



Faculty of Engineering – Assiut University  
Bachelor Degree

Civil Engineering Program

Dept. of Civil Engineering

Course specification

1. Course Aim

<b>Main Aim</b>	The course aims to develop an understanding of how structural elements behave under load and understand how a structural element responds to an applied load and induced stress distribution (normal, shear and combined). Various methods of calculating stresses in structural members, such as beams, columns and shafts are introduced. The methods that can be employed to predict the response of a structure take into account various properties of the materials.
<b>Sub-Aims</b>	<ol style="list-style-type: none"> <li>1- Introduce the basics of normal stresses due to normal force and bending moments and determine of normal stresses in elastic bodies (homogeneous, heterogeneous and composite) for symmetrical and unsymmetrical sections.</li> <li>2- Determine of the Shear stresses in homogenous sections for different straining actions under applied static loads.</li> <li>3- Determine of combined stresses analytically and graphically.</li> <li>4- Determine of deformation for elastic bodies using (double integration method – conjugate beam).</li> <li>5- To enhance a student's ability to communicate effectively, both verbally and in written reports.</li> </ol>

2. Course Topics

الأسبوع	الموضوعات	
1 - 2	- Revise the cross section properties; general internal Straining actions; normal and shear straining actions.	الموضوع الأول 1 <sup>st</sup> topic
3 - 7	<ul style="list-style-type: none"> <li>- <b>Concept of Normal stress</b>; application to the analysis of simple structures; stresses on an oblique plane under axial loading.</li> <li>- Normal stresses in elastic bodies for homogeneous symmetrical and unsymmetrical sections for eccentric axial loading in a plane of symmetry; general case of eccentric axial loading.</li> <li>- Core of cross sections, stresses distribution on no tensile material.</li> <li>- Normal stresses in elastic bodies for heterogeneous and composite symmetrical and unsymmetrical sections for eccentric axial loading in a</li> </ul>	الموضوع الثاني 2 <sup>nd</sup> topic

الأسبوع	الموضوعات	
	plane of symmetry; general case of eccentric axial loading.	
8 - 12	<ul style="list-style-type: none"> <li>- <b>Concept of shear stress</b>; application to the analysis of simple structures; shear stresses due to direct and flexural shear.</li> <li>- Determination of shear stresses on sections due to shearing force; Transverse loading: Shear flow; shear stresses; stresses under combined loading.</li> <li>- Determination of shear center for open thin walled sections</li> <li>- Determination of shear stresses on sections and bolts due to torsional moment</li> </ul>	الموضوع الثالث 3 <sup>rd</sup> topic
13 - 14	<ul style="list-style-type: none"> <li>- Determination of combined stresses; Transformation of plane stresses: Principal stresses; maximum shearing stress; Mohr's circle of stress in thin-walled pressure vessels.</li> </ul>	الموضوع الرابع 4 <sup>th</sup> topic
15 - 16	<ul style="list-style-type: none"> <li>- Determination of deflection, using the method of double integration, Area method, elastic weight, conjugates method.</li> </ul>	الموضوع الخامس 5 <sup>th</sup> topic

### 11.2 Grades Distribution

Assesment Methods		Percentage	
<b>Final Exam</b>		70 % من النهاية العظمى (بحسب اللائحة)	
<b>Oral Final Exam</b>		--	
<b>Med term exam</b>			
<b>Assessments</b>	<b>Written Exam</b>	<b>65 %</b>	30%
	<b>Oral Exam</b>	--	
	<b>Tutorial assessment</b>	<b>15 %</b>	
	<b>Project assessment</b>	--	
	<b>Report assessment</b>	<b>10%</b>	
	<b>Quiz assessment</b>	<b>10 %</b>	
	<b>Presentation assessment</b>	-	
	<b>Laboratory test</b>	-	
<b>Total</b>		<b>100%</b>	

### 3. List of References

Course notes	<i>"Structural Analysis: Stresses and deflection"</i> Mohamed M. Ahmed and Shehata E. Abdel Raheem
Required books	<i>S.D. Rajan: Introduction to Structural Analysis and Design, John Wiley &amp; Sons, Inc., 2001.</i>
Recommended books	<ol style="list-style-type: none"> <li>1. Chu Kia Wang &amp; Charles G. Salmon, " Introductory Structural Analysis" , Prentice Hall,USA,1984</li> <li>2. Russell C. Hibbeler, <i>Structural Analysis</i>, Third Edition, Prentice-Hall, 1994.</li> </ol>

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3. C. H. Morris, J. B. Wilbur, and S. Utku, *Elementary Structural Analysis*, Third Edition, McGraw-Hill, 1976.
  4. Y. Y. Hsieh, *Elementary Theory of Structures*, Prentice-Hall, 1970.
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Periodicals, web  
sites... etc.