STRUCTURAL ENGINEERING

		L	T/P	C
Paper Code: ETEN-204				
Paper: Structural Engineering		3	1	4

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: (i) To identify determinate, indeterminate, stable and unstable structures, (ii) To determine forces and deflections in trusses, beams and frames, (iii) To construct influence lines and be able to use them, and (iv) To use computer tools to assist in classical structural analysis.

UNIT I

Columns and struts: Columns and struts of uniform section, crippling/buckling load, Euler theory and concept of equivalent length, Rankine's formula and other empirical formulae, Secant formula. Combined direct and bending stresses: Middle third rule, core of a section, stresses due to wind, water and earth pressure in structures like retaining walls, dams, chimneys, walls etc.

Thin cylinders: Thin cylinders subjected to internal fluid pressure, wire wound thin cylinders. Thin cylindrical shells, circumferential and hoop stresses, longitudinal stresses, Maximum shear stress.

[T1,T2] [No. of Hours: 12]

UNIT II

Moving loads and Influence lines : Introduction to moving loads, concept of equivalent UDL, absolute maximum bending moment and shear force, concept of influence lines, influence lines for reaction, shear force, bending and deflection of determinate beams, Application of Muller Breslau Principle for determinate structures.

Indeterminate structures: Indeterminacy, choice of unknowns, Castigliano's second theorem and its applications.

[T1,T2] [No. of Hours: 11]

UNIT III

Method of consistent deformation: Analysis of indeterminate beams and frames upto two degree of indeterminacy, settlement effects, analysis of pin jointed trusses, externally and internally redundant trusses, effects of settlement and prestrains.

Slope deflection method: analysis of continuous beams, analysis of rigid frames, frames with sloping legs, gabled frames, frames without sway and with sway, settlement effects.

Moment distribution method: Analysis of beams and frames.

[T1,T2] [No. of Hours: 12]

UNIT IV

Arches : Theory of arches, Eddy's theorem, Circular , parabolic and geometric arches, concept of radial shear force and axial thrust, analysis of three hinged and two hinged arches, Effect of yielding of supports, rib shortening and temperature changes, tied arches, ILD for 3 hinged arches.

Curved Beams: plan and elevation, beams on elastic foundations

[T1,T2] [No. of Hours: 10]

Text Books:
[T1]   Structural Analysis,G.S. Pandit, CBS Publication.
[T2]   Fundamental of Structural Analysis, Sujit kumar Roy,S. Chand Publication.

References Books:
[R1]   Statically Indeterminate Structures, C.K.Wang, Mc Graw Hill
[R2]   Basic Structural Analysis, C.S. Reddy, Tata McGraw Hill
[R3]   Structural Analysis, R.C. Hibbler, Pearson Publications
[R4]   Structures, Schodek, Pearson Education
[R5]   Comprehensive Structural Analysis, Vaidyanathan and P Perumal, Luxmi Publications