Paper Code: ARI 307	L	T/P	Credits
Subject: Principles of Communication Systems	4	-	4

Marking Scheme:
Teachers Continuous Evaluation: As per university examination norms from time to time.
End Term Theory Examination: As per university examination norms from time to time.

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks: As per University Norms

➢ There should be 9 questions in the end term examination question paper.

➢ Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 15 marks.

➢ Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, students may be asked to attempt only 1 question from each unit. Each question should be 15 marks.

➢ The questions are to be framed keeping in view the learning outcomes of course/paper. The standard/ level of the questions to be asked should be at the level of the prescribed textbooks.

➢ The requirement of (scientific) calculators/ log-tables/ data-tables may be specified if required.

Course Outcomes [Bloom's Knowledge Level (KL)]:

CO1	Understand the basic concepts of analog communication system **[K1, K2]**
CO2	Evaluate the performance of fundamental blocks constituting various angle modulation techniques. **[K1, K2, K3, K4, K5]**
CO3	Apply the principles of sampling in deriving different pulse modulation approaches and digital modulation techniques for optimal reception.[**K1, K2, K3]**
CO4	Understand about the basic concept of Communication Networks. **[K1, K2]**

CO/PO	**PO01**	**PO02**	**PO03**	**PO04**	**PO05**	**PO06**	**PO07**	**PO08**	**PO09**	**PO10**	**PO11**	**PO12**
CO1	3	2	-	-	1	-	-	-	-	-	-	2
CO2	3	2	-	-	1	-	-	-	-	-	-	2
CO3	3	3	3	-	-	-	-	-	-	1	2	2
CO4	3	2	-	3	-	-	-	-	-	-	-	-

Course Content	**No of lectures**

Unit I **Amplitude Modulation:** Need for modulation, Amplitude Modulation - Generation of AM waves, frequency discrimination and Phase discrimination methods for generating SSB, Demodulation of SSB Waves, principle of Vestigial sideband modulation.	[10]
Unit II **Angle Modulation:** Angle Modulation fundamentals, Frequency Modulation – Modulation index and sidebands, Narrowband FM, Wideband FM, Principles of Phase Modulation, Frequency Modulation verses Amplitude Modulation, FM demodulation	[10]
Unit III **Pulse Modulation:** Types of Pulse modulation- PAM, PWM and PPM. Comparison of FDM and TDM**.** **Pulse Code Modulation:** PCM Generation and Reconstruction, Quantization Noise, Non-Uniform Quantization and Companding, DPCM, Adaptive DPCM, DM and Adaptive DM**.**	[10]
Unit IV **Digital Modulation Techniques:** ASK- Modulator, Coherent ASK Detector, FSK- Modulator, Non- Coherent FSK Detector, BPSK- Modulator, Coherent BPSK Detection. Principles of QPSK, Differential PSK and QAM.	[10]

Text Books:

[T1] J. G. Proakis and M. Salehi, *"Fundamentals of Communication Systems,"* Prentice Hall, 2004.
[T2] S. Haykin, *"Communication Systems,"* John Wiley & Sons, 5th Ed., 2009.

Reference Books:

[R1] B.P. Lathi and Z. Ding, *Modern Digital and Analog Communication Systems*, 4th Ed., Oxford University Press, 2009.
[R2] Louis E. Frenzel, *Principles of Electonic Communication Systems*, 3rd Ed., Tata McGraw-Hill, 2008.
[R3] Dennis Roddy and John Coolen, *Electronic Communications*," 4th Ed., Pearson, 2008.