AYDIN ADNAN MENDERES UNIVERSITY
COURSE INFORMATION FORM

Course Title	Performance Based Seismic Design								
Course Code	MCE513		Couse Level	Second Cycle (Master's Degree)					
ECTS Credit	8	Workload	198 *(Hours)*	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	The main aim of this course is to introduce the developments in seismic design, differences between traditional and new methods. In mentioned aims, performance-based design of buildings and performance-based design parameter definition, earthquake ground motion, performance objectives and performance levels, identification, seismic hazard concept and the response spectrum concepts are examined. Calculation of seismic behavior of the existing structure, effects cyclical loading to seismic behavior of structures, P-? effects are explained. The methods for performance based analysis are studied.In analysis of methods, the concept of adaptive pushover analysis, the incremental dynamic analysis and nonlinear static methods will be introduced to students.								
Course Content	Understanding the basics of the concept of performance-based analysis. Introduce the concept of advanced static and dynamic analysis. Application of nonlinear static and dynamic analysis techniques. Application of suitable improvement techniques for different performance levels. Determination of performance level of exixting building according to ATC, FEMA and TDY.								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Demonstration, Discussion, Project Based Study, Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria		
Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	40
Attending Lectures	21	5
Assignment	1	15
Term Assignment	2	10

Recommended or Required Reading	
1	Celep Z., Kumbasar N., Deprem Müh. Giriş ve Dep. Day. Yapı Tasarımı, Beta Dağıtım, İstanbul 2000.
2	Deprem Bölgelerinde yapılacak Binalar Hakkında Yönetmelik-2007, Bayındırlık ve İskan Bakanlığı
3	Teng, J.G., Bozorgnia, Y. and Bertero, V. V. “Earthquake Engineering: From Engineering Seismology to Performance-Based Engineering”, CRC Press, 2004
4	Bangash, M. Y. “Earthquake Resistant Buildings: Dynamic Analyses, Numerical Computations, Codified Methods, Case Studies and Examples”, Springer, 2011
5	FEMA 273, 356, 440, 445., ATC40,41

Week	Weekly Detailed Course Contents	
1	Theoretical	Definition of performance-based earthquake resistant design of structures
2	Theoretical	Performance-based earthquake resistant design of structures (Continue) a. Definition of structural performance b. Definition of earthquake movements and levels c. Target performance levels for buildings
3	Theoretical	Damage limits and damage zone in structural members a. Cross section damage limits b. Cross section damage zone
4	Theoretical	Determination of performance levels of existing and strengthened buildings by linear elastic analysis methods: Equavalent earthquake load/Modal analysis
5	Theoretical	Determination of damage levels in reinforced concrete bulding members.
6	Intermediate Exam	Midterm Exam
7	Theoretical	Determination of performance levels of existing and strengthened buildings by non-linear elastic analysis methods.
8	Theoretical	Determination of performance levels of existing and strengthened buildings by non-linear elastic analysis methods.

9	Theoretical	Incremental equivalent seismic load method/ Incremental modal analysis/ Time history method
10	Theoretical	Incremental equivalent seismic load method/ Incremental modal analysis/ Time history method
11	Theoretical	Idealization of non-linear behavior
12	Theoretical	Determination of strain response
13	Theoretical	Capacity of reinforced concrete and steel member
14	Theoretical	ATC-40, FEMA-356 and FEMA-440
15	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	21	1	1	42
Lecture - Practice	2	3	1	8
Assignment	1	4	3	7
Term Project	1	25	5	30
Individual Work	13	6	1	91
Midterm Examination	1	5	5	10
Final Examination	1	5	5	10
			Total Workload (Hours)	198
			[Total Workload (Hours) / 25*] = **ECTS**	8

**25 hour workload is accepted as 1 ECTS*

Learning Outcomes

1	Ability to access wide and deep information with scientific researches in the field of Engineering, evaluate, interpret and implement the knowledge gained in his/her field of study
2	Ability to complete and implement “limited or incomplete data” by using the scientific methods
3	Ability to consolidate engineering problems, develop proper method(s) to solve and apply the innovative solutions to them
4	Ability to develop new and original ideas and method(s), to develop new innovative solutions at design of system, component or process
5	Develop the ability to manage effectively the allocation of time in performing tasks by meeting the deadlines for submission of assignments
6	Gain high level ability to define the required information and data

Programme Outcomes *(Civil Engineering Master)*

1	To be able to develop expertise knowledge in a Civil engineering area founded on their graduate competence.
2	To be able to use the theoretical and practical expertise knowledge gained in their specialty area.
3	To be able to use the information, problem solving and / or practical skills from the field, in interdisciplinary studies.
4	To be able to create new knowledge by integrating their knowledge area with the knowledge coming from different disciplines; and solve problems that need expertise by using scientific research methods
5	To be able to solve the problems related to his/her area by using appropriate research methods
6	To be able to devise a problem in their specialty area, develop a solution methodology, solve the problem, and interpret the results and take action if necessary
7	To be able to criticize the knowledge in their specialty area, guide the learning process, and independently direct high level studies
8	To be able to systematically communicate the recent developments in their specialty area and their own studies to groups both inside and outside their specialty area, orally, in writing and visually
9	To be able to use computer software at a level required by their specialty area with drawing upon information and communication technology at a high level
10	To be able to introduce scientific, technological, social and cultural advancements in the field of civil engineering and to contribute to the process of being an information of the society and to sustain it.
11	To be conscious of professional and ethical responsibility and contribute to the establishment of this consciousness.
12	To be able to protect social, scientific, and ethical values during collection, interpretation, and dissemination stages of the data associated with their specialty area; instruct and supervise these values
13	To be able to use at least one foreign language in a level to follow current developments related to the field.

Contribution of Learning Outcomes to Programme Outcomes *1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High*

	L1	L2	L3	L4	L5	L6
P1	5	5	5	4	5	4

P2	4	4	4	5	4	5
P3	5	5	5	4	5	4
P4	4	4	4	5	4	5
P5	5	5	5	4	5	4
P6	4	4	4	5	4	5
P7	5	5	5	4	5	4
P8	4	4	4	5	4	5
P9	5	5	5	4	5	4
P10	4	4	4	5	4	5
P11	5	5	5	4	5	4
P12	4	4	4	5	4	5
P13	5	5	5	4	5	4