

Date: 10/07/2021

BHCS 12 - Theory of Computation
Discipline specific core course (LOCF)

Unit	Topic	Chapter	Reference	Total Hours
1.	Languages: Alphabets, String, Language, Basic operations on language, Concatenation, Union, Kleene Star	2	[1]	5
2.	Regular Languages and Finite Automata: a) Regular expressions b) Deterministic finite automata (DFA)	4 5	[1] [1]	12
3.	Regular Languages: a) Non-deterministic finite automata (NFA) b) Relationship between NFA and DFA c) Transition graphs (TG) d) Properties of regular languages e) The relationship between regular languages and finite automata (Converting RE into FA and vice-versa) f) Kleene's theorem	7 7 6 9 7 7	[1] [1] [1] [1] [1] [1]	15
4.	Non-Regular Languages and Context Free Grammars: a) Pumping lemma for regular grammars (Excluding Myhill-Nerode theorem & Quotient Languages) b) Context-free grammars (CFG), parse tree (Excluding Lukasiewicz notation)	10 12	[1] [1]	10
5.	Context-Free Languages (CFL) and Pushdown Automata (PDA): a) Deterministic and non-deterministic pushdown automata b) Grammatical Format (Including killing Λ (null) productions, killing unit productions, Chomsky normal form (CNF), leftmost derivation) c) Pumping lemma for CFL d) Properties of CFL (Excluding mixing context-free and regular languages)	14 13 16 17	[1] [1] [1] [1]	10
6.	Turing Machines and Models of Computations: a) Simple Turing machine (configuration and computation) b) Decidability (Church Turing thesis, universal Turing machine, halting problem)	4 (upto 4.2) 5 (upto 5.3)	[2] [2]	8

References

1. Cohen, D. I. A. (2011). **Introduction to Computer Theory**. 2nd edition. Wiley India.
2. Lewis, H.R. & Papadimitriou, H. R. (2002). **Elements of the Theory of Computation**. 2nd edition. Prentice Hall of India (PHI)



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