SHAMOON COLLEGE OF ENGINEERING

COURSE SYLLABUS

Intro to Earthquakes

1000031

COURSE DETAILS

Campus:	Beer Sheva	**Academic year:**	2023
Department:	Civil Engineering	Type of Course:	Required
Discipline:	Structural Engineering	Level of Course:	Undergraduate
Year of Study:	Third	Semester:	B
Prerequisites:		Credit:	2
Co-Requisites:		ECTS Credit Points:	3
Language of Instruction:	Hebrew	Mode of delivery:	Face to Face, Project oriented.
Work Placement(s):			
Lecturer(s):	Michael Frid *michafr@ac.sce.ac.il*	Teaching Assistant(s):	

AIM

Knowing the fundamental principles of earthquakes, the differences between different intensity scales, terms related to seismic wave propagation in the underground, and the phenomena associated with earthquakes (rock and soil slides, liquefaction, and tsunami, for example) that must be addressed in the design of buildings for earthquake resistance, analysis of survey findings of site response and soil liquefaction, and knowledge of standard principles 431.

LEARNING OUTCOMES

On successful completion of the course, the students will be able to:

1. Define fundamental concepts in the field of earthquakes, including their causes and consequences.
2. To describe the phenomenon of earthquakes in Israel and the current risk areas.
3. Analyze and apply the findings of the site response survey to resolve basic issues related to the topic.
4. Identifying various types of earthquake scales and defining the seismic risk that must be assessed through appropriate construction.
5. Learn the principles of 431 design codes and define the risk assessment methods outlined in the construction standards.
6. Specify the methods for assessing the damage caused by earthquakes.
7. To be able to select a related academic topic and create an interactive project in collaboration with others.

COURSE CONTENTS

Week	Subject	Relevant Reading
1	Lecture (6.3): Outlining the course structure and requirements, an introduction to earthquakes in Israel and around the world, and the significance of the subject for civil engineers.	[1],[2]
2	Lecture (13.3): Fundamental earthquake concepts.	[2],[3]
3	Lecture (20.3): A brief introductory exam on basic concepts, measurement scales, Gutenberg-law, Richter's and inclinations.	[3],[4]
4	Lecture (27.3): Seismicity , Site response, Landslides and soil liquefaction and standard 431 design code.	[1],[5],[6],[7],[8]
5	Lecture (3.4): Tsunami and earthquake prediction. Presentation of a list of research project topics, guidelines, minimum requirements, scoring method and grouping are carried out.	[1],[5],[6]
6	Reception hours (17.4): Based on pre-registration, assisting hours for creating a presentation program for the research project in class and presenting the research project in the Hackathon.	
7	Reception hours (24.4): Based on pre-registration, assisting hours for creating a presentation program for the research project in class and presenting the research project in the Hackathon.	
8	Reception hours (1.5): Based on pre-registration, assisting hours for creating a presentation program for the research project in class and presenting the research project in the Hackathon.	
9	Lecture (8.5): In accordance with the registration order, each team presents its research topic in class.	
10	Lecture (15.5): In accordance with the registration order, each team presents its research topic in class.	
11	Lecture (22.5): In accordance with the registration order, each team presents its research topic in class.	
12	Examiner (29.5): In accordance with the registration order, each team presents its research topic in class.	

13	Examiner (5.6): American examiner summary (digital in the Model). Admission hours (12.6): Admission hours by prior arrangement and independent work on research projects. The hackathon (20/21.6) - the deadline for submitting the research project report and presenting the products at the college.

RECOMMENDED OR REQUIRED READING

Text book:

1. Bolt, B.A. et al. Geological Hazards: Earthquakes-Tsunamis-Volcanoes-Avalanches-Landslides-Floods. Springer Science & Business Media, 2013

Other readings:

2. Bozorgnia, Y, Bertero, V.V. Earthquake Engineering: From Engineering Seismology to Performance-Based Engineering. CRC Press, 2004
3. Sucuoglu, H., Akkar, S. (2014).
3. Sucuoglu, H., Akkar, S. (2014). Basic Earthquake Engineering. From Seismology to Analysis .and Design. New York City
4. Grunthal, G. European Macroseismic Scale 1998. European Seismological Commission (ESC), 1998
5. Bommer, J. J., Boore, D. M. "Engineering Geology Seismology." (2005): 499-515
6. Kramer, S.L., Geotechnical Earthquake Engineering, Pearson New International Edition, 2014
7. . ת"י 413 , "המדא תודיערב סינבמ תודימע קבת", וכמ ,ילארשיה סינקתה ,199
8. Lee, W.H.K. et al., Eds. International Handbook of Earthquake & Engineering Seismology. Academic Press, 2002

PLANNED LEARNING ACTIVITIES AND TEACHING METHODS

Lecture hours: 2. Number of face-to-face sessions: 8-10.

Lecture hours per week: 2. The number of face-to-face sessions is 8-10, with a total of 6 hours of frontal lectures. The course is delivered using a task-based learning method as part of the project-oriented course. Students must independently research a topic from a list of topics relevant to the course, explain it to the other students in the course, and produce a research paper and a product that illustrates the topic for the benefit of an educational exhibition summarizing the course.

ASSESSMENT METHODS AND CRITERIA

Criterion	Percentage	Comments
Quizzes:	25%	5% An American exam on basic concepts in earthquakes at the beginning of the course. 20% An American exam about all course topics (digitally in the Model).
Presentation:	15%	Presenting the scientific background to the class.
Hackathon:	40%	Production of a 5-10 minute physical representation to be presented at the concluding event of the course.
Reports:	20%	Research project on the chosen topic - submission of a scientific research report.
Bonus:	10%	For participation, creativity and thinking outside the box a bonus of up to 10% will be given.