

MECHANICAL ENGINEERING PROGRAM

ABET COURSE SYLLABUS

ME 440: Mechanical Engineering Design (3 credit): Required Course

Course Description (2008-2010 Catalog):

Stress analysis; deflection of machine elements; design of machine elements for static and fatigue strength.

Prerequisite Course: ME 301, ME 302

Prerequisite by Topic:

- Structure and Properties of Solids
- Mechanics of Materials

Textbook: “Fundamentals of Machine Component Design”, Juvinall and Marshek, 4th Edition, Wiley & Sons, 2006, ISBN 0-471-66177-5

Other Reference Material: N/A

Course Coordinator: Brendan O’Toole, Associate Professor

Course learning outcomes:

- Identify critical static and dynamic stresses in a mechanical component.
- Suggest suitable dimensions and material to ensure that a mechanical component meets its design requirements.
- Select mechanical components from appropriate catalogs.
- Design simple mechanical systems starting from an abstract specification list.

Relationship of Course to Mechanical Engineering Program Educational Outcomes:

Goal 1: Provide mechanical engineering graduates with technical capabilities.					Goal 2: Prepare the mechanical engineering graduates to have effective workplace skills.				Goal 3: Instilling a sense of responsibility as a professional member of society.			
1.a	1.b	1.c	1.d	1.e	2.a	2.b	2.c	2.d	3.a	3.b	3.c	3.d
H	M	H	M	H	H	L	H	M	L			L

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Topics Covered:

1. Load Analysis
2. Material Properties
3. Combined Stresses and Stress Concentration
4. Elastic Strain, Deformations, Energy Methods for Deflection
5. Failure Theories, Reliability
6. Fatigue
7. Threaded Fasteners and Power Screws
8. Shear and Welded Connections
9. Springs
10. Bearings
11. Spur Gears
12. Shafts and Keys

Laboratory Projects: Students perform a semester-long design project. They must fabricate a model of at least part of their design using a 3D printer in the ME machine shop.

Class/Laboratory Schedule: 75 minutes lecture two sessions per week

Assessment of Student Progress toward Course Objectives

Three written exams, home-work assignments, two group projects, final exam, and model fabrication

Class/Laboratory Schedule: TR 10:00 - 11:15 AM (Fall Semester)

Contribution of Course for meeting Professional Component:

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| (a) Mathematics and basic sciences: | 0 credit |
| (b) Engineering Topics (Design/Science): | 3 credit |
| (c) General Education: | 0 credit |
| (d) Others: | 0 credits |

Prepared By:

Brendan O'Toole

Date:

October 12, 2009