TED UNIVERSITY

CE 214
Introduction to Mechanics of Materials

SYLLABUS/Fall 2023

Course Information

Required or Elective	☑Required ☐Elective	**Date Prepared**	September 2023
Semester	Fall 2023	**Class Hours and Classrooms**	Wed 15:00-15:50, F204 Thu 12:00-13:50, G101 Fri 14:00-15:50, HB03-L
Course Credit Hours/ ECTS credits	(3+0+2) 4 / 6	**Pre-requisite/ Co-requisite**	None
Level of Course	Sophomore	**Language of Instruction**	☑ English ☐ Turkish
Instructors and their office hours	Assoc. Prof. Dr. Rıza Secer Orkun Keskin, E-mail: secer.keskin@tedu.edu.tr; Room: D313 Office Hour: Please get an appointment by e-mail.		
Teaching Assistant(s)	Mehmet Fırat Aydın, E-mail: firat.aydın@tedu.edu.tr Ömer Can Pamuk, E-mail: omer.pamuk@tedu.edu.tr		
Textbook	Mechanics of Materials by F. Beer, E.R. Johnston, J.DeWolf, D.Mazurek, 7th Edition, McGraw-Hill, 2014.		
Recommended Readings	1) Engineering Mechanics 2 by D.Gross, W.Hauger, J.Schröder, W.A.Wall, J.Bonet, 11th Edition, Springer, 2011 2) Engineering Mechanics of Solids by E.P.Popov, T.A.Balan, 2nd Edition, Prentice Hall, 1998 3) Introduction to Solid Mechanics by I.H.Shames, J.M.Pitarresi, 3rd Edition, Prentice Hall,1999 4) Mechanics of Materials by R.C.Hibbeler, 9th Edition, Prentice Hall,2014		
Course Web Pages	Please follow the course web page on https://lms.tedu.edu.tr regularly to have access to the posted course materials and announcements.		

Course Description

Simple stress and strain. Equilibrium, compatibility, and constitutive relations. State of stress and state of strain with emphasis on two dimensional problems. Bending and shear stresses. Deflection of beams. Torsion of circular shafts. Combined stresses. Buckling of columns.

Course Objective

Mechanics is the physical science that deals with the effects of forces on objects. Mechanics can be divided into three main branches: rigid-body mechanics, deformable-body mechanics, and fluid mechanics. This course is an introductory level course on deformable-body mechanics. The objective of this course is to introduce students to the fundamental concepts and principles employed by engineers - whether civil, mechanical, aeronautical, etc. - in the design of structures of all sorts, sizes and purpose.

Course Learning Outcomes

Upon successful completion of this course, students will be able to:

1. use theoretical knowledge of deformable body mechanics,
2. analyze stresses under combined loading,
3. calculate principal stresses and strains,
4. solve indeterminate problems by using compatibility conditions,
5. calculate displacements of 1D determinate/indeterminate elastic structural members,
6. examine stability of columns.

Course Assignments

A. ***Laboratory Sessions (10%):*** There will be five 2-hour labs during the semester. Each student is expected to attend the lab sessions and fill out the necessary readings and calculations to the laboratory booklet and take the lab quiz. After each session, the booklets will be collected and graded individually.
B. ***Homework Assignments (10%):*** A number of problem sets will be given.
C. ***Coursera Course (10%):*** A course (Mechanics of Materials I) on Coursera will be asked to complete.
D. ***Midterm exams (20%+20%):*** Two mid-term exams will be given.
E. ***Final Exam (30%):*** There will be a cumulative final exam.

Course Assessments & Learning Outcomes Matrix

Assessment Methods	Course Learning Outcomes
Laboratory	#1 - #6
Homework Assignments	#1 - #6
Midterm Exams	#1 - #5
Final Exam	#1 - #6

Relationship to Program Outcomes

This course contributes to fulfillment of the following program outcomes:
i. Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in the solution of complex engineering problems.
v. Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.

Tentative Course Outline

A tentative course outline for the lectures is given below. Any changes and updates will be announced on the Moodle web page for the course.

Week	Topics
1	• Concept of Stress: normal stress, shear stress and bearing stress
2	• Concept of Stress: examples
3	• Axial loading
4	• Stress-strain relationships • **Laboratory session 1 (Axial Load)**
5	• Torsion
6	• Beam bending: theory and applications • **Laboratory session 2 (Torsion)**
7	• Beam bending: composite beams • **Midterm Exam #1**
8	• Shear stress in beams • **Laboratory session 3 (Flexural Deformation)**
9	• Shear stress in thin-walled members
10	• Transformation of stress and strain • **Laboratory session 4 (Cantilever Beam)**
11	• Principle stresses under combined bending
12	• Deflection of beams: differential equations
13	• Deflection of beams: moment area method and indeterminate problems • **Midterm Exam #2**
14	• Buckling of columns • **Laboratory session 5 (Deflection of Beams)**

Course Policies and Some Remarks

Attendance

To be admitted to the final exam, a student **must attend all laboratory sessions, must submit at least 80% of the given assignments and take the mid-term exams**. Students who are not given the permission to take the final exam will automatically receive the grade FX at the end of the semester.

Calculator Policy

You may use a scientific calculator during the exams. Programming the calculator before or during the exams are not allowed.

Make Up Exams

Make-up exams for midterm exams will NOT be offered. The only exceptions are illness or emergency (e.g., death in family, a traffic accident, etc.). In case of an illness or emergency you need to supply a documentation that supports your claim. Also please read the document given in the link http://www.tedu.edu.tr/tr/main/yonetmelikler-ve-yonergeler

Plagiarism

Collaboration on non-collected homework and in studying is strongly encouraged; however, the work you hand in must be solely your own. Sharing written work before it is turned in to be graded is academic dishonesty. For more information on TEDU policy on intellectual integrity see the TEDU student handbook (https://student.tedu.edu.tr/en/student/principles-of-academic-integrity).

TEDU Without Barriers Unit

Please inform the TEDU Without Barriers Unit and the instructor of the course about the specific issues in case you have a physical or mental disability and are having trouble with anything related to this course—such as accessing the material, participating in the class, taking notes, preparing for, attending or managing to complete the exams. Your situation will be reviewed by commission, in accordance with the principle of confidentiality, and if deemed appropriate, facilitating measures will be taken so that you can take the course more efficiently.

For further information and/or questions:

engelsiz@tedu.edu.tr, https://www.tedu.edu.tr/engelsiz-tedu

Student Development and Psychological Counseling Center

Student Development and Psychological Counseling Centre is mandated with providing crisis intervention and supportive listening services to the campus community. The Center conducts individual counseling, group guidance studies, workshops, seminars, and orientation studies for all students in need. You may apply to the Center in order to deal with all your current problems.

For further information and/or questions:

ogrencidanismamerkezi@tedu.edu.tr, http://csc.tedu.edu.tr/