COURSE SYLLABUS AND COURSE REQUIREMENTS
ACADEMIC YEAR 2022/2023 SEMESTER 2

Course title	*SEISMIC DESIGN*
Course Code	MSM414ANEP
Hours/Week: le/pr/lab	2 / 0 / 0
Credits	3
Degree Programme	Structural Engineering MSc
Study Mode	*full time*
Requirements	*semester grade with signature*
Teaching Period	Spring semester
Prerequisites	MSM412ANEP Structural Dynamics
Department(s)	*Department of Civil Engineering*
Course Director	*Dr. Adél Len assistant professor*
Teaching Staff	*Dr. Ivica Guljas*

COURSE DESCRIPTION

The course provides comprehensive and practical knowledge and skills for all engineers, designers and analysts of earthquake resistant structures. It deals with understanding of how structures respond to ground shaking as well as with improved forms of analysis and assessment (especially according to the Eurocode 8), the retrofit of existing buildings, building contents and seismic isolation.

SYLLABUS

1. GOALS AND OBJECTIVES

The main goal is to deliver a clear and effective introduction to the underlying principles of earthquakes and seismic behaviour, design and analysis. The principles of behaviour are linked to EC8 through worked examples, tutorials and structured discussion. The emphasis is on reinforced concrete building structures although the concepts are widely applicable.

On completion of this course, students will be able to:

- Understand earthquake damages and their causes
- Learn from recent and past earthquakes
- Perform the conceptual design of buildings in earthquake zones
- Carry out linear analysis methods
- Understand the basic settings of the nonlinear analysis
- Understand seismic design of RC and masonry buildings
- Appreciate seismic detailing of RC buildings
- Carry out the preliminary design of earthquake resistant buildings to EC8.

2. COURSE CONTENT

	TOPICS
LECTURE	1. *Ground Motions & Geotechnical Aspects* 2. *E/Q Damages & Causes* 3. *Principles of Conceptual Design of Buildings* 4. *Performance Requirements & Compliance Criteria* 5. *Seismic Analysis* 6. *RC Design & Detail* 7. *Safety Verifications*

DETAILED SYLLABUS AND COURSE SCHEDULE

ACADEMIC HOLIDAYS INCLUDED

LECTURE

week	**Topic**	**Compulsory reading; page number (from … to …)**	**Required tasks (assignments, tests, etc.)**	**Completion date, due date**
3.	Lessons Learnt from Earthquake Damage Seismology (a short overview)	[1] [2]	Assignment	Next week
5.	Constitution of the Earth, Tectonic plates Elastic Seismic Waves	[1] [2]		
8.	Magnitude vs. Intensity Engineering Seismology	[1] [2]		
10.	Seismic Hazard, Risk and Vulnerability Earthquake Effects that Causes Damages	[1] [2]	Assignment	Next week
12.	Natural Vibrations of Buildings Earthquake Resistant Buildings – concepts Damping and Isolation	[1] [2]		
14.	Analysis of Structures using EC8 – Design Analysis of Structures using EC8 – Evaluation	[1] [2]	Assignment	End of semester
15.	Performance Based Seismic Design Tests and Discussions	[1] [2]	Test, Discussions	Same day

3. ASSESSMENT AND EVALUATION

ATTENDANCE

In accordance with the Code of Studies and Examinations of the University of Pécs, Article 45 (2) and Annex 9. (Article 3) a student may be refused a grade or qualification in the given full-time course if the number of class absences exceeds 30% of the contact hours stipulated in the course description.

Method for monitoring attendance *(e.g.: attendance sheet / online test/ register, etc.)*

Attending is required all classes. In case of unexcused absence from more than 30% of the total number of lesson will be grounds for failing the class. To be in class at the beginning time and stay until the scheduled end of the lesson is required, tardiness of more than 20 minutes will be counted as an absence. In the case of an illness or family emergency, the student must present a valid excuse, such as a doctor's note. Attendance is monitored through the attendance sheets.

ASSESSMENT

Course resulting in mid-term grade *(PTE TVSz 40§(3))*

Mid-term assessments, performance evaluation and their ratio in the final grade

Type	Assessment	Ratio in the final grade
Attendance	*max 10 points*	*eg. 10 %*
Project	*max 30 points*	*eg. 30 %*
Presentation (optional)	*max 10 points*	*eg. 10 %*
Final Test	*max 50 points*	*eg. 50 %*

Opportunity and procedure for re-takes (PTE TVSz 47§(4))

The specific regulations for improving grades and resitting tests must be read and applied according to the general Code of Studies and Examinations. E.g.: all tests and assessment tasks can be repeated/improved at least once every semester, and the tests and home assignments can be repeated/improved at least once in the first two weeks of the examination period.

The Final test and Project can be retake once on the first examination week, if they not reach the min 40%.

Grade calculation as a percentage

Course grade	Performance in %
excellent (5)	85 % – 100%
good (4)	70 % – 84%
satisfactory (3)	55 % – 69%
pass (2)	40 % – 54%
fail (1)	0 % – 39%

4. SPECIFIED LITERATURE

In order of relevance. (In Neptun ES: Instruction/Subject/Subject details/Syllabus/Literature)

COMPULSORY READING AND AVAILABILITY

[1.] Andrew Charleson: Seismic Design for Architects, Elsevier, Oxford, 2008

[2.] Victor Gioncu, Federico Mazzolani: Earthquake Engineering for Structural Design, Spon Press, 2011

RECOMMENDED LITERATURE AND AVAILABILITY

[3.] Paulay, T.; Priestley, M.J.N.: Seismic Design of Reinforced Concrete and Masonry Buildings, A Wiley Interscience Publication, New York 1992.

[4.] Chopra, Anil K: Dynamics of Structures: Theory and Applications to Earthquake Engineering, Prentince-Hall, 1995