



Course Code MENG-310	Course Title Mechanical Engineering Design	Credits (ECTS) 6
Department Engineering	Semester Fall, Spring	Prerequisites None
Type of Course Required	Field Engineering	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 3 rd	Lecturer Dr Marios Alaeddine
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:

- Introduce students to cover the basics of machine design, including the design process, engineering mechanics and materials failure prevention under static and variable loading and the characteristics of the principal types of mechanical elements.
- Offer a practical approach to the subject through a wide range of real world applications and examples.
- Encourage students to link design and analysis.
- Encourage students to link fundamental concepts and practical components specifications.

Learning Outcomes:

After completion of the course students are expected to:

- Provide a physical meaning of Mechanical Engineering Design.
- Be able to recognize the phases and interactions of the design process.
- Be able to choose the design tools and resources.
- Be able to understand the standards.
- Understand the Engineer's professional responsibilities.
- Understand the safety issues and the product liability.
- Be able to analyze the strength and stress.
- Be able to make uncertainty analysis.
- Understand the design factor and the factor of safety.
- Understand the reliability and the probability of failure.
- Be able to understand the economics related to the engineering design.

Course Contents:

- Introduction to Mechanical Engineering Design.
- Materials strength, stiffness and properties.

- Load and stress analysis.
- Deflection and stiffness.
- Failure prevention.
- Design of Mechanical Elements.
- Screws, Fasteners and the design of Non-permanent Joints.
- Welding and Bonding.
- Mechanical Springs.
- Rolling - Contact Bearings.
- Bevel and Worm Gears.
- Flexible Mechanical Elements.
- Power transmission case study.
- Finite Element Analysis.

Learning Activities and Teaching Methods:

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

Assessment Methods:

Homework, midterm exams, design assignment, final exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
R.G.Budynas and J.K. Nisbett	Shigley's Mechanical Engineering Design	McGraw- Hill	2014	987-0-07- 339820-4

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
G.E.Dieter	Engineering Design: A material and processing approach.	McGraw Hill	2000	0-07-016902-0