamwork: Oregon tech students will collaborate effectively in teams or groups.

Direct assessment was performed in EE 325 Electronics III (KF: N = 2, PM: N = 2) and ENGR 465 Capstone Project (KF: N = 10, PM: N = 14). A description of the artefacts used for direct assessment can be found in section 4.1.

In addition to direct assessment measures, ISLOs 1-6 are indirectly assessed through a senior exit survey of graduating students. Students are asked to rate their proficiency in each of the ISLOs on a 4-point scale. Thirteen graduating students completed the survey (N = 10).

The results of the direct and indirect assessments of ISLO 4 are presented in Table 14.

Table 14: Results of direct assessment for ISLO4 - Teamwork

Performance Criteria	1 Limited Proficiency	2 Some Proficiency	3 Proficiency	4 High Proficiency	Students ≥ 3	Outcome Attained?
Direct Assessment, EE 325, N = 4, Attainment Target: 70% of scores ≥ 3						
Planning/Exec.	0	0	4	0	100%	Y
Responsibility	0	0	4	0	100%	Y
Communication	0	0	4	0	100%	Y
Conflict Res.	0	0	4	0	100%	Y
Collaboration	0	0	4	0	100%	Y
Decision Making	0	0	4	0	100%	Y
Direct Assessment, ENGR 465, N = 24, Attainment Target: 70% of scores ≥ 3						
Planning/Exec.	0	0	7	15	100%	Y
Responsibility	0	0	6	16	100%	Y
Communication	0	0	7	15	100%	Y
Conflict Res.	0	0	7	15	100%	Y
Collaboration	0	0	7	15	100%	Y
Decision Making	0	0	7	15	100%	Y
Indirect Assessment, N = 13, Attainment Target: 70% of scores ≥ 3						
ISLO5	0	0	0	13	100.0%	Y

4.2.3 Indirect Assessment of ISLOs

The complete results of the indirect assessment of all ISLOs from the senior exit survey is shown in Figure 2. The target of 70% of students rating themselves at a level of 3 or above was met for all ISLOs. (Note: ISLO1 Communication is split into two subcategories, 1a Writing and 1b, Speaking).

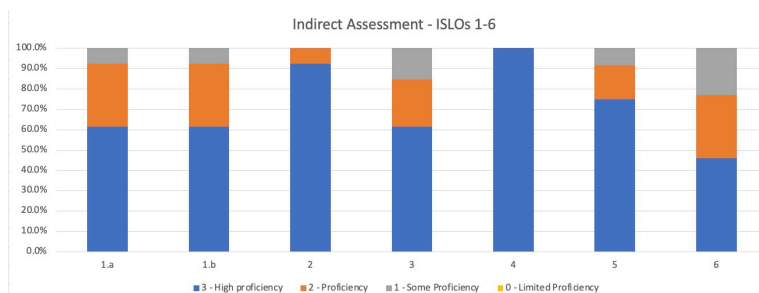


Figure 2: Results of indirect assessment for ISLOs 1-6 (N=13)

4.3 Degree Completion and Retention

Figure 3 shows the 6-year degree completion rates for students starting their degree in Fall 2014 through Fall 2018. Figure 4 shows the 4th term retention rates for students starting at Oregon Tech in Fall 2019 through Fall 2023. The 4th term retention rate represents the proportion of students who were still enrolled at Oregon Tech four terms after their start term (excluding Summer term). Both sets of data are presented for three student populations: (1) BSEE students, (2) College of ETM students, and (3) all Oregon Tech students. By overlapping these three populations, we can identify whether there are trends that pertain specifically to BSEE students, or whether they follow the overall college or university trend.

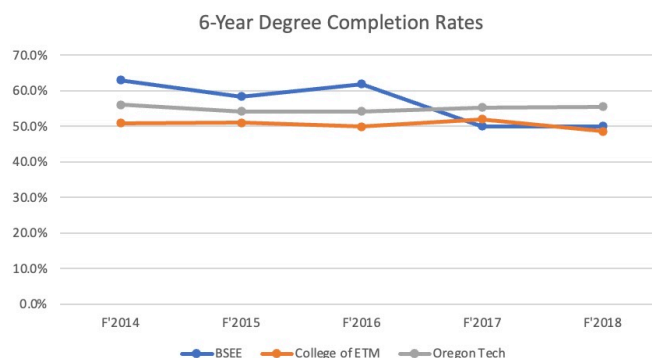


Figure 3: 6-year completion rates for students who started at Oregon Tech in Fall 2013 through Fall 2017.

