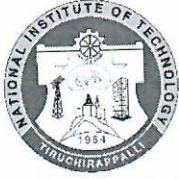


NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	B. Tech - Electronics and Communication Engineering		
Course Title	Statistical Theory of Communication		
Course Code	ECPC19	No. of Credits	4
Course Code of Pre-requisite subject(s)	MAIR 45		
Session	July 2019	Section (if, applicable)	A & B
Name of Faculty	N. Vijayanthi	Department	ECE
Official Email	vaijuanand@hotmail.com	Telephone No.	9791756326
Name of Course Coordinator(s) (if, applicable)	Nil		
Official E-mail		Telephone No.	
Course Type (please tick appropriately)	<input checked="" type="checkbox"/> Core course <input type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
<p>Information measure. Discrete entropy. Joint and conditional entropies. Uniquely decipherable and instantaneous codes. Kraft-McMillan inequality. Noiseless coding theorem. Construction of optimal codes.</p> <p>DMC. Mutual information and channel capacity. Shannon's fundamental theorem. Entropy in the continuous case. Shannon-Hartley law.</p> <p>Binary hypothesis testing. Baye's, minimax and Neyman-Pearson tests. Random parameter estimation-MMSE, MMAE and MAP estimates. Nonrandom parameters – ML estimation.</p> <p>Coherent signal detection in the presence of additive white and non-white Gaussian noise. Matched filter.</p> <p>Discrete optimum linear filtering. Orthogonality principle. Spectral factorization. FIR and IIR Wiener filters.</p> <p>Text Books</p> <ol style="list-style-type: none"> 1. R.B.Ash, "Information Theory", Wiley, 1965. 2. M.D.Srinath, P.K.Rajasekaran & R. Viswanathan, "Statistical Signal Processing with Applications", PHI 1999. <p>Reference Books</p> <ol style="list-style-type: none"> 1. H.V.Poor, "An Introduction to Signal Detection and Estimation, (2/e)", Spring Verlag. 1994. 2. M.Mansuripur, "Introduction to Information Theory", Prentice Hall. 1987. 3. J.G.Proakis, D G Manolakis, "Digital Signal Processing", (4/e), Pearson Education, 2007. 			



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE OBJECTIVES	
The subject aims to make the students to understand the statistical theory of telecommunication, which are the basics to learn analog and digital telecommunication	
MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
1. CO1: show how the information is measured and able to use it for effective coding.	PO1,PO2
2. CO2: summarize how the channel capacity is computed for various channels	PO1,PO2
3. CO3: use various techniques involved in basic detection and estimation theory to solve the problem	PO1,PO2
4. CO4: summarize the applications of detection theory in telecommunication.	PO12
5. CO5: summarize the application of estimation theory in telecommunication.	PO12

COURSE PLAN – PART II			
COURSE OVERVIEW			
The course consist information theory, estimation theory and detection theory in communication systems.			
COURSE TEACHING AND LEARNING ACTIVITIES			(Add more rows)
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	3 rd Week of July	Information measure. Discrete entropy. Joint and conditional entropies	Chalk and Talk
2	4 th Week of July & 1 st Week of August	Uniquely decipherable and instantaneous codes. Kraft-McMillan inequality.	Chalk and Talk, Class discussion
3	1 st Week of August	Noiseless coding theorem. Construction of optimal codes	Chalk and Talk
4	2 nd Week of August	DMC. Mutual information and channel capacity	Chalk and Talk, Cooperative learning
5	3 rd Week of August	Shannon's fundamental theorem. Entropy in the continuous case. Shannon-Hartley law.	Chalk and Talk



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6	4 th Week of August	Binary hypothesis testing. ASSIGNMENT	Chalk and Talk
7	1 st week of September	Baye's, minimax and Neyman-Pearson tests ASSESSMENT-1	Chalk and Talk/ PPT
8	2 nd Week of September	Random parameter estimation- MMSE, MMAE and MAP estimates	Chalk and Talk/PPT
9	3 rd Week of September	Nonrandom parameters – ML estimation	Chalk and Talk
10	4 th Week of September	Coherent signal detection in the presence of additive white and non-white Gaussian noise.	Chalk and Talk
11	1 st week of October	Matched filter.	Chalk and Talk
12	2 nd Week of October	Discrete optimum linear filtering	Chalk and Talk/PPT
13	3 rd Week of October	Orthogonality principle. ASSESSMENT-2	Chalk and Talk
14	4 th Week of October	Spectral factorization. OBJECTIVE TYPE TEST	Chalk and Talk
15	1 st week of November	FIR Wiener filters	Chalk and Talk
16	2 nd Week of November	IIR Wiener filters RE-ASSESSMENT (CPA)	Chalk and Talk, Class discussion

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	ASSESSMENT-1	1 st Week of September	60 mins	20
2	ASSESSMENT-2	3 rd Week of October	60 mins	20



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3	ASSIGNMENT	4 th Week of August		5
4	Objective type Test	4 th Week of October		15
CPA	Compensation Assessment*	2 nd Week of November	60 mins	
5	Final Assessment *	3 rd Week of November	120 mins	40

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

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

- Getting feedback from the students during class committee meeting.
- Consolidated feedback through questionnaire.

COURSE POLICY (including compensation assessment to be specified)

All the correspondence regarding assessment schedule/assignment questions/course material of this course will be intimated in class only. For other information students are asked to check their webmail regularly. Compensation assessment will be conducted only for absentees with genuine reasons.

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.

ADDITIONAL INFORMATION, IF ANY



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

Nil

FOR APPROVAL

Course Faculty

[Signature]

CC- Chairperson

[Signature]

HOD

[Signature]

(Dr. R.K. Jayachitra)



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

Guidelines

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

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