

Course Number and Name												
<b>BCE401 - THEORY OF STRUCTURES</b>												
Credits and Contact Hours												
<b>4 &amp; 60</b>												
Course Coordinator's Name												
Mr.K.Sathish Kumar												
Text Books and References												
<b>TEXT BOOKS:</b>												
1. Gupta S.P, Pandit G.S, Gupta R. , Theory of Structures, Vol.I&II .Tata McGraw HillCo,1981												
<b>REFERENCES:</b>												
1. Kazimi S.M.A, "Solid Mechanics", Tata McGraw-Hill Publishing Co., New Delhi, 2003												
2. Beer and Johnson. Mechanics of Materials, S.I Metric Edition, McGraw Hill Co, 2002												
3. Punmia B.C.Theory of Structures (SMTS) Vol 1&II, Laxmi publishing Pvt Ltd, NewDelhi, 2004.												
4. Jain O.P. and.Jain B.K., Theory and analysis of structures, Mechanics of Materials Nem Chand & Brothers, Roorkee, 2001												
Course Description												
<ul style="list-style-type: none"> <li>To know the method of finding slope and deflection of beams and trusses using energy theorems and to know the concept of analysing indeterminate beam.</li> <li>To estimate the load carrying capacity of columns, stresses due to unsymmetrical bending and various theories for failure of material.</li> </ul>												
Prerequisites						Co-requisites						
NIL						Basic Structural Design						
required, elective, or selected elective (as per Table 5-1)												
Course Outcomes (COs)												
CO1	To find the deflection in beams and frames using Energy theorems.											
CO2	To analyze indeterminate beams like continuous beams and fixed beams											
CO3	To analyze the long and short columns and determine the design loads											
CO4	To assess the state of stress in three dimensions											
CO5	To solve problems involving unsymmetrical bending structural members											
Student Outcomes (SOs) from Criterion 3 covered by this Course												
COs/SOs	a	b	c	d	e	f	g	h	i	j	k	
CO1	H		H	M								
CO2	M		H	M								
CO3	M		H	M								
CO4	H		H	M								

	CO5	H		H	M								
<b>List of Topics Covered</b>													
<b>UNIT I</b>	<b>ENERGY THEOREM</b>											<b>12</b>	
Conservative and non-conservative systems – Strain energy and complimentary energy – Principle of virtual displacement and virtual forces, castigliano’s first theorem, Engesser’s theorem, castigliano’s second theorem, Maxwell’s theorem													
<b>UNIT II</b>	<b>DEFLECTION OF BEAM</b>											<b>12</b>	
Determination of deflection and slope – Double integration method – Macaulay’s method-Area moment method-conjugate beam method, strain energy and dummy unit load approaches.													
<b>UNIT III</b>	<b>STATICALLY INDETERMINATE BEAMS</b>											<b>12</b>	
Axially load members - composite bars – Beams: Propped, fixed and continuous beams - Theorem of three moments-calculations of reactions, Bending Moment and Shear forces - shear force and bending moment diagrams.													
<b>UNIT IV</b>	<b>THEORY OF COLUMNS</b>											<b>12</b>	
Axial load - combined bending and axial – Euler’s formula for long struts-practical applications – Rankine’s Gordon’s formula – beam columns.													
<b>UNIT V</b>	<b>THICK CYLINDERS</b>											<b>12</b>	
Lame’s equation - shrink fit- compound cylinders – wire wound cylinders. <b>DEFLECTION OF TRUSSES</b> Castigliano’s Theorem, dummy unit load method, Williotmohr’s diagram.													