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Course Name

Seismic Design and Retrofitting of Structures

Sector Name

Civil Engineering

Document Type

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Seismic Design and Retrofitting of Structures

Course Introduction

The essence of successful seismic design lies in three critical elements:

adopting a multi-hazard approach that addresses seismic forces alongside other hazards, adhering to performance-based requirements exceeding minimum code standards, and fostering a unified understanding among design team members. Seismic design involves ensuring that buildings resist earthquakes and other hazards such as blast impacts and high winds with minimal damage.

This course provides a comprehensive understanding of seismic and wind design principles and detailing for reinforced concrete and steel structures. Participants will learn advanced techniques in accordance with global standards (e.g., ADIBC/ACI/ASCE), enabling efficient and robust structural design.

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Seismic Design and Retrofitting of Structures

Target Audience

✓ civil engineers.
✓ Experienced Civil Engineers Seeking Professional Development
✓ Architects and Urban Planners
✓ Entrepreneurs in the Construction Industry
✓ Project Managers in the Construction Industry

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Learning Objectives

- ✓ Gain comprehensive knowledge of designing and detailing earthquake-resistant steel and reinforced concrete structures.
- ✓ Estimate the probability and intensity of ground motions and their implications on structural design.
- ✓ Perform seismic analysis using manual methods and advanced computer tools.
- ✓ Understand capacity design concepts and structural ductility.
- ✓ Apply seismic and wind design provisions from ADIBC/ACI/ASCE standards.
- ✓ Evaluate wind design pressures and understand the impact of various windstorm types.
- ✓ Accurately calculate design pressures for structural components and cladding.
- ✓ Develop performance-based designs for seismic and wind hazards.

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Seismic Design and Retrofitting of Structures

Course Outline

✓ DAY 1

Seismic Analysis and Code Provisions

- ✓ Multi-Degrees of Freedom (MDOF) Systems:
- ✓ Dynamic analysis using modal and time history procedures
- ✓ Linear seismic analysis approaches

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Course Outline

✓ Day 02

Code Provisions for Earthquake-Resistant Design:

- ✓ Seismic provisions from ADIBC/ACI/ASCE
- ✓ Inelastic behavior, ductility, and capacity design concepts
- ✓ Code-based dynamic analysis requirements

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Seismic Design and Retrofitting of Structures

Course Outline

✓ Day 03

Seismic Design of Steel and Concrete Structures

- ✓ Seismic Design of Steel Buildings:
- ✓ Ductile moment-resisting frames
- ✓ Ductile steel braced frames
- ✓ **Solved example:** Steel building seismic design

Seismic Design of Reinforced Concrete Structures:

- ✓ Ductile moment-resisting concrete frames
- ✓ Reinforced concrete shear walls
- ✓ **Solved example:** Concrete building seismic design

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Course Outline

✓ Day 04

Wind Design Essentials

- ✓ Introduction to Wind Engineering:
- ✓ Climatology of windstorms and hazard maps
- ✓ Determining site-specific wind speeds
- ✓ Basics of wind engineering and ASCE 7 wind design provisions

Wind Hazard Analysis:

- ✓ Performance-based wind design concepts
- ✓ Practical exercises in calculating wind pressures for frames and cladding

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Course Outline

✓ Day 05

Advanced Wind Design and Performance-Based Approaches

- ✓ Advanced Wind Design Techniques:
- ✓ Wind tunnel testing methodologies
- ✓ Using multi-source data for wind design solutions
- ✓ Tornado-specific design considerations using ASCE 7

Integrated Seismic and Wind Design Review:

- ✓ Performance-based approaches for multi-hazard resilience
- ✓ Case studies and course review
- ✓ Final discussion and participant feedback

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
May 24, 2027	May 28, 2027	5 days	5950.00 $	USA , Texas
Sept. 21, 2026	Sept. 25, 2026	5 days	4250.00 $	UAE , Dubai
Dec. 14, 2026	Dec. 18, 2026	5 days	4250.00 $	UAE , Abu Dhabi
Jan. 10, 2027	Jan. 14, 2027	5 days	4250.00 $	KSA , Riyadh

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