20BSM401T					Discrete Mathematics					
Teaching Scheme					Examination Scheme					
L	T	P	C	Hrs. / Week	Theory			Practical		Total Marks
					MS	ES	IA	LW	LE/Viva	
3	1	0	4	4	25	50	25	--	--	100

COURSE OBJECTIVES

- To understand the concept of recursive functions and its solution.
- To apply truth tables for validation of propositions.
- To apply the Karnaugh maps to simplify Boolean expression.
- To construct the finite state machine.

UNIT 1 RECURSIVE FUNCTIONS **10 Hrs.**

Recursive function, Recurrence relations (n^{th} order recurrence relation with constant coefficients, Homogeneous recurrence relations, Inhomogeneous recurrence relation), Generating function (closed form expression, properties of G.F., Solution of recurrence relation using G.F).

UNIT 2 PROPOSITIONAL LOGIC **10 Hrs.**

Proposition logic, Logical connectives, Truth tables, Tautologies, Contradiction, Normal forms (conjunctive and disjunctive), Modus ponens and modus tollens, Validity, Predicate logic, Universal and existential quantification. contrapositive, negation, and contradiction, Direct proof, Proof by using truth table.

UNIT 3 LANGUAGES, GRAMMARS AND MACHINES **10 Hrs.**

Alphabets and Words, Languages, Operations on Languages, Regular Languages, Finite State Automata, Grammars, Types of Grammars, Finite State Machine, State Diagram.

UNIT 4 BOOLEAN ALGEBRA **10 Hrs.**

Basic definitions, Duality, Boolean algebra as Lattices, SoP form for Sets, SoP form for Boolean algebra, Minimal Boolean expressions, Minimal SoP Form, Logic Gates and Circuits, Karnaugh maps.

40 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 – Understand concepts needed to test the logic of a program.
CO2 – Apply the Karnaugh maps to simplify Boolean expression.
CO3 – Explain the concept of Languages and Grammar and its use.
CO4 – Construct the finite state machine.
CO5 – Defend and point out fallacious reasoning and propositions.
CO6 – Create and solve recurrence relations that arise in counting problems including problems of determining the time complexity of recursively defined algorithms.

TEXT / REFERENCE BOOKS

1. S. Lipschutz and M. Lipson, Discrete Mathematics, 3rd ed., Schaum Series (TMH), 1997.
2. Kenneth H Rosen, Discrete Mathematics and Its Applications, 7th ed., Tata McGraw Hill, 2011.
3. B. Kolman, , R. Busby and S. C. Ross, Discrete Mathematical Structures, 6th ed., Pearson, 2008.
4. T. Koshy, Discrete Mathematics with Applications, Academic Press Inc., 2004.
5. R. P. Grimaldi, Discrete and Combinatorial Mathematics, 5th ed., Pearson Education, 2006.
6. C.L. Liu, D.P. Mohapatra, Elements of Discrete Mathematics: **:** A Computer Oriented Approach, 4th ed., McGraw Hill Education, 2017.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100	Exam Duration: 3 Hrs.
Part A: 6 questions of 4 marks each	24 Marks
Part B: 6 questions of 8 marks each	48 Marks
Part C: 2 questions of 14 marks each	28 Marks