COURSE DESCRIPTION FORM	
Course Code and Title	CE323 STRENGTH OF MATERIALS II
Semester	5
Catalog description	This course is intended to teach the following concepts in mechanics of materials; Transformation of plane stress and strain. Deflection of beams. Integral method. Moment area method. Conjugate beam method. Energy methods. Introduction to elastic stability.
Required reading	F.P. Beer, E.R. Johnston, J. DeWolf, D. Mazurek, "Mechanics of Materials", Mc Graw-Hill.
Recommended reading	1. Hilmi Luş, Uğur Ersoy, Erdem Canbay, S. Tanvir Wasti, "Çubukların Mukavemeti", Boğaziçi Üniversitesi Yayınevi. 2. Mehmet H. Omurtag, "Mukavemet", Birsen Yayınevi. 3. James M. Gere, Barry J. Goodno, "Mukavemet", çeviri editörleri: Talha Ekmekyapar, Mustafa Özakça, Nobel Yayınevi
ECTS	5
Prerequisites and co-requisites	Prerequisite of this course is: **CE226 Strength of Materials I** Required attendance to lectures is at least 70% of total term hours.
Compulsory/Elective	Compulsory course
Language of instruction	English
Aim of course	The aim of this course is to teach; How to represent stress and strain components at a point using transformation, Definition of elastic curve and the calculation of displacements of elastic beams, The buckling analysis of columns with various types of supports.
Learning outcomes of the course unit	Upon completion of the course student should be able to; 1. Define components of stress and strain at a point along various directions, 2. Determine the elastic curve using different methods, 3. Calculate elastic strain energy for various types of loading, 4. Calculate displacements using energy methods, 5. Make stability analysis for axially loaded elastic columns.
Mode of delivery	The mode of delivery of this course is face to face.
Course content	1. Plane stress transformation, general equations of transformation. 2. Mohr circle, stress variation in a prismatic beam, absolute max shear stress. 3. Plane Strain transformation, general equations, Mohr circle. 4. Strain rosettes, generalized Hooke's law. 5. Midterm 6. The elastic curve, slope and deflection by integration. 7. Moment-Area method. 8. Conjugate beam method. 9. Statically indeterminate beams. 10. Energy methods, strain energy for various types of loading. 11. Castigliano's theorem. 12. Midterm / Buckling of columns, critical load. 13. Buckling of columns, critical load. 14. Buckling for columns having various types of supports. 15. Design of columns for eccentric loading.
Planned learning activities and teaching methods	3 lecture hours per week (3+0) Reading

Preparing Reports
Midterm exam and required works
Final exam and required works

Assessment methods and criteria

	Quantity	Percentage (%)
Mid-terms	2	50
Assignment	8	10
Exercises	-	-
Projects	-	-
Practice	-	-
Quiz	-	-
Contribution of In-term Studies to Overall Grade %		60
Contribution of Final Examination to Overall Grade (%)		40
Attendance		

Workload

Work activity	Total Week Count	Weekly Duration (in hour)	Total Workload in Semester
Theoretical Study Hours of Course Per Week	14	3	42
Practicing Hours of Course Per Week	0	0	0
Reading	14	2	28
Searching in Internet and Library	0	0	0
Designing and Applying Materials	0	0	0
Preparing Reports	8	2	16
Preparing Presentation	0	0	0
Presentation	0	0	0
Mid-Term and Studying for Mid-Term	2	15	30
Final and Studying for Final	1	15	15
Other	0	0	0
Total Workload:			131
Total Workload / 25:			5.24
ECTS:			5

Course's contribution to program

No	Program Learning Outcomes	1	2	3	4	5
1	Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.					X
2	Ability to identify, formulate, and solve complex civil engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.					X
3	Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.					
4	Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in civil engineering practice; ability to employ information technologies and to use at least one computer programming language effectively.			X		
5	Ability to design and conduct experiments, gather data, analyze and interpret results for					

	investigating complex civil engineering problems or discipline specific research questions.						
6	Ability to work efficiently in intra-disciplinary and multi-disciplinary teams.						
7	Ability to work individually.						X
8	Ability to communicate effectively in Turkish, both orally and in writing; ability to write effective reports and comprehend written reports.				X		
9	Knowledge of English of B1 level according to Common European Framework of Reference.			X			
10	Prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.						
11	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.						
12	Consciousness to behave according to ethical principles and professional and ethical responsibility.						
13	Knowledge on standards used in civil engineering practice.						
14	Knowledge about business life practices such as project management, risk management, and change management.						
15	Awareness in entrepreneurship, innovation; knowledge about sustainable development.						
16	Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering.						
17	Awareness of the legal consequences of engineering solutions.						

Name of lecturer(s) and contact information	Prof. Dr. Sinan ALTIN saltin@gazi.edu.tr Prof. Dr. Tekin GÜLTOP tgultop@gazi.edu.tr Prof. Dr. Kurtuluş SOYLUK ksoyluk@gazi.edu.tr Prof. Dr. Özgür ANIL oanil@gazi.edu.tr Assoc. Dr. Bahadır ALYAVUZ balyavuz@gazi.edu.tr