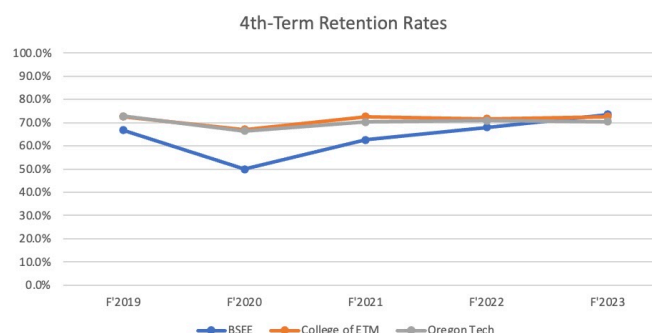


Figure 4: 4th term retention rates for students who started at Oregon Tech in Fall 2017 through Fall 2021.

The 6-year graduation rate appears to be stabilizing at around 50%, which tracks the trend for the college of ETM, being slightly lower than the overall university rate of 55%. The 4th term retention rate for the BSEE program (73.5%) also seems to track the overall trend of the college of ETM (72.6%) and the university as a whole (70.4%)

5 Continuous Improvement and Closing-the-Loop

The BSEE Closing-the-Loop meeting was held on ??? to review the assessment results. A summary of the discussions and action plans based on assessment results are presented in the following sections.

5.1 Historical Summary of Program Assessment Results

Table 15 shows a summary and history of results for the direct assessment of program outcomes assessed in AY2023-24. The table shows the percentage of students scoring 2 (accomplished) or above in each performance criteria. These results combine the total number of students assessed within the year from all campus locations. The objective set by the EERE department is to have at least 80% of the students perform at the level of accomplished or exemplary in all performance criteria.

Table 15: Summary and historical results of BSEE assessment. The objective set by the EERE department is 80% attainment.

Student Outcome	AY21–22	AY22–23	AY23–24	AY24–25	Outcome Met?
(3) Communication					YES
Direct Assessment	$N = 12$	–	–	$N = 31$	
3.1 Oral	100%	–	–	90%	✓
3.2 Written	100%	–	–	97%	✓
3.3 Graphical	100%	–	–	97%	✓
3.4 Audience	100%	–	–	100%	✓
Indirect Assessment	$N = 9$	–	–	$N = 13$	
Communication	100%	–	–	92%	✓
(5) Teamwork					YES
Direct Assessment	$N = 15$	–	–	$N = 26$	
5.1 Leadership	93%	–	–	100%	✓
5.2 Collaboration	100%	–	–	100%	✓
5.3 Planning and Execution	80%	–	–	100%	✓
Indirect Assessment	$N = 9$	–	–	$N = 10$	
Teamwork	89%	–	–	90%	✓

5.2 Evaluation of Assessment Results and Data Driven Action Plans

Below is a summary of the discussion and recommendations made by the BSEE faculty based on the evaluation of the assessment results. The summary of the action plans proposed can be found in Table 16.

1. Assessment of Program SOs

All outcomes assessed were attained to the desired level, which is consistent with historical trends.

No action required at this point.

Outcome (3) Communication showed slightly lower level of attainment in the performance criterion related to oral communication in one of the direct assessments (EE 323 PM, 71.4%). Given the small sample size ($N = 7$) and the fact that the attainment exceeded the 80% threshold in all other assessments of this outcome performed this year, this appears to be an outlier and there is no specific action to be taken at this point other than continuing to monitor this outcome through the regular assessment cycle.

The assessment of SO 4 Ethics was originally scheduled for AY2024-25 but moved to AY2025-26 following the same move of the corresponding ISLO 3 Ethical Reasoning. This is a permanent change to the assessment cycle to balance the number of assessments per year.

2. Assessment of ISLOs

ISLOs 1 and 4 were assessed and attained to the desired level of 70%. No action required. The assessment of ISLO 3 Ethical Reasoning was originally scheduled for AY2024-25 but moved to AY2025-26 by the university's Executive Assessment Committee. This is a permanent change in the assessment cycle to balance the number of assessments per year.

3. Indirect Assessment

Indirect assessment data collected from senior exit survey shows generally a positive level of attainment of student outcomes. Participation in exit survey has increased slightly to 46%. We'll continue to encourage participation by having advisors remind students to complete the survey when they submit their applications to graduate.

