

CE-805 Advance Concrete Design

Code	Credit Hours	Category
CE-805	3	Core

Course Description:

This course aims to provide students with advanced knowledge and tools for the analysis and design of concrete structures. Students will explore topics such as the estimation of stability coefficients, analysis and design of long columns, and the behavior and design of one-way and two-way slabs. The course also covers methods for deflection evaluation, cracking behavior and crack control, design of shear reinforcement in two-way slabs, and seismic design of concrete structures. This comprehensive approach equips students with the necessary skills for advanced concrete design and analysis challenges in their professional careers.

Text Book:

- James K. Wight (2015): Reinforced Concrete-Mechanics and Design, 7th Edition, Prentice-Hall International, Inc.

Reference Books:

- Edward G. Nawy (2000): Reinforced Concrete A Fundamental approach, 4th Edition, Prentice-Hall International, Inc.
- Arthur H. Nilson, David Darwin and Charles W. Dolan (2005): Design of Concrete Structures, 13th Edition, McGraw-Hill.
- ACI Committee 318 (2002): Building Code Requirements for Structural Concrete (ACI 318-02) and Commentary (ACI 318R-02).
- American Concrete Institute (2005): ACI Manual of Concrete Practice 2005.

Prerequisites:

BE (Civil, Architecture, Construction Engineering & Management)

Assessment System

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

Teaching Plan:

Week No	Topic	Learning Outcomes
1	Estimate of stability coefficient	Understand the methods to estimate stability coefficients.
2	Analysis and design of long columns (sway and non-sway)	Analyze and design long columns for sway and non-sway conditions.
3	Behavior and design of one way slabs	Evaluate the behavior and design principles of one-way slabs.
4	Behavior and design of two way slabs	Understand the behavior and design methods for two-way slabs.
5	Direct design method	Apply the direct design method for two-way slabs.
6	Equivalent frame method	Use the equivalent frame method for designing two-way slabs.
7	Direct method of deflection evaluation	Evaluate deflection using the direct method.
8	Cracking behavior and crack control	Analyze cracking behavior and methods for crack control.
9	Mid Term Exam/ OHT, (As per NUST Exam Policy)	
10	Design of shear reinforcement in two way slabs	Design shear reinforcement for two-way slabs.
11	Seismic design of concrete structures	Understand the principles of seismic design for concrete structures.
12-13	Review of all topics	Review all topics covered in the course.

14-15	Case Studies and Practical Applications	Analyze case studies and practical applications in advanced concrete design.
16-17	Advanced Topics in Concrete Design	Explore advanced topics in concrete design.
16	ESE	