



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF CIVIL ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	M. Tech – Structural Engineering		
Course Title	SEISMIC DESIGN OF STRUCTURES		
Course Code	CE670	No. of Credits	3
Course Code of Pre-requisite subject(s)			
Session	Jan. 2021	Section (if, applicable)	
Name of Faculty	Dr. R. Senthil Kumar	Department	Civil Engineering
Email	senthilr@nitt.edu	Telephone No.	+91 - 9566111484
Name of Course Coordinator(s) (if, applicable)			
E-mail		Telephone No.	
Course Type	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		
Syllabus (approved in Senate)			
<ul style="list-style-type: none"> Engineering seismology – rebound theory – plate tectonics – seismic waves - earthquake size and various scales – local site effects – Indian seismicity – seismic zones of India – theory of vibration – near ground and far ground rotation and their effects. Seismic design concepts – EQ load on simple buildings – load path – floor and roof diaphragms – seismic resistant building architecture – plan configuration – vertical configuration – pounding effects – mass and stiffness irregularities – torsion in structural system. Provision of seismic code (IS1893, IS 13920) – Building systems – frames – shear wall – braced frames – layout design of Moment Resisting Frames (MRF) – ductility of MRF – Infill walls – Non-structural elements. Calculation of EQ load – 3D modelling of building systems and analysis (theory only), Design and detailing of frames, shear wall and frame walls. Cyclic loading behaviour of RC, steel and pre-stressed concrete elements - modern concepts – base isolation – Adaptive systems – case studies 			

COURSE OBJECTIVES	
<ol style="list-style-type: none"> 1. To introduce the basics of earthquake engineering and how they influence the structural design. 2. To aim at introducing engineering seismology and building characteristics. 3. To make students understand structural irregularities, do's and don'ts in earthquake engineering design, code provision on different types of structures. 4. To make students be familiar with structural modelling and lateral load resisting design. 5. To make students get exposed to strength, stiffness and ductility requirements and energy dissipation devices 	
COURSE OUTCOMES (CO)	
Course Outcomes	Aligned Programme Outcomes (PO)
By the end of this course the students	
1. To understand the basics of earthquake engineering and how they influence the structural design.	1, 4, 5, 9, 10
2. To understand engineering seismology and building characteristics	1, 2, 4, 9
3. To learn structural irregularities, do's and don'ts in earthquake engineering design, code provision on different types of structures.	1, 2, 4, 6, 9
4. To be familiar with structural modelling and lateral load resisting design.	1, 2, 3, 4, 6, 9
5. To get exposed to strength, stiffness and ductility requirements and energy dissipation devices.	1, 4, 6, 9

COURSE PLAN – PART II			
COURSE OVERVIEW			
<p>This course uses different mode of lecture like Power point presentations, Chalk and Talk, Video Lectures, etc., throughout the course work for all the five units.</p>			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	1 st week – 3 hours	Engineering seismology – rebound theory – plate tectonics – seismic waves - earthquake size and various scales	Online
2	2 nd week – 3 hours	Local site effects – Indian seismicity – seismic zones of India – theory of vibration – near ground and far ground rotation and their effects.	Online
3	3 rd week – 3 hours	Seismic design concepts – EQ load on simple buildings – load path – floor and roof diaphragms	Online
4	4 th week – 3 hours	Seismic design concepts – EQ load on simple buildings – load path – floor and roof diaphragms	Online

5	5 th week – 3 hours	Seismic resistant building architecture – plan configuration – vertical configuration – pounding effects	Online
6	6 th week – 3 hours	Mass and stiffness irregularities – torsion in structural system.	Online
7	7 th week – 3 hours	Provision of seismic code (IS1893, IS 13920) – Building systems – frames – shear wall – braced frames	Online
8	8 th week – 3 hours	Layout design of Moment Resisting Frames (MRF) – ductility of MRF – Infill walls – Non-structural elements.	Online
9	9 th week – 3 hours	Calculation of EQ load – 3D modelling of building systems and analysis (theory only)	Online
10	10 th week – 3 hours	Design and detailing of frames	Online
11	11 th week – 3 hours	Design and detailing of shear walls	Online
12	12 th week – 3 hours	Design and detailing of frame walls.	Online
13	13 th week – 3 hours	Cyclic loading behavior of RC, steel and pre-stressed concrete elements	Online
14	14 th week – 3 hours	Modern concepts – Base isolation	Online
15	15 th week – 3 hours	Adoptive systems	Online
16	16 th week – 3 hours	Case studies	Online

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Mid Term Assessment	10 th week	1 hour	30
2	Quiz	15 th week	20 mins	20
3	Assignment	-	-	20
CPA	Compensation Assessment*	16 th week	1 hour	30
4	Final Assessment	17 th week	2 hours	30

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

The student's feedback mechanism will be followed at the end of this course through questionnaire format in MIS portal

COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

Apart from interactions with the students in the class, the students can also contact the concerned faculty member as given below:

Dr. R. Senthil Kumar

Email: senthilr@nitt.edu

Mob: +91 - 9566111484

COMPENSATION ASSESSMENT POLICY

1. The students have to submit a letter and get it signed by the Head of the Department or the course coordinator/ chairman stating the reason for their absence in the exam. Only genuine cases of absence shall be considered.
2. The student can only write one compensation assessment whether he/she is found to be absent for one or both the internal assessments

ATTENDANCE POLICY (A uniform attendance policy as specified below shall be followed)

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

MINIMUM PASS MARK POLICY

The Passing minimum: As per Institute norms.

ACADEMIC DISHONESTY & PLAGIARISM

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

The above policy against academic dishonesty shall be applicable for all the programs.

FOR APPROVAL



Course Faculty _____



CC-Chairperson _____



HOD _____

Head
Department of Civil Engineering
National Institute of Technology
Tiruchirappalli - 620 015.