

**DEPARTMENT OF CIVIL ENGINEERING
NATIONAL INSTITUTE OF TECHNOLOGY, JAMSHEDPUR
B.TECH. IV SEMESTER
CIVIL ENGINEERING**

COURSE HANDOUT

Course No.: CE 1501

Credits: 3-1-0 (4)

Course Title: Structural Analysis II

Instructor in Charge: Dr. S. Madhuri (smadhuri.ce@nitjsr.ac.in)

1. Course Objective

1. To introduce the concepts and techniques on the analysis of indeterminate beams, trusses, grids and portal frames
2. To make student familiar on the analysis of indeterminate structures using slope deflection, moment distribution, strain energy method, force and displacement methods
3. To acquaint student on the analysis of structures using computer programming.
4. To make the student expert on the analysis of indeterminate structures using flexibility and stiffness methods
5. Introduce the concepts of plastic analysis of beams and frames

2. Course Outcome

1. At the end of the course, the student will be able to analyze indeterminate beams and structures using
 - Slope deflection method
 - Moment distribution method
 - Strain energy principle
 - Flexibility and stiffness methods
2. The student will be able to develop a computer code for the analysis of beams/frames
3. Able to determine plastic moment of beams and frames for the give boundary conditions and loading.

3. Text/ Reference Books:

1. Structural Analysis, Hibbeler, Pearson Publications.
2. Structural Analysis, Aslam Kassimali, Cengage Learning Publications.
3. Structural Analysis in Theory and Practice, Alan Williams, Elsevier Publications.
4. Elementary Structural Analysis, C. H. Norris, J. B. Wilbur and S. Utku., Tata Mcgraw Hill Publications.
5. Structural Analysis, L.S. Negi and R. S. Jangid, Tata Mcgraw Hill Publications.
6. Intermediate Structural Analysis, C. K. Wang, Tata Mcgraw Hill Publications.
7. Matrix Analysis of Framed Structures, W. Weaver (Jr.) and J. M. Gere, CBS Publications.

4. Course Plan

Lecture No.	Learning Objective	Topics	Chapter Reference
1-9	Analyze indeterminate structures using Moment distribution and slope deflection methods	Moment Distribution and Slope Deflection Methods	ppt/ Class Notes
10-18	Analyze indeterminate beams, trusses and plane frames using Strain Energy method	Strain Energy Methods- Introduction, Method of Minimum Strain Energy for indeterminate beams, Trusses and plane frames.	ppt/ Class Notes
19-27	Introduce the concepts of force and displacement methods for the analysis of indeterminate structures	Introduction-Introduction, Force and Displacement Methods of Analysis of Indeterminate Structures, Method of Consistent Deformation for beams and plane frames.	ppt/ Class Notes
28-36	To make students familiar, with multi degree of freedom systems and concepts of matrix method for the analysis of beams, trusses, frames and grid structures	Matrix Method of Analysis- Introduction, Flexibility Method- Application to Beams, Trusses, Frames and Grid Structures; Stiffness Method- Application to Beams, Trusses, Frames and Grid Structures (including plane and space structures.	ppt/ Class Notes
37-45	To introduce the students with computer oriented analysis Make student familiar with Plastic Analysis of Structure	Computer Oriented Direct Stiffness Method- Introduction, Application to Beams, Frames and Trusses. Plastic Analysis of Structures-Introduction, Analysis of Plastic Structures.	ppt/ Class Notes

5. Evaluation Schedule

Component	Duration	Weightage (%)	Date & Time	Remarks
Mid-Term Exam	Two Hours	30	As per Acad. Cal.	Closed / Open Book
End Semester Exam	Three Hours	40	As per Acad. Cal.	Closed / Open Book
Assignments/ Teacher's Assessment		30		Open Book

6. Assignments

The Assignments are framed to add to understanding of the subject through theory and to motivate the learners to work out the numerical problems on analysis of indeterminate structures.

7. Consultation: By Email

S. Madhuri
Instructor in Charge