


College of Engineering Department of Civil Engineering										
<h2>CE 305 Mechanics of Materials Laboratory</h2>										
Credit and Contact hours	1/ 0 (Lectures), 0 (Tutorials), 2 (Laboratory)									
Required, or Elective	Required for a BSCE degree									
Course Description	<p>Introduction to numerical tools for solving Mechanics of materials problems. Experimental demonstrations of uniaxial deformations and Poisson's effect. Experimental calculation of beam deflections and angle of twist and shearing strain in a twisted circular shaft. Calculation of Column buckling loads using Euler's formula for different boundary conditions. Determination of flexural Modulus of elasticity for different metallic materials subjected to lateral loads.</p>									
Prerequisites or Co-requisites	<p>Prerequisite: Statics (GE 201)</p> <p>Co-requisite: CE 302 (Mechanics of Materials)</p>									
Course Learning Outcomes	<p>Students completing this course successfully will be able to</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Course Learning Outcomes</th> <th style="text-align: center;">Related Student Outcomes (SO)</th> </tr> </thead> <tbody> <tr> <td>CLO1. Analyze basic stresses & strains problems for columns, beams and shafts when subjected to different external loads using modern numerical tools</td> <td style="text-align: center;">SO1</td> </tr> <tr> <td>CLO2. Use Computer modeling to verify the theoretical concepts of stresses and strains in different structural members under different loading conditions.</td> <td style="text-align: center;">SO1</td> </tr> <tr> <td>CLO3. Interpret material and member properties using different experiments to draw conclusions on behavior of materials.</td> <td style="text-align: center;">SO6</td> </tr> </tbody> </table>		Course Learning Outcomes	Related Student Outcomes (SO)	CLO1. Analyze basic stresses & strains problems for columns, beams and shafts when subjected to different external loads using modern numerical tools	SO1	CLO2. Use Computer modeling to verify the theoretical concepts of stresses and strains in different structural members under different loading conditions.	SO1	CLO3. Interpret material and member properties using different experiments to draw conclusions on behavior of materials.	SO6
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Student Outcomes related to this Course	<p>SO1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics, [ABET 1] and using modern engineering tools.</p> <p>SO6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions [ABET 6]</p>									

Topics Covered	List of Topics		Related CLOs
	1. Introduction - Overview on Stress-strain diagrams and Hooke's Law		CLO1
	2. Orientation to computer software		CLO1
	3. Analyzing columns, beams and shafts when subjected to different external loads using computer software		CLO2
	4. Strain gauge applications for measuring bending and shear stresses		CLO2
	5. Computer modeling to verify the theoretical concepts of stresses and strains in different structural members under different loading conditions.		CLO2
	6. Experiments to evaluate material and members properties and draw conclusions on material behavior (through a project)		CLO2
Textbook(s) and Other Required Material	Mechanics of Materials by Beer, Johnston, Dewolf, and Mazurek, 6th Edition in SI Units, McGraw Hill		
Grading System	Two Mid-term Exams	45 %	
	Reports and assignments	15%	
	Final Exam:	40%	
Instructors	Prof. Tarek Almusallam (2A9), email; musallam@ksu.edu.sa		
Date of Review	November, 2020		