Department of Civil Engineering

Course Name:

Seismic Design Principles

Course Number: 20-003	**Credit:** 3
Program: Graduate	**Course Type:** Technical Required
Prerequisite: -	**Corequisite:** -

Course Description (Objectives):

The objective of this course is to familiarize students with the design of earthquake-resistant structural components using the load and resistance factor method. Students will learn the principles and criteria for designing structures to withstand earthquake forces and evaluating their performance under such conditions.

Course Content (outline):

- Chapter 1: Effects of earthquakes on structures and seismic damage in past earthquakes
- Chapter 2: General considerations and regulations in seismic design, the impact of factors such as irregularities and architecture on structural performance
- Chapter 3: General philosophy of seismic design, ductility, energy dissipation, mechanisms, design concepts based on capacity and performance
- Chapter 4: Types of earthquake-resistant systems
- Chapter 5: Seismic design of steel frames with a review of code provisions
- Chapter 6: Seismic design of reinforced concrete frames with a review of code provisions
- Chapter 7: Seismic design of concentrically braced steel frames
- Chapter 8: Seismic design of eccentrically braced frames
- Chapter 9: Seismic design of concrete shear walls
- Chapter 10: Seismic design of steel shear walls
- Chapter 11: Seismic design of masonry buildings
- Chapter 12: Special considerations for the design and control of non-structural systems and components
- Chapter 13: Review of national and international code provisions

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References:

- Seismic Provisions for Structural Steel Buildings, ANSI/AISC 341-22.
- Specification for Structural Steel Buildings, ANSI/AISC 360-22.
- Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications, ANSI/AISC 358-22.
- Minimum Design Loads and Associated Criteria for Buildings and Other Structures, ASCE/SEI 7- 22.
- Building Code Requirements for Structural Concrete (ACI 318-19).
- AISC Seismic Design Manual, 2018, 3rd edition.