4. Program Changes

Last year guidelines were developed to include engineering standards in senior projects. All faculty teaching capstone projects must ensure that engineering standards are incorporated as part of the capstone project report. We need to continue to monitor that these guidelines are followed in a consistent manner by all instructors of Capstone Project

Faculty had previously discussed the need to incorporate content related to ethical judgements in the curriculum. An assignment was designed as an independent module and used for the EE 401 Communications course. The assignment requires students to familiarize themselves with the IEEE code of ethics, and articulate an ethical reasoning to a case study based on current technological trends in the electrical engineering field. Faculty agreed that this or a similar module will continue to be incorporated in EE 401 Communications as well as ENGR 465 Capstone Project. The implementation of this change is now scheduled for AY2025-26, as we will be assessing SO 4 Ethics.

5. Enrollment, Retention and Graduation trends

BSEE enrollment appears stable at around 115 over the last three years, and similarly the number of BSEE graduates has stayed in the low 20s. Numbers appear evenly distributed across campuses.

The 4th term retention rate has steadily increased over the last 4 years from a 50% low-point three years ago to 70% this year. However, the 6-year graduation rate has decreased slightly in the same time period from 60% to 50%. This could be due to more students enrolling in the accelerated BS+MS programs, which postpone graduation by 1-2 years on average.

With the hiring of two new faculty members, the aim is to provide more stability in terms of predictable schedules and course offerings. The department chair will work on course assignments for new faculty

so this aim is met, with the understanding that there will be a ramp-up period of one or two years before the results in terms of enrollment, retention and graduation will be fully materialized.

6. Assessment Process

Assessment data must be timely collected and submitted at the end of every term. Assessment coordinator to send out assessment plan at the beginning of the academic year, as well as an e-mail with instructions and an e-mail reminder at the beginning and end of every term. Specially for new faculty collecting assessment data, Assessment Coordinator (Cristina Crespo) can be contacted for any questions or if assistance is needed.

Table 16: Summary of data-driven action plans

Item	Action	Person In Charge	Due Date
Program SOs: All SOs assessed this year met to the desired target level.	None. Continue to assess these outcomes according to assessment cycle.	N/A	N/A
ISLOs: ISLO1 - Communication and ISLO4 - Teamwork met. ISLO 3 ethical Reasoning moved to AY2025-26	None. Continue to assess according to ISLO assessment cycle.	N/A	N/A
Indirect Assessment - All SOs and ISLOs attained. Participation at 46%	Continue to encourage participation. Advisors to remind students to complete survey when application for degree is submitted.	Faculty advisors.	Spring 2026
Program Changes - Include: (1) engineering standards in capstone project report, and (2) ethical reasoning module/assignment in EE 401 Communications and ENGR 465 Capstone Project	Last year guidelines were developed to include engineering standards in senior projects. Faculty teaching ENGR 465 must ensure this continues to be implemented consistently across campuses. All faculty teaching capstone courses must ensure engineering standards are included in the capstone project report. An ethics module/assignment was developed for EE 401 Communications. This or a similar ethics module/assignment will be used in EE 401 Communications and ENGR 465 Capstone Project courses .	Naga Korivi, Scott Prah, Feng Shi (all faculty teaching EE 401 or ENGR 465)	Spring 2026

Table 16: Summary of data-driven action plans

Item	Action	Person In Charge	Due Date
Enrollment, Retention and Graduation	With the hiring of two new faculty members, the aim is to provide more stability in terms of predictable schedules and course offerings. The department chair will work on course assignments for new faculty so this aim is met, with the understanding that there will be a ramp-up period of one or two years before the results in terms of enrollment, retention and graduation will be fully materialized.	N. Korivi	Spring 2026
Assessment Process: Need for improvement regarding timely submission of assessment data	Assessment data must be timely and correctly submitted at the end of every quarter. Assessment coordinator to send out assessment plan at the beginning of the academic year, as well as e-mail with instructions at the beginning and end of each quarter.	C. Crespo	Beginning and end of each term.

5.3 Review of Previous Year Action Plans

Table 17 shows the status of implementation of recommendations for changes based on prior assessments.

Table 17: Status of action plans from prior assessments.

