



## ME465 Machine Design II (Required Course)

**Code and Name:** ME465 Machine Design II

**Credit Hours:** 3 (Lecture: 3, Tutorial: 0)

**Textbook:**

- Shigley's Mechanical Engineering Design, R.G. Budynas, J.K. Nisbet, 9<sup>th</sup> Edition, McGraw Hill, 2011.

**Other References:**

- Machine Design, R.L. Norton, 5<sup>th</sup> Edition, Prentice Hall, 2013.

**Course Description:**

This course introduces the fundamentals of machine design, including analysis and design of mechanical components. Covers shafts, fasteners, belt and chain drives, brakes, gears, springs and bearings. Includes predicting static and fatigue failures for various loadings and materials. Design techniques and the design of a simple machine.

**Pre-requisites:** ME365 Machine design I

**Co-requisites:** None

**Course Learning Outcomes:**

With relation to ABET Student Outcomes (SOs: 1-7)

1. List codes and standards to machine component design (1)
2. Name type of failure in shaft parts under static and variable loadings (1, 6)
3. State the steps of threaded fasteners and welded joints (2)
4. Describe the steps and select the suitable type of Gears (2)
5. Describe the steps of bearing selection and evaluation of bearing life and failure (2, 6)
6. Outline the procedure of selecting appropriate mechanical components from manufacturers' catalogues (1)
7. Develop student's ability to think conceptually, critically and analytically (2, 4)
8. Analyze and simulate an existing mechanical system (7)
9. Design of machine elements like shafts, threaded fasteners, gears and bearings (1, 7)
10. Prepare discussion, examples and illustrations to demonstrate the difference among topics (1, 2, 6)
11. Write lecture notes clearly and regularly on a notebook and/or on a provided lecture slides (3, 5)
12. Use text book and reference material to acquire knowledge (7)
13. Demonstrate how to participate in class discussion and act efficiently to provide opinion on a topic (3)
14. Calculate factor of safety in a shaft subjected to fatigue load using fatigue failure theories (4)

**Topics to be covered:**

- Shafts and Shaft Components
- Screws, Fasteners, and the Design of Nonpermanent Joints
- Rolling-Contact Bearings
- Gears design, Spur and Helical Gears, Bevel and Worm Gears
- Clutches, Brakes, Couplings, and Flywheels
- Flexible Mechanical Elements
- Power Transmission: Case Study.

**Grading Policy:**

The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.

