Lesson plan

B,Tech Civil Engineering – IV semester 2015 – 2016

Course Code	**CE1010**
Course Name	**STRENGTH OF MATERIALS**
Prerequisites	**CE1004**
Category	**P (STRUCTURAL ENGINEERING)**

INSTRUCTIONAL OBJECTIVES

Instructional objectives no.	Instructional objectives
1.	To determine the deflections in beams by various methods which is an important criteria in design
2.	To analyse the structural elements by energy concepts and find stresses and deflections
3.	To study Euler's, Rankine's and other theories of columns
4.	To study various theories of failure in designing the structural members
5.	To understand advanced concepts like unsymmetrical bending, stressed in curved bars and locating shear centre and stresses in thick cylinders

STUDENT OUTCOME

Student outcome number	Student outcome
(a)	An ability to apply of mathematics, science, and engineering.
(e)	An ability to identify, formulate, and solve engineering problems
(k)	An ability to use the techniques, skills, and modern engineering tools

Lecture No	Topic covered	Instructional objectives	Student outcome	Reference
1&2	Overall view of the syllabus	1	a,e,k	**1,2,3,4,5,6**
3-6	Determination of deflection Double integration method	1	a,e,k	**1,2**
			a,e,k	**1,2**
7-12	Macaulay's method	1	a,e,k	**1,2**
11-15	Moment-Area method	1	a,e,k	**1,2**
16-19	Conjugate beam method	1	a,e,k	**1,2**
20&21	Effect of Shear on Deflection	1	a,e,k	**1,2**
22	Deflection of spring	1	a,e,k	**1,2**
	Cycle Test I			
23-27	Energy concepts – theorems – Principle of virtual works	2	a,e,k	**1,2,3,4**
28-32	Deflection of beams(unit load method)	2	a,e,k	**1,2,3,4**
33-37	Deflection of pin jointed frames(unit load method)	2	a,e,k	**1,2,3,4**
38-39	Maxwell's reciprocal theorem with solved examples	2	a,e,k	**1,2,3,4**
40-42	Euler's theorem for columns	3	a,e,k	**1,2**
43-45	Rankine's theory for columns	3	a,e,k	**1,2**
46	Eccentrically loaded columns – combined bending and axial load (middle third rule)	3	a,e,k	**1,2**
	Cycle Test II			
47-50	Theories of failure	4	a,e,k	**1,2**
51-55	Problem solving in theories of failure	4	a,e,k	**1,2**
56-59	Finding product moment of inertia and Principal Moment of Inertia	5	a,e,k	**1,2**
60-63	Unsymmetrical bending – biaxial bending of purlins (channels, angle sections)	5	a,e,k	**1,2**
64-65	Curved Bars-Winkler Bach Formula	5	a,e,k	
66	Shear centre - Simple Problems	5	a,e,k	
67-69	Thin Cylinders and spherical Shells	5	a,e,k	**1,2**

70-72	Deformation of thin Shells - Stresses at a point in thin shells.	5	a,e,k	**1,2**
73 & 74	Thick cylinders – analysis for stresses	5	a,e,k	**1,2**
75	Compound cylinders	5	a,e,k	**1,2**
Model Examination				

TEXT BOOKS

1. Rajput R.K., Strength of Materials, S.Chand of Company Ltd - New Delhi.2001.
2. Punmia.B.C., Ashok Kumar Jain, Arun Kumar Jain, Strength of Materials and Theory of Structures, Vol 1, Laxmi Publications, 9th edition.1992
3. Beer and Johnson , "Mechanics for Engineers", Statics and Dynamics, Mc Graw Hill Book Company,1987

REFERENCE BOOKS

4. Timoshenko.S.P and Gere J.M. mechanics of materials, CBS publishing, Delhi. 2 Edn. 1984.
5. Gupta.S.P., Pandit.G.S., Gupta.R, Theory of Structures, Vol.I Tata McGraw Hill Publishing Company, 1999
6. Dr.Sadhu Singh, Theory of Elasticity, pg 1-5, 26, 27, Khanna Publishers, Delhi.