

ME-302 MECHANICAL SYSTEMS II

SPRING 2021

Instructor: Eralp Demir

E-mail: eralpd@sabanciuniv.edu

Class hours: Tuesday 5:40-17:30

Zoom ID:

465 324 4758

TAs:

Ali Rashed (rashed)

Thursday (16:40-17:30) ME302-L-A

Can Bayraktar (canbayraktar)

Friday (10:40-12:30) ME302-L-B

Celal Umut Kenanoglu (umut.kenanoglu)

Thursday (12:40-14:30) ME302-R-A

Fiyinfoluwa Abioye (fabioye)

Thursday (14:40-16:30) ME302-R-B

Office Hours: After class, or by appointment

Main References:

- **Richard G. Budynas and J. Keith Nisbett, *Shigley's Mechanical Engineering Design*, McGraw Hill, 2011.**

Objectives: This course intends to give design and engineering principles of machine elements for undergraduate students.

Prerequisites: ME-301

Tentative Course Outline:

Week-1: Basics of Machine Design

Introduction

Materials

Stress Analysis

Deflection and Stiffness

Week-2: Failure Analysis

Static Strength and Failure

Fatigue Failure

Week-3/12: Design of Mechanical Elements

Design principles related with the machine elements

Week-3: Design of Shafts

Week-4: Design of screws, fasteners, non-permanent joints

Week-7: Design of welds, bonds, and permanent joints

Week-8: Mechanical springs

Week-9: Rolling contact bearings

Week-10: Gears

Week-11: Flexible Machine Elements

Week-12: Power Transmission

Week-13: Finite Element Method

Generalized FEA for static linear elasticity; Basic Finite Element Principles; Stress Analysis using a commercial software (Solidworks).

Learning Outcomes:

- Ability to perform design of machine elements
- Decision making for selection of machine elements
- Strength and Failure analysis considering static and fatigue load conditions
- Ability to solve basic engineering problems with the use of a commercially available software

Computer Programming: MATLAB, ANSYS

Grading Policy: Assignments(30%), Project (20%), Midterm (20%), Final (30%).

Important Dates:

will be announced

Class Policy:

- Regular attendance is essential and expected.
- Quizzes will be done during lab or recitation hours.