

HONORS SUBJECTS

EARTHQUAKE ENGINEERING

Offering Branches	CE		
Course Category:	HONS	Credits:	4
Course Type:	Theory	Lecture-Tutorial-Practical:	3-1-0
Prerequisites:	20CE3503-Structural Analysis 20CE3501-Design of Reinforced Concrete Structures	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	Describe the causes and effects of Earthquake	K2
CO2	Describe the characteristics of ground motion during earthquake	K2
CO3	Design earthquake resistant masonry buildings	K6
CO4	Design earthquake resistant RCC buildings	K6
CO5	Adopt techniques to reduce vibration in buildings	K3

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	2	2					2	2	2
CO2	2	2	2	2	2	2	2					2	2	2
CO3	3	3	3	3	3	3	3					3	3	3
CO4	2	2	2	2	2	3	3					3	2	3
CO5	2	2	2	2	2	2	2					2	2	2
Avg.	2					2	2	2						

1- Low

2-Medium

3-High

Course Content

UNIT-1	INTRODUCTION TO SEISMOLOGY Earth's Interior and Plate Tectonics - Causes of Earthquakes - Seismic Zoning of India - Earthquake Effects - On ground and soil liquefaction, buildings, structures, power plants, switch, yards, equipment's & other lifeline structures. Secondary Effects- Land and rock slides, liquefaction, fires, tsunamis, floods, release of poisonous gases and radiation.	CO1
UNIT-2	EARTHQUAKE PHENOMENON Focus, epicentre, seismic waves - Measurement of Earthquakes and Measurement parameters -magnitude, intensity, intensity scale and its correlation with ground acceleration - characteristics of strong ground motions and attenuation - earthquake recording instruments Time History Records and Frequency Contents of Ground Motion - Concept of Response Spectrums of Earthquake - Design Spectrum. Dos and Don'ts for protection of life and property	CO2
UNIT-3	EARTHQUAKE RESISTANT DESIGN OF MASONARY BUILDINGS Structural Systems - Types of Buildings - Causes of damage - Planning Considerations - Philosophy and Principle of Earthquake Resistant Design - Guidelines for Earthquake Resistant Design Earthquake Resistant Masonry Buildings - Design consideration – Guidelines	CO3
UNIT-4	EARTHQUAKE RESISTANT DESIGN RCC BUILDINGS Earthquake design philosophy – Assumptions – Determination of lateral loads upto G+2, study of various earthquake load combination, Calculation of Axial, shear and moments. Capacity based Design and detailing, Design of flexure member, Design of exterior column, Design of Shear wall.	CO4

UNIT-5	VIBRATION CONTROL TECHNIQUES Vibration Control - Tuned Mass Dampers – Principles and application, Basic Concept of Seismic Base Isolation – various Systems- Case Studies, Important structures.	CO5
Learning Resources		
Text Books	<ol style="list-style-type: none"> 1. Duggal S K , “Earthquake Resistant Design of Structures”, Oxford University Press, 2007. 2. Pankaj Agarwal and Manish Shrikhande, “Earthquake Resistant Design of Structures”, Prentice Hall of India, 2009 3. Paulay,T and Priestley, M.J.N., “Seismic Design of Reinforced Concrete and Masonry buildings”, John Wiley and Sons, 1992. 	
Reference Books	<ol style="list-style-type: none"> 1. Brebbia C. A.,”Earthquake Resistant Engineering Structures VIII”,WIT Press, 2011 2. Bruce A Bolt, “Earthquakes” W H Freeman and Company, New York, 2004. 	
e-Resources& other digital material	<ol style="list-style-type: none"> 1. civilengineering9714.blogspot.com/2015/01/earthquake-engineering-books-free.html 2. https://archive.org/details/Earthquake_Engineering_Application_to_Design 	