Section 1 – Program Mission and Educational Objectives

A. Mission Statements

University: 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 (https://www.oit.edu/about/mission-statement).

Department: The mission of the Oregon Tech Civil Engineering program is to prepare students for professional practice. To be prepared to practice as professionals, engineers must be able to act responsibly and ethically, understand their limits and the limits of the tools they use, communicate effectively, work well in teams, and, amid the changing landscape of the field of civil engineering, be able to pursue graduate-level education (https://www.oit.edu/academic-excellence/assessment/reports/civil-engineering/civil-engineering).

B. Program Educational Objectives

The Program Educational Objectives (PEOs) are posted publicly on the website for the university's Office of Academic Excellence and can be found at https://www.oit.edu/academic-excellence/assessment/reports/civil-engineering/civil-engineering.

The following objectives are what the faculty expects graduates from the program to be able to accomplish a few years after the commencement of their careers and stem directly from the program mission. The alumni from the BSCE program at Oregon Tech should be able to:

- practice in civil engineering or a related field.
- pursue advanced or continuing education in civil engineering or a related field.
- act as responsible, effective, and ethical citizens.
- communicate effectively.
- collaborate effectively.

C. Consistency of the Program Educational Objectives with the Mission of the Institution

The BSCE PEOs are extremely well aligned with the mission of the university. Table 2-1 maps the key academic points of the university mission to these BSCE program objectives. As illustrated, each of the BSCE objectives has a direct relationship with at least one academic aspect of the university mission. Transversely, each of the key academic aspects of the institutional mission has a direct relationship with at least one of the BSCE objectives. Thus, the BSCE objectives are consistent with the mission of OIT.

Table 1-1. Relationships Between BSCE Program Educational Objectives and the Institutional Mission

BSCE Program Objectives	Key Academic Points of University Mission			
	Offers innovative, professionally-focused undergraduate... degree programs in the areas of engineering…	To foster student and graduate success, the university provides a hands-on, project-based learning environment and emphasizes innovation, scholarship, and applied research	A commitment to diversity and leadership development	Offers statewide educational opportunities and technical expertise to meet current and emerging needs of Oregonians as well as other national and international constituents
Practice in civil engineering or a related field	D	D	D	D
Pursue continued or advanced education in civil engineering or a related field	D	D	I	I
Act as responsible, effective, and ethical citizens	I	D	D	D
Communicate effectively	I	D	D	D
Collaborate effectively	I	I	D	D
Relationship: D = Direct, I = Indirect				

Section 2 – Program Student Learning Outcomes

The BSCE program outcomes are listed below. These are statements of skills, abilities, and knowledge that students are expected to achieve or attain prior to graduating from the BSCE program. These outcomes are published on the university's website (https://www.oit.edu/academic-excellence/assessment/reports/civil-engineering/civil-engineering) and in the departmental assessment reports (available at that same link). Upon graduating from the BSCE program at Oregon Tech, students should possess:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
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
3. an ability to communicate effectively with a range of audiences

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
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
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Section 3 – Curriculum Map

Correlations between the student outcomes and the courses within the curriculum are noted below in Tables 3-1—3-5, wherein I = introduced, R = reinforced, M = mastered.

Table 3-1. Mapping of Program Outcomes to Engineering Fundamentals Courses

	Program Outcomes						
Introductory Engineering Courses	Outcome 1 Problem Solving	Outcome 2 Design	Outcome 3 Communication	Outcome 4 Ethics	Outcome 5 Teamwork	Outcome 6 Experimentation	Outcome 7 New Knowledge
ENGR 101 - Introduction to Engineering I	I	I	I	I		I	I
ENGR 102 - Introduction to Engineering II			I		I		
ENGR 211 - Engineering Mechanics: Statics	I						
ENGR 213 - Engineering Mechanics: Strength of Materials	R	I	I			I	I
ENGR 318 - Fluid Mechanics	R					R	
CE 203 - Engineering Graphics			I				I
CE 205 - Computational Methods	I						
CE 212 - Civil Engineering Materials	R					R	
GIS 134 Geographic Information Systems			I				
GME 161 Plane Surveying I	I						

