

## Subject title: Fundamentals of Earthquake Engineering

Course Basic Information			
Academic Unit:	Faculty of Civil Engineering		
Course Name:	Fundamentals of Earthquake Engineering		
Level:	MSc		
Course Status:	Elective		
Year of Study:	2 <sup>nd</sup> year, III- semester		
Number of Hours per Week:	2+2		
ECTS Credits:	6		
Time /Venue:	According to timetable		
Course Teacher:	Prof. asoc.Dr. Misin Misini		
Contact Details:	e-mail: <a href="mailto:misin.misini@uni-pr.edu">misin.misini@uni-pr.edu</a>		
Course Description			
Course Description	Various methodologies for design are covered, from simplified preliminary design methods to more advanced techniques, including special seismic protection systems according to EC8. The current application of Performance Based Earthquake Engineering is also covered.		
Course Objectives:			
Course Objectives:	The module aims to provide an understanding of the earthquake hazard, analysis of structures subject to earthquake-induced loads and evaluation of a range of design techniques and their implementation in practice, including introduction to earthquake design codes.		
Learning Outcomes:			
Learning Outcomes:	On Having successfully completed this module, students will be able to demonstrate knowledge and understanding of: -The earthquake hazard (sources, magnitude, recurrence rates, seismic intensity and site effects) -The concept of ductility and capacity design and its importance in earthquake engineering; -The basis of earthquake design codes and their relationship to theory on earthquake response of structures, -Performance based earthquake engineering, objectives and implementation in practice		
Student Workload (Consistent with the Learning Outcomes)			
Activity	Hours	Day/ Week	Total
Lectures	2	15	30
Theory/ Lab Work	2	15	30
Practical Work			
Contact Hours with Teacher /Consultations during Office Hours			7
Field Work			
Colloquium, Seminars	2	2	4
Homework	4	2	10

Self-study Time (in the Library or at Home)			20
Final Exam Preparation			18
Evaluations (Tests, Quiz, Final exam)			4
Projects, Presentations, etc.	1	3	2
<b>Total</b>			<b>150</b>
<b>Teaching Methodology:</b>			
	<i>Lectures + Exercises</i>		
<b>Evaluation Methods:</b>			
	Attendance 5%; First Evaluation 30%; Second Evaluation 25%; Individual work 10%, Final exam (oral) 30%.		
<b>Basic Literature:</b>			
	<ol style="list-style-type: none"> <li>1. <i>Misin Misini: Bazat e inxhinierisë së tërmeteve, FNA, Prishtinë 2008</i></li> <li>2. <i>N. Pojani: Inxhinieria sizmike, Tiranë 2003</i></li> <li>3. <i>EUROCODE-8 : Design of Structures for earthquake resistance, CEN, Bruxelles, 2004</i></li> </ol>		
<b>Additional Literature:</b>			
	<ol style="list-style-type: none"> <li>1. <i>Chopra, A. K. (2001): Dynamics of Structures: Theory and Applications to Earthquake Engineering, s.e, NJ: Prentice-Hall.</i></li> <li>2. <i>Clough, R. W. and Penzien, J. (1993): Dynamics of Structures, 2nd ed. McGraw-Hill, New York.</i></li> </ol>		

<b>Course Plan:</b>	
<b>Week</b>	<b>Title of the Lecture,</b>
<b>Week 1:</b>	Engineering Seismology, Earthquake Characteristics, Causes of Earthquakes, Estimation of Earthquake parameters,
<b>Week 2:</b>	Structural response characteristics
<b>Week 3:</b>	Performance requirements and compliance criteria
<b>Week 4:</b>	Ground conditions and seismic action, Design spectrum for elastic analysis, Design of buildings, Characteristics of earthquake resistant buildings
<b>Week 5:</b>	Basic principles of conceptual design, Primary and secondary seismic members, Criteria for structural regularity, Combination coefficients for variable actions, Importance classes and importance factors.
<b>Week 6:</b>	Structural analysis, Modelling, Accidental torsional effects, Methods of analysis, Displacement calculation, Non-structural elements.
<b>Week 7:</b>	Determination of the target displacement for nonlinear static (pushover) analysis)
<b>Week 8:</b>	Design and detailing rules for concrete buildings,
<b>Week 9:</b>	Design and detailing rules for steel buildings,
<b>Week 10:</b>	Design and detailing specific rules for composite steel - concrete buildings
<b>Week 11:</b>	Design and detailing rules for timber buildings
<b>Week 12:</b>	Design and detailing rules for masonry buildings
<b>Week 13:</b>	Seismic design with base isolation
<b>Week 14:</b>	Foundations, retaining structures and geotechnical aspects

**Week 15:**

Displacement based Seismic Design of Structures

**Academic Policies and Rules of Civility:**

*Regular attendance of lectures and exercises*

*Mobile phones need to be switched off during class.*

*Attending the class in time.*