

Civil ■ Construction ■ Architectural ■ Environmental

Student Learning Outcome Levels of Achievement Rubric – This table provides the outcome statement for each student learning outcome at each level, including the level expected at graduation (bolded). Outcomes statements are also included for the MS and PhD degrees, but you only need to document your achievement of the BS graduation outcomes.

Outcome ID	Outcome Name	Level 1 Knowledge	Level 2 Comprehension	Level 3 Application	Level 4 Analysis	Level 5 Synthesis	Level 6 Evaluation
F1	Math and Science	Define key factual information related to (1) mathematics through calculus and differential equations; (2) probability and statistic; and (3) at least two areas of natural science.	Explain key concepts and problem-solving processes in (1) mathematics through calculus and differential equations; (2) probability and statistics; and (3) at least two areas of natural science.	Solve problems in (1) mathematics through calculus and differential equations; (2) probability and statistics; and (3) at least two areas of natural science. (BS)			
F2	Humanities and Social Behavior	Define key facts from (1) humanities, literature, and fine arts; and (2) history and social.	Discuss the key facts of (1) humanities, literature, and fine arts; and (2) history and social behavior.	Explain the importance of (1) humanities, literature, and fine arts; and (2) history and social behavior. (BS)			
T1	Materials and Mechanics	Define key factual information related to engineering mechanics and materials.	Explain key concepts and problem-solving processes in engineering mechanics and materials.	Solve problems in engineering mechanics and materials.	Analyze and solve problems in engineering mechanics and materials. (BS)		
T2	Experiments and Data Analysis	Identify the procedures and equipment necessary to conduct engineering related experiments.	Explain the purpose, procedures, equipment, and practical applications of engineering related experiments.	Conduct engineering related experiments according to established procedures, and report the results.	Select and conduct engineering experiments, and analyze and evaluate the resulting data. (BS)	Specify or design an experiment to meet a need, conduct the experiment, and analyze and explain the resulting data.	Evaluate the effectiveness of a designed experiment and the implications of the resulting data. (PhD)

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T3	Tools and Engineering Problems	Identify the techniques, skills, and modern engineering tools that are necessary for engineering practice.	Explain how relevant techniques, skills, and modern engineering tools are used in engineering practice, including key concepts and problem-solving processes.	<p>Apply relevant knowledge, techniques, skills, and modern engineering tools to identify, formulate, and solve engineering problems, including problems in:</p> <p>BSCivE – environmental, water resources, transportation, structural, construction, and geotechnical (BS)</p>	<p>Identify, formulate, and solve complex relevant engineering problems by selecting and applying appropriate tools and techniques. (MS)</p> <p>BSConE – project controls, construction methods, materials, and safety (BS)</p>	<p>Synthesize and explain the solution to complex relevant engineering problems, including the use of appropriate tools and techniques.</p> <p>BSArchE – building structures, building mechanical systems, building electrical systems, and construction engineering and management (BS)</p>	<p>Verify and justify the solution to a complex relevant engineering problem, including the use of appropriate tools and techniques. (PhD)</p> <p>BSEnvE – air, land, and water systems, and associated environmental health impacts (BS)</p>
T4	Impacts of Historical and Current Events	Define the impacts of specific historical and contemporary issues on engineering practice.	Discuss the impact of historical and contemporary issues on engineering practice.	Explain the impact of historical and contemporary issues on engineering practice. (BS)			
T5	Project Management	List key principles of project management.	Explain what a project is and the key aspects of project management.	Develop solutions to well-defined project management problems. (BS)			

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T6	Design	Define engineering design; list the major steps in the engineering design process; and list constraints that affect the process and products of engineering design.	Describe the engineering design process, and explain how real-world constraints affect the process and products of engineering design.	Apply the engineering design process to a component to meet a well-defined set of requirements and constraints.	Illustrate the engineering design process for a basic engineering system or process to meet a well-defined set of requirements and constraints.	Design a system or process in more than one area within the discipline to meet desired needs, including sustainability and within other realistic constraints such as environmental, economic, social, political, ethical, health and safety, and constructability. (BS)	
T7	Specialization	Define key aspects of at least one traditional or emerging area of advanced specialization within the discipline.	Explain key aspects of at least one traditional or emerging area of area of advanced specialization within the discipline. (BS)	Apply specialized knowledge to solve problems in a traditional or emerging area of advanced specialization.	Analyze complex system of process in a traditional or emerging area of advanced specialization.	Synthesize advanced technical knowledge in a traditional or emerging area of specialization. (MS)	Develop and evaluate new, advanced technical knowledge in a traditional or emerging area of specialization. (PhD)
P1	Professional, Ethical, and Legal Aspects	List the professional, legal, and ethical responsibilities of an engineer.	Describe the professional, legal, and ethical responsibilities of an engineer.	Apply standards of professional, legal, and ethical responsibility in a relatively clear-cut situation to determine an appropriate course of action.	Analyze a situation involving multiple conflicting professional, legal, and ethical interests, and determine an appropriate course of action. (BS)		
P2	Communication	List the characteristics of effective verbal, written, and graphical communications.	Describe the characteristics of effective verbal, written, and graphical communications.	Apply rules of grammar, composition and appropriate graphical standards to deliver verbal, written, and graphical communications.	Organize and deliver effective written, verbal, and graphical communications. (BS)	Synthesize and explain the relevance and application of new, advanced technical knowledge in both technical and non-technical terms. (PhD)	

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P3	Independent Study	Define life-long learning.	Explain the need for life-long learning and describe the skills required of a life-long learner.	Demonstrate the ability to learn through independent study, without the aid of formal instruction. (BS)			
P4	Attributes, Leadership, and Teaming	Describe attributes supportive of the professional practice of engineering, and key aspects of leadership and teamwork.	Discuss attributes supportive of the professional practice of engineering, leadership principles, and the principles of collaborative teaming.	Demonstrate attributes supportive of the professional practice of engineering; apply leadership principles to direct the efforts of a small group to solve a relatively constrained problem; and function effectively as a member of a multidisciplinary team to solve open-ended engineering problems. (BS)			
P5	Licensure, Business, and Globalization	List key concepts of licensure, engineering management, business, law, and globalization.	Explain the importance of professional licensure and basic concepts in engineering management, business, law, and globalization. (BS)				