

# FINITE AUTOMATA AND FORMAL LANGUAGES

## IV SEM

Course Code: 16CS205

### Module 1

**Introduction to Finite Automata:** Study and Central concepts of automata theory, An informal picture of finite automata, deterministic and non-deterministic finite automata, applications of finite automata, finite automata with epsilon – transitions.

### Module 2

**Regular expression and languages:** Regular expressions, finite automata and regular expressions, algebraic laws of regular expressions. applications of regular expressions such as Grep, and Lex etc.  
Properties of Regular Languages: closure properties of regular languages, Pumping Lemma, equivalence and minimisation of automata.

### Module 3

**Context – free Grammars and Languages:** Context free grammars, Context-free languages, Parse trees, Ambiguity in grammars and languages  
Pushdown Automata: Pushdown automation (PDA), the language of PDA, equivalence of PDA's and CFG's, Deterministic Pushdown Automata.

### Module 4

**Properties of Context – Free Languages:** Normal forms of context free grammars, pumping lemma for context free languages, closure properties of context free languages. Applications of CFG – such as spec of programming languages, parsing techniques, and Yacc.

### Module 5

**Introduction to Turing Machine:** The Turing machine, programming techniques for Turing machine, extensions to the basic Turing machine, restricted Turing Machines, Turing Machines and Computers. Chomsky hierarchy.