

Course Name:

Introduction to Earthquake Engineering

Course Number:

20164

Credit:

3

Prerequisite:

Loading

Course Description (Objectives):

The primary objective of this course is to learn why earthquakes happen and how they affect the structures. The emphasis will be on developing an understanding for factors, which influence the dynamic response of structures during seismic excitation. Students completing this course will be able to understand the vast and growing body of the literature on engineering seismology, structural dynamics, and earthquake engineering. They will also be able to evaluate the effect of earthquakes on structures, perform dynamic analysis to determine internal forces and deformations in structures, and understand the theory behind seismic design procedures in building codes.

Course Content (outline):

- Introduction to Earthquake Engineering
 - Ground Failure
 - Ground Shaking
 - Engineering Seismology
 - Strong Ground Motions
- Dynamics of Structures
 - Dynamic Response of Single-degree-of-freedom (SDOF) Systems
 - Equations of Motion
 - Free Vibration
 - Response to Harmonic Excitation
 - Response to Impulse and Arbitrary Excitation
 - Earthquake Response of Linear Systems
 - Earthquake Response of Inelastic Systems
 - Dynamic Response of Multi-degree-of-freedom (MDOF) Systems
 - Equations of Motion
 - Free Vibration
 - Damping in Structures
 - Dynamic Response of Linear Systems
- Seismic Code
 - Equivalent Static Analysis
 - Analogy of the Iranian Standard 2800 with the National Building Code of Canada (NBCC)
 - Dynamic Analysis

- Irregularities

References:

- Geotechnical Earthquake Engineering, Kramer, Prentice Hall, 1996.
- Dynamics of Structures: Theory and Applications to Earthquake Engineering, Chopra, “ 4th Edition, Prentice Hall, 2013
- Building and Housing Research Center, “Iranian Code of Practice for Seismic Resistant Design of Buildings”, 4th Edition, Standard 2800, 2015.