Structural Analysis-II

Course Code	Credit Hours
CE-306	3-0

Course Description

This course provides the knowledge and understanding of analyzing structural elements by Force and Displacement Methods of analysis. Construction of influence lines for indeterminate structures is also carried out, along with analysis of 2-hinged arches. Students will grasp classical methods, become familiar with various techniques, and develop proficiency in state-of-the-art structural analysis approaches. The theoretical framework covers force and displacement approaches, including compatibility methods, moment distribution, and slope deflection for beams and frames. The course also explores the fundamental concepts of finite element methods with in-depth examples. Moreover, this course provides the knowledge and understanding of analyzing structural elements by Matrix Method of analysis. Students who complete the course will have the analytical abilities necessary for indeterminate structural analysis.

Text Book:

1. Fundamentals of Structural Analysis by Kenneth M. Leet
2. Structural Analysis by R.C.Hibbeler
3. Stresses in Plates, Beams, And Shells by Ansel C. Ugural
4. Matrix Structural Analysis By Ronald L. Sack
5. Fundamentals of Finite Element Analysis By David V. Hutton
6. Structural Dynamics By Clough And Penzien

Reference Book:

Prerequisites :

CE-206 Structural Analysis-I.

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15

Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1	Consistent Deformation Method and Method of Least Work for Analysis of 1^{st}, 2^{nd}, and 3^{rd} degree indeterminate Beams.
2-3	Consistent Deformation Method and Method of Least Work for Analysis of 1^{st}, 2^{nd}, and 3^{rd} degree indeterminate Frames. Analysis of externally and internally indeterminate trusses. Analysis of support settlement cases.
4	Slope-Deflection Method for Analysis of 1^{st}, 2^{nd}, and 3^{rd} degree indeterminate Beams.
5-6	Slope-Deflection Method for Analysis of 1^{st}, 2^{nd}, and 3^{rd} degree indeterminate Frames and Multi-story frames Analysis of support settlement cases.
7	Moment Distribution Method for Analysis of 1^{st}, 2^{nd}, and 3^{rd} degree indeterminate beams.
8	Moment Distribution Method for Analysis of 1^{st}, 2^{nd}, and 3^{rd} degree indeterminate Frames and multi-story frames

	Analysis of support settlement cases.
9	**Mid Semester Exam**
10	Influence Lines for Indeterminate Beams Approximate structural analysis Analysis of frames using the Portal Method.
11	Introduction to matrix algebra Degree of Indeterminacy and Degree of freedom Linear Springs
12-15	**Matrix Stiffness Method** Introduction to Matrix Stiffness Method Development of member and Structure stiffness matrices Bending moment and shear force diagrams Use of Appropriate Software for matrix operations
16	**-Introduction to Matrix Flexibility Method** **-Introduction to Structural Dynamics** • Vibration of Single Degree of Freedom System. • Free & Force Vibrations. • Natural Vibration of Single Degree of Freedom System. • Intro to earthquake engineering & forms **-Finite Element Method** **Introduction to Finite Element** • Introduction to Shape Functions of Bar Element **Introduction to Three Hinged Arches**
17-18	**End Semester Exam**

Practical: Nil