Item	Action	Person In Charge	Status
Indirect Assessment - Participation low	Participation has increased slightly and is now at 46% (target is 70%), advisors should continue to remind students to complete survey when they turn in their application to graduate.	Faculty Advisors	In progress

Table 17: Status of action plans from prior assessments.

Item	Action	Person In Charge	Status
Program Changes - Include: (1) engineering standards in capstone project report, and (2) ethical reasoning module/assignment in EE 401 Communications and ENGR 465 Capstone Project	Engineering standards documentation developed and incorporated in AY2024-25, ethical reasoning modules to be incorporated in AY2025-26.	M. Aboy, N. Korivi, F. Shi, S. Prah	In progress
Enrollment, Retention and Graduation - Stabilize faculty resources, work with Admissions and university on recruiting effort	Two new faculty members hired (start date Fall 2025). Had some participation at E-week in Portland in Winter 2025. Enrollment and retention numbers slightly up. Continue to work with university on hitting enrollment targets.	N. Korivi	In progress. Continued in AY25-26
Assessment Process - Need to improve timely submission of assessment data)	Assessment Coordinator provided assessment plan at the beginning of the year, together with reminders and instructions at the beginning and end of each term. Most faculty did not submit their assessment data until Fall 2025. Must make an effort to submit assessment data timely at the end of each term.	Faculty scheduled for assessment	In progress. Continued in AY25-26

5.4 Assessment Plan for AY2025-26

An outline of the planned assessment activities for AY2025-26 is shown in Table 18. The table shows the outcomes that will be assessed (both programmatic SOs and ISLOs), as well as the courses and terms when they will be assessed, and the faculty responsible for collecting the assessment data.

Table 18: Assessment Plan for AY2025-26

Student Outcome	Fall 2024	Winter 2025	Spring 2025
(2) Design/Broader Factors ISLO6 Diverse Perspectives		EE 325 C. Crespo	ENGR465 F. Shi, S. Prah
(4) Ethics ISLO3 Ethical Reasoning		ENGR 465 F. Shi, S. Prah	EE 461 C. Venugopal, F. Shi

6 Rubrics

The rubrics used by the program faculty for direct assessment of programmatic student outcomes are included below. To promote consistency and reliability of assessment results, all faculty assessing a particular outcome use the same rubric.

The rubrics used for ISLO assessment are provided by the university through the Executive Assessment Committee, and can be found on the [Institutional Assessment website](#).

EAC RUBRIC: OUTCOME (1) – PROBLEM SOLVING

Outcome (1) An ability to identify, formulate, and solve complex engineering problems ¹ by applying principles of engineering, science, and mathematics				
CRITERIA	1-DEVELOPING	2-ACCOMPLISHED	3-EXEMPLARY	SCORE
ABILITY TO IDENTIFY A COMPLEX ENGINEERING PROBLEM	An engineering problem is not identified, or the identification is too vague or unclear.	An engineering problem of reasonable complexity is adequately identified and its significance minimally explained.	A complex engineering problem is properly identified and clearly stated. Its significance is thoroughly explained.	
ABILITY TO FORMULATE A COMPLEX ENGINEERING PROBLEM BY APPLYING PRINCIPLES OF ENGINEERING, SCIENCE AND MATHEMATICS	A complex engineering problem is not properly formulated in engineering, scientific, and/or mathematical terms. Most of the assumptions and specifications are either missing or unclear.	A complex engineering problem is adequately formulated in engineering, scientific, and/or mathematical terms, but some of the assumptions and specifications may be missing or not clearly presented.	A complex engineering problem is clearly formulated with a valid and complete set of assumptions and specifications.	
ABILITY TO SOLVE A COMPLEX ENGINEERING BY APPLYING PRINCIPLES OF ENGINEERING, SCIENCE AND MATHEMATICS	The solution to a complex engineering problem is not developed according to engineering, scientific, and mathematical principles, or it does not follow the original set of assumptions and specifications.	The solution to a complex engineering problem is developed according to engineering, scientific, and mathematical principles. The solution reasonably meets most of the original set of assumptions and specifications.	The solution to a complex engineering problem is very well developed according to engineering, scientific, and mathematical principles. The solution meets or exceeds the original set of assumptions and specifications.	

¹ As defined by ABET, complex engineering problems include one or more of the following characteristics: involving wide-ranging or conflicting technical issues, having no obvious solution, addressing problems not encompassed by current standards and codes, involving diverse groups of stakeholders, including many component parts or sub-problems, involving multiple disciplines, or having significant consequences in a range of contexts.

