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RGPV B.Tech – CSE 5th Semester Syllabus

CS-501: Theory of Computation

Unit I: Finite Automata

- Introduction to formal languages and automata
- Deterministic and Non-deterministic Finite Automata
- Equivalence of DFA and NFA
- Regular expressions and their equivalence with FA

Unit II: Context-Free Grammars

- Definition and examples of CFG
- Parse trees and ambiguity
- Chomsky Normal Form and Greibach Normal Form
- Pumping lemma for regular and context-free languages

Unit III: Pushdown Automata

- Definition and working of PDA
- Equivalence of PDA and CFG
- Designing PDA for simple languages

Unit IV: Turing Machines

- Basic model and definition
- Designing TM for simple problems
- Church-Turing thesis
- Undecidability and Halting Problem

Unit V: Computability and Complexity

- Recursive and recursively enumerable languages

- Time and space complexity
- Introduction to P, NP, and NP-complete problems

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