

INTRODUCTION TO MECHANICAL ENGINEERING AND CAREER PLANNING

Manisa Celal Bayar University - Department of Mechanical Engineering
Fall 2024

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Course Time:

Monday 13:30 to 15:10 and 20:40 to 22:20

Course Credit:

2,00(Theo) : 4,00(ECTS)

Course Room:

AZ-02 (Engineering)

Office Hours:

Please check the schedule from the website <https://burakozhan.cbu.edu.tr/> or request an appointment via Microsoft Teams (account name Burak ÖZHAN)

Textbook:

A large number of introductory books or notes on Engineering and Mechanical Engineering are available. Following books are recommended to the students to explore.

- Jonathan Wickert and Kemper Lewis, An Introduction to Mechanical Engineering, Fourth Edition, Cengage Learning (Turkish version of previous edition is also available).
- J. Paulo Davim (Editor), Introduction to Mechanical Engineering, Materials Forming, Machining and Tribology, Springer International Publishing AG, part of Springer Nature 2018.
- Francesco Sorge and Giuseppe Genchi (Editors), Essays on the History of Mechanical Engineering, Springer International Publishing Switzerland 2016.
- John Bird and Carl Ross, Mechanical Engineering Principles, Newnes, A division of Reed Educational and Professional Publishing Ltd, 2001.
- Ibn al-Razzaz al-Jazari, The Book of Knowledge of Ingenious Mechanical Devices, Translated and annotated by Donald R. Hill, D. Reidel Publishing Company Dordrecht-Holland / Boston-U.S.A., 1st edition 1974.
- Edward H. Smith (Editor), Mechanical Engineer's Reference Book Twelfth edition, Butterworth-Heinemann A division of Reed Educational and Professional Publishing Ltd, 2000.

Course Information:

The course can be divided into two parts, which are on interaction with each other. The first part of the course includes mechanical engineering concepts. The main objective of this part is to prepare the students for the mechanical engineering profession at an early stage. The course aims to give the students a general understanding of major fields of mechanical engineering, to explore the role of mechanical

engineering in industries and society, and to emerging trends and technologies in different sectors such as energy, manufacturing, automotive, aerospace, and marine. Understanding general concepts of machine tool operations, manufacturing systems, mechanical power, and transmission and fostering students' insight into future technologies are also essential course aims. The second part of the course focuses on the career planning of students. In this part, students will learn career and life planning concepts and theories and participate in experiential activities to assist them in their career planning. The class will involve readings, group discussions, and written exercises. This part will focus on the philosophy of the career development concept using the Career Development Cycle. The objectives of the course include:

- To provide philosophy and fundamental concepts of Engineering and Mechanical Engineering
- To make the students familiar with sub-divisions of mechanical engineering
- To develop an understanding of the role of Mechanical Engineers and the core concepts within the discipline
- To have knowledge about mechanical engineering curriculum and the content of engineering courses
- To understand behavior of structures by using mathematical and physical principles.
- To improve written and oral communication skills.
- To understand the essential components of the career choice, including personal and educational awareness

Course Outcomes:

By the end of this course, students will be able to:

- Describe the type of work that mechanical engineers do, list some of the technical issues they address, and identify the impact that they have in solving global, social, environmental, and economic problems.
- Outline the major steps involved in a mechanical design process.
- Recognize why communication skills are important to engineers, and be able to clearly present solutions in written, oral and graphical forms.
- Understand the importance of ethics in engineering profession.
- Will assess their own interests, values, strengths, and weaknesses pertaining to life and career planning

Prerequisites:

- A high school-level understanding of physics and mathematics, critical thinking and communication ability.
- Motivation to learn.

Tentative Course Outline:

- Week 1 :What Is Engineering? Lifelong Learning. Mathematical Modeling.
- Week 2 :The Mechanical Engineering Profession. The Elements of Mechanical Engineering.
- Week 3 :Engineering Philosophy
- Week 4 :Mechanical Engineering's Top Ten Achievements. Emerging Fields Within Mechanical Engineering. Computer-Aided Engineering Technology.
- Week 5 :The most important enduring fields/tools in mechanical engineering.
- Week 6 :Career.
- Week 7 :Typical Program of Study. Innovation and Design. Engineering Sciences and Analysis. Accreditation (ABET and MÜDEK).
- Week 8 :Mechanical Design. Manufacturing Processes.
- Week 9 :Technical Problem-Solving and Communication Skills.
- Week 10 :Unit Systems and Conversions. Base and Derived Units. International System of Units.
- Week 11 :Forces in Structures and Machines. Equilibrium. Free Body Diagrams. Materials and Stresses.
- Week 12 :Career paths . Career Opportunities.
- Week 13 :Main concepts in successful career planning.
- Week 14 :Class discussions.

Grading Policy:

Midterm (40%), Final (60%).

Important Dates:

Midterm Exam to be announced.
Final Exam to be announced.

Course Policy:

Every student is expected to come to class prepared and to actively participate in learning environment.

Class Policy:

Regular attendance is essential and expected.

Academic Honesty:

Lack of knowledge of academic honesty is not a reasonable explanation for a violation.