EARTHQUAKE RESISTANT DESIGN OF STRUCTURES

III Semester: ST								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
BSTC29	**Elective**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	0	0	3	30	70	100
Contact Classes: 45	**Total Tutorials: Nil**	**Total Practical Classes: Nil**				**Total Classes: 45**		

I. COURSE OVERVIEW:

The main aim of research is to find out the truth which is hidden and which has not been discovered as yet. Though each research study has its own specific purpose. A clearly defined objective directs a researcher in the right direction. Clearly defined objectives are important feature of a good research study. Without a clear objective a researcher is aimless and directionless in conducting the study. Without focused objectives, no replicable scientific findings can be expected. The objective of the IPR is to make the students aware of their rights for the protection of their invention done in their project work. To get registration in our country and foreign countries of their invention, designs and thesis or theory written by the students during their project work and for this they must have knowledge of patents, copy right, trademarks, designs and information Technology Act.

II. COURSE OBJECTIVES:

The student will try to learn:

I. The causes of earthquake and potential consequences of strong earthquakes on structures and civil infrastructure.
II. Design, construct and maintain structures to perform at earthquake exposure up to the expectations and in compliance with building codes
III. Single degree of freedom systems subjected to free and forced vibrations

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:		
CO 1	Summarize engineering seismology and discuss the causes and effects of earthquakes by using seismic design parameters.	Evaluate
CO 2	Interpret the requirements of building codes of practice on seismic detailing of reinforced concrete building structures.	Apply
CO 3	Explain the seismic analysis and design lateral loads for the modeling of RCC structures.	Analyze
CO 4	Analyze in detail the multi-storeyed structures using I.S Codes by seismic coefficient and response spectrum methods.	Apply
CO 5	Design multi-storey building and shear walls using I.S:13920 code.	Analyze
CO 6	Design earthquake-resistant masonry buildings by using lateral load analysis.	Analyze

IV.COURSE SYLLABUS:

MODULE-I: EARTHQUAKE GROUND MOTION AND STRUCTURAL DYNAMICS (09)

Engineering seismology, seismic zoning map of India, strong motion studies in India, strong motion Characteristics, evaluation of seismic design parameters.

Initiation into structural dynamics, dynamics of SDOF systems, theory of seismic pickup, numerical evaluation of dynamic response, response spectra, dynamics of MDOF systems.

MODULE-II: CONCEPTS OF EARTHQUAKE RESISTANT DESIGN OF RCC STRUCTURES (09)

Basic elements of earthquake resistant design, identification of seismic damages in RCC buildings, effectof structural irregularities on performance of RCC buildings during earthquakes, earthquake resistant building architecture.

MODULE-III: SEISMIC ANALYSIS AND MODELING OF RCC STRUCTURES (09)

Code based procedure for determination of design lateral loads, infill walls, seismic analysis procedure as per IS 1893 code.

Equivalent static force method, response spectrum method, time history analysis, mathematical modeling of multi-storey RCC buildings.

MODULE-IV: EARTHQUAKE RESISTANT DESIGN OF RCC STRUCTURES (09)

Ductility considerations, earthquake resistant design of multi-storey RCC buildings and shear wall based on IS 13920 code, capacity based design

MODULE-V: EARTHQUAKE RESISTANT DESIGN OF MASONRY STRUCTURES (09)

Identification of damages and non-damages in masonry buildings, elastic properties of structural masonry, lateral load analysis of masonry buildings, seismic analysis and design of one-storey and two-storeymasonry buildings.

V.TEXT BOOKS:

1. Earthquake resistant design of structures – S. K. Duggal, Oxford University Press, 2009.
2. Earthquake resistant design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd, 2001.
3. Seismic design of reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons, 2009.

VI. REFERENCE BOOKS:

1. Anil K. Chopra, "Dynamics of Structures – Theory and Applications to Earthquake Engineering, Prentice-Hall India Pvt Ltd, 2nd Edition, 2001.
2. Anand S.Arya, Nemchand & Bros, "Masory and Timber Structures including Earthquake Resistant Design, 1995.
3. MihaTomazevic, "Earthquake Resistant Design of Masonry Building, Imperial college Press, 1992.
4. C.V.R. Murty, "Earthquake tips – Learning Earthquake Design and Construction, 2004.

VII. WEB REFERENCES:

1. http://www.nicee.org/iaee/E_Chapter3.pdf
2. http://www.iitk.ac.in/nicee/wcee/article/vol.3_session4_1917.pdf

V. E-TEXT BOOKS:

1. https://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/BSSC/FEMA_P-749.pdf