

CE 302 Mechanics of Materials Department of Civil Engineering King Saud University	
Course Description: CE 302 Mechanics of Materials (Required for a BSCE degree)	Introduction and fundamentals of mechanics of deformable materials. Concept of stress and strain and Hooke's law. Concept of failure, yield and allowable stresses. Factor of safety and allowable stress design. Limitations of strains and deformations. Normal stress under axial loading and bending. Shear stress under shear force and torsion. Shear force and bending moment diagrams. Transformation of stress and strain and Mohr's circle. Buckling of columns. (3,1,0)
Prerequisite	Pre-requisite course: GE 201 Statics, Co-requisite: CE 305 Pre-requisite topics: 1. Analysing Force systems 2. Determining Moments and couples 3. Describing Force and moment equilibrium 4. Determining Centroids of composite sections 5. Calculating moment of inertia
Course Learning Outcomes	Students completing successfully this course will be able to: 1. Recognize the concept of stress, strain and factor of safety 2. Compute deformations under axial load and also shear stress & deformations in shafts under torsion 3. Analyze and design beams for bending and shear 4. Determine transformation of stresses in 2-D and construct Mohr's circle 5. Recognize the concept of buckling and compute Euler's critical load
Topics Covered	1. Introduction – Concept of Stress (6 hours) 2. Stress and Strain – Axial Loading (7 hours) 3. Torsion (5 hours) 4. Pure Bending (7 hours) 5. Analysis and Design of Beams for Bending (7 hours) 6. Shear Stress in Beams (5 hours) 7. Transformation of Stress (5 hours) 8. Buckling of columns (3 hours)
Class/ tutorial Schedule	Class is held three times per week in 50-minute lecture sessions. There is also a 50-minute weekly tutorial associated with this course.
Computer Applications	None
Project	None
Contribution of Course to Meeting the Professional Component	1. Students recall stress and strain analysis to be involved in designing various structural components. 2. Students should recognize the importance of this basic course for the various civil engineering topics in particular structural analysis and design.

Relationship of Course to Student Outcomes	<ol style="list-style-type: none"> 1. Students apply algebra, elementary calculus, and principles of mechanics. 2. Students are able to identify and formulate an engineering problem and to develop a solution. 3. Students recognize the importance of analysis in designing structural components. 4. Students are told to submit accurate analysis in an efficient and professional way. 5. Students recognize the importance of reading and understanding technical contents in English in order to achieve life-long learning and be able to carry out their responsibilities. 6. Students are told to improve their writing, communication and presentation skills. 7. Students recognize the difference between analysis and design process.
Textbook(s) and/or Other Required Material	Mechanics of Materials, 7 th Edition in SI units by Beer, Johnston, Dewolf and Mazurek, McGraw Hill
Academic Year/Semester	1441-1442 (2020-2021) / 1 st Semester
Instructors	Prof. Mohammed J. Alshannag & Dr. Ahmet Tuken & Dr. Saleh Aldeghaither & Dr. Hussam Alghamdy
Grade Distribution	<p>There are two 90-minute midterm exams and a 180-minute final exam and also some homeworks and quizzes in tutorial hours.</p> <p>The course grade distribution is as follows:</p> <p>25%-1st Midterm (Date & time will be announced later by the college of engineering)</p> <p>25%-2nd Midterm (Date & time will be announced later by the college of engineering)</p> <p>10%-Tutorials (Homeworks, Quizzes, Attendance)</p> <p>40% Final Exam (Date & time will be announced later by the college of engineering)</p>