



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	M.Tech - Communication Systems		
Course Title	Advanced Digital Communication		
Course Code	EC602	No. of Credits	03
Course Code of Pre-requisite subject(s)	EC601	Linear Algebra and Stochastic Processes	
Session	July / January 2021	Section (if, applicable)	A / B
Name of Faculty	Dr. R. K. JEYACHITRA	Department	Electronics and Communication Engineering
Email	jeyachitra@nitt.edu	Telephone No.	0431 2503320
Name of Course Coordinator(s) (if, applicable)	NONE		
Official E-mail	NIL	Telephone No.	NIL
Course Type	<input checked="" type="checkbox"/> Core course	<input type="checkbox"/> Elective course	
Syllabus (approved in BoS)			
<p>Course Content</p> <p>Baseband data transmission- Nyquist criterion for zero ISI, Correlative level coding, Optimum design of transmit and receive filters, Equalization.</p> <p>Passband Digital transmission- Digital modulation schemes, Carrier synchronization methods, Symbol timing estimation methods.</p> <p>Error control coding - Linear block codes, cyclic codes-encoding and decoding, Non-binary codes, Convolutional codes, Decoding of convolutional codes, Trellis coded modulation, Interleaver, Turbo coding, Performance measures.</p> <p>Spread spectrum communication- D S and F H spread spectrum, CDMA system based on FH and DS spread spectrum signals, Applications, Synchronization of spread spectrum signals.</p> <p>Multichannel and Multicarrier communication Systems, Multi user communication systems.</p> <p>Text Books</p> <ol style="list-style-type: none"> 1. J.G.Proakis, "Digital Communication (4/e)", McGraw- Hill, 2001 2. S. Haykin, "Communication systems (4/e)", John Wiley, 2001 3. B.P. Lathi, Zhi Ding, "Modern Digital and Analog Communication Systems (4/e)", Oxford University Press, 2010 			



Reference Books	
<ol style="list-style-type: none"> 1. S.Lin & D.J.Costello, <i>Error Control Coding (2/e) Pearson, 2005</i> 2. <i>Recent literature in Advanced Digital Communication.</i> 	
COURSE OBJECTIVES	
<p>This subject gives an in-depth knowledge and advancement in digital communication systems. It introduces some of the upcoming technologies like Multiuser - communication, Multi-channel and Multicarrier communication technologies.</p>	
MAPPING OF COs with POs	
Course Outcomes	Programme Outcomes (PO) (Enter Numbers only)
At the end of the course student will be able	
1. Understand the operation, theoretical analysis and design of baseband, passband data transmission systems	PO1,PO2,PO3,PO4, PO5
2. Design and implement various error control codes	PO1,PO2,PO3,PO4, PO5,PO7,PO9,PO10
3. Summarize spread spectrum technology and its application	PO1,PO3,PO4, PO5,PO9,PO10
4. Compare single carrier and multicarrier communication systems	PO1,PO2,PO3,PO4, PO5,PO9,PO10
5. Do research in the digital communication systems	PO5,PO6,PO9,PO10

COURSE PLAN – PART II			
COURSE OVERVIEW			
<p>Students can understand the concept of Baseband and Passband digital transmission systems. Students will get exposure to the Error control coding and Spread spectrum techniques. In addition to that students will know the technological advancement in digital communication systems such as Multiuser - communication, Multi-channel and Multicarrier communication technologies.</p>			
COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	1 st WEEK (3 Contact Hours)	Introduction to Baseband data transmission, Nyquist criterion for zero ISI and Correlative level coding	Lecture PPT-Online
2	2 nd WEEK (3 Contact Hours)	Optimum design of transmit and receive filters	



