

Course Title	Theory of Automata and Formal Languages		
Course Code	DC-320		
Credit Hours	3 (3,0)		
Category	Computer Science Core		
Prerequisite	None		
Co-Requisite	None		
Follow Up	None		
Course Learning Outcomes (CLOs)	At the end of the course, the students will be able to:	BT	PLO
	CLO1: Explain and manipulate the different concepts in automata theory and formal languages such as formal proofs, automata, regular expressions, Turing machines etc.	C2 (Understand)	1, 2
	CLO2: Prove properties of languages, grammars and automata with rigorously formal mathematical methods	C2 (Understand)	1, 2
	CLO3: Design of automata, RE and CFG	C3 (Apply)	3, 4
	CLO4: Transform between equivalent NFAs, DFAs and REs	C3 (Apply)	3, 4
	CLO5: Define Turing machines performing simple tasks	C2 (Understand)	1, 2
	CLO-6 Differentiate and manipulate formal descriptions of languages, automata and grammars with focus on regular and context-free languages, finite automata and regular expressions.	C3 (Apply)	3, 4
Course Description	Finite State Models: Language definitions preliminaries, Regular expressions/Regular languages, Finite automata (FAs), Transition graphs (TGs), NFAs, Kleene's theorem, Transducers (automata with output), Pumping lemma and non-regular language Grammars and PDA: CFGs, Derivations, derivation trees and ambiguity, Simplifying CFLs, Normal form grammars and parsing, Decidability, Context sensitive languages, grammars and linear bounded automata (LBA), Chomsky's hierarchy of grammars Turing Machines Theory: Turing machines, Post machine, Variations on TM, TM encoding, Universal Turing Machine, Defining Computers by TMs.		
Text Book(s)	1. Daniel I. A. Cohen, "Introduction to computer theory", 2 nd Ed., Wiley India Pvt. Limited, 2007. ISBN 0471137723, 9780471137726		
Reference Material	1. Peter Linz, "An Introduction to Formal Languages and Automata", 5 th Ed., Jones & Bartlett Publishers, 2011. ISBN: 144961552X, 9781449615529		