



DEPARTMENT OF CIVIL ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	M.Tech, Structural Engineering		
Course Title	Stochastic Processes in Structural Mechanics		
Course Code	CE662	No. of Credits	3
Course Code of Pre-requisite subject(s)			
Session	January 2020	Section (if, applicable)	NA
Name of Faculty	Dr. Greegar George	Department	Civil Engineering
Official Email	greegar@nitt.edu	Telephone No.	9483742674
Name of Course Coordinator(s) (if, applicable)			
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	<input checked="" type="checkbox"/> Elective course	<input type="checkbox"/> Core course	
Syllabus (approved in BoS)			
<p>Basic Theory of Random variables - Probability distribution of a random variable, multiple random variables, main descriptors of a random variable – Moments, expectation, covariance, correlation, conditional mean and variance. Functions of random variables, moments of functions of random variables.</p> <p>Basic Theory of Stochastic Processes - Introduction, Statistics of stochastic processes, Ergodic processes, Some properties of the correlation functions, Spectral analysis, Wiener-Khintchine equation.</p> <p>Some Important Random Processes - Normal processes, Poisson processes, Markov processes.</p> <p>Properties of Random Processes - Level crossing peaks, Fractional occupation time, Envelopes, First-Passage time, Maximum value of a Random Process in a time interval.</p> <p>Some Models of Random Processes in Nature - Earthquake, Wind, Atmosphere turbulence, Random Runways, Road Roughness, Jet Noise, Ocean wave turbulence.</p> <p>Fourier analysis and Data Processing</p>			
COURSE OBJECTIVES			
<ol style="list-style-type: none"> 1. To understand the basic concept of random variables and its extension to stochastic processes. 2. To know the modelling of natural phenomena through random processes. 			



3. To learn probability distribution of a random variable. 4. To understand the concept of multiple random variables. 5. To familiarize students with covariance, conditional mean and variance.	
MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. To understand basic theory of stochastic processes and its relevance in the realistic modeling of natural phenomena.	1, 3, 4, 8
2. To understand the basic theory of random variables, multiple random variables and random processes.	1, 3, 4, 8, 10
3. To be familiar with probability distribution of a random variable.	1, 3, 4, 8, 9
4. To be familiar with covariance, conditional mean and variance.	1, 3, 4, 8, 9, 10
5. To understand the concept of Fourier analysis and data processing.	1, 4, 8, 9, 10

COURSE PLAN – PART II			
COURSE OVERVIEW			
<ul style="list-style-type: none"> This course gives students the knowledge about the the basic concept of random variables and its extension to stochastic processes 			
COURSE TEACHING AND LEARNING ACTIVITIES			(Add more rows)
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1	Basic Theory of Random variables - Probability distribution of a random variable	PPT / Digital writing board (Online)
2	Week 2		PPT / Digital writing board (Online)
3	Week 3	Main descriptors of a random variable – Moments, expectation, covariance, correlation, conditional mean and variance	PPT / Digital writing board (Online)
4	Week 4	Multiple random variables	PPT / Digital writing board (Online)
5	Week 5	Functions of random variables, moments of functions of random variables	PPT / Digital writing board (Online)



6	Week 6	Basic Theory of Stochastic Processes - Introduction	PPT / Digital writing board (Online)
7	Week 7	Statistics of stochastic processes, Ergodic processes, Some properties of the correlation functions	PPT / Digital writing board (Online)
8	Week 8		
9	Week 9	Spectral analysis, Wiener-Khintchine equation	PPT / Digital writing board (Online)
10	Week 10	Some Important Random Processes - Normal processes, Poisson processes, Markov processes	PPT / Digital writing board (Online)
11	Week 11	Properties of Random Processes - Level crossing peaks, Fractional occupation time, Envelopes, First-Passage time, Maximum value of a Random Process in a time interval	PPT / Digital writing board (Online)
12	Week 12		PPT / Digital writing board (Online)
13	Week 13	Some Models of Random Processes in Nature - Earthquake, Wind, Atmosphere turbulence, Random Runways, Road Roughness, Jet Noise, Ocean wave turbulence	PPT / Digital writing board (Online)
14	Week 14	Fourier analysis and Data Processing	PPT / Digital writing board (Online)
15	Week 15	Seminar / Project Presentation	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Mid semester Exam	Week 7	90 minutes	20
2	Assignments (2 Nos & Quiz	As per deadlines announced in class	Assignments are to be submitted with in 1 week duration	20+10



3	Seminar / Project	Week 15		20
CPA	Compensation Assessment*	12 th week	1 hour	20
4	Final Assessment *	March 2 nd week	2 hours	30

***mandatory; refer to guidelines on page 4**

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

1. Feedback from students during Class committee meetings
2. Anonymous feedback through questionnaire at the end of the semester (through the feedback section portal in "mis")

COURSE POLICY (including compensation assessment to be specified)

1. The closing date of attendance for the subject is Week 13.
2. 100 % attendance is desirable for every student, minimum being 75%.
3. Attendance during each assessment is mandatory.
4. Submission of assignments as per schedule is compulsory.
5. Compensation assessment will be given to only those students who have missed the cycle tests on genuine records and upon prior intimation to the respective faculty. The portion of compensation assessment will include all topics covered till that date.

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.

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 programmes.



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ADDITIONAL INFORMATION, IF ANY

1. The faculty is available for consultation during office hours at room number C105 of Department of Civil Engineering.
2. Queries if any can also be emailed to the faculty or through MS Teams.

FOR APPROVAL

Dr Greagar George

Course Faculty

08-02-2021

CC- Chairperson

HOD

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



Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or (Class average/2) whichever is greater.		(Peak/3) or (Class Average/2) whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.