

Semester	6
Course	MAJOR
Paper Code	
Paper Title	THEORY OF COMPUTATION
No. of Credits	4
Theory / Practical / Composite	THEORY
Minimum No. of preparatory hours per week a student has to devote	5
Number of Modules	TWO
Syllabus	GROUP A 1. Introduction to Theory of Automata: Mathematical Preliminaries and notation, Basic concepts of Languages, Grammars and Automata, Some Applications 2. Languages: Alphabets, string, language, Basic Operations on language, Concatenation, Kleene's Star, Kleene's theorem. 3. Finite Automata and Regular Languages: Regular Expressions, Transition Graphs, Deterministic Finite automata (DFA) and non-deterministic finite automata (NFA), NFA to DFA Conversion, Regular languages and their relationship with finite automata, Pumping lemma and closure properties of regular languages. GROUP B 4. Context free languages: Chomsky hierarchy of languages, Context free grammars, parse trees, ambiguities in grammars and languages, Pushdown automata (Deterministic and Non-deterministic), Properties of context free languages, Chomsky Normal Form(CNF), Greibach Normal Form(GNF). 5. Turing Machines and Models of Computations context sensitive language, Turing Machine as a model of computation, Designing Turing, Non deterministic Turing machine, halting problem. 6. Other Turing Models: Linear bounded automata, Universal Turing Machine.
Learning Outcomes	1. To give an overview of the theoretical foundations of computer science from the perspective of formal languages. 2. To illustrate finite state machines to solve problems in computing. 3. To familiarize Regular grammars, context free grammar. 4. To use basic concepts of formal languages of finite automata techniques. 5. To solve various problems of applying normal form techniques, push down automata and Turing Machines. 6. After the completion of this course the students should find themselves favorably positioned to learn the design of a compiler

Reading/Reference Lists	1. P. Linz, An Introduction to Formal Language and Automata 4th edition Publication Jones Bartlett, 2006 2. Hopcroft, Aho, Ullman, Introduction to Automata theory, Language & Computation–3rd Edition, Pearson Education. 2006 3. Lewis & Papadimitriou, Elements of the theory of computation, PHI 1997.	
Evaluation	Theory CIA: 25 Attendance: 5 Semester Exam: 70	
Paper Structure	GROUP A: Answer 5 out of 7 of 7 marks each GROUP B: Answer 5 out of 7 of 7 marks each	