Table 3-2. Mapping of Program Outcomes to Civil Engineering Core Courses

Fundamentals and Core Courses	Program Outcomes						
	Outcome 1 Problem Solving	Outcome 2 Design	Outcome 3 Communication	Outcome 4 Ethics	Outcome 5 Teamwork	Outcome 6 Experimentation	Outcome 7 New Knowledge
CE 308 - Principles of Professional Practice			R	R	I		I
CE 311 - Introduction to Geotechnical Engineering	R	I				R	
CE 312 - Earth Pressures and Foundations	R	R					
CE 331 - Structural Analysis	R						
CE 341 - Elementary Structural Design		R					R
CE 351 - Introduction to Transportation Engineering	R	R		R			
CE 354 - Traffic Engineering	R	M		R		R	R
CE 371 - Closed Conduit Design	R	M					
CE 374 - Hydrology	R	M					R
CE 442 - Advanced Reinforced Concrete Design	R	M					
CE 444 - Intermediate Steel Design	R	M					
CE 401 - Civil Engineering Project I	R	R	R	R	R		R
CE 402 - Civil Engineering Project II	M	M	M	M	M		M
CE 405 - Sustainability and Infrastructure	M	R	R	M	R		R

Table 3-3. Mapping of Program Outcomes to Civil Engineering Elective Courses

Fundamentals and Core Courses	Program Outcomes						
	PSLO 1 Problem Solving	PSLO 2 Design	PSLO 3 Communication	PSLO 4 Ethics	PSLO 5 Teamwork	PSLO 6 Experimentation	PSLO 7 New Knowledge
CE 407 – Highway Design		R			R		
CE 407 – Introduction to Geotechnical Design Software	R	M					
CE 407 – Introduction to Geosynthetics	M	M					
CE 407 – Society and Transportation			R	R			R
CE 407 – Traffic Operations		R	R				
CE 412 – Seismic Engineering	M	R					
CE 424 - Advanced Soil Mechanics	M	R					
CE 432 - Structural Loading & Lateral Forces	M	M					R
CE 433 - Structural Matrix Analysis	M						
CE 439 - Highway Bridge Rating	M						R
CE 447 - Masonry Design		R					
CE 448 - Timber Design		R					
CE 449 - Bridge Design	M	R					R
CE 450 - Transportation Structures	M	R					R
CE 455 – Bicycle and Pedestrian Transportation		M					R
CE 456 - Pavement Engineering	M	M				R	
CE 458 - Transportation Safety	M		R				
CE 468 - Travel Demand Modeling	M						
CE 473 - Groundwater	M						
CE 476 - Applied Hydraulic Design	M	M					R
CE 481 - Environmental Engineering I	M						

Table 3-4. Mapping of Program Outcomes to Math and Science Courses

Math and Science Courses	Program Outcomes						
	Outcome 1 Problem Solving	Outcome 2 Design	Outcome 3 Communication	Outcome 4 Ethics	Outcome 5 Teamwork	Outcome 6 Experimentation	Outcome 7 New Knowledge
CHE 221/222 General Chemistry	I					I	I
GEOL 201 Physical Geology	I						
PHY 221/222 General Physics with Calculus	I					I	I
MATH 251 Differential Calculus	I						
MATH 252 Integral Calculus	R						
MATH 254N Vector Calculus I	R						
MATH 321 Applied Differential Equations I	R						
MATH 361 Statistical Methods	R						
MATH/SCI Electives	R						

Table 3-5. Mapping of Program Outcomes to Communication, Humanities, and Social Science Courses

Communication, Humanities, and Social Sciences Courses	Program Outcomes						
	Outcome 1 Problem Solving	Outcome 2 Design	Outcome 3 Communication	Outcome 4 Ethics	Outcome 5 Teamwork	Outcome 6 Experimentation	Outcome 7 New Knowledge
COM 111 - Public Speaking			I				
WRI/COMM Electives			I				
WRI 121 - English Composition			I/R				I
COM 401 – Civil Engineering Project I			R	R	R		R
Humanities Electives				I			
Social Science Electives			I/R				
ANTH452 Globalization			R				

