CE-874 Non-linear Structural Analysis

Code	Credit Hours	Category
CE-874	3 Credit Hours	Elective

Course Description:

This course explores the principles and applications of non-linear structural analysis, focusing on advanced techniques to assess the behavior of structures under non-linear conditions. Topics include material non-linearity, geometric non-linearity, and computational methods. The basic objective of this course is to equip the students with very different non-linear analysis of solids and structures, study its mechanics, consistent linearization, incremental iterative solution approaches, computational plasticity and software implementation.

Text Book:

- K. J. Bathe (1995), "Finite Element Procedures," Prentice-Hall.

Reference Books:

- J. T. Oden (1980), "Finite Elements of Nonlinear Continua," McGraw-Hill.
  T. Belytschko, W. K. Liu, and B. Moran (2000), "Nonlinear Finite Elements for Continua and Structures," Wiley.
- Matrix Structural Analysis, by McGuire and Gallagher
- An Introduction to Linear and Nonlinear Finite Element Analysis, by Kythe and Wei

Prerequisites:

BE (Civil, Architecture, Construction Engineering & Management).

Assessment System

Component	Weightage
Quizzes	10-15%
Assignments	10-20%
Mid Terms	30-35%
ESE	40-50%
Project (optional)	10-15%

Teaching Plan:

Week No	Topic
1	Introduction to Non-linear Analysis
2-4	Material Non-linearity
5-6	Geometric Non-linearity
7-8	Non-linear Finite Element Analysis
9	**Mid Term Exam/ OHT, (As per NUST Exam Policy)**
10-13	Computational Methods for Non-linear Analysis
14-17	Case Studies and Applications
18	**ESE**