

## **Course Name:**

Nonlinear Structural Analysis

Course Number: 20-118	Credit: 3
Program: Graduate	Course Type: Technical Selective
Prerequisite: -	Corequisite: -

## **Course Description (Objectives):**

The objective of this course is to introduce students to the nonlinear behavior of structures in terms of large deformations and material nonlinearity. Students will become familiar with the fundamentals of nonlinear analysis and its impact on structural response under various loading conditions.

## **Course Content (outline):**

- Chapter 1: Stress–Strain Relationships
- Chapter 2: Moment–Curvature Relationships for Beams and Columns
- Chapter 3: Moment–Rotation Relationships for Beams and Columns
- Chapter 4: Plastic Analysis of Beams and Frames
- Chapter 5: Inelastic Beam–Column Element
- Chapter 6: Inelastic Frame Analysis
- Chapter 7: Numerical Models for Nonlinear Analysis

## **References:**

- Horne, M.R., and Morris, L.J., "Plastic Design of Low-Rise Frames", Collins, London, 1981.
- Chen, W.F., and Lui, E.M., "Stability Design of Steel Frames", CRC Press, London, 1991.
- Jirasek, M., and Bazant, Z.P., "Inelastic Analysis of Structures", J. Wiley, London, 2002.
- De Borst, René, et al. Nonlinear finite element analysis of solids and structures. John Wiley & Sons, 2012.