EAC RUBRIC: OUTCOME (2) – BROADER FACTORS

Outcome (2) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors				
CRITERIA	1-DEVELOPING	2-ACCOMPLISHED	3-EXEMPLARY	SCORE
ABILITY TO APPLY ENGINEERING DESIGN TO PRODUCE SOLUTIONS THAT MEET SPECIFIED NEEDS	Does not follow the engineering design process, or the designed solution does not meet the specified need(s).	Reasonably follows the engineering design process to produce a solution that adequately meets the specified need(s).	Methodically follows the engineering design process to produce a solution that thoroughly meets the specified need(s).	
ABILITY TO DESIGN SOLUTIONS ACCOUNTING FOR BROADER CONSIDERATIONS, SUCH AS PUBLIC HEALTH, SAFETY, AND WELFARE, AS WELL AS GLOBAL, CULTURAL, SOCIAL, ENVIRONMENTAL, AND ECONOMIC FACTORS	The solution provided does not take into account broader practical considerations, such as public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	The solution provided takes into account and partially addresses some of the broader practical considerations, such as public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	The solution provided takes into account and thoroughly addresses several of the broader practical considerations, such as public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	

EAC RUBRIC: OUTCOME (3) – COMMUNICATION

Outcome (3) An ability to communicate effectively with a range of audiences				
CRITERIA	1-DEVELOPING	2-ACCOMPLISHED	3-EXEMPLARY	SCORE
ABILITY FOR EFFECTIVE ORAL COMMUNICATION	The main ideas are not clearly presented. Low volume or monotonous tone make it hard for audience to engage. Speaker does not transmit any interest or enthusiasm about the topic.	The main ideas are clearly presented. Adequate volume and dynamic tone are used to engage audience. Speaker occasionally transmits interest and enthusiasm about the topic.	Speaker is an excellent communicator. The main ideas are clearly presented. Speaker is eloquent and dynamic, effective at engaging the audience. Speaker displays and transmits a strong interest and enthusiasm about the topic.	
ABILITY FOR EFFECTIVE WRITTEN COMMUNICATION	Content is disorganized, the main ideas are not clearly stated and developed. Writing style is rough or imprecise. Frequent grammar/spelling errors. Document presentation and format rough or inconsistent.	Content is well organized and the main ideas are clearly stated and reasonably developed. Writing style is adequate for purpose and readable. Grammar/spelling mostly correct. Document presentation and format adequate and consistent.	Content is very well organized and easy to follow, main ideas are clearly presented and thoroughly developed. Writing style is adequate for purpose, readable, and tailored to intended audience. Grammar/spelling correct. Work is professionally presented and very well formatted.	
ABILITY FOR EFFECTIVE GRAPHICAL COMMUNICATION	Inadequate use of figures, charts, and/or tables to display data. Figures are not well placed, many figures, charts, and tables missing key formatting elements, such as titles, labels, units, captions, etc. Overall, figures do not contribute to a better understanding of key ideas or results.	Adequate use of figures, charts, and tables to display data. Figures are well placed, most figures, charts, and tables are properly labeled and formatted. Figures moderately contribute to a better understanding of key ideas or results.	Excellent use of figures, charts, and tables to display data. All figures, charts, and tables properly labeled and formatted, easy to read and interpret. Figures substantially and effectively contribute to a better understanding of key ideas or results.	
ABILITY TO ADDRESS A RANGE OF AUDIENCES	Does not address target audience. Content is too technical or too superficial to be understood by and of interest to a wide range of audiences.	Adequately addresses the target audience. Content has a reasonable balance of technical and non-technical information to be understood by and of interest to a wide range of audiences.	Effectively addresses the target audience. Content has the right balance of technical and non-technical information to be understood by and of interest to a wide range of audiences.	