Section 4 – Assessment Cycle

During the 2023-24 academic year, the Civil Engineering Department met to develop a new three-year assessment cycle. There were three goals that we were working toward while developing this cycle:

1. Assessments of each outcome were to be completed in one academic year
2. Two targeted assessments were to be completed during that year in two different courses
3. Each faculty member would conduct at least one assessment

With these goals in mind, target courses, instructors, and terms were identified and the cycle was assembled as presented below in Table 4-1. The faculty understand that this cycle is not fixed and that it may require revisions in the future. Any updates will be identified in future assessment reports.

Table 4-1. 2024-2027 BSCE Program Assessment Cycle

	2024	2024-2025			2025-2026			2026-2027		
Outcome	Spring	Fall	Winter	Spring	Fall	Winter	Spring	Fall	Winter	Spring
1. Problem Solving	ENGR 213									
	CE 442									
2. Design					Traffic	CE 402				
					Ops					
3a. Written Communication		CE 458								
			CE 402							
3b. Oral Communication		CE 450								
			CE 402							
4a. Ethics and Professionalism		CE 401								
			CE 308							
4b. Judgements and Impacts		CE 405								
			CE 308							
5. Teamwork									CE 308	
									CE 402	
6. Experimentation					ENGR 318					
							ENGR 213			
7. New Knowledge								CE 401	Society &	
									Transpor.	

Section 5 – Targeted Assessment Activities

As shown in Table 4-1, the department chose to assess Outcome 1—Problem Solving. Two targeted assessments were conducted and are summarized below.

5.1 Outcome 1—an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

5.1.1 First Assessment

Twenty-three students were enrolled in CE 442-Advanced Reinforced Concrete Design in the spring term of 2024. The problems solving skills of these students were assessed on an exam question using performance criteria and rubric (see Appendix A) developed by the civil engineering faculty. The results of this assessment are summarized in Table 5-1.

Table 5-1. Summary of First Assessment of Outcome 1.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Identify a complex engineering problem	Design of a Square Tied Reinforced Concrete Column	1 to 4 according to rubric	75% scoring 3 or higher	87.0% ≥ 3 0% = 4
Formulate a complex engineering problem				78.2% ≥ 3 60.8% = 4
Solve a complex engineering problem				78.2% ≥ 3 17.4% = 4
Apply principles of engineering, science, and mathematics				78.2% ≥ 3 30.4% = 4

The results of this assessment indicate that students do possess the ability to identify, formulate, and solve complex engineering problems. Students performed very well in solving the complex problem of designing a reinforced concrete column for both axial loads and applied moments. Very little framework was provided on the exam for how to solve and solutions ranged widely. Benchmarks were met, no further action was required.

5.1.2 Second Assessment

Twenty-four students were enrolled in ENGR 213-Engineering Mechanics: Strengths of Materials in the spring term of 2024. The problems solving skills of these students were assessed on a final project, in which students were arranged into groups of two or three and asked to create a physical structure that 3 types of internal forces. After construction, they were asked to predict the structures strength and displacement and then compare to tested results. The results of this assessment are summarized in Table 5-2.

Table 5-2. Summary of Second Assessment of Outcome 1.

Performance Criteria	Assessment Methods	Measurement Scale	Minimum Acceptable Performance	Results
Identify a complex engineering problem	Team-based final project to create a structure that carries 3 of 4 types of internal force, predict strength and displacement, and compare to tested results.	1 to 4 according to rubric	75% scoring 3 or higher	100.0% ≥ 3 82% = 4
Formulate a complex engineering problem				82% ≥ 3 45% = 4
Solve a complex engineering problem				82% ≥ 3 36% = 4
Apply principles of engineering, science, and mathematics				82% ≥ 3 55% = 4

Students created structures that carried forces as requested, identifying a complex engineering problem that they could solve with the course topics. Formulation of the problem took the form of prediction of structure behavior, which most groups handled effectively, selecting appropriate theories and methods. 82% of groups solved the problem effectively, or revisited prediction calculations to compare more accurately to tested results. Most required instructor prompting. 82% of groups correctly performed calculations, with 55% selecting appropriate tools/theories independently. The results of this assessment met the departmentally-set benchmarks and no further action was required.