3	3 rd WEEK (3 Contact Hours)	Equalization and Introduction to Passband Digital transmission	Lecture PPT-Online
4	4 th WEEK (3 Contact Hours)	Digital modulation schemes-coherent and non-coherent modulation	
5	5 th WEEK (3 Contact Hours)	Carrier synchronization methods	
6	6 th WEEK (3 Contact Hours)	Symbol timing estimation methods	
		ASSESSMENT I – 20 MARKS	WRITTEN TEST
7	7 th WEEK (3 Contact Hours)	Introduction to Error control coding, Linear block codes, cyclic codes encoding and decoding	Lecture PPT-Online
		ASSESSMENT II – 10 MARKS	ASSIGNMENT
8	8 th WEEK (3 Contact Hours)	Non-binary codes, Convolutional codes, Decoding of Convolutional codes	Lecture PPT-Online
9	9 th WEEK (3 Contact Hours)	Trellis coded modulation, Interleaver, Turbo coding, Performance measures	
10	10 th WEEK (3 Contact Hours)	Introduction to Spread spectrum communication, D S and F H spread spectrum	
11	11 th WEEK (3 Contact Hours)	CDMA system based on FH and DS spread spectrum signals	
12	12 th WEEK (3 Contact Hours)	Applications, Synchronization of spread spectrum signals	
		ASSESSMENT III – 20 MARKS	WRITTEN TEST
13	13 th WEEK (3 Contact Hours)	Introduction to advanced topics in ADC	Lecture PPT-Online
14	14 th WEEK (3 Contact Hours)	Multichannel and Multicarrier communication Systems	



15	15 th WEEK (3 Contact Hours)	Multi user communication systems		
		ASSESSMENT IV – 20 MARKS	SEMINARS	
FINAL ASSESSMENT			WRITTEN TEST	
<ul style="list-style-type: none"> • PPT - Power Point 				
COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	ASSESSMENT I WRITTEN TEST-ONLINE (UNIT 1 & 2)	4 th Week of February	60 Minutes	20
2	ASSESSMENT II ASSIGNMENT	1 st Week of March	5 days	10
3	ASSESSMENT III WRITTEN TEST-ONLINE (UNIT 3 & 4)	4 th Week of March	60 Minutes	20
4	ASSESSMENT IV SEMINAR PRESENTATION / VOICE OVER PPT	2 nd Week of April	15 Minutes	20
CPA	COMPENSATION ASSESSMENT (WRITTEN TEST-ONLINE)	1 st Week of May	60 Minutes	Please refer course policy for more details
5	FINAL ASSESSMENT * ALL UNITS (WRITTEN TEST-ONLINE)	2 nd Week of May	120 Minutes	30
*mandatory; refer to guidelines on page 6				
COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)				
<ul style="list-style-type: none"> • Feedback from the students during class committee meetings. • Individual Subject feedback through MIS website at the end of the semester. 				
COURSE POLICY (including compensation assessment to be specified)				
<u>MODE OF CORRESPONDENCE (email/ phone etc.)</u>				
<ul style="list-style-type: none"> ➤ All the students are advised to check their NITT WEBMAIL regularly. All the correspondence (schedule of classes/ schedule of assessment/ any other information regarding this course) will be done through their webmail only. ➤ Queries (if required) to the course teacher shall only be emailed to the email id specified by the teacher. 				
<u>COMPENSATION ASSESSMENT POLICY</u>				
<ul style="list-style-type: none"> ➤ Attending all the assessments is MANDATORY for every student. 				



- If any student is not able to attend any one of the continuous assessments descriptive examination due to genuine reason, the student is permitted to attend the compensation assessment (CPA) with 20% weightage.
- At any case, CPA will not be considered as an improvement test.
- Submission of assignment and presentation of the seminar are MANDATORY for every student within the stipulated time failing which 10% weightage will not be considered for the final grade assessment.
- Finally, every student is expected to score a minimum as per the regulations of the institute out of the total assessments (1, 2, 3, 4, and 5) to pass the course. Otherwise, the student would be declared fail and 'F' grade will be awarded.

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.

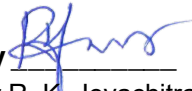
ACADEMIC DISHONESTY & PLAGIARISM

- 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

The faculty is available for consultation at times as per the intimation given by the faculty.

FOR APPROVAL

Course Faculty 
(Dr.R. K. Jeyachitra)

CC-Chairperson 
(Dr.V.Sudha)

HOD 



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.