

Course Description Form	
Course Code and Name	ME212 Strength of Materials
Course Semester	4
Catalog Content	Introduction. Stress and Strain. Axial Load. Torsion. Bending. Transverse Loading. Combined Loading. Stress Transformation.
Textbook	Mechanics of Materials, R. C. Hibbeler, Prentice-Hall Inc., USA
Supplementary Textbooks	Mechanics of Materials, F. P. Beer and E. R. Johnston, McGraw Hill Comp., England
Credit	5
Prerequisites of the Course (Attendance Requirements)	70% Attendance, MM201-Statics
Type of the Course	Compulsory
Instruction Language	English
Course Objectives	<ol style="list-style-type: none"> 1- Analyze the stresses in load carrying members subject to direct axial or shear force. 2- Understand the strain concept. 3- Determine the displacement of the long members subject to axial load. 4- Calculate the stresses and angle of twist in the shafts subject to torque. 5- Calculate the bending stresses in the beams. 6- Calculate the shear stresses in the beams subject to transverse shear force. 7- Analyze the stress state of the members subject to combined load. 8- Understand the concept of principal stresses and max in-plane shear stress by using the stress transformation equations and Mohr's circle.
Course Learning Outcomes	<ol style="list-style-type: none"> 1. Understanding of stress and strain concepts for the elastic bodies. 2. Ability to calculate the stress state at a point under the combined loading effect for the mechanical design. 3. Ability to solve the statically undetermined problems. 4. Understanding the principle stress concepts and ability to apply the stress transformation.
Instruction Methods	The mode of delivery of this course is "Face to face"
Weekly Schedule	<ol style="list-style-type: none"> 1. STRESS: equilibrium of a deformable body, average normal and shear stress, bearing stress. 2. STRESS: allowable stress, factor of safety STRAIN: deformation. 3. STRAIN: normal and shear strain, MECHANICAL PROPERTIES OF MATERIALS: the tension test, Hooke's law, Poisson's ratio. 4. AXIAL LOAD: elastic deformation of an axially loaded members, principle of superposition. 5. AXIAL LOAD: statically indeterminate axially loaded member, thermal stress. 6. TORSION: the torsion formula, power transmission, statically indeterminate torque-loaded members. 7. BENDING: Shear and moment diagrams. 8. Midterm Exam I: BENDING: The flexure formula.

