PVP-19

DIGITAL COMMUNICATIONS

Course Code	19EC4501A	**Year**	III	**Semester**	I
Course Category	Program Elective - I	**Branch**	ECE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Nil
Continuous Internal Evaluation	30	**Semester End Evaluation**	70	**Total Marks**	100

Course Outcomes	
Upon successful completion of the course, the student will be able to	
CO1	Construct different Baseband Digital Systems. (L3)
CO2	Analyze different parameters of digital Pass-band modulation Techniques. (L4)
CO3	Analyze different parameters in Spread Spectrum modulation Techniques. (L4)
CO4	Develop various Source Coding techniques.(L3)
CO5	Build Coding sequences for different error correcting codes.(L3)

Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3-High, 2:Medium, 1:Low)

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	2					1		2	2	1
CO2	3	3	3	2	2					1		2	2	1
CO3	3	3	2	2	2					1		2	2	1
CO4	3	3	3	2	2					1		2	2	1
CO5	3	3	2	2	2					1		2	2	1
Average* (Rounded to nearest integer)	3	3	3	2	2					1		2	2	1

Syllabus

Unit No.	Contents	Mapped CO
I	**Waveform Coding Techniques:** Introduction, Pulse code modulation (PCM), Delta modulation, Adaptive delta modulation, Differential Pulse Code Modulation (DPCM), output Signal to quantization Noise ratio in PCM and DM systems. **Base band Pulse Transmission**: Inter symbol interference, Nyquist's Criterion for Distortion less Baseband Binary Transmission, Correlative coding.	CO1
II	**Signal Space Analysis:** Introduction, Gram Schmidt Orthogonalization procedure, Geometric interpretation of signals, Coherent detection of signals in noise, Probability of error, Correlation receiver, Matched filter, Properties. **Digital Modulation Techniques:** Coherent Phase Shift Keying, Coherent Frequency Shift Keying, Quadrature Phase Shift Keying, Non Coherent Frequency Shift Keying, Differential Phase Shift keying.	CO2

III	Spread-Spectrum Modulation: Introduction, Pseudo-Noise Sequences, Direct sequence spread spectrum, Processing Gain, Probability of Error, Antijam Characteristics, Frequency- Hop Spread spectrum, Slow frequency Hopping, Fast Frequency Hopping	CO3
IV	Information Theory: Introduction, information, Entropy, Source Coding Theorem, Data Compaction, Shannon-Fano coding, Huffman coding, Lempel-Ziv Coding, Discrete memory less channels, Mutual information, channel coding Theorem, Differential Entropy , Information Capacity Theorem and its implications.	CO4
V	Error Control Coding: Introduction, Linear Block codes, Syndrome and its Properties, Syndrome Decoding, Cyclic Codes, Encoder, Syndrome calculator, Convolutional Codes, Code Tree, Trellis and State Diagram.	CO5

Learning Resources
Text Books
1. Digital communications, Simon Haykin, John Wiley, 4th Edition 2010 2. Digital Communications–John Proakis, TMH, 3rd Edition, 1995
Reference Books
1. Digital and Analog Communication Systems – Sam Shanmugam, John Wiley, 1979 2. Communication systems–AB Carlson, McGraw-Hill,4th Edition, 2002 3. Principles of Communication Systems–H.Taub , D.Schilling, TMH, 3rd Edition, 2008 4. Digital communications –B Sklar, Pearson Education, 2nd Edition, 2013
e-Resources & other digital material
1. http://www.ece.utah.edu/~npatwari/ece5520/lectureAll.pdf 2. http://nptel.iitm.ac.in/syllabus/syllabus.php?subjectId=117105077