



Jordan University of Science and Technology
Faculty of Engineering
Civil Engineering Department

CE918 Seismic Resistant Design - JNQF Level: 10

First Semester 2024-2025

Course Catalog

3 Credit Hours. The CE 918 course provides graduate civil engineering students with the fundamentals of earthquake engineering and seismic analysis including the different aspects of earthquake input motion and structural response evaluation. This advanced course provides a thorough review of the seismic provisions of the 4. ASCE/SEI 7-22 and covers the seismic design and detailing requirements for reinforced concrete buildings according to the ACI 318M-19 code.

Teaching Method: On Campus

Text Book

Title	Fundamentals of Earthquake Engineering
Author(s)	Amr S. Elnashai and Luigi Di Sarno
Edition	2nd Edition
Short Name	Ref # 1
Other Information	John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, United Kingdom, 2015, 2nd edition, ISBN 978-1-118-67892-3.

Course References

Short name	Book name	Author(s)	Edition	Other Information
Ref # 2	NEHRP Recommended Seismic Provisions for New Buildings and Other Structures, Volume I: Part 1 Provisions, Part 2 Commentary.	Federal Emergency Management Agency (FEMA)	1st Edition	FEMA P-2082-1/ September 2020.
Ref # 3	NEHRP Recommended Seismic Provisions for New Buildings and Other Structures, Volume II: Part 3 Resource Papers.	Federal Emergency Management Agency (FEMA)	1st Edition	FEMA P-2082-2/ September 2020.

Ref # 4	ASCE/SEI7-22 Minimum Design Loads and Associated Criteria for Buildings and Other Structures, 2022.	American Society of Civil Engineers, ASCE	1st Edition	American Society of Civil Engineers, ASCE 1801 Alexander Bell Drive Reston, Virginia. ISBN 978-0-7844-8349-7 (PDF).
Ref # 5	Earthquake-Resistant Design Concepts, An Introduction to Seismic Provisions for New Buildings, Second Edition, FEMA P-749 / September 2022.	Federal Emergency Management Agency (FEMA)	2nd Edition	Second Edition, FEMA P-749 / September 2022.
Ref # 6	Building Code Requirements for Structural Concrete, ACI 318M-19	American Concrete Institute (ACI)	1st Edition	American Concrete Institute, Farmington Hills 2019.
Ref # 7	Dynamics of Structures	Ray W. Clough and Joseph Penzien	3rd Edition	Third edition, 2003. Computers & Structures, Inc., 1995 University Ave., Berkeley, CA 94704 USA.
Ref # 8	Geotechnical Earthquake Engineering	Steven L. Kramer	1st Edition	Prentice Hall, Upper Saddle River, New Jersey 07458, 1996, ISBN: 0-13-374943-6.
Ref # 9	2021 International Building Code	International Code Council, Inc. Publications	1st Edition	International Code Council, Inc. Publications, 4051 West Flossmoor Road, Country Club Hills, IL 60478-5795.

Instructor	
Name	Prof. Hanan Al-Nimry
Office Location	C2 L-1 No. 35
Office Hours	Mon : 11:30 - 13:00 Tue : 10:30 - 12:00 Wed : 11:30 - 13:00 Thu : 11:00 - 12:30
Email	hsnimry@just.edu.jo

Class Schedule & Room
Section 1: Lecture Time: Mon, Wed : 13:00 - 14:30 Room: C3018

Tentative List of Topics Covered		
Weeks	Topic	References
	Structural response characteristics: stiffness, strength, ductility, overstrength, damping, force reduction factor.	
	Earthquake input motion, earthquake spectra and design spectra.	

	Response Evaluation: ground motion and load modelling, seismic load combinations, structural modelling, methods of analysis, performance levels and objectives, response indicators.	
	General design concepts, structural configurations and systems for effective earthquake resistance.	
	Structural design and detailing requirements in international codes.	From Ref # 2 , From Ref # 3 , From Ref # 6

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
To understand the effects of earthquakes on buildings, lifelines and on the ground. [1L10S2]	10%	
Assess the structural response characteristics (stiffness, strength, ductility, overstrength, damping, force reduction factor) [1L10S2]	25%	
To understand and evaluate seismic response (ground motion and load modelling, seismic load combinations, structural modelling, methods of analysis, performance levels and objectives, response indicators) [1L10S3]	30%	
To understand and implement conceptual design (efficient structural configurations and systems) [1L10S2]	10%	
To understand and apply the design and detailing requirements of international seismic codes [1L10C4]	25%	

Relationship to Program Student Outcomes (Out of 100%)											
PI-1a	PI-2a	PI-2b	PI-2c	PI-2d	PI-3a	PI-4a	PI-4b	PI-5a	PI-6a	PI-6b	PI-7a

Relationship to NQF Outcomes (Out of 100%)		
L10S2	L10S3	L10C4
45	30	25

Policy	
Deadlines	A strict deadline for submission will be observed and no credit will be given to late assignments.
Exam Dates	Exam dates will be assigned during the semester.
Course Outline	This course outline represents a plan for the course. The instructor reserves the right to adjust the content and marking scheme to better satisfy the needs and abilities of the class and to introduce new materials and topics.

Date Printed: 2024-10-27