Course Number and Name
BCE301 - APPLIED MECHANICS
Credits and Contact Hours
4 & 60
Course Coordinator's Name
Ms.R.J.Rinu Isah
Text Books and References

TEXT BOOKS:

1. Ramamurtham S & Narayanan R, Strength of Materials , Dhanpat Rai Publication 2008
2. Bansal R.K, Engineering Mechanics and Strength of Materials, Laxmi Publications (P) Ltd. New Delhi 2010

REFERENCE:

1. Egor P, Popov, Introduction of Mechanics of Solids,1998.
2. Ryder G.H. Strength of Materials, Macmillan India,2002.
3. Khurmi R.S, A Text Book of Engineering Mechanics S.Chand& Co, 2012.
4. Srinath L S, Advanced Mechanics of Solids, Tata McGraw Hill Co, 2009.
5. Jain O.P. &.Jain B.K, Theory and Analysis of Structures Vol I & II 2012,2011

Course Description

- To learn fundamental concepts of Stress, Strain and deformation of solids with applications to bars, beams and thin cylinders.
- To know the mechanism of load transfer in beams, the induced stress resultants and deformations.
- To understand the effect of torsion on shafts and springs.
- To analyze a complex two dimensional state of stress and plane trusses

Prerequisites	Co-requisites
Engineering Mechanics	NIL
required, elective, or selected elective (as per Table 5-1)	

Course Outcomes (COs)	
CO1	To apply the fundamental concepts of stress and strain in the design of various structural components and machines
CO2	To analyze and design shafts to transmit required power
CO3	To analyze about the force in member Truss with different methods
CO4	To determine the bending, shear stresses and deflection produced in a beam subjected to system of loads
CO5	To determine stresses due to impact and suddenly applied loads

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		M	M					L		
CO2	H	M	M	M	H				L		
CO3	H	M	M	M					L		
CO4	H		M	M					L		

	CO5	H		M	M	H				L			

List of Topics Covered

UNIT I   SIMPLE STRESSES AND STRAINS   **12**

Tension, compression and shear stress - Hook's law - simple problems -compound bars - Relationship between elastic constants - Thermal stresses.

UNIT II   PRINCIPAL STRESSES& TORSION   **12**

Combined stresses – Principles stress and principal planes – Mohr's circle - stresses in thin cylinders and shells. Theory of torsion – Strain energy in torsion – Torsion of circular shafts – shear stresses due to torsion of Closed and Open coiled helical springs.

UNIT III   ANALYSIS OF PLANE TRUSSES   **12**

Stability and Equilibrium of plane frames, Perfect Frames, Types of trusses – Analysis of forces in truss members - Method of joints – Methods of sections – Tension coefficient method – Graphical method.

UNIT IV   BEAMS & BENDING   **12**

Beams and support conditions - Types of supports - Shear force and bending moment – Dynamics for simply supported beams, cantilevers and overhanging beams with concentrated and / distributed loads. Theory of simple bending – bending stress distribution – shear stress distribution - leaf springs.

UNIT V   STRAIN ENERGY   **12**

Strain energy due to axial force, bending moment, flexural and torsional shear – Resilience stresses due to impact and suddenly applied loads.