Course Syllabus

According to JORDAN National Qualification Framework (JNQF)

Course Name: Structural Design of Structuters

Course Number: 04037240

General Course Information:

Course title	Seismic Design of Structures
Course number	04037240
Credit hours	Three hours' theory
Education type	[Face-to-Face]
Prerequisites/corequisites	Bachelor's degree in Structural Engineering.
Academic Program	MSc in Structural Engineering
Program code	040
Faculty	Engineering
Department	Civil Engineering
Level of course	Master
Academic year /semester	2021-2022/Second
Awarded qualification	Structural Engineer
Other department(s) involved in teaching the course	Non
Language of instruction	English
Date of production/revision	March 2021

Course Coordinator:

Coordinator's name	Dr. Mohammed Al-lami
Office No	4251
Office Phone extension number	2454
Office Hours	Sun. Tu.&Th.: 10-1 Mon. &Wen.: 11-12:30
Email	mohammed.allamy@iu.edu.jo

Other Instructors:

Instructor name	NON
Office No	
Office Phone extension number	
Office Hours	
Email	

Course Description *(English/Arabic)*:

English	Evaluation, design, and construction of structures in seismic regions, Factors influencing earthquake ground motions, Measurements of Earthquakes, Factors influencing earthquake ground motions, Analysis and design of structures using static and dynamic procedures, Design spectra, design of linear and nonlinear single-and multiple-degree-of-freedom-system structures.
Arabic	تقييم وتصميم وبناء الهياكل في المناطق الزلزالية ، والعوامل التي تؤثر على الحركات الأرضية للزلازل ، وقياسات الزلازل ، والعوامل التي تؤثر على الحركات الأرضية للزلازل ، وتحليل وتصميم الهياكل باستخدام الطرق الإستاتيكية والديناميكية ، وأطياف التصميم ، والتصميم الخطي وغير الخطي لهياكل احادية ومتعددة درجات حرية الحركة للهياكل.

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Ref: Deans Council (05) Decision No. (06) Date: 18/10/2021.
Ref: Quality Assurance Council Session (03) Decision No. (03) Date:05/10/2021.

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Textbook: *Author(s), Title, Publisher, Edition, Year, Book website.*

Shashikant K. Duggal, Earthquake-Resistant Design of Structures, © Oxford University Press, Second Edition, 2013 ISBN: 978-0-19-808352-8

References: *Author(s), Title, Publisher, Edition, Year, Book website.*

M. Nadim Hassoun, Akthem Al-Manaseer, Structural Concrete Theory and Design, JOHN WILEY & SONS, INC., Fifth Edition, 2012, ISBN 978-1-118-13134-3 (hardback).
JAMES K. WIGHT, JAMES G. MACGREGOR, REINFORCED CONCRETE Mechanics and Design, PEARSON, SIXTH EDITION, 2012, ISBN-13: 978-0-13-217652-ISBN-10: 0-13-217652-1

Course Educational Objectives (CEOs):

1.	Understand the fundamentals of structural dynamics.
2.	Perform seismic analysis of buildings manually and using computer modeling.
3.	Apply the seismic provisions of the building codes.
4.	Understand the concept of capacity design.
5.	Design seismic-resistant reinforced concrete and steel buildings

Intended Learning Outcomes (ILO's):

	Subject Intended learning outcomes (ILOs) describe what students are expected to know and be able to do at the end of the course. These outcomes are related to the knowledge, skill and competence that students acquire:	Relationship to CEOs	Contribution to PLOs	Bloom Taxonomy Levels*	Descriptors**
A	**Knowledge and Understanding:**				
A1	**Identify the seismicity of a given geographical location and select a set of appropriate ground motions that can match the seismicity of the location**	**1&2**	**1&2**	3	K,C
A2	**Identify the static and dynamic degrees of freedom of a given structure, compute the mass and stiffness of the different elements in the structure.**	**2&3**	**2&7**	3	K,C
A3	**Develop a simplified mathematical model of a single degree of freedom system and simple frame structures.**	**3&4**	**2&7**	4	K,C
A4	**Identify the different lateral load resisting systems accepted by building authorities and the respective building codes that can be used to design and detail these structural systems.**	**3&4**	**2&7**	5	K,C
A5	**Perform an equivalent lateral load analysis of the building structure based on the provisions in ASCE 7.**	**3,4&5**	**2&7**	5	K,C

A6	**Design the different elements and connections in structural systems.**	5	2&7	3	K,C
B	**Intellectual skills:**				
B1					
B2					
B3					
C	**Subject specific skills:**				
C1					
C2					
C3					
D	**Transferable skills:**				
D1					
D2					
D3					

*Bloom Taxonomy Levels

Level #	1	2	3	4	5	6
Level Name	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Evaluation**	**Synthesis**

** Descriptor (National Qualification Framework Descriptors): K : Knowledge, S: Skill, C: Competency.

Program Learning Outcome (PLOs):

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the (_____) program will demonstrate:	Descriptors**		
	K	S	C

			K		C
1.	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics		K		C
2.	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors				
3.	An ability to communicate effectively with a range of audiences				
4.	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts				
5.	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives				
6.	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions				
7.	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies		K		C

** Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)

Weekly Schedule *(please choose the type of teaching)*

☐ **Face to Face**

Week	First Lecture (12:30-2:00)	Ach. ILOs	Ach. PLOs	Descriptors**
1	Evaluation, design, and construction of structures in seismic regions.	1	1,7	K
2	Factors influencing earthquake ground motions.	1	1,7	K,C
3	Design spectra, design of linear and nonlinear single- and multiple-degree-of-freedom-system structures	1	1,7	K,C
4	Force-based and displacement-based design methods	1	1,7	K,C
5	Capacity design	2	1,7	K,C
6	Detailing and construction of steel and reinforced concrete structures	2	1,7	K,C
7	Introduction to performance-based design, seismic isolation, and energy dissipation.	3	1,7	K,C

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Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:
- **Interactive videos**
- **Discussion Forums**
- **Quizzes**
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Course Policies:

A- Attendance policies:

    The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

    Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

    Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

D- Honesty policy regarding cheating, plagiarism, and misbehaviour:

    Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Practice labs, Discussion Forums, Quizzes) **20%**
- Midterm **30%**
- Final Exam **50%**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

Required equipment:

- **PC / Laptop with webcam and mic**
- **Internet Connection**
- **Access to the IU E-Learning Platform at: https://elearn.iu.edu.jo/**
- **E-learning plan**
- Satisfaction questionnaires for online and face-to-face learning
- Software for e-learning
- Training

Assessment Tools implemented in the course:

- Final Exam
- Midterm Exam
- Quizzes
- Homework
- Discussion Forums
- Periodic reports for learning assessment
- face-to-face teaching

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Responsible Persons and their Signatures:

Course Coordinator	Dr. Mohammed Al-lami	Completed Date	/ /
		Signature	

Received by (Department Head)	Dr. Ibrahim Varouqa	Received Date	/ /
		Signature	