

**DR. A.P.J. ABDUL KALAM TECHNICAL UNIVERSITY
LUCKNOW**



Study & Evaluation Scheme with Syllabus

For

B.Tech. Second Year

(Information Technology)

On

Choice Based Credit System

(Effective from the Session: 2017-18)

THIRD SEMESTER

S. No.	Subject Code	Subject Name	L-T-P	Th/Lab ESE	Sessional		Total	Credit
					CT	TA		
1	RAS301/ ROE030, 032 to 037, 039	Mathematics-III/ Science Based OE	3-1-0	70	20	10	100	4
2	RVE301/ RAS302	Universal Human Values & Professional Ethics / Environment & Ecology	3-0-0	70	20	10	100	3
3	REC301	Digital Logic Design	3-0-0	70	20	10	100	3
4	RCS301	Discrete Structures & Theory of Logic	3-0-0	70	20	10	100	3
5	RCS302	Computer Organization and Architecture	3-0-0	70	20	10	100	3
6	RCS303	Data Structures	3-1-0	70	20	10	100	4
7	RCS351	Digital Logic Design Lab	0-0-2	50	30	20	100	1
8	RCS352	Discrete Structure & Logic Lab	0-0-2	50	30	20	100	1
9	RCS353	Computer Organization Lab	0-0-2	50	30	20	100	1
10	RCS354	Data Structures Using C / Java Lab	0-0-2	50	30	20	100	1
	TOTAL						1000	24

Science Based Open Electives:

1. ROE030/040 Manufacturing Process
2. ROE032/042 Nano Science
3. ROE033/043 Laser System and Application
4. ROE034/044 Space Science
5. ROE035/045 Polymer Science & Technology
6. ROE036/046 Nuclear Science
7. ROE037/047 Material Science
8. ROE039/049 Applied Linear Algebra

FOURTH SEMESTER

S. No.	Subject Code	Subject Name	L-T-P	Th/Lab ESE	Sessional		Total	Credit
					CT	TA		
1	ROE040, 042 to 047, 049/ RAS401	Science Based OE/ Mathematics-III	3-1-0	70	20	10	100	4
2	RAS402/ RVE401	Environment & Ecology/ Universal Human Values & Professional Ethics	3-0-0	70	20	10	100	3
3	REC40	Information Theory and Coding	3-0-0	70	20	10	100	3
4	RCS401	Operating Systems	3-0-0	70	20	10	100	3
5	RCS402	Software Engineering	3-0-0	70	20	10	100	3
6	RCS403	Theory of Automata and Formal Languages	3-1-0	70	20	10	100	4
7	RCS451	Operating Systems Lab	0-0-2	50	30	20	100	1
8	RCS452	Software Engineering Lab	0-0-2	50	30	20	100	1
9	RCS453	TAFL Lab	0-0-2	50	30	20	100	1
10	RCS454	Python Language Programming Lab	0-0-2	50	30	20	100	1
	TOTAL						1000	24

Science Based Open Electives:

1. ROE030/040 Manufacturing Process
2. ROE032/042 Nano Science
3. ROE033/043 Laser System and Application
4. ROE034/044 Space Science
5. ROE035/045 Polymer Science & Technology
6. ROE036/046 Nuclear Science
7. ROE037/047 Material Science
8. ROE039/049 Applied Linear Algebra

REC40: INFORMATION THEORY AND CODING

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

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-Elias Coding and Introduction to Arithmetic Coding.

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.

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

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.

References:

1. K. Sam Shanmugam, "Digital and analog communication systems", John Wiley.
2. Simon Haykin, "Digital communication", John Wiley.
3. Ranjan Bose, "ITC and Cryptography", Tata McGraw-Hill.
4. Thomas M. Cover, Joy A. Thomas, "Elements of Information Theory, 2nd Edition", Wiley Publication.
5. Roberto Togneri, Christopher J.S deSilva, "Fundamentals of Information Theory and Coding Design", CRC Press.
6. Steven Roman, "Introduction to Coding and Information Theory", Springer New York.
7. Glover and Grant, "Digital Communications", Pearson Education