EAC RUBRIC: OUTCOME (4) – ETHICS

Outcome (4). An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts				
CRITERIA	1-DEVELOPING	2-ACCOMPLISHED	3-EXEMPLARY	SCORE
ABILITY TO RECOGNIZE ETHICAL AND PROFESSIONAL RESPONSIBILITIES IN ENGINEERING SITUATIONS	Description of ethical and professional responsibilities is limited or rudimentary.	Description of ethical and professional responsibilities is substantive.	Description of ethical and professional responsibilities is complete and thorough.	
ABILITY TO IDENTIFY GLOBAL, ECONOMIC, ENVIRONMENTAL, AND SOCIETAL CONTEXTS IN ENGINEERING SITUATIONS	Identifies a single context area relevant in an engineering situation. Explanation of the context is rudimentary.	Identifies most context areas relevant in an engineering situation. Explanation of the contexts is substantive.	Identifies all context areas relevant in an engineering situation. Explanation of contexts is complete and thorough.	
ABILITY TO JUDGE THE IMPACT OF ENGINEERING SOLUTIONS ON GLOBAL, ECONOMIC, ENVIRONMENTAL, AND SOCIETAL CONTEXTS	Analysis and judgement of the impact of engineering solutions on contexts is rudimentary.	Analysis and judgement of the impact of engineering solutions on contexts is substantive.	Analysis and judgement of the impact of engineering solutions on contexts is complete and thorough.	

EAC RUBRIC: OUTCOME (5) – TEAMS

Outcome (5) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives				
CRITERIA	1—DEVELOPING	2—ACCOMPLISHED	3—EXEMPLARY	SCORE
ABILITY TO PROVIDE TEAM LEADERSHIP	Lacks adequate ability to resolve problems and conflicts. Lacks ability to provide adequate leadership in decision making, planning, and goal setting. Does not show appreciation for other team members' contributions. Exhibits poor team communication skills (e.g., interrupts others, gets defensive, does not ask questions, gets distracted). Does not motivate others or lead by example.	Capable of resolving problems and conflicts. Demonstrates adequate leadership ability in decision making, planning, and goal setting. Occasionally shows appreciation for other team members' contributions. Exhibits reasonable team communication skills. Capable of motivating others. Willing to share problems and progress. Mainly does assigned work instead of willingly taking on additional responsibilities.	Proficient in resolving problems and conflicts and exhibits proficient leadership ability in decision making, planning, and goal setting. Appropriately recognizes and shows appreciation for other team members' contributions. Exhibits proficient team communication skills including good body language and active listening. Transparent about expectations and objectives. Motivates others and leads by example. Willing to share problems and take on additional responsibilities and help others when necessary.	
ABILITY TO CREATE A COLLABORATIVE AND INCLUSIVE ENVIRONMENT AS A TEAM MEMBER	Rarely uses respectful language or show cooperative communication skills. Does not demonstrate mutual respect and tends to dismiss others' unique perspectives, opinions, or ideas. Does not demonstrate ability and willingness to compromise with other group members.	Generally, uses respectful language and shows cooperative communication skills. Does not disrespect other group members or dismiss their unique perspectives, opinions, or ideas. Demonstrates adequate ability and willingness to compromise with other group members. Does not dismiss the sharing of ideas.	Uses respectful language and shows cooperative communication skills. Actively demonstrates mutual respect and welcomes others' unique perspectives. Demonstrates high ability and willingness to compromise with other group members. Makes other group members feel safe and valued through openly encouraging the sharing of ideas.	
ABILITY TO ESTABLISH GOALS, PLAN TASKS, AND MEET OBJECTIVES AS A TEAM MEMBER	Lacks basic awareness of team duties and responsibilities. Lacks basic awareness of the links between project goals and tasks. Fails to identify risks to meet project deadlines.	Capable of performing most team duties and responsibilities. Capable of establishing goals and performing necessary tasks on time to meet project deadlines and identifies most issues impacting project success.	Proficient execution of all team duties and responsibilities. Proficient in establishing goals and performing necessary tasks on time to meet project deadlines and identifies issues impacting projects success.	

