YEDİTEPE UNIVERSITY
FACULTY OF ENGINEERING

COURSE DESCRIPTION FORM

COVER PAGE

2023/2024-1

Course Code & Name	CE236 MECHANICS OF MATERIALS

Course Schedule	Tuesday 13:00-16:00; Thursday 09:00-11:00
Room	B442
Instructor's Name **Phone** **E-mail** **Office Hours**	Assist. Prof. Dr. Özgür KÖYLÜOĞLU 0216-578 00 00 / 1724 ozgur.koyluoglu@yeditepe.edu.tr Tuesday 12:00-13:00; Wednesday 13:00-14:00; Thursday 11:00-12:00
Assistant's Name **Phone** **E-mail**	Şükrü Efe Ölgün Engineering Building 6th Floor, Assistants' Office efe.olgun@yeditepe.edu.tr
Midterm Dates	Midterm 1: 9.November.2023 (Thursday) Midterm 2: 14.December.2023 (Thursday)
Additional Information	*Grading out of 100 is as follows:* Midterms: 30% Quizes: 15% (Total 3 quizes and 2 model making sessions will be graded) Homeworks: 15% (Total 6 homeworks including problems from each chapter of the book) (1 point deducted for each day of delay; homeworks copied from others will be graded as zero) Homeworks will be presented on a the engineering paper by the students. An engineering paper sample is uploaded on YULEARN. Homeworks will be submitted by the students on YULEARN at the designated space, the file given the name as in the following format: **Student number_Name_Surname_A1** If **no name** is given to the file then **no marks** will be given to the assignment. The last number corresponds to assignment number. No late submissions. Do not send homeworks by e-mail. Final Exam 40% *Attendance:* 80% attendance is required by the university regulations (20% non-attendance only for sick-leave or similar; to be proven)

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COURSE INFORMATON				
Course Code	**CE 236**	**Course Title**	**MECHANICS OF MATERIALS**	
Semester	*Credits*	*ECTS*	*C +P + L Hour*	Prerequisites
4	4	6	3+2+0	CE 231

Language of Instruction	**Course Level**	**Course Type**
English	Bachelor's Degree (First Cycle Programmes)	Core

Course Coordinator	Assist. Prof. Dr. Özgür Köylüoğlu
Instructors	Assist. Prof. Dr. Özgür Köylüoğlu
Assistants	Research Assistant Şükrü Efe Ölgün
Goals	The goal of this course is to acquire the ability to apply fundamental concepts of mechanics of deformable bodies for calculation of stresses and deformations on simple structural members.
Content	Concepts of stress and deformation in structural members; Uniaxial tension test and stress-strain diagrams; Stresses in torsion; Stresses in pure bending; Solution of statically indeterminate systems; Stress calculations in composite members; Plastic moment capacity in pure bending; Shear and moment diagrams for simple beams; Normal and shear stresses at critical sections of beams; Shear stresses in thin-walled structural members; Transformation of stress, principal stresses, and Mohr's circle; Combined stresses under axial loading and bending; Derivation of elastic curve in beams; Energy methods and principle of virtual work for calculation of displacements of simple beams; Stability and buckling calculations of columns.
Contribution of the Course to the Professional Education	By performing calculations including static analysis of the simple structural system and stress checks on the members will provide the students with necessary background infromation for the courses that they will subsequently be taking, such as structural analysis, design of structural members and soil mechanics and they will start to form the engineering concepts at this course.

Course Learning Outcomes	Detailed Program Outcomes	Teaching Methods	Assessment Methods
1) Ability to describe types of stresses and deformations under loading for simple stsructural members	1a	1,3	A,E
2) Awareness on the effect of mechanical properties of materials on the stresses and deformations of the structural members	1a, 2a, 6c	1,3	A,E
3) Ability to analyze the stresses and deformations in simple structural members under the effect of axial, torsional, bending or combined loading	1a, 1b, 2a, 6c	1,3,5	A,E,H
4) Ability to solve statically indeterminate systems to the first degree using deformation compatibility relationships	1b, 2b, 6c	1,3,5	A,E
5) Ability to calculate deflections in simple structural systems	1a, 1b, 2b, 6c	1,3,5	A,E,H
6) Ability to analyze principal stresses and stresses on transformed sections	1b, 2a, 2b, 6c	1,3,5	A,E,H

Teaching Methods:	1: Lecture by instructor, 2: Lecture by instructor with class discussion, 3: Problem solving by instructor, 4: Use of simulations, 5: Problem solving assignment, 6: Reading assignment, 7: Laboratory work, 8: Term research paper, 9: Presentation by guest speaker, 10: Sample Project Review, 11: Interdisciplinary group working, 12: …
Assessment Methods:	A: Written exam, B: Multiple-choice exam C: Take-home quiz, D: Experiment report, E: Homework, F: Project, G: Presentation by student, H:Quiz

COURSE CONTENT

Week	Topics	Study Materials
1	Analysis of a system, calculation of internal loads	Textbook
2	Axial stress, shear stress and strain concepts in structural members	Textbook
3	Stresses in members under torsional loading	Textbook
4	Simple bending of beams; composite members; plastic moment capacity	Textbook
5	Combined stresses in unsymmetrical bending and eccentric axial loading	Textbook
6	Midterm Exam - 1	Textbook
7	Shear and moment diagrams for simple beams	Textbook

8	Derivation of elastic curve in simple beams	Textbook
9	Shearing stresses in beams; Thin-walled structural members	Textbook
10	Transformation of stress, principal stresses, and Mohr's circle	Textbook
11	Combined shear and bending in beams	Textbook
12	Midterm Exam - 2	Textbook
13	Stability and buckling of columns	Textbook
14	Energy methods, principle of Virtual Work	Textbook

RECOMMENDED SOURCES	
Textbook	**Mechanics of Materials (6th Edition)** Authors: Ferdinand P. Beer, E. Russell Johnston, Jr, John T. DeWolf, David F. Mazurek, Mc Graw Hill, 2012.
Additional Resources	**Mechanics of Materials (9th Edition),** Authors: Russell C. Hibbeler, Pearson, 2013.

MATERIAL SHARING	
Documents	Slides are shared with the students on electronic media (Moodle)
Assignments	Weekly homeworks submitted by the students are graded and returned back
Exams	Exam questions are solved if needed

ASSESSMENT		
IN-TERM STUDIES	**NUMBER**	**PERCENTAGE**
Mid-terms	2	50
Homeworks	10	25
Quizes	4	25
Total		**100**
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE		40
CONTRIBUTION OF IN-TERM STUDIES TO OVERALL GRADE		60
Total		**100**

COURSE CATEGORY	Field Course

COURSE'S CONTRIBUTION TO PROGRAM OUTCOMES		
No	Program Learning Outcomes	check √
1a	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline,	√
1b	Ability to use theoretical and applied knowledge in these areas in complex engineering problems.	√
2a	Ability to identify, formulate, and solve complex engineering problems,	√
2b	Ability to select and apply proper analysis and modeling methods for this purpose.	√
6c	Ability to work individually.	√

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION			
Activities	Quantity	Duration (Hour)	Total Workload (Hour)
Course Duration	14	5	70
Hours for off-the-classroom study (Pre-study, practice)	14	3	42
Homework	6	6	36
Final exam	1	3	3
Total Work Load			151
Total Work Load / 25 (h)			6.04
ECTS Credit of the Course			6

Prepared by: Assist.Prof.Dr. Özgür Köylüoğlu	Preparation date: 15.09.2022