Course Number and Name
BME303 – MECHANICS OF SOLIDS
Credits and Contact Hours
4&60
Course Coordinator's Name
Mr.R.Sharavanan
Text Books and References

TEXT BOOKS:

1. Prabhu T.J. – Mechanics of Solids, 2009

REFERENCES:

1. Gere Timoshenko – Mechanics of materials – CBS, 1997.
2. Beer & Johnson – Mechanics of materials , SI Metric Edition – McGraw Hill, ISE, 2006.
3. Timoshenko & young, Engineering Mechanics – McGraw Hill, 2007.
4. Popov E.P. Engineering Mechanics of solids – PHI, New Delhi,2006.
5. Shames Irvin. H – Introduction to Solid Mechanics – PHI,2002
6. www.freeengineeringbooks.com/Civil/**Mechanics-of-Solids**-Books.php

Course Description
To gain knowledge of simple stresses, strains and deformation in components due to external loads. To assess stresses and deformations through mathematical models of beams twisting bars or combinations of both.

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

Course Outcomes (COs)	
CO1	Upon completion of this course, the students can able to apply mathematical knowledge to calculate shear force & Bending moment diagram
CO2	Understand stress and strain behavior of solids
CO3	Understand and analyze stress behavior.
CO4	analyze the deflection in beams
CO5	Understand thick and thin cylinder
CO6	Upon completion of this course, the students can able to apply mathematical knowledge to calculate the deformation behavior of simple structures.

Student Outcomes (SOs) from Criterion 3 covered by this Course

COs/SOs	a	b	c	d	e	f	g	h	i	j	k	l
CO1	H	H	L					M	M		H	H
CO2	H	H	L					M	M		H	H
CO3	H	H	L					M	M		H	H
CO4	H	H	L					M	M		H	H
CO5	H	H	L					M	M		H	H
CO6	H	H	L					M	M		H	H

List of Topics Covered

UNIT I TRUSSES, SHEAR FORCE AND BENDING MOMENT DIAGRAM 12

Analysis of trusses – Method of joints – Method of section – Shear force and Bending moment diagram – cantilever – simply supported – overhanging beams, Relation between load, shear force and bending moments.

UNITII STRESS AND STRAIN BEHAVIOUR OF SOLIDS 12

Tension, Compression and shear, Normal stress and strain, Statically indeterminate problems – temperature effects – stress and strain diagram – Elasticity – Plasticity, strain energy in tension – Impact loads – Shear stress and strain – Allowable stress – Poisson's ratio – Relation between elastic constants.

PRINCIPAL STRESSES Principal stresses and maximum shear stress – importance of zero principal stress in a three dimensional state of stress – Solution to problems by analytical method, Calculation of principal stress and maximum shear stress for a pressure vessel and shaft.

UNIT III BENDING & TORSION 12

Normal and shear stresses in beams – Torsion of circular shafts – Statically indeterminate torsional members – Torque diagrams, Strain energy in torsion.

UNIT IV DEFLECTION OF BEAMS 12

Slope and deflection of beams – Double integration method – Macaulay's method – Strain energy method for cantilever, simply supported and overhanging beams.

UNIT V THIN AND THICK CYLINDERS 12

Thin cylinder and shells – Volumetric strain – rotational stress in thin cylinders and discs, Thick cylinders – Shrink fit – Compounding of cylinders.

COLUMN AND STRUTS Columns and struts – Eccentric loading of short struts – Euler's Formula – Limitations of Euler's formula – Rankine – Gordon formula – Johnson's Parabolic formula.