

2	Morison, I., <i>Introduction to Astronomy and Cosmology</i>	Wiley
3	Kutner, M.L., <i>Astronomy: A Physical Perspective</i>	Cambridge University Press
4	Green, S.F. & Jones, M.H., <i>An Introduction to the Sun and Stars</i>	Cambridge University Press
5	Jones, M.H. & Lambourne, R.J.A., <i>An Introduction to Galaxies & Cosmology</i>	Cambridge University Press
6	Carroll, B.W. & Ostlie, D.A., <i>An Introduction to Modern Astrophysics</i>	Pearson

1. Subject Code: **EP-409**

Course Title: **Information Theory and Coding**

S. No.	Contents	Contact Hours
1.	UNIT-I: Review of probability theory, Definition of Information Measure and Entropy: Measure of information, Average information content of symbols in long independent sequences, Average information content of symbols in long dependent sequences. Mark-off statistical model for information source, Entropy and information rate of mark off source, Mutual information. Asymptotic Properties of Entropy and Problem Solving in Entropy	08
2.	UNIT-II: Block Code and its Properties, Data compression, Kraft-Mcmillan Equality and Compact Codes, Encoding of the source output, Shannon's encoding algorithm, Coding Strategies, Huffman Coding, Shannon-Fano-EliasCoding and Introduction to Arithmetic Coding.	08
3.	UNIT-III: Introduction to Information Channels, Communication Channels, Discrete communication channels, Continuous channels. Discrete memory less Channels, Mutual information, Channel Capacity, Channel coding theorem, Differential entropy and mutual information for continuous ensembles, Channel capacity Theorem.	08
4.	UNIT-IV: 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	09
5.	UNIT-V: 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. Convolution Codes, Time domain approach. Transform domain approach	09
	Total	42

2. Contact Hours :

L : 3 T : 1 P : 0

3. Examination Duration (Hrs.) :

Theory : 3 Practical : 0

4. Relative Weight :

CWS : 25 PRS : 0 MTE : 25 ETE : 50 PRE : 0

5. Credits :

4

6. Semester :

ODD

7. Subject Area :

DEC-5

8. Pre-requisite :

Nil

9. Objective :

To introduce information theory, the fundamentals of error control coding techniques and their applications

10. Details of Course

11. Suggested Books

S. No.	Name of Books/Authors	Year of Publication/ Reprint
1	Digital and Analog Communication Systems by K. Sam Shanmugam / Wiley India Private Limited	2012
2	Digital Communications by Simon Haykin/ Wiley	2006