

COURSE CATALOG

Course Code: CE 202				Course Name: Strength of Materials II			
Semester	T + P + L	Credits	ECTS	Language of Instruction	Course Type	Instruction Methods	Prerequisite(s)
4	3 + 1 + 0	3	5	English	Required (D1)	Lecture	CE 201 Strength of Materials I
Course Objectives			Combine loadings. Stress transformation: General equations, Mohr Circle. Stain transformation. Design of beams. Deflections of beams: Elastic curve, method of superposition, statically determinate and indeterminate beams. Effect of shear on the elastic curve. Normal force with bending. Bending with torsion. Energy methods: Conservation of energy. Virtual work. Castigliano's theorem. Buckling of columns.				
Topics Covered			Combine bending. Stress and strain transformations. Bending with shear. Center of shear. Study of elastic curve by various methods. Differential equations, Boundary conditions. Mohr Method. Influence functions. Effect of shear on the elastic curve. Normal force with bending. Core. Materials not resistant to tension. Second order theory. Bending with torsion. Theorem of virtual work. Theorems of Betti and Castigliano. Minimum principles. Elastic stability. Euler cases. Buckling beyond the elastic limit. Frames, Curved bars. Approximate methods. Rayleigh ratio.				
Learning Outcomes of the Course			After successfully completing this course students should gain: 1-An ability to apply knowledge of mathematics, science and engineering [1,2,7,9,13] 2-Aan ability to design a system, component, or process to meet desired needs,[1,2] 3-An ability to identify, formulate and solve engineering problems [2,14] 4- An ability to use the techniques, skills and modern engineering tools necessary for engineering practice [2,10,13,14] <i>[Note that the numbers in between the brackets address the bullet numbers in the program outcomes list.]</i>				
ISCED Category of the Course			52 Engineering				
Textbook			R.C.Hibbeler, Mechanics of Materials, Prentice Hall, 2008, 7th edition.				
Recommended Sources			1. Mustafa İnan, Cisimlerin Mukavemeti, İTÜ Vakfı, 1988. 2. Esin İnan, Cisimlerin Mukavemeti-Problem Kitabı. 3. Hilmi Demiray, Mukavemet, Çağlayan Kitapevi, 1968, 4. Henry W. Haslach, Jr. and Ron Armstrong, Deformable Bodies and Their Material Behavior, Wiley 2004. 5- J.M. Gere, S.P. Timoshenko, Mechanics of Materials, Chapman and Hall, 1991.				

WEEKLY SCHEDULE

Week	Theoretical Topic	Applied / Laboratory Topics
1	Review of CE201.Combine loadings.	
2	Stress and strain transformations. Mohr Circles.	
3	Bending with shear. Center of shear.	
4	Elastic curve. Differential equations Method.	
5	Boundary conditions, Mohr's Method.	
6	Influence functions. Method of Superposition. Effect of shear on the elastic curve. Second order theory.	
7	Normal force with bending. Core. Materials not resistant to tension.	
8	Bending with torsion.	
9	Theorem of virtual work.	
10	Energy Methods, Conservation of energy. Minimum principles.	
11	Theorems of Betti and Castigliano.	
12	Elastic stability. Euler cases.	
13	Buckling beyond the elastic limit. Frames, Curved bars.	
14	Approximate methods. Rayleigh ratio.	

COURSE ASSESSMENT POLICY

	Activities	Number	Contribution (%)
Studies throughout the	Quiz	3	05
	Term Homework/ Project		

term	Reports	-	-
	Graduation Thesis/ Project	-	-
	Seminar	-	-
	Homework	5	10
	Presentations	-	-
	Midterm Exams	2	35
	Project		
	Laboratory		
	Other (attendance)	14	10
FINAL EXAM	1	40	
Total		100	

#### CONTRIBUTION OF THE COURSE TO CIVIL ENGINEERING PROGRAM OUTCOMES

Program Outcomes	1	2	3
1 The ability to apply knowledge of mathematics, science, and engineering			X
2 The ability to identify, formulate, and solve engineering problems			X
3 The ability to design a system or component to meet desired needs with realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability and sustainability			X
4 The ability to analyze and interpret data			X
5 The ability to design and conduct experiments and apply experimental results to improve processes			X
6 The ability to convey technical material through oral presentations and written papers/reports			X
7 The ability to function within multidisciplinary teams			X
8 The understanding of professional and ethical responsibilities		X	
9 The understanding of the impact of engineering on society		X	
10 The understanding of the necessity to engage in life-long learning		X	
11 The understanding of management and leadership principles and techniques		X	
12 The appreciation of the role of research in civil engineering problems		X	
13 A knowledge of contemporary issues in civil engineering			X
14 The ability to use modern engineering techniques, skills, and tools			X
15 The ability to understand and explain basic concepts in management, business, and leadership			X
16 A commitment to quality, punctuality and continuous improvement		X	

Contribution Level: 1 low, 2 medium, 3 high

#### ECTS-WORKLOAD TABLE

ACTIVITIES	Number	Duration (Hour)	Workload(Hour)
Lecture Time	14	3	42
Final Exam (Including Preparation Time)	1	10	10
Quiz			
Term Homework / Project	-	-	-
Reports			
Graduation Thesis/Project	-	-	-
Seminar			
Study Time Outside the Class	14	2	28
Homework	5	5	25
Presentations	-	-	-
Midterm Exams (Including Preparation Time)	2	10	20
Project			
Laboratory			
Total Workload			125
ECTS Credits of the Course (Total Workload / 25)			5

Last update on 19.12.2013	Coordinator / PREPARED BY Esin İnan	APPROVED BY Esin İnan
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