	<p>9. TRANSVERSE SHEAR: the shear formula, shear stresses in beams, shear flow in built-up members.</p> <p>10. COMBINED LOADING: state of stress caused by combined loading.</p> <p>11. COMBINED LOADING: state of stress caused by combined loading.</p> <p>12. Midterm Exam I: COMBINED LOADING: state of stress caused by combined loading.</p> <p>13. STRESS TRANSFORMATION: plane stress transformation, general equations of plane stress transformation.</p> <p>14. STRESS TRANSFORMATION: Mohr's circle.</p> <p>15. Final Exam.</p>																																																				
<p>Teaching and Learning Methods</p> <p><i>(These are examples. Please fill which activities you use in the course)</i></p>	<p>Weekly theoretical course hours: 3</p> <p>Weekly applied course hours: 1</p> <p>Reading Activities:1</p> <p>Designing and implementing materials:0</p> <p>Report preparing: 0</p> <p>Preparing a Presentation: 0</p> <p>Presentations: 0</p> <p>Internet browsing, library work:2</p> <p>Preparation of Midterm and Midterm Exam:5</p> <p>Final Exam and Preparation for Final Exam:5</p> <p>Others(Quiz) :2</p>																																																				
<p>Assessment Criteria</p>	<table border="1"> <thead> <tr> <th></th> <th>Numbers</th> <th>Total Weighting (%)</th> </tr> </thead> <tbody> <tr> <td>Midterm Exams</td> <td>2</td> <td>50</td> </tr> <tr> <td>Assignment</td> <td></td> <td></td> </tr> <tr> <td>Application</td> <td></td> <td></td> </tr> <tr> <td>Projects</td> <td></td> <td></td> </tr> <tr> <td>Practice</td> <td></td> <td></td> </tr> <tr> <td>Quiz</td> <td>6</td> <td>10</td> </tr> <tr> <td>Percent of In-term Studies (%)</td> <td></td> <td>60</td> </tr> <tr> <td>Percentage of Final Exam to Total Score (%)</td> <td></td> <td>40</td> </tr> <tr> <td>Attendance</td> <td></td> <td></td> </tr> </tbody> </table>		Numbers	Total Weighting (%)	Midterm Exams	2	50	Assignment			Application			Projects			Practice			Quiz	6	10	Percent of In-term Studies (%)		60	Percentage of Final Exam to Total Score (%)		40	Attendance																								
	Numbers	Total Weighting (%)																																																			
Midterm Exams	2	50																																																			
Assignment																																																					
Application																																																					
Projects																																																					
Practice																																																					
Quiz	6	10																																																			
Percent of In-term Studies (%)		60																																																			
Percentage of Final Exam to Total Score (%)		40																																																			
Attendance																																																					
<p>Workload</p>	<table border="1"> <thead> <tr> <th>Activity</th> <th>Total Number of Weeks</th> <th>Duration (weekly hour)</th> <th>Total Period Work Load</th> </tr> </thead> <tbody> <tr> <td>Weekly Theoretical Course Hours</td> <td>14</td> <td>3</td> <td>42</td> </tr> <tr> <td>Weekly Tutorial Hours</td> <td>14</td> <td>1</td> <td>14</td> </tr> <tr> <td>Reading Tasks</td> <td>9</td> <td>1</td> <td>9</td> </tr> <tr> <td>Studies</td> <td>9</td> <td>2</td> <td>18</td> </tr> <tr> <td>Material Design and Implementation</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Report Preparing</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Preparing a Presentation</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Presentations</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Midterm Exam and Preperation for Midterm Exam</td> <td>4</td> <td>5</td> <td>20</td> </tr> <tr> <td>Final Exam and Preperation for Final Exam</td> <td>2</td> <td>5</td> <td>10</td> </tr> <tr> <td>Other (Quiz)</td> <td>6</td> <td>2</td> <td>12</td> </tr> <tr> <td>Total Workload</td> <td></td> <td></td> <td>125</td> </tr> </tbody> </table>	Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load	Weekly Theoretical Course Hours	14	3	42	Weekly Tutorial Hours	14	1	14	Reading Tasks	9	1	9	Studies	9	2	18	Material Design and Implementation				Report Preparing				Preparing a Presentation				Presentations				Midterm Exam and Preperation for Midterm Exam	4	5	20	Final Exam and Preperation for Final Exam	2	5	10	Other (Quiz)	6	2	12	Total Workload			125
Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load																																																		
Weekly Theoretical Course Hours	14	3	42																																																		
Weekly Tutorial Hours	14	1	14																																																		
Reading Tasks	9	1	9																																																		
Studies	9	2	18																																																		
Material Design and Implementation																																																					
Report Preparing																																																					
Preparing a Presentation																																																					
Presentations																																																					
Midterm Exam and Preperation for Midterm Exam	4	5	20																																																		
Final Exam and Preperation for Final Exam	2	5	10																																																		
Other (Quiz)	6	2	12																																																		
Total Workload			125																																																		

	Total Workload / 25				5		
	Course Credit (ECTS)				5		
Contribution Level Between Course Learning Outcomes and Program Outcomes	No	Program Outcomes	1	2	3	4	5
	1	Adequate knowledge of subjects specific to mathematics, natural sciences and related engineering disciplines; ability to use theoretical and applied knowledge related to these areas in complex engineering problems				X	
	2	Ability to identify, define, formulate, and solve complex engineering problems; ability to select and apply appropriate analysis and modeling methods to this end.				X	
	3	Ability to design a complex system, process, device or product under realistic constraints and conditions to meet specific requirements; ability to apply modern design methods for this purpose			X		
	4	Ability to develop, select and use modern techniques and tools required for the analysis and solution of complex problems encountered in engineering practice; ability to use information technologies effectively.					
	5	Ability to design and conduct experiments, collect data, analyze and interpret results to investigate complex engineering problems or discipline-specific research topics					
	6	Ability to work effectively in disciplinary and multi-disciplinary teams; ability to work individually					
	7	Ability to communicate effectively in Turkish, both orally and in writing; knowledge of at least one foreign language; the ability to write effective reports and understand written reports, to prepare design and production reports, to deliver effective presentations, to give and receive clear and understandable instructions					
	8	Awareness of the necessity of lifelong learning; the ability to access information, to follow developments in science and technology, and to renew oneself constantly					
	9	Acting in accordance with ethical principles, professional and ethical responsibility; information about standards used in engineering applications					
	10	Information about business life practices such as project management, risk management and change management; awareness of entrepreneurship, innovation; information about sustainable development.					
	11	Knowledge about the universal and social effects of engineering applications on health, environment and safety and the problems of the age reflected in the engineering field; awareness of the legal consequences of engineering solutions.					
The Course's Lecturer(s) and Contact Informations	tapatay@gazi.edu.tr , Dr.Tunç APATAY						