

BCO 017A	FORMAL LANGUAGES & AUTOMATION THEORY	3-1-0 [4]
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Objective:

- To understand various Computing models like Finite State Machine, Pushdown Automata, and Turing Machine.
- To understand Decidability and Undesirability of various problems
- To construct pushdown automata and the equivalent context free grammars.
- To prove the equivalence of languages described by pushdown automata and context free grammars.
- To construct Turing machines and Post machines and prove the equivalence of languages described by Turing machines and Post machines.

UNIT 1	Basics of Strings and Alphabets, Finite Automata – DFA, transition graphs, regular languages, non-deterministic FA, equivalence of DFA and NDFA, Mealy and Moore Machine, minimization of Finite Automata,
UNIT 2	Regular grammars, regular expressions, equivalence between regular languages, properties of regular languages, pumping lemma. Relationship between DFA and Regular expression.
UNIT 3	Context Free Languages – Leftmost and rightmost derivation, parsing and ambiguity, ambiguity in grammar and languages, simplification of CFG, Normal forms
UNIT 4	Pushdown Automata – NDPDA, DPDA, context free languages and PDA, comparison of deterministic and non-deterministic versions, closure properties, pumping lemma for CFL,
UNIT 5	Turing Machines, variations, halting problem, PCP, Chomsky Hierarchy, Recursive and Recursive enumerable language, Rice Theorem.

Course Outcomes: At the end of the course, the student should be able to:

CO1: Understand and construct finite state machines and the equivalent regular expressions.

CO2: Prove the equivalence of languages described by finite state machines and regular expressions.

CO3: Construct pushdown automata and the equivalent context free grammars.

CO4: Prove the equivalence of languages described by pushdown automata and context free grammars.

CO5: Construct Turing machines and Post machines and prove the equivalence of languages described by Turing machines and Post machines