

MSCS301 COMPILER DESIGN (3-0-0)

Module I (9Hrs)

Introduction to Automata Theory: Alphabet, Language, DFA, NFA, NFA- ϵ , Equivalence of DFA and NFA, Minimisation of DFA, Regular Language, Regular Expression, Conversion of Regular Expression to FA.

Module II (9Hrs)

Compiler Structure: Model of compilation, various phases of a compiler. Lexical analysis: Interface with input parser and symbol table, token, lexeme and patterns, difficulties in lexical analysis, input buffering. Specification of tokens.

Syntax Analysis: Grammar, Parsing, ambiguity, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing LL(1) grammar, Bottom up parsing, operator precedence grammars, LR parsers (SLR, CLR, LALR).

Module III(9Hrs)

Syntax directed definitions: Inherited and synthesized attributes, dependency graph, evaluation order, L- and S-attributed definitions. Type checking: type system, type expressions, structural and name equivalence of types, type conversion.

Run time system: storage organization, activation tree, activation record, parameter passing, symbol table, dynamic storage allocation.

Symbol table management: Data structure for symbol table organization. Error Handling and recovery.

Module IV (9Hrs)

Intermediate code generation: intermediate code representation techniques. Intermediate Code generation for control flow, function call, Boolean expressions and procedure calls.

Code optimization: source of optimizations, optimization of basic blocks, loops, code improving transformations.

Code generation and instruction selection: Issues, basic blocks and flow graphs, register allocation, code generation, DAG representation of programs, peep hole optimization.

Text Books:

1. Alfred V. Aho, Ravi Sethi, and Ullman, "Compilers Principles, Techniques and Tools", 2nd Edition, 2012, Pearson Publication
2. K. C. Louden, "Compiler Construction, Principle and Practice", 1st Edition, 1997, Cengage Publication

Reference Books:

1. V.Raghvan, "Principles of Compiler Design", 1st Edition, 2017, TMH Publication
2. Levine, Mason and Brown, "Lex & Yacc", 2nd Edition, 1992, O' Reilly Publication