



MUTAH UNIVERSITY
Faculty of Engineering
Department of Mechanical Engineering



Strength of Materials

COURSE SYLLABUS

Course Code	Course Name	Credits	Contact Hours
0402227	Strength of Materials	3	48

INSTRUCTOR/COORDINATOR	
Name
Email@mutah.edu.jo
Website	

TEXTBOOK
<p><u>TextBook:</u></p> <ul style="list-style-type: none"> • J. Gere & B. Goodno, "Mechanics of Materials", Cengage Learning, 2013, Eighth-Edition <p><u>References:</u></p> <ol style="list-style-type: none"> 1. R. C. Hibbeler, "Mechanics of Materials", 2. F. P. Beer, and E. R. Johnston, "Mechanics of Materials", McGraw Hill. 3. L. G. Kraige, "Mechanics of Materials", John Wiley and Sons. 4. P. Popov, "Mechanics of Materials", Prentice Hal

SPECIFIC COURSE INFORMATION
<p>A. Brief Description of the Content of the Course (Catalog Description)</p> <p>Axial loading, Material properties obtained from tensile tests, Stresses and strains due to axial loading, Thermal Stresses, Elementary theory of torsion, Solid and hollow shafts, Thin-walled tubes, Rectangular cross-section, Stresses in beams due to bending, shear and combined forces. Composite beams, Analysis of plane stress, Mohr's Circle, Combined stresses, Thin-walled pressure vessels, Deflection of beams, Buckling of columns, Energy Methods.</p>
<p>B. Pre-requisites (P) or Co-requisites (C)</p> <p>(P): 0402226</p>

C. Course Type (Required or Elective)

Required

SPECIFIC GOALS

A. Specific Outcomes of Instruction

- **An ability to apply knowledge of calculus and differential equations in derivation of some basic equations of strength of materials (SLO-1).**
- **2. Understand mechanical behavior of the material and interpret data to draw Stress-Strain diagram (SLO-1).**
- **3. Analyze normal stresses and strains due to axial loading, bending, pressure and combined loading and investigate transformation equations on inclined sections by Mohr's circle (SLO-2).**
- **4. Analyze shear stresses in beams, in shafts due to torsion, principal stresses and maximum shear stresses by Mohr's circle (SLO-2).**
- **5. Understand design of rods, beams, shafts, columns and thin walled-pressure-vessel through computing the maximum normal and shear stresses at a point (SLO-2).**

B. Student Learning Outcomes (SLOs) Addressed by the Course

1	2	3	4	5	6	7				
✓	✓									

BRIEF LIST OF TOPICS TO BE COVERED

List of Topics	No. of Weeks	Contact Hours
• Introduction: Concept of stress and strain at a point of a stressed body, Basic loadings: tension, compression, shearing and bearing.	1	3 hr/week
• Stress-strain diagram and mechanical behavior of the material, Allowable values of influences and responses and Factors of safety.	2-3	3 hr/week
• Axially loaded members: Deformation, Normal stresses and normal strains, Shear stresses.	3-4	3 hr/week
• Thermal stresses, Stresses on inclined planes.	5	
• Torsion: Pure shear and Transmission of power by circular shafts	6	3 hr/week
• Shear force and bending moment diagrams.	7-8	3 hr/week
• Elementary flexure theory of beams	9-10	3 hr/week
• Analysis of stresses: Transformation equations of plane stresses, Extreme values of stresses: Principal stresses and maximum shear stresses, Mohr's circle for plane stresses.	11-12	3 hr/week
• Pressure vessels and combined loading: Cylindrical and spherical vessels analysis; Combined loading analysis in beams	13-4	3 hr/week
• Beam deflection using integration method and other methods	14-16	3 hr/week

METHODS OF ASSESSMENT			
No.	Method of assessment	Week and Date	%
1	Midterm Examination	9th week	30
2	Homeworks and Activities	All over the Semester	20
3	Final examination	End of Semester	50
Total			100