Section 6 – Continuous Improvement

As these were the first two assessments in this cycle and all the benchmarks were met, there were no loops to close at this time.

Appendix A - Rubrics

Table A-1. Rubric Used to Assess Outcome 1.

Performance: Criteria	High Proficiency (4) The work meets listed requirements for this criterion; little to no development needed.	Proficiency (3) The work meets most requirements; minor development would improve the work.	Some Proficiency (2) The work needs moderate development in multiple requirements.	Limited Proficiency (1) The work does not meet this criterion: it needs substantial development in most requirements.
Identify a complex engineering problem	Identifies a creative, focused, and manageable problem that addresses potentially significant yet previously less-explored aspects of the subject.	Identifies a focused and manageable problem that appropriately addresses relevant aspects of the subject.	Identifies a problem that, while manageable, is too narrowly focused and leaves out relevant aspects of the subject.	Identifies a problem that is too general and wide-ranging to be manageable.
Formulate a complex engineering problem	All elements of the methodology or theoretical framework are skillfully developed.	Critical elements of the methodology of theoretical framework are appropriately developed. However, more subtle elements are ignored.	Critical elements of the methodology of theoretical framework are missing, incorrectly developed, or unfocused.	Inquiry design demonstrates a misunderstanding of the methodology or theoretical framework.
Solve a complex engineering problem	Solve idenified problem(s) with chosen methodology, with little to no instructor prompting, or guidance. Acknowledge and justify assumptions used in solving problem(s).	Solve idenified problem(s) with correct equation(s), in response to broad instructor prompting. Acknowledge and justify assumptions used in solving problem(s).	Solve idenified problem(s) with correct equation(s), closely following instructors previous solved examples, but in a slightly differring context.	Solve problems using formulas or frameworks provided directly from instructor for the specific solution(s) of this/these specific probem(s).
Apply principles of engineering, science, and mathematics	Correctly perform challenging computations and sequences of computations, knowing the tools needed.	Correctly perform longer and more complicated computations, or sequences of linked computations selecting from a list of possible tools.	Correctly perform longer and more complicated computations, or sequences of linked computations with tools provided.	Perform fairly short single computations with tools provided.

Program Assessment Report Feedback

2020-21 Assessment Report

Program:

Department Chair:

Program Assessment Report Author:

Rubric Measure	Well Developed, Progressing or Not included.
Program mission is aligned to University Mission	
Educational Objectives Wording is Actionable	
PSLO's are justified by Professional Standards	
PSLO'S are aligned to ISLO	
Curriculum Map: Scaffolding indicates Foundational, Practice, and Capstone Assessments by course	
Assessment Cycle is three years to cover all PSLO and ISLO	
Actions taken by programs on assessment during each year of the cycle are specified	
During collection year, courses/assignments are specified that align to PSLO at FP&C levels	
Rubric: Criteria for grading the assignment is described (appendix)	
Sample: Number of samples reviewed is specified	
Reliability: Reviewer and locations of the assignment are specified	
Performance Targets of acceptability are indicated	
Results include: Graduation, Retention, Persistence, DFWI, Post Grad Success, Equity Gaps, PSLO, ISLO	
Interpretation: Current results are compared against performance targets	
Interpretation: Current results are compared against previous 3 years of data	
Interpretation: Current results are compared against University data	
Action drivers: Items not meeting performance targets have actions planned	
Action drivers: Additional action plans for overall department improvement are indicated	
Action plans: Specifics of accountability and timelines are indicated	
Action plans: Actions are linked to budgetary decisions	
Faculty discuss trends in the data	
Faculty discuss previous action plan success given new data	
Faculty discuss the assessment process and make any improvements necessary	