Department of Civil Engineering

Course Name:

Advanced Concrete Design

Course Number: 20-236	**Credit:** 3
Program: Graduate	**Course Type:** Technical Selective
Prerequisite: -	**Corequisite:** -

Course Description (Objectives):

This course focuses on the strength and performance of concrete structures. The behavior of the structure at the material, member, and structural levels will be examined, with ductility being considered as the most important parameter.

Course Content (outline):

- Chapter 1: Behavior of concrete under multiaxial stresses
- Chapter 2: Calculation of theoretical weight coefficient
- Chapter 3: Ductility of concrete structures
- Chapter 4: Final deformations and softness of structures at the element level
- Chapter 5: Final deformations and softness of flexural members
- Chapter 6: Final deformations and softness of compressive members and calculation
- Chapter 7: Calculation of P for members under bending and compression
- Chapter 8: Strength and softness of frames
- Chapter 9: Seismic design based on softness and strength
- Chapter 10: ACI recommendations for designing soft frames in seismic zones
- Chapter 11: Redistribution of moments
- Chapter 12: Plastic design
- Chapter 13: Analysis and design of shear walls in high-rise structures
- Chapter 14: Short and tall walls
- Chapter 15: Design of shear walls based on ACI
- Chapter 16: Analysis of concrete slabs using limit-state theory
- Chapter 17: Load testing and ACI regulations for evaluating the strength of existing structures
- Chapter 18: Calculation of column capacity under biaxial bending

- Chapter 19: Methods of strengthening concrete structures in seismic zones

References:

- Park_Paulay (Reinforced concrete structures)