(IT609) MODERN COMPILER DESIGN

(ELECTIVE - I)

Objective of the Course :

This course deals with modern techniques like yacc and LEX and different phases of compiler design and parsing techniques.

UNIT - I

Course Contents : Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction. Lexical analysis: interface with input, parser and symbol table, token, lexeme and patterns. Difficulties in Lexical analysis. Error reporting. Implementation. Regular definition, Transition diagrams, LEX.

UNIT - II

Syntax analysis : CFGