



Course Code MENG-350	Course Title Machine Elements	ECTS Credits 6
Department Engineering	Semester Fall, Spring	Prerequisites MENG-250, MENG-270
Type of Course Required	Field Engineering	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 3 rd	Lecturer(s) Dr Vasileios Drakonakis
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisites None

Objectives of the Course:

The main objectives of the course are to:

- Understand the fundamental concepts of machine elements design.
- Comprehend the engineering design methodology toward design optimization.
- Understand failure risks.
- Be able to utilize in design multiple types of machine elements such as vessels, elastic components, friction joints, shafts, links, and gears.

Learning Outcomes:

After completion of the course students are expected to:

- Synergize forces, moments, torques, stresses and strength information in order to develop the ability of analyzing, designing and/or selecting machine elements with particular attention to performance, safety, and reliability.
- apply mathematics, science and engineering principles.
- identify, formulate and solve engineering problems.
- use the techniques, skills and modern engineering tools necessary for machine elements design

Course Contents:

- Engineering design methodology, design optimization and reliability.
- Theory of failure from static and dynamic loading.
- Introduction to fracture mechanics.
- Design of permanent (welding, riveting) and nonpermanent joints (Screws, Fasteners).
- Pressure vessels. Stresses in Pressurized Cylinders and tight joints.
- Steel structures, elastic components, springs, keys, splines.
- Friction joints, power transfer, axes-shafts, dynamic analysis of axes-shafts.
- Belts, links, clutches, brakes.
- Surface resistance, Hertzian Theory, lubrication, elements rolling anti-friction bearings.

- Theory of gears. Various types of gears, configurations, calculation methods, industrial applications.

Learning Activities and Teaching Methods:

Lectures, in-class examples and exercises, in-class activities, designing, videos.
The course format is 3 h lectures and 1 h design tutorial session per week.

Assessment Methods:

In-class activities, participation, homework (applied design exercises), mid-term exam, final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
V. B. Bhandari	Design of Machine Elements	Tata McGraw-Hill Education	2007	9780070611412

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
R.S. Khurmi & J.K. Gupta	Machine Design	S Chand	2005	8121925371
Jack A. Collins, Henry R. Busby, George H. Staab	Mechanical Design of Machine Elements and Machines, 2nd Edition	John Wiley & Sons, Inc.	2009	9780470563205