



# Engineering Program

Specialization	Common
Course Number	20204121
Course Title	Strength of Materials
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

**Brief Course Description:**

- ❖ Principles of statics including equilibrium and static equivalence. Determination of moment and force resultants in slender members. Introduction to mechanics of deformable bodies; concepts of stress and strain, classification of material behavior, stress-strain relations and generalized Hook's Law. Application to engineering problems involving members under axial load, torsion of circular rods and tubes, bending in beams, buckling of columns.

**Course Objectives:**

After presenting this course student should:

1. Analyze the different types of loading
2. Classify the types of beams support.
3. Distinguish between the effect of concentrated or distributed load



**Detailed Course Description:**

Unit Number	Unit Name	Unit Content	Time Needed
1.	Axial Loading	<ul style="list-style-type: none"> <li>▪ Introduction, static review, types of loads</li> <li>▪ Normal and shear stresses, concept of strain</li> <li>▪ Stress strain diagram</li> <li>▪ Hokes law and modulus of elasticity (Young's modulus)</li> <li>▪ True stress and true strain</li> <li>▪ Strain energy and factor of safety</li> <li>▪ Stresses in stepped bars</li> <li>▪ Stresses in compounded columns</li> <li>▪ Poison's ratio</li> <li>▪ Stresses in thin-walled vessels due to internal pressure</li> </ul>	
2.	Torsion	<ul style="list-style-type: none"> <li>▪ Torsion stress and strain in solid and hollow shafts</li> <li>▪ Torsion in stepped shafts</li> <li>▪ Power transmitted by rotating shafts</li> <li>▪ Twist angle in elastic range</li> </ul>	
3.	Bending of beams	<ul style="list-style-type: none"> <li>• Bending stresses and axial strain in symmetric sections</li> <li>• Curvature of beams under bending</li> <li>• Types of bending loads, concentrated and uniformly distributed loads</li> <li>• Shear and bending moment diagrams for beams under concentrated and uniformly distributed loads</li> </ul>	
4.	Buckling of columns	<ul style="list-style-type: none"> <li>▪ Euler's formula for pin ended columns</li> <li>▪ Types of end conditions of columns</li> <li>▪ Column design under axial</li> </ul>	

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**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	
	Second Exam	20%	
	Final Exam	50%	
Homework and Quizzes		10%	

**Teaching Methodology:**

- ❖ Lectures and presentations

**Textbook:**

1. Mechanics of materials R.C. Hibler 5<sup>th</sup> edition , Prentice Hall, 2003



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❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008



# Program Engineering

Specialty	Common
Course Number	20204122
Course Title	Strength of Materials Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008



**Brief Course Description:**

- ❖ Applying theory gained within the strength of materials theoretical through practical experimentation

**Course Objectives:**

After presenting this course student should:

1. Distinguish between the behavior of brittle and ductile materials under tensile.
2. Distinguish between the behavior of brittle and ductile materials under torsion test.



## Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Tensile test	<ul style="list-style-type: none"> <li>▪ Identification of the tensile testing machine, its specifications and standard specimen</li> <li>▪ Test procedure</li> <li>▪ Performing the test on different specimen</li> <li>▪ Plotting stress-strain curve using load-elongation curve</li> <li>▪ Studying the effect of percentage of carbon in steel on the tensile test results</li> <li>▪ Comparison among mild steel</li> <li>▪ Cast iron, brass and aluminum</li> </ul>	
2.	Compression test	<ul style="list-style-type: none"> <li>▪ Test procedure</li> <li>▪ Compression test specimen</li> <li>▪ Plotting stress-strain for compression test</li> <li>▪ Comparison the test results for different specimen</li> </ul>	
3.	Impact test	<ul style="list-style-type: none"> <li>▪ Identification of the pendulum</li> <li>▪ Impact testing machine and standard specimen</li> <li>▪ Test procedure and the specifications of specimen (Izod-Charpy)</li> <li>▪ Performing and comparing the test results for specimen under different temperatures</li> </ul>	
4.	Hardness tests	<ul style="list-style-type: none"> <li>▪ Elements of the</li> </ul>	

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

		<p>hardness testing machine</p> <ul style="list-style-type: none"> <li>▪ Testing specimen and procedure</li> <li>▪ Conducting hardness tests using Brinnell method, Vickers method and Rockwell method</li> </ul>	
5.	<b>Non-destructive inspection NDI</b>	<ul style="list-style-type: none"> <li>▪ Elements of the following NDI equipment: X-ray inspection Ultrasonic inspection Magnetic particle inspection</li> <li>▪ Methods of determination of internal defects of metals</li> </ul>	

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	Reports	30%	--/--/----
	Med- term	20%	--/--/----
	Final Practical Exam	50%	--/--/----

**Teaching Methodology:**

❖ Laboratory

**Textbook:****Instructional Lab. Sheets**

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