

MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT park, OMR, Chennai - 603103

LESSON PLAN							
Department of <u>Electronics and Communication</u> Engineering							
Name of the Subject	Digital Communication	Name of the handling Faculty	M.KAMARAJAN				
Subject Code	EC8501	Year / Sem	III/V				
Acad Year	AY 2022-2023	Batch	2021-2024				
Course Objective							
To know the principles of sampling & quantization							
To study the various waveform coding schemes							
To learn the various baseband transmission schemes							
To understand the various band pass signaling schemes							
To know the fundamentals of channel coding							
Course Outcome							
At the end of the course, the students should be able to:							
CO1: Explain the information theory							
CO2: Design the PCM systems							
CO3: Design and implement base band transmission schemes							
CO4:Design, implement the band pass signaling schemes and Analyze the spectral characteristics of band pass signaling schemes and their noise							
CO5:Design error control coding schemes							
Lesson Plan							
Sl. No.	Topic(s)	T / R*	Periods Required	Mode of Teaching (BB / PPT / NPTEL / MOOC / etc.)	Blooms Level (L1-L6)	CO	PO
		Book					
UNIT I INFORMATION THEORY							
1	Discrete Memoryless source	T1	1	BB	L2	CO1	PO1-PO2
2	Information, Entropy	T1	1	BB	L1	CO1	PO1-PO2
3	Mutual Information	T1	1	BB	L2	CO1	PO1-PO2
4	Discrete Memoryless channels	T1	1	BB	L2	CO1	PO1-PO3
5	Binary Symmetric Channel,	T1	1	BB	L2	CO1	PO1-PO2
6	Source coding theorem	T1	1	BB	L2	CO1	PO1-PO2
7	Channel Capacity — Hartley — Shannon law	T1	1	BB	L2	CO1	PO1-PO2
8	Source coding theorem Shannon — Fano	T1	1	BB	L3	CO1	PO1-PO3
9	Huffman codes.	T1	1	BB	L3	CO1	PO1-PO3
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Tuorials							
Evaluation method : Tuorials on Shannom's Fano and Haufman Coding							
UNIT II WAVEFORM CODING & REPRESENTATION							
10	Prediction filtering and DPCM	T1	1	BB	L2	CO2	PO1-PO3
11	Delta Modulation	T1	1	BB	L2	CO2	PO1-PO3
12	ADPCM & ADM principles	T1	1	BB,PPT	L2	CO2	PO1-PO3
13	Linear Predictive Coding	T1	1	BB	L2	CO2	PO1-PO3
14	Properties of Line codes	T1	1	BB	L2	CO2	PO1-PO2
15	Power Spectral Density of Unipolar / Polar RZ	T1	1	BB	L2	CO2	PO1-PO2
6	Polar RZ & NRZ	T1	1	BB	L2	CO2	PO1-PO2
17	Bipolar NRZ	T1	1	BB	L2	CO2	PO1-PO2
18	Manchester	T1	1	BB	L2	CO2	PO1-PO2
Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any :QUIZ							
Evaluation method : MCQ -Google form							
UNIT III BASEBAND TRANSMISSION & RECEPTION							
19	ISI	T1	1	BB	L2	CO3	PO1-PO2

20	Nyquist criterion for distortion less transmission	T1	1	BB	L2	CO3	PO1-PO2
21	Pulse shaping	T1	1	BB	L2	CO3,CO5	PO1-PO2
22	Correlative coding	T1	1	BB	L2	CO3	PO1-PO3
23	Eye pattern	T1	1	BB,PPT	L2	CO3	PO1-PO2
24	Receiving Filters- Matched Filter	T1	1	BB	L2	CO3	PO1-PO3
25	Correlation receiver	T1	1	BB	L2	CO3	PO1-PO4
26	Adaptive Equalization	T1	1	BB	L2	CO3	PO1-PO4
27	Adaptive Equalization	T1	1	BB	L2	CO3	PO1-PO3

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any :

MCQ

Evaluation method : MCQ -Google form

UNIT IV DIGITAL MODULATION SCHEME

28	Geometric Representation of signals	T1	1	BB	L2	CO4	PO1-PO2
29	Coherent BPSK	T1	1	BB	L3	CO4	PO1-PO3
39	BFSK	T1	1	BB	L3	CO4	PO1-PO3,PO5
31	QPSK	T1	1	BB,NPTEL	L3	CO4	PO1-PO3,PO5
32	QAM	T1	1	BB	L3	CO4	PO1-PO3
33	Carrier Synchronization	T1	1	BB	L2	CO4	PO1-PO2
34	Structure of Non-coherent Receivers	T1	1	BB	L2	CO4	PO1-PO2
35	Principle of DPSK.	T1	1	BB	L2	CO4	PO1-PO2
36	Comparision of Signaling Scheme	T1	1	BB	L2	CO4	PO1-PO3

