Student Outcomes Course Mapping for B.S. in Engineering Science, Picker Engineering Program

KEY:
Covered/Supported: Student Outcome Always ●

Student Outcome Potentially Covered/Supported: ◊

Performance Indicator	EGR 100 Engineering for Everyone	EGR 110 Fundamental Engineering Principles	EGR 220 Circuit Theory	EGR 270 Mechanics	EGR 290 Thermo-dynamics	EGR 374 Fluid Mechanics	EGR 410D EGR Design & Professional Practice	EGR 421D Capstone Design with Faculty	EGR 422D Design Clinic	EGR 312 Atmospheric Processes	EGR 314 Contaminants in Aquatic Systems	EGR 315 Ecohydrology	EGR 320 Signals & Systems	EGR 322 Acoustics	EGR 324 Fundamentals of Microelectronics	EGR 325 Electric Power Systems	EGR 326 Dynamic Systems/ Intro to Control	EGR 328 Digital Circuits & Sensors	EGR 340 Geotechnical Engineering	EGR 350 Engineering and Cancer	EGR 351 Introduction to Biomedical Engineering	EGR 360 Advanced Thermo-dynamics	EGR 363 Mass and Heat Transfer	EGR 373 Skeletal Biomechanics	EGR 375 Strength of Materials	EGR 376 Materials Science & Engineering	EGR 377 Aerial Vehicle Design	EGR 389 Techniques for Modeling EGR Processes
	Core Classes									**Technical Electives**																		
Student Outcome (1): an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics																												
(*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.)																												
(1)a: The student solves a complex engineering problem that requires mathematical skill and principles from engineering science (e.g., mechanics, fluids, circuits, thermodynamics).		◊	◊			◊		◊	◊	●	◊		●	●	●	●	●	●	●	●	●	●	●	◊	●	◊	●	
(1)b: The student transforms a complex system into a simplified mathematical model and articulates the impact of simplifying assumptions.		●			●					◊	◊	●		●	●	◊	●			●	●	●	●		●			●
(1)c: The student identifies, formulates, and solves a complex engineering problem that requires mathematical skill and principles from engineering science (e.g., mechanics, fluids, circuits, thermodynamics).		◊	◊					◊	◊	●	◊		●	●	●	●	●	●		●	●	●	●	◊	●	◊	●	
Student 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																												
(2)a: The student develops, tests, and iteratively refines a design to meet desired needs and requirements.								◊	●		●		●	●		◊	●	●			◊						●	
(2)b: The student articulates stakeholder needs, realistic constraints, and relevant design requirements for a design problem.							●	◊	●		◊				●	◊	◊	◊		●	●							
Student Outcome (3): an ability to communicate effectively with a range of audiences																												
3(a): The student presents engineering data utilizing effective graphical representation			●	●	●	●	◊	◊	●	◊	◊	●	●	●		●	●		●	●	●	●	●	◊	◊			●
(3)b: The student's writing utilizes appropriate grammar and format, effectively articulates ideas, incorporates relevant published work, and demonstrates appropriate style for the audience.							◊	◊	●	●	●		◊	◊		◊			●	●	◊	●	●	●	●	●		●
(3)c : The student conveys technical content with an oral presentation that is professional and accessible to a general audience.		◊					◊	◊	●	◊	●		●	●						●	●		●	●	◊	◊		
Student 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																												
(4)a: The student demonstrates an awareness of professional ethics and is able to evaluate the ethical dimensions of an engineering problem.				●			●	◊	◊		◊					◊		◊		●	●			◊		●		●
(4)b: The student evaluates the impact of an engineering design or solution within the context of economic, environmental, and/or societal factors.							◊	◊	◊	◊	◊					●		◊		●	●	◊					◊	
Student 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																												
(5)a: The student recognizes and utilizes the diverse skills and knowledge of team members.		◊		●				◊	●							◊		◊	◊	◊	◊	◊	◊		●	●	◊	◊
(5)b: The student establishes goals, plans tasks, and meets objectives in a collaborative team setting.		◊		◊				◊	●		●					◊		◊	◊	◊	◊	◊	◊		●	◊	◊	◊
Student Outcome (6): an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions																												
(6)a : The student demonstrates an ability to make quantitative measurements and consider sources of error.		●	●	◊	●	●		◊	◊		●			●	●			●				◊	◊		●	◊		
(6)b: The student analyzes data and draws conclusions based on those data.		◊	●	●	●	●		◊	◊	◊	●	●	●	●	●			◊	●	●	●	●	●		●	●	●	●
(6)c : The student designs an experiment and carries it out.		◊	●					◊	◊		●			●				●				◊	◊		●	◊	●	
Student Outcome (7): an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.																												
(7)a: The student is able to articulate gaps in their knowledge and address those knowledge gaps.		◊		●	◊		●	◊	●	◊	●					◊	◊	●	●	●	●	●	●	●	●			●
(7)b: The student is able to transfer an engineering concept from one context/class to another.								◊	◊	◊	◊		●	●		●	●	●	●	●	●	●	●	●	●	●	◊	◊