

BACHELOR OF SCIENCE IN CIVIL ENGINEERING (BSCE) STUDENT LEARNING OUTCOMES (SLOs) ASSESSMENT PLAN Updated – 2025 May

The student learning outcomes for the BSCE Program at CSU Pueblo were adopted from the Engineering Accreditation Commission (EAC) of ABET. The program adopted all seven (7) Student Outcomes (SO's) of the EAC of ABET listed below:

- 1. 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.

The BSCE program faculty plan to evaluate <u>three (3)</u> consequent outcomes each year starting from the AY 2024-2025.

The mapping between the Program Educational Objectives and Student Learning Outcomes is shown in Table 1.

Table 1. Mapping between the Program Educational Objectives and Student Learning Outcomes

Student Learning Outcomes	 The objectives of the BSCE program is to provide an integrated educational experience so that its graduates: successfully enter as entry-level engineers or planners and continue practicing in different civil engineering areas continue rapid, life-long learning for professional growth and/or higher-level education in different civil engineering areas
1. Ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;	Х
2. 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;	Х
3. Ability to communicate effectively with a range of audiences;	Х
4. 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;	X
5. 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;	Х
6. Ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;	Х
7. Ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	Х

The SLOs, the Performance Indicators and the Methods of Assessment to be used in judging the student performance on the student outcomes are listed in **Table 2**.

Student Learning Outcomes	Performance Indicators	Method(s) of Assessment (Instructor may choose similar other methods)		
1. Ability to identify, formulate, and solve complex engineering problems by applying	• Chooses a mathematical model of a system or process appropriate	HW, Quiz, Exam		
	• Applies mathematical principles to achieve analytical or numerical solution to model equations	HW, Quiz, Exam		
principles of engineering, science, and mathematics;	• Examines approaches to solving an engineering problem to choose the more effective approach	HW, Quiz, Exam		
2. Ability to apply engineering design to	• Problem statement shows understanding of the problem	HW, Quiz, Exam		
produce solutions that meet specified needs with	• Solution procedure and methods are defined.	HW, Quiz, Exam		
consideration of public health	• Problem solution is appropriate and within reasonable constraints	HW, Quiz, Exam		
	• Writing conforms to appropriate technical style	Lab Report, Semester Project Report, drawings, Exam		
3. Ability to communicate effectively with a range of	• Appropriate usage of graphics	Lab Report, Semester Project Report, Power-point slides, Exam		
audiences;	• Grammar and editorial aspects	Lab Report, Semester Project Report, Power-point slides, Exam		
		Lab Report, Semester Project Report, Power-point slides		
4. Ability to recognize ethical and professional	practice	HW, Exam, Survey, Interviews		
responsibilities in engineering situations and	various impacts	HW, Exam, Survey, Interviews		
make informed judgments	 Understands and applies professional standards. 	HW, Exam, Survey, Interviews		
5. Ability to function effectively on a team whose	• Recognize participant roles in a team setting	Instructor Survey, Peer Evaluation, Interviews		
members together provide leadership, create a		Instructor Survey, Peer Evaluation, Interviews		
collaborative and inclusive environment		Interviews		
6. Ability to develop and conduct appropriate experimentation, analyze and interpret data	• Designs and conducts experiments following proper procedures	Lab Report, Presentation		
	• Collects and analyzes experimental data accurately	Lab Report, Presentation		
	• Draws valid conclusions based on data analysis.	Lab Report, Presentation		
7. Ability to acquire and apply new knowledge as needed, using appropriate		Instructor Survey, Peer Evaluation, Interviews, Report, HW, Quiz, Exam		
	• Applies new knowledge to solve engineering problems			
learning strategies.		Instructor Survey, Peer Evaluation, Interviews, Report, HW, Quiz, Exam		

 Table 2. Performance Indicators to be used for Student Learning Outcomes

Each outcome has been mapped to the civil engineering courses as depicted in **Table 3.** Although a course may satisfy many SLOs, only major satisfying outcomes are listed and used for assessment.

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Table 3. Mapping courses to the Student Learning Outcomes

The rubric to evaluate students' work is presented in **Table 4**. Four criteria are generally used to make the evaluation simple and effective.

Table 4. Grading Rubric for Performance Indicators based on Instructor's Judgement (Instructor may choose his/her own rubric)

Performance Level	Good	Fair	Poor	Unable
Score be given	100%	75%	50%	0%

Performance Target: 75% students will achieve 70% score in each SLO combining the score in all Performance Indicators.