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any

Quiz: Assignment

Evaluation method : Assignment

UNIT V ERROR CONTROL CODING

36	Channel coding theorem	T1	1	BBT	L1	CO5	PO1-PO2
37	Linear Block codes	T1	1	BBT	L3	CO5	PO1-PO2,PO5
38	Linear Block codes	T1	1	BBT	L3	CO5	PO1-PO2,PO5
39	Hamming codes	T1	1	PPT	L2	CO5	PO1-PO3
40	Cyclic codes	T1	1	PPT	L2	CO5	PO1-PO3
41	Convolutional codes	T1	1	PPT	L2	CO5	PO1-PO3.PO5
42	Convolutional codes Examables	T1	1	PPT	L2	CO5	PO1-PO3
43	Viterbi Decoder	T1	1	BB,NPTEL	L2	CO5	PO1-PO3
44	Viterbi Decoder examables	T1	1	BB	L2	CO5	PO1-PO3

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any

Asisgnment on Viterbi Decoder

Evaluation method:

Content Beyond the Syllabus Planned

1	OFDM
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Text Books

1	S. Haykin, —Digital CommunicationsI, John Wiley, 2005 (Unit I –V)
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Reference Books

1	B. Sklar, —Digital Communication Fundamentals and ApplicationsI, 2nd Edition, Pearson Education, 2009
2	B.P.Lathi, —Modern Digital and Analog Communication SystemsI 3rd Edition, Oxford University Press 2007.
3	H P Hsu, Schaum Outline Series – —Analog and Digital CommunicationsI, TMH 2006
4	J.G Proakis, —Digital CommunicationI, 4th Edition, Tata Mc Graw Hill Company, 2001.

Website / URL References

1	http://www.nitttrc.edu.in/nptel/courses/video/117102062/lec24.pdf(QPSK)
2	http://www.nitttrc.edu.in/nptel/courses/video/117104120/lec8.pdf

Blooms Level

Level 1 (L1) : Remembering	Lower Order Thinking	Fixed Hour Exams	Level 4 (L4) : Analysing		Higher Order Thinking	Projects / Mini Projects
Level 2 (L2) : Understanding			Level 5 (L5) : Evaluating			
Level 3 (L3) : Applying			Level 6 (L6) : Creating			

Mapping syllabus with Bloom's Taxonomy LOT and HOT														
Unit No	Unit Name					L1	L2	L3	L4	L5	L6	LOT	HOT	Total
Unit 1	INFORMATION THEORY					1	6	2	0	0	0	9	0	9
Unit 2	WAVEFORM CODING & REPRESENTATION					0	9	0	0	0	0	9	0	9
Unit 3	BASEBAND TRANSMISSION & RECEPTION					0	9	0	0	0	0	9	0	9
Unit 4	DIGITAL MODULATION SCHEME					0	5	0	4	0	0	5	4	9
Unit 5	ERROR CONTROL CODING					1	6	2	0	0	0	9	0	9
Total						2	35	4	4	0	0	41	4	45
Total Percentage						4.44	77.78	8.89	8.89	0.00	0.00	91.11	8.89	100.00
CO PO Mapping														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	0	0	-	-	-	-	-	-	-	-	0
CO2	3	2	1	0	0	-	-	-	-	-	-	1	-	0
CO3	3	2	1	0	0	-	-	-	-	-	-	-	-	0
CO4	3	2	1	0	1	-	-	-	-	-	-	1	-	0
CO5	3	3	1	0	1	-	-	-	-	-	-	-	-	0
Avg	3	2.2	1	0	1	0	0	0	0	0	0	1	-	0
Justification for CO-PO mapping														
CO1	Strong knowledge of mathematical preliminaries for information theory (PO1) and relate it with varoius problems in information (PO2).Less relevance to provide solutions based design (PO3) by interpreting data (PO4).													
CO2	High correlation for PO1 and medium correlation for PO2 is given as the CO2 can be used to apply knowledge of mathematics,science and engineering fundamentals to formulate the waveform coding design(PO3)													
CO3	High correlation for PO1 and medium correlation for PO2 is given as the CO3 can be used to apply knowledge of mathematics,science and engineering fundamentals to formulate the base band transmission schemes (PO3)													
CO4	High correlation for PO1 and medium correlation for PO2 is given as the CO4 can be used to apply knowledge of mathematics,science and engineering fundamentals to formulate the pass band modulation schemes(PO3).Modern tools usage (PO5) and Life long learning required (PO12)													
CO5	Strong knowledge of mathematical preliminaries for error control coding (PO1) and relate it with solving a problems in error control (PO2).Less relevance to provide solutions based design (PO3) by interpreting data (PO4).													
3		High level			2		Moderate level			1		Low level		
Name & Sign of Faculty Incharge : M.Kamarajan														
Name & Sign of Subject Expert :														
Head of the Department : Dr.M.Sivakumar														