EAC RUBRIC: OUTCOME (6) – EXPERIMENTATION

Outcome (6) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions				
CRITERIA	1-DEVELOPING	2-ACCOMPLISHED	3-EXEMPLARY	SCORE
ABILITY TO DEVELOP AND CONDUCT AN EXPERIMENT	Demonstrates inadequate knowledge and abilities for conducting experiments with standard test and measurement equipment to collect experimental data. May not observe lab safety and procedures.	Demonstrates adequate knowledge and abilities for conducting experiments. Able to use standard test and measurement equipment to collect experimental data. Reasonably capable of troubleshooting to overcome measurement problems. May require supervision and steering in the right direction. Overall, observes lab safety plan and procedures.	Demonstrates comprehensive knowledge, exceptional abilities, and resourcefulness for conducting experiments. Selects appropriate equipment and measuring devices and methodology for conducting experiments. Demonstrates a proficient ability to troubleshoot, predict and overcome measurement problems. Observes established lab safety plan and procedures. Proposes improvements as necessary.	
ABILITY TO ANALYZE AND INTERPRET DATA	Demonstrates inadequate knowledge and abilities for analyzing and interpreting experimental results. Reporting methods are unsatisfactory.	Demonstrates adequate abilities for experimental data analysis, interpretation, and visualization. Able to draw some reasonable conclusions based on experimental results. Demonstrates an awareness for measurement error. Reporting methods are satisfactorily organized, logical, and complete	Demonstrates exceptional ability for experimental data analysis, interpretation, and visualization. Able to draw insightful conclusions based on experimental results. Analyzes and interprets data using appropriate theory, accounts for measurement error into analysis and interpretation, reporting methods are well-organized, logical, and complete.	
ABILITY TO USE ENGINEERING JUDGEMENT TO DRAW CONCLUSIONS	Lacks the ability and awareness for interpreting experimental data to draw meaningful conclusions, decide, act, and/or communicate suggestive actions using of appropriate scientific/engineering principles, standards, and practices. Not adept at navigating complexity, open ended problems, or ambiguous data.	Adequately capable of interpreting experimental data to draw meaningful conclusions, decide, act, and/or communicate suggestive actions based upon the use of appropriate scientific/engineering principles, standards, and practices. May require significant guidance in the face of complexity, open ended problems, or ambiguous data.	Proficient in interpreting experimental data to draw meaningful conclusions, decide, act, and/or communicate suggestive actions based upon the use of appropriate scientific/engineering principles, standards, and practices. Able to make quality engineering decisions/conclusions, especially in the face of complexity, open-ended problems, or ambiguous data.	

EAC RUBRIC: OUTCOME (7) – LEARNING

Outcome (7) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies				
CRITERIA	1-DEVELOPING	2-ACCOMPLISHED	3-EXEMPLARY	SCORE
ABILITY TO ACQUIRE NEW KNOWLEDGE USING APPROPRIATE LEARNING STRATEGIES	Shows poor ability and little openness to acquire new knowledge and diagnosing their learning needs. Does not identify proper opportunities or resources to expand knowledge and skills. Unable or uninterested to find new information without significant guidance and prompting. Lacks awareness at one's current knowledge and skills for identifying basic gaps in understanding. Lacks the strategies and motivation necessary for self-directed learning.	Shows sufficient ability and openness to acquire new knowledge and diagnosing their learning needs. Able to identify some opportunities or resources to expand knowledge and skills. Able and interested to find new information, perhaps with some prompting. Uses current knowledge and skills to identify basic gaps in understanding. Exhibits adequate strategies and motivation necessary for self-directed learning.	Demonstrates proficient ability and openness to acquire new knowledge and diagnosing their learning needs. Independently identifies and uses a diverse range of resources to expand knowledge and skills. Able and interested to find new information with minimal prompting. Uses current knowledge and skills to identify key gaps in understanding. Exhibits exemplary strategies and motivation necessary for self-directed learning.	
ABILITY TO APPLY NEW KNOWLEDGE AS NEEDED	Inadequately unmotivated and skilled at applying new knowledge as needed for decision making, completing tasks, drawing conclusions, and/or understanding a topic in more depth. Insufficiently understands and determines the significance or relevance of the learned information needed for the task.	Adequately motivated and skilled at applying new knowledge as needed for decision making, completing tasks, drawing conclusions, and/or understanding a topic in more depth. Partially understands and determines the significance or relevance of the learned information needed for the task.	Proficiently skilled and motivated at applying new knowledge as needed for decision making, completing tasks, drawing conclusions, and/or understanding a topic in more depth. Understands and determines the significance or relevance of the learned information needed for the task.	

7 Raw Assessment Data

The EERE department stores all data used for direct assessment in the *EERE/Assessment* folder in Teams. The raw data for the BSEE direct assessments performed in AY2024-25 can be found in the folder *EERE/Assessment/BSEE/2024-25*. The documentation in the folder includes, for every direct assessment performed, a copy of the assignment used for assessment of the outcome, the individual student work, and a spreadsheet listing the scores given to each student in the different performance criteria for the outcome, according to the outcome rubric. This data is not included in the report for space considerations, but access to this data is available upon request.