

GANPAT UNIVERSITY										
FACULTY OF DIPLOMA ENGINEERING										
Programme		Diploma Engineering				Branch/Spec.		Electronics and Communication Engineering		
Semester		VI				Version		1.0.0.0		
Effective from Academic Year			2026-27			Effective for the Batch admitted in			July2024	
Course Code		1EC61PE01		Course Name		Information Theory and Coding				
Teaching Scheme						Examination Scheme(Marks)				
(Per week)		Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW						
Credit	3	0	1	0	4	Theory	40	60		100
Hours	3	0	2	0	5	Practical	30	20		50
Pre-requisites										
Probability theory, Linear Algebra										
Course Outcomes										
On successful completion of the course, the students will be able to:										
CO1	Understand the basics of Information theory, techniques of coding and decoding.									
CO2	Analyze and compare different coding and decoding schemes Evaluate.									
CO3	Solve numerical problems on channel capacity and coding.									
CO4	Evaluate and case study broadcast channels for different coding schemes and also multiuser channel coding.									
Theory Syllabus										
Unit	Content									Hrs.
1	Basics of information theory: Measure of information, Entropy for discrete ensembles, differential entropy and mutual information; Shannon's noiseless coding theorem, Calculation of channel capacity and bounds for discrete channels, continuous channels, application to continuous channels.									10
2	Source Coding: Encoding of discrete sources, Markov sources, Shannon's noisy coding theorem and converse for discrete channels, Huffman coding.									08
3	Introduction to Error Control Coding: Introduction, Types of errors, examples, Types of codes Linear Block Codes: Matrix description, Error detection and correction, Standard arrays and table look up for decoding.									10
4	Cyclic Codes: Binary Cycle Codes, Algebraic structures of cyclic codes, Encoding using an (n-k) bit shift register, Syndrome calculation. BCH codes, RS codes, Golay codes, Shortened cyclic codes, Burst error correcting codes. Burst and Random Error correcting codes.									08
5	Convolutional Codes: Convolutional codes; majority logic decoding; Viterbi decoding algorithm, Trellis codes.									09
Practical Content										
Practical assignments are based on the above syllabus.										
Text Books										
1	Digital communication, Simon Haykin, John Wiley, 2003									
2	Information Theory Coding and Cryptography, Ranjan Bose, TMH, II edition, 2007									
Reference Books										
1	Digital communication, Amitabh Bhattacharya, McGraw Hill Education, 2017.									
2	Elements of Information Theory, Thomas M. Cover, Joy A. Cover, John Wiley, 2 nd Editon.									
3	Digital Communications - Glover and Grant; Pearson Ed. 2nd Ed 2008									
4	Modern Digital and Analog Communication Systems by B.P.Lathi, Zhi Ding, Oxford , 2011.									

ICT/MOOCs Reference	
1	https://nptel.ac.in/courses/108102117

Mapping of CO with PO and PSO:															
	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	P S O 1	P S O 2	P S O 3
CO1	3	3	2	3	3	0	0	0	0	1	0	2	3	3	2
CO2	2	2	2	3	2	0	0	0	1	1	1	3	3	2	3
CO3	1	2	3	2	3	0	0	0	0	1	0	3	3	1	2
CO4	3	1	2	3	2	0	0	0	0	1	0	2	2	3	3