COURSE DESCRIPTION FORM	
Course Code and Title	IM226 STRENGTH OF MATERIALS I
Semester	4
Catalog description	Basic assumptions and principles. Average stress and strain. Stress and strain for axially loaded members. Compatibility. Torsion of rods with circular cross-section. Bending and unsymmetrical bending. Transverse shear, shear flow and shear center. Thin-walled pressure vessels. Combined loading.
Required reading	R.C. Hibbeler, "Mechanics of Materials", Pearson.
Recommended reading	1. F.P. Beer, E.R. Johnston, J. DeWolf, D. Mazurek, "Mechanics of Materials", Mc Graw-Hill. 2. HilmiLuş, UğurErsoy, ErdemCanbay, S. TanvirWasti, "ÇubuklarınMukavemeti", BoğaziçiÜniversitesiYayınevi. 3. Mehmet H. Omurtag, "Mukavemet", BirsenYayınevi. 4. James M. Gere, Barry J. Goodno, "Mukavemet", çevirieditörleri: TalhaEkmekyapar, Mustafa Özakça, Nobel Yayınevi
ECTS	6
Prerequisites and co-requisites	Prerequisite of this course is: **CE223 MECHANICSI (STATICS)** 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 develop the understanding of mechanical behavior of basic elastic members, and to teach how to analyze anddetermine the stress and strains of deformable rods, shafts and beams underexternal loading.
Learning outcomes of the course unit	Upon completion of the course student should be able to; 1. Determine average normal and shear stress, 2. Design simple rod connections using factor of safety and allowable stress, 3. Determine normal and shear strains, 4. Determine the axial deformation of statically determined and statically undetermined axially loaded rods under external loads and temperature changes, 5. Determine torsional stress and deformations of circular bars, 6. Determine bending stresses in beams, 7. Determine transverse shear stresses in beams, 8. Analyze built-up beams, shear flow and shear center, 9. Determine the strain and stresses for combined loading.
Mode of delivery	The mode of delivery of this course is face to face.
Course content	1. Basic concepts, assumptions, stress, average normal and shear stress. 2. Factor of safety, allowable stress and design. 3. Strain, axial deformation, mechanical properties of materials. 4. Axial loading, deformation calculations for axially loaded rods. 5. Superposition, statically indeterminate axially loaded rods, force method for axially loaded rods. 6. Temperature changes, stress concentration. 7. Shear stresses in a circular shaft due to torsion, angle of twist and Midterm exam-1 8. Shear stresses in a circular shaft due to torsion, angle of twist.

	9. Statically indeterminate torque-loaded members,non-circular shafts and thin-walled tubes. 10. Bending, flexure formula. 11. Unsymmetrical bending, composite beams. 12. Midterm exam-2 13. Transverse shear in beams, the shear flow in a built-up beams. 14. The shear flow in thin-walled beams, the shear center of a cross section. 15. Stresses developed under combined loading, thin-walled pressure vessels.
Planned learning activities and teaching methods	3 lecture hours per week (3+0) Reading Homework Midterm exam and required works Final exam and required works

Assessment methods and criteria

	Quantity	Percentage (%)
Mid-terms	2	40
Assignment	7	15
Exercises	-	-
Projects	-	-
Practice	-	-
Quiz	7	5
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	0	0	0
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	7	5	35
Total Workload:			150
Total Workload / 25:			6
ECTS:			6

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. Prof. Dr. Bahadır ALYAVUZ balyavuz@gazi.edu.tr