22CPA01 - THEORETICAL FOUNDATIONS OF COMPUTER SCIENCE					
			L	**T**	**P**	**C**
			3	**0**	**0**	**3**
PREREQUISITE : NIL					
Course Objectives		**Course Outcomes**			
1.0	To learn about cardinality, finite and countable infinite sets and to determine their characteristics	**1.1**	The Students will be able to arrive at conclusions about sets and relations, construct the number of arrangements and selections using principles of counting.		
2.0	To impart the knowledge of propositional and predicate logics.	**2.1**	The Students will be able to solve propositional logic, including modeling English description with propositions and connectives along with truth analysis and will be conversant in predicate logic.		
3.0	To explain about various types of graphs including Regular graphs and Random graphs.	**3.1**	The Students will be able to identify spanning trees, cut sets, isomorphism and different representation of a graph.		
4.0	To inculcate more complex queuing systems.	**4.1**	The Students will be able to analyze the basic characteristic features of a queuing system and models.		
5.0	To gain knowledge on advanced courses in automation theory, formal languages, algorithms & logic.	**5.1**	The Students will be able to solve problems using formal languages and automata.		

UNIT I - FOUNDATIONS	**(9)**
Sets-Relations-Equivalence relations-Partial orders-Functions-Recursive functions-Sequences-Induction principle- Structural induction-Recursive algorithms-Counting - Pigeonhole principle-Permutations and Combinations (Self study)-Recurrence relations.	
UNIT II - LOGIC	**(9)**
Propositional logic-Logical connectives-Truth tables-Normal forms (conjunctive and disjunctive)-Predicate logic- Universal and existential quantifiers-Proof techniques-Direct and Indirect-Proof by contradiction-Mathematical Induction (Self study).	
UNIT III - GRAPH STRUCTURES	**(9)**
Tree Structures- Graph Structures- Graph Representations-Regular graph structures-Random graphs-Connectivity- Cycles-Graph coloring-Cliques, Vertex Covers, Independent sets-Spanning Trees-Network flows(Self study)- Matching.	
UNIT IV - QUEUE MODELS	**(9)**
Characteristics of Queuing Models- Kendal's Notation-Single and Multi-Server Markovian queuing models – M/M/1, M/M/C(Self study) (finite and infinite capacity) and (M/G/1) :(∞/GD).	

UNIT V - MODELING COMPUTATION AND LANGUAGES	(9)
Finite state machines – Deterministic and Non- deterministic finite state machines – Turing Machines – Formal Languages – Classes of Grammars – Type 0 – Context Sensitive – Context Free – Regular Grammars(Self study) – Ambiguity.	
TOTAL (L:45) : 45 PERIODS	

REFERENCES :

1. Kenneth H. Rosen, "Discrete Mathematics and its Applications", 7th edition, TMH, 2011.
2. M.K. Venkataraman, N. Sridharan and N.Chandrasekaran," Discrete Maths.", The National Publishing Company, 2003.
3. Kishore S Trivedi, "Probability and statistics with reliability, Queuing and computer science applications", PHI, 2006.
4. H. A.Taha, ," Operations Research" - An Introduction,9th Edition, Prentice Hall of India Ltd New Delhi, 2014.
5. Ralph P Girmaldi and B.V. Ramana ,"Discrete and Combinatorial Mathematics: An Applied Introduction", Pearson Education ,Asia, Delhi, 5th Edition, 2006.

Mapping of COs with POs / PSOs

COs	POs						PSOs	
	1	2	3	4	5	6	1	2
1	2	-	1	-	-	2	2	-
2	3	-	1	2	-	2	2	-
3	3	-	1	-	-	2	-	2
4	2	-	-	1	1	2	-	-
5	3	-	1	2	-	2	2	2
CO (W.A)	3	-	1	2	1	2	2	2