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

| Course Code | Core Course | Technical electives
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#### Student Outcome (1): an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- Formulating engineering problems requires the ability to translate a real-world situation into a mathematical model that incorporates relevant factors from various domains.
- Solving complex problems involves selecting and applying appropriate mathematical and computational tools.
- Applying theorems and principles from solid mechanics, fluid mechanics, circuit theory, and/or thermodynamics.
- Formulating a problem requires understanding the underlying concepts and identifying relevant principles.
- Solving problems often involves iterative processes, requiring multiple attempts to refine solutions.
- An engineering problem typically involves multiple constraints or objectives.

#### Student Outcome (2): an ability to apply engineering design to produce solutions that meet specified needs within considerations of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
- Applying engineering design principles to create a practical solution.
- Understanding the impact of engineering solutions on global, societal, and environmental contexts.
- Selecting appropriate design concepts and methods to address specific needs.
- Designing systems and components that meet specified performance requirements.
- Evaluating the feasibility and sustainability of proposed solutions.

#### Student Outcome (3): an ability to communicate effectively with a range of audiences
- Communicating technical information effectively to both technical and non-technical audiences.
- Using appropriate language and terminology.
- Preparing and delivering presentations that engage and inform.
- Writing clear and concise reports and documentation.
- Interacting with colleagues and stakeholders.

#### 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.
- Recognizing the ethical implications of engineering decisions.
- Making informed judgments based on moral principles.
- Understanding the broader implications of engineering actions.
- Ensuring compliance with professional standards and codes of ethics.

#### 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
- Working collaboratively with team members.
- Establishing clear goals and objectives.
- Planning and executing tasks effectively.
- Resolving conflicts and managing stakeholder expectations.
- Demonstrating leadership and initiative.

#### Student Outcome (6): an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
- Designing and executing experiments.
- Analyzing data and interpreting results.
- Making informed decisions based on evidence.
- Applying engineering judgment to solve problems.

#### Student Outcome (7): an ability to acquire and apply new knowledge as needed, using appropriate learning strategies
- Continuously updating skills and knowledge.
- Effectively using learning resources and technologies.
- Adapting to new information and technologies.
- Applying knowledge to solve novel problems.

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*Complex engineering problems include one or more of the following characteristics: involving wide-ranging or conflicting design problem. Requirements. Environmental, and/or societal factors. A student incorporates relevant work, and demonstrates appropriate style for the audience.*