



Kadi Sarva Vishwavidyalaya's
LDRP Institute of Technology & Research
Gandhinagar-382 015



B.E. Semester: IV

Department of Civil Engineering

Subject Name: Structural Analysis - II (CV407-N)

A. Objectives of the Course:

The aim of this subject is to understand the behaviour of the structures through advanced matrix methods, which are used in all the popular computer software. Different type structures like frame, truss, and grids are analyzed using methods like slope and deflection and moment distribution. They will study the behaviour of various beams subjected to moving loads. The course also covers analysis of skeletal structure using iterative methods like slope deflection method and moment distribution.

B. Teaching & Evaluation Scheme:

Teaching Scheme				Credit	Evaluation Scheme					Total Marks
L hrs	T hrs	P hrs	Total Hrs		Theory		Mid Sem Exam	CIA	Pra/Viva	
					Hrs	Marks	Marks	Marks	Marks	
3+1*	2	0	6	5	3	70	30	20	30	150

C. Detailed Syllabus:

1. Introduction to Analysis Methods for Indeterminate Structures:

Introduction to Force and Displacement Methods, Classification of Analysis Methods

2. Analysis of Indeterminate Beams:

Calculations of Shear Force and Bending Moment for Propped Cantilever Beam, Fixed Beam and Continuous Beam using (i) Unit Load Method (ii) Castigliano's Second Theorem (iii) Consistent Deformation Method (iv) Area Moment Method (v) Slope Deflection Method (vi) Moment Distribution Method

3. Analysis of Indeterminate Plane Trusses:

Calculations of Deflection using (i) Unit Load Method



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4. Analysis of Indeterminate Plane Frames:

(A) Calculations of Axial Forces, Shear Force, Bending Moment and Torsional Moment for Gravity Load using (i) Slope Deflection Method (ii) Moment Distribution Method

(B) Calculations of Shear Force, Bending Moment and Torsional Moment for Lateral Load using (i) Portal Method and (ii) Cantilever Method

5. Influence Lines for Determinate and Indeterminate Structures:

Introduction to Influence Lines

(A) Plotting of Influence Lines Diagrams for Determinate beams for Reactions, Shear Force and Bending Moment for (i) Point Load (ii) UDL shorter and longer than span (iii) Several Point loads

(B) Plotting of Influence Lines Diagrams for Determinate Trusses for Member Forces
Muller - breslau's Principal, Plotting of Influence Lines Diagrams for Indeterminate beams for Reactions, Shear Force and Bending Moment for Point Load

D. Lesson Planning:

Unit No	Title of the Unit	Minimum Hours	Weightage (%)
1	Introduction to Analysis Methods for Indeterminate Structures	1	2
2	Analysis of Indeterminate Beams	16	35
3	Analysis of Indeterminate Trusses	2	7
4	Analysis of Indeterminate Frames	10	22
5	Influence Lines for Determinate and Indeterminate Structures	16	35

E. Assignments:

Minimum 10 examples from each topic

Note: Students will have to submit the term work in one spiral bound of A4 Blank Pages



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F. Instructional method and pedagogy (Continuous Internal Assessment Scheme CIA):

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures, practical and Tutorial which carries 05 Marks.
- At regular intervals assignments is given. In all, a student should submit all assignments of 05 marks each.
- Classroom participation and involvement in solving the problems in Tutorial rooms carries 05 Marks.
- Viva Voce will be conducted at the end of the semester of 05 Marks.
- One internal exam of 30 marks is conducted as a part of Mid Semester evaluation.

G. Students Learning Outcomes:

On the successful completion of this course

- The students will be able to understand the fundamentals of structure and various Methods of analysis.
- The students will be able to determine the effects of loads on physical structures and their components.
- The course gives students an understanding of the importance of structural analysis and the tools available to determine the response of a structural system to external loads.

H. Recommended Study Materials:

A. Text book & Reference Books:

1. Junarkar, S.B. and Shah, H.J., Mechanics of Structures Vol. I, Charotar Publishing House
2. Negi, L.S. and Jangid, R.S., Structural Analysis, Tata McGraw Hill



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3. Reddy, C.S., Basic Structural Analysis, Tata McGraw Hill
4. Structure By Schedok
5. Gere and Timoshenko, Mechanics of Materials, CBS Publishers
6. Hibbler, R.C., Mechanics of Materials, Pearson Education
7. Wang, C.K., Intermediate Structural Analysis, Tata McGraw Hill 50
8. Gere and Wiver

B. Web Materials:

1. <http://www.nptel.iitm.ac.in/courses.php?branch=Civil>
2. <http://www.nptel.iitm.ac.in/video.php?courseId=1053>
3. <http://www.nptel.iitm.ac.in/courses/Webcoursecontents/IITDelhi/Mechanics%20of%20Solids/index.htm>
4. <http://www.nptel.iitm.ac.in/video.php?courseId=1069>