

**MECHANICAL ENGINEERING PROGRAM**  
**ABET COURSE SYLLABUS**

**ME 234: Philosophy of Design (3) Required**

**Course Description:** (2013-2015 Catalog) General approach to the meaning of engineering design. Conceptual blocks, creativity, design process, design considerations and elements. 3 lectures.

**Prerequisite Courses:** ME 130 and ME 228

**Prerequisites by Topic:** None

**Textbook:** (and/or other required material) Creative Design of Products and Systems, Saeed B. Niku, John Wiley and Sons, 2009.

**References:**

**Course Coordinator/Instructor:** Saeed Niku, Professor of ME

- Course Learning Outcomes:**
1. To recognize how mental blocks prevent one from synthesizing original or alternative solutions and designs.
  2. To classify methods that overcomes mental blocks.
  3. To recognize the benefits of the design process and the issues involved in the design of products and systems.
  4. To recognize the role of liability, human factors, safety and economics issues in design.
  5. To demonstrate their ability in applying these methods through design projects.
  6. To synthesize design solutions for a variety of problems and product needs.

<b>Relationship of Course to MECHANICAL ENGINEERING Program Outcomes:</b>												
<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>
<b>H</b>	<b>L</b>	<b>H</b>	<b>H</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>M</b>	<b>H</b>	<b>L</b>	<b>H</b>

**Topics Covered:** (recommended number of hours each)

1. Considerations in Design: weight, size, design standards, material properties, cost, performance, styling, human factors, safety, serviceability, environmental effects, manufacturing processes, and aesthetics.

2. Design Process: search for problems and problem definition, idea generation, preliminary analysis, idea selection, analysis and final design, implementation, and testing.
3. Individual and Team Design Projects: Includes a mid-quarter prototype fabrication, testing, demonstration, and final report.
4. Mental blocks: perceptual, cultural, environmental, emotional, intellectual, expressive, and how to overcome them.
5. Idea Generation Techniques: brainstorming, verbal manipulation, synectics, morphological forced connection, attribute analogy chains.
6. Human Factors: anthropometric tables, safety, control panels, man-machine systems, environments, aesthetics.

**Laboratory Projects:** There is no laboratory in this course. However, students design and build a prototype of a project for testing. They also synthesize and present a final design project.

**Class/Lab Schedule:** Tuesdays and Thursdays, 8:10 to 9:30, 9:40 to 11:00, or 1:40 to 3:00

<b>Contribution of Course to Meeting the Professional Component:</b>	(a) College-level mathematics and basic sciences:	0 credits
	(b) Engineering Topics: Design	3 credits Yes
	(c) General Education:	0 credits
	(d) Other:	0 credits

**Prepared by:**  
Saeed Niku

**Date:**  
9-23-2013