

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
ENGINEERING**

**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech.		
Course Title	Principles of Communication Systems		
Course Code	ICPC23	No. of Credits	3
Course Code of Pre-requisite subject(s)	-		
Session	July 2019	Section (if, applicable)	A
Name of Faculty	Dr.N.Gunavathi	Department	ECE
Email	gunavathi@nitt.edu	Telephone No.	04312503315
Name of Course Coordinator(s) (if, applicable)			
E-mail		Telephone No.	
Course Type	Core course		
Syllabus (approved in BoS)			
<p>Modulation -need for modulation. Principles of amplitude modulation: modulation and demodulation of AM, DSBSC, SSB signals, VSB and FDM systems. AM transmitter and Receiver. Essence of industrial data communication.</p> <p>Principles of angle modulation: frequency and phase modulation, narrow and wide band FM, generation and demodulation of FM signals. FM transmitter and Receiver</p> <p>Pulse modulation systems-Sampling theorem, Pulse Amplitude Modulation (PAM), Pulse width modulation (PWM), Pulse time modulation (PTM): PDM and PPM. TDM systems.</p> <p>Pulse code modulation-Pulse Code Modulation quantization -PCM systems-DPCM and Delta modulation. Digital modulation schemes: ASK-PSK-FSK-Generation and detection.</p> <p>Noise-Source and classification, atmospheric noise, thermal noise and shot noise. Noise equivalent bandwidth, noise figure and equivalent noise temperature of a two terminal network.</p>			



**Text Books:**

1. S.Haykin, Communication Systems, John Wiley & Sons, 4<sup>th</sup> Edition, 2000.
2. H.Taub & D.Schilling, Principles of Communication System, Tata McGraw Hill, 3<sup>rd</sup> Edition, 2007
3. J.S.Beasley&G.M.Miler, Modern Electronic Communication, Prentice-Hall, 9<sup>th</sup> Edition, 2008.

**Reference Books:**

1. B.P.Lathi, Modern Analog And Digital Communication systems, Oxford University Press, 3<sup>rd</sup> Edition, 2007
2. B.Carlson, Communication Systems , McGraw Hill Book Co. 3<sup>rd</sup> Edition, 1986.
3. Sam Shanmugam, Digital and analog Communication Systems, John Wiley, 1985.

**COURSE OBJECTIVES**

To introduce the concept of communication systems and to impart knowledge in the different methods of analog and digital communications and their significance. To familiarise students with various sources of noise and its characteristics.

**COURSE OUTCOMES (CO)**

Course Outcomes	Aligned Programme Outcomes (PO)
1. Develop an understanding of need for modulation and generation & detection of analog modulation techniques.	1,2,8,12
2. Explore AM and FM Super heterodyne receiver working principle.	1,2,8,12
3. Discuss the techniques for generation and detection of pulse analog modulation techniques	1,2,8,12
4. Understand the basic operation involved in PCM like sampling, quantization & encoding and are able to calculate and derive entropy and channel capacity	1,2,8,12
5. Describe different types of noise and calculate the noise equivalent bandwidth and noise figure of a two -port network.	1,2,8,12

**COURSE PLAN – PART II****COURSE OVERVIEW**

To introduce the principles of analog and digital communication systems involving different modulation and demodulation schemes.

**COURSE TEACHING AND LEARNING ACTIVITIES**

S.No.	Week/Contact Hours	Topic	Mode of Delivery



1.	1 <sup>st</sup>	Modulation and its need. Types of modulation. Amplitude modulation. DSB-FC modulation. Time and frequency domain representation.	Chalk and Talk, PPT
2.	2 <sup>nd</sup>	Generation methods and Demodulation of DSB-FC. Power efficiency. DSB-SC modulation technique. Highlights and demerits. Generation and Detection.	Chalk and Talk, PPT
3.	3 <sup>rd</sup>	SSB, VSB modulation techniques. Generation and detection. Multiplexing and need. FDM system. AM transmitter and receiver. TRF receiver.	Chalk and Talk, PPT
4.	4 <sup>th</sup>	AM Superheterodyne receiver. Related problems. Angle modulation. Phase and Frequency modulation.	Chalk and Talk, PPT
5	5 <sup>th</sup>	Narrow band and wideband FM. FM generation methods. Transmission bandwidth.	Chalk and Talk, PPT
6	6 <sup>th</sup>	Demodulation of FM signals. FM Superheterodyne receiver.	Chalk and Talk, PPT
7	7 <sup>th</sup>	Pulse modulation. Pulse analog and Pulse digital modulation. Sampling theorem. Time division multiplexing.	Chalk and Talk, PPT
8	8 <sup>th</sup>	Pulse amplitude modulation. Pulse time modulation. Generation methods.	Chalk and Talk, PPT
9	9 <sup>th</sup>	Pulse code modulation. Measure of information. Channel capacity. Differential pulse code modulation.	Chalk and Talk, PPT

10	10 <sup>th</sup>	Delta modulation. Digital modulation. Generation and detection of ASK, FSK and PSK signals	Chalk and Talk, PPT
11	11 <sup>th</sup>	Noise source and Classification. External and Internal noise. Noise calculation. SNR.	Chalk and Talk, PPT
12	12 <sup>th</sup>	Noise Figure. Noise temperature	Chalk and Talk, PPT

**COURSE ASSESSMENT METHODS (shall range from 4 to 6)**

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	<b>ASSESSMENT I</b> Descriptive Type Examination (2 Units )	6 <sup>th</sup> Week	60 Minutes	20
2	<b>ASSESSMENT II</b> Descriptive Type Examination (2 Units )	11 <sup>th</sup> Week	60 minutes	20
3	<b>SEMINAR/ASSIGNMENT</b>			10
CPA	Compensation Assessment*	3 <sup>rd</sup> Week of October		
4	<b>Final Assessment</b>	End of the Semester	180 minutes	50

\*mandatory; refer to guidelines on page 4

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

1. Direct feedback from the students by having face-to-face meeting individually and as the class as a whole.
2. Feedback from the students during the class committee meetings

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

**MODE OF CORRESPONDENCE (email/ phone etc)**

Students may contact the teacher through the e-mail mentioned

**COMPENSATION ASSESSMENT POLICY**

Attending all the assessments is MANDATORY for every student.  
If any student is not able to attend either one or both of the continuous assessments I & II



due to genuine reason, student is permitted to attend the compensation assessment (CPA) with only 20 % weightage for both the cases.  
At any case, CPA will not be considered as an improvement test.

**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**

Students may fix appointments for detailed discussion by sending email to [gunavathi@nitt.edu](mailto:gunavathi@nitt.edu) two days prior to the desired appointments date with the topic to discuss. The students must come prepared for the discussion with background preparation. Minor doubts will be clarified after the contact hours without any prior appointment.

**FOR APPROVAL**

Course Faculty  CC-Chairperson  HOD 