

IM 486 STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING		CIVIL ENGINEERING	
Semester	Credit Structure		
	Lecture	Recitation	Laboratory
8	3	0	
Language	English		
Compulsory / Elective	Compulsory		
Prerequisites	None		
Catalog Description	Introduction. Single degree of freedom systems. Free and forced vibration. Earthquake response of structures. Multi degree of freedom systems. Free and forced vibration. Rayleigh's quotient and mode superposition method. General concepts for earthquake resistant design. Earthquake movement and response of reinforced concrete structures. Design of buildings under earthquake. Earthquake prevention techniques. Strengthening of buildings against earthquake.		
Course Objectives	To introduce basic principles and importance of structural dynamics and earthquake in civil engineering applications. To teach the behavior of structures under dynamic and earthquake exactions, the general knowledge required for design and analysis. To teach and apply basic methods employed for analysis of civil engineering problems involving dynamics and earthquake.		
Course Outcomes	Understanding of basic principles and importance of structural dynamics and earthquake effects on structures. Learning the importance of structural dynamics and earthquake exactions in civil engineering in practice. Learning and apply basic methods employed for analysis of civil engineering problems involving dynamics and earthquake.		
Textbook and /or References	Dynamics of Structures, Theory and Applications to Earthquake Engineering, Anil, K. Chopra, Prentice Hall, Second Edition, 2001 Dynamics of Structures, Ray, W. Clough, Joseph, Penzien, McGraw-Hill Int. Editions, Second Edition, 1993		
Assessment Criteria		Quantity	Percentage
	Midterm Exams	2	40
	Quizzes	2	5
	Homeworks	4	5
	Projects	-	-
	Term Paper	-	-
	Laboratory Work	-	-
	Other	-	-
	Final Exam	1	50
Course Category by Content (%)	Mathematics and Basic Sciences	50	
	Engineering Science	25	
	Engineering Design	25	
	Social Sciences	-	
Instructor	Prof. Dr. Sıddık ŐENER, Do. Dr. KurtuluŐ SOYLUK		

COURSE PLAN

Week	Topics
1	Introduction to earthquake engineering
2	Single degree of freedom systems
3	Free vibration, forced vibration
4	Structural response to earthquake
5	Multi degree of freedom systems
6	Rayleigh method and modes superposition methods
7	Seismic risk and seismic hazard, earthquake magnitude and intensity measurements
8	Basic principles in earthquake resistant structural design
9	Selection of material and structural systems
10	Failure mode control and earthquake resistant structural systems
11	Earthquake exactions and the behavior of reinforced concrete structures
12	Earthquake prevention methods and seismic isolation
13	Strengthening of structures against earthquake
14	Detailing in earthquake resistant structures

RELATIONSHIP BETWEEN THE COURSE AND DEPARTMENT CURRICULUM

Program Outcomes		1	2	3
1	An ability to apply knowledge of mathematics, science, and engineering			X
2	An ability to design and conduct experiments, as well as to analyze and interpret data		X	
3	An ability to design a system, component, or process to meet desired needs			X
4	An ability to function on multi-disciplinary teams		X	
5	An ability to identify, formulate, and solve engineering problems			X
6	An understanding of professional and ethical responsibility			X
7	An ability for effective written and oral communication in Turkish and English		X	
8	The broad education necessary to understand the impact of engineering solutions in a global and societal context		X	
9	A recognition of the need for, and ability to engage in life-long learning		X	
10	A knowledge of contemporary issues		X	
11	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice		X	

Contribution of the course : 1: None 2: Partially 3: Completely