

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

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

**Course Description:** (2019-2020 Catalog) General approach to the meaning of engineering design. Conceptual blocks, creativity, design process, design considerations and elements. 3 lectures.

**Prerequisite Courses:** Sophomore standing

**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 barriers.
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, quality, safety, intellectual property, 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.

**Relationship of Course to Mechanical Engineering Program Outcomes:**

SO 1: Develop (D)  
SO 2: Introduce (I)  
SO 3: Develop (D)  
SO 4:  
SO 5: Introduce (I)  
SO 6:  
SO 7: Introduce (I)

**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, intellectual properties, 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 barriers: Perceptual, cultural, environmental, emotional, intellectual, expressive, and how to overcome them.
5. Idea Generation Techniques: Brainstorming, verbal manipulation, synectics, morphological menu matrix, 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

**Contribution of Course to  
Meeting the Professional  
Component:**

- |   |                  |
|---|------------------|
| (a) College-level mathematics and basic sciences: | 0 credits        |
| (b) Engineering Topics:<br>Design                 | 3 credits<br>Yes |
| (c) General Education:                            | 0 credits        |
| (d) Other:  | 0 credits        |

**Prepared by:**  
Saeed Niku

**Date:**  
10-23-2019