

Gopal Krishna College of Engineering and Technology

Lesson Plan (2025–2026)

Name of the Subject: Structural Analysis

Subject Code: CIPC2004

Branch: Civil Engineering

Semester: 4th Semester

No. of Weeks: 12 Weeks

Name of the Faculty: Pabani Patra

Module 1 (Week 1–3)

WEEK	Class Day	Theory / Practical
1st	1st	Introduction to structural analysis
	2nd	Determinate and indeterminate structures
	3rd	Degree of static and kinematic indeterminacy
2nd	1st	Equilibrium equations and compatibility requirements
	2nd	Introduction to force and displacement methods
	3rd	Analysis of propped cantilever by consistent deformation method
3rd	1st	Moment-Area method
	2nd	Conjugate beam method
	3rd	Theorem of three moments and numerical problems

Module 2 (Week 4–6)

WEEK	Class Day	Theory / Practical
4th	1st	Energy theorems and applications
	2nd	Strain energy method
	3rd	Virtual work and unit load method
5th	1st	Betti's law and Maxwell's law
	2nd	Castigliano's theorem
	3rd	Concept of minimum potential energy
6th	1st	Theories of failure
	2nd	Maximum stress and strain theories
	3rd	Distortion energy and octahedral shear stress theories

Module 3 (Week 7–9)

WEEK	Class Day	Theory / Practical
7th	1st	Analysis of redundant plane trusses
	2nd	Deflection of pin jointed plane trusses
	3rd	Strain energy and unit load methods for trusses
8th	1st	Williot-Mohr diagram
	2nd	Introduction to space truss
	3rd	Introduction and classification of arches
9th	1st	Bending moment, shear force and normal thrust in three hinged arches
	2nd	Suspension cables and stiffening girders
	3rd	Numerical problems and revision

Module 4 (Week 10–12)

WEEK	Class Day	Theory / Practical
10th	1st	Rolling loads and influence lines
	2nd	Influence line diagrams for determinate structures
	3rd	ILD for reactions, shear force and bending moment
11th	1st	ILD for wheel loads and point loads
	2nd	ILD for uniformly distributed loads
	3rd	Maximum bending moment envelope
12th	1st	ILD for arches
	2nd	Numerical problems and tutorial
	3rd	Revision

Text Books & Reference Books

1. R. C. Hibbeler, *Structural Analysis*, Pearson Prentice Hall.
2. K. Leet, C. M. Uang & A. M. Gilbert, *Fundamentals of Structural Analysis*, McGraw-Hill Higher Education.
3. Louis F. Geschwindner & Harry H. West, *Fundamentals of Structural Analysis*, Wiley Publication.
4. L. S. Negi, *Theory and Problems in Structural Analysis*, Tata McGraw Hill.
5. C. S. Reddy, *Basic Structural Analysis*, McGraw Hill Education.
6. S. S. Bhavikatti, *Structural Analysis*, Vikas Publishing House.