



## ME365 Machine Design I (Required Course)

**Code and Name:** ME365 Machine Design I

**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:**

General principles of machine design, reliability and statistical considerations, engineering materials and their mechanical properties, factor of safety, fits & tolerances, deflections and stress analysis for different types of elements, buckling, static strength and failure theories, fatigue strength and failure theories. Basic design principles of some machine elements and their selection (power screws, fasteners, and welded joints). Ethical and social impacts of mechanical design.

**Pre-requisites:** GE 101 – Engineering Graphics and Design, ME 331 – Mechanics of Machines

**Co-requisites:** None

**Course Learning Outcomes:**

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

1. Recognize human and legal factors to be taken care of in designing (2)
2. Outline the types of failure in simple parts under static and variable loadings (1)
3. State the designing steps of threaded fasteners, welded joints, and mechanical springs (6)
4. Estimate the failure limits of structures subjected to any stress state (1)
5. State different failure theory (1)
6. Operate computational tools to organize design data in class (1, 2, 6)
7. Calculate design parameters, boundary conditions, induced stress, and factor of safety in real applications (2, 6)
8. Research on internet to locate available design data (1, 2, 6)

**Topics to be covered:**

- Introduction to Mechanical Engineering Design
- Load and stress analysis
- Deflection and stiffness
- Failure resulting from static loading
- Fatigue failure resulting from variable loading
- Design of non-permanent joints
- Design of permanent joints
- Mechanical springs.

**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.

