Lesson Plan

Course: ETAT203

Strength of Materials

S.No.	Topic (from syllabus)	Lecture/Tute No.	Lecture Plan Date	Sub-Topics (& References from Text-books)	Assignment / Quize	Exam	Target Outcome
1	**Simple Stress & Strain**	L1		Concept of normal and shear stresses and strain/ R2 P1-10	Assignment 1	First Term Examination	CO-ETAT203.1
				Stress-strain diagram, Hook's law/ R2 P11-13, 16			
		L2		Deformation due to force, self weight, taper bar/ R2 P16, 23			
		L3		Analysis of stepped and composite bars, Numericals/ R2 P20-21, 36			
		T1		***Numericals***			
		L4		Poisson's ratio, Volumetric stress and strain/ R2 P59			
				Elastic constants, Relation between E, G and K/ R2 P60-63			
		L5		Complimentary shear stress and strain/ R2 P57-58			
				Generalized Hook's law, Numericals/ R2 P62, 64-70			
		L6		Thermal stress in simple bar and composite bars/ R2 P45-47, 50			
		T2		***Numericals***			
		L7		Resilience and Strain Energy/ R2 P70			
				Stress due to gradually applied, suddenly load and Impact Load/ R2 P71-73			
		L8		Strain energy stored due to shear stress, Numericals/ R2 P74, 75-81			
2	**Shear Force and Bending Moment Diagram**	L9		Introduction to various beams and loads/ R2 P140	Assignment 2		CO-ETAT203.2
				Concept of SFD and BMD, Relation between SF and BM/ R2 P141-143			
		T3		***Numericals***			
		L10		SFD and BMD for :Simply supported beam/ R2 P146-152			
				SFD and BMD for :Cantilevers beams / R2 P144-145			
		L11		SFD and BMD for:Overhanging beams / R2 P169-172			
3	**Simple Bending**	L12		Pure bending, concept of bending stress, Neutral axis, Section modulus/ R2 P177-184			
		T4		***Numericals***			
		L13		Bending stress distribution, Assumptions, Flexural formula/ R2 P177-184			
		L14		Numericals on beams/ R2 P185-198			
		L15		Beams of uniform strength, Stresses due to eccentric loads/ R2 P204-206			
		T5		***Numericals***			
		L16		Shear stress in beams, Shear stress distribution/ R2 P207-215			
		L17		Numericals on shear stress in beam/ R2 P216-224			
4	**Slope and Deflection of Beam**	L18		General expression of slope and deflection in beams/ R2 P240-242			
		T6		***Numericals***			
		L19		Slope & deflection of cantilever beams, supported beams and over hanging beams / R2 P243-252			
		L20		Macaulay's method, moment area method, principle of superposition/ R2 P259-260,283-285			
		L21		Castigliano's theorem/ R2 P337-339			
		T7		***Numericals***			
7	**Columns**	L22		Concept of short, medium and long columns/ R2 P450	Assignment 3	Second Term Examination	CO-ETAT203.3
				Combined direct and bending stresses in short columns/ R2 P451-455			
		L23		Euler's equation for all four types of columns/ R2 P456-462			
		L24		Euler's equation, Limitation of Euler's formula, Rankine -Gordon equation/ R2 P463-465			
		T8		***Numericals***			
5	**Torsion**	L25		Concept of pure torsion, shear stress distribution/ R2 P354			
				Torsional equation, assumptions/ R2 P355-357			
		L26		Power transmit by shaft, torsional strength and rigidity/ R2 P357-358			
				Strain energy under torsion/ R2 P383-385			
		L27		Comparision of solid and hollow shafts, Numericals/ R2 P365-370			
		T9		***Numericals***			
		L28		Torsion of stepped and composite shafts/ R2 P370-371			
		L29		Numericals/ R2 P372-379			
6	**Complex stress**	L30		Analytical method for finding stress at oblique plane/R2 P91-96			
		T10		***Numericals***			
		L31		Introduction to Principle stresses and strain/ R2 P98-101			
		L32		Mohr's Circle for determination of stresses/ R2 P109-112			
		L33		Theories of failure/ R2 P131-133			
		T11		***Numericals***			
		L34		Combined bending and twisting, eqivalent bending moment and twisting moment/ R2 P395-397			
		L35		Numericals on combined bending and twisting/ R2 P397-401			
8	**Pressure vessel**	L36		Analysis of thin cylinder and sphere/ R2 P409-411, 420-422	Assignment 4		CO-ETAT203.4
		T12		***Numericals***			
		L37		Analysis of thick cylinder, Lami's theorem and equation/ R2 P424-426			
		L38		**Numericals**			
		L39		Compound cylinders/ R2 P433			
		T13		***Numericals***			
9	**Spring**	L40		Closed coiled springs subjected to axial load/ R2 P385-389			
		L41		Closed coiled springs subjected to axial twist/ T1 P826			
		L42		Analysis of Leaf spring/ T1 P840-842			
		T14		***Numericals***			

Text Books:

T1. Sadhu S., "Strength of Materials", Khanna Publication, Delhi.
T2. Rajput, R.K., "Strength of Materials", S Chand, New Delhi, 2013.
T3. Hibbler R.C., "Mechanics of Materials", Prentice Hall, New Delhi, 1994.

Reference Books:

R1. Timoshenko S.P., Gere J "Elements of Strength of Materials", East-West affiliated, New Delhi.
R2. Bhavikatti S. S. Strength of Materials", 4th Ed.Vikas Publishers 2000.
R3. Sri Nath L.S. et.al., "Strength of Materials", McMillan, New Delhi,2001.
R4. Popov Eger P., "Engg. Mechanics of solids", Prentice Hall, New Delhi, 1998.
R5. Fenner, Roger.T, "Mechanics of Solids", U.K. B.C. Publication, New Delhi, 1990.