

SHIV NADAR UNIVERSITY
U.G. / P.G. COURSE DESCRIPTION

- I. **Course Title:** Structural Analysis - I
- II. **Course Code:** CED204
- III. **Course Credits (L:T:P):** (3:0:0)
- IV. **Course Type:** Major
- V. **Prerequisite/s (If Any):** CED201, MED203
- VI. **Course Coordinators/Instructor(s):** Dr. Ghanshyam Pal
- VII. **School:** School of Engineering
- VIII. **Department:** Civil Engineering
- IX. **Objective:** CED204 is the first course of a two-course series intended to teach the techniques of determining the response of a structure to the external stimuli. CED204 begins with introducing students to the basic ingredients of a structures e.g, loadings, boundary conditions, etc. to the students and determinacy / indeterminacy in a structure. The primary objective of this course is to teach the students the methods of analyzing the determinate structures. By the end of this course, the students learn to calculate the influence lines, reactions, internal forces / stresses and deflections in determinate structures.
- X. **Learning Outcomes:** Upon successful completion of the course, students are able to:
- Understand the different types of structure, loadings and boundary conditions; Basic flow of structural analysis.
 - Understand and differentiate between statically determinate and indeterminate structures.
 - Understand the role and influence of internal forces in different structural systems e.g. frames, trusses and beams.
 - Perform deflection calculations for statically determinate systems using different methods.
 - Introductory understanding of analysis to statically indeterminate structures.
- XI. **Course Content:**
- Module 1: Introduction**
Introduction to structural analysis; Definition of Structure; Types of loading, boundary conditions, and response.
- Module 2: Statically Determinate Structures**
Support reactions; Internal forces in beams, Axial forces in trusses; Axial forces in cables and three hinge arches; Internal forces in frames,

Module 3: Influence lines

Drawing the influence lines using direct equilibrium and principle of virtual displacements; Influence lines for beams, girders and trusses.

Module 4: Displacement response in statically determinate structures

Deflection in beams using conventional methods; principle of virtual forces; Basic energy methods.

Module 5: Introduction to analysis of statically indeterminate structures

Propped cantilever; Pinned and continuous beams; Trusses and plane frames; Theorem of least work; Introduction to displacement methods.

XII. Recommended Books:

- [1] R. Hibbeler, Structural Analysis.
- [2] Jack C McComac, Structural Analysis.
- [3] Devdas Menon, Structural Analysis.
- [4] Reddy, C.S., Basic Structural Analysis

XIII. Assessment Scheme #, *, **:

- [1] Assignment: 15 %
- [2] Quiz: 15 %
- [3] Mid Semester Exam: 20 %
- [4] Class Participation: 10%
- [5] Final Exam: 40 %
- # The above marking scheme is based on an absolute scale.
- * Minimum marks required to pass the course (on absolute scale): 50%
- ** Final grades will be assessed based on the relative (percentile) basis.