Course No	Course Name	L-T-P-Credits
CE 206	**STRUCTURAL ANALYSIS-I**	**(3- 0- 0: 3)**

Prerequisite: nil;   Co requisite: nil

Course Objectives:
1. To analyse and study the respond of structures subjected to various types of loading
2. To apply the equation of equilibrium to structures and compute the reactions
3. To acquire the knowledge to solve statically determinate structures by different methods

Course Outcomes:
1. To use the concept of structural analysis and able to solve different critical analytical problems in civil engineering field.
2. To analyse statically determinate trusses, beams, and frames and obtain internal loading
3. To obtain the influence lines for statically determinate and indeterminate structures
4. To Determine deflections of beams and frames using classical methods
5. To familiar with professional and ethical issues and the importance of lifelong learning in structural engineering

SYLLABUS

Module	Contents	Hours
	Introduction to Structural analysis	3
I	Forms of structures, Loads and Forces on the structural system, Free body diagram, conditions of equilibrium of forces, support and connections – reactions, Difference between determinate and indeterminate structures, static and kinematic indeterminacy.	
	Methods of Analysis	4
II	Equilibrium equations, compatibility requirements, Introduction to force and displacement methods.	
	Analysis of trusses	5
III	Plane truss, compound truss, complex truss and space truss, Arches and suspension cables, three hinged arches and suspension cables,	
	Deflection in Beams	7
IV	Computation of slope and deflection by double integration, moment area method, conjugate beam method, applications to simply supported, overhang and cantilever beams.	
	Analysis of indeterminate structures	3
V	Force methods, flexibility coefficients methods	
VI	**Energy methods**	8
	Principle of minimum potential energy, principle of virtual work, Castigliano's theorems, Reciprocal theorem and their applications to find deflection and redundant forces in simple cases,	
VII	**Moving loads and influence lines**	8
	Unit load method, Influence line and Rolling loads, beam, frames and arches, Muller-Breslau Principles and its applications to determinate and indeterminate structures.	

Essential Readings:
1. Hibbeler R.C., "Structural Analysis", Pearson, 9th Edition, 2017
2. Reddy C.S., "Basic Structural Analysis", Tata McGraw Hill, 3rd Edition, 2011
3. B C Punmia, "Theory of Structures" Laxmi Publication house, 16th Edition, 2017
4. S Ramamrutham, "Theory of Structures", Dhanpat Rai Publications, 9th Edition, 2014

Supplementary Readings:
1. Prakash Rao, D.S., "Structural Analysis: Unified approach", Universities Press., 1st Edition,1996
2. Norris C.H., Wilbur J.B. and Utku S., "Elementary Structural Analysis", Tata McGraw Hill, 6th Edition, 2003
3. Negi L.S and Jangjid R.S., "Structural Analysis", Tata McGraw Hill, 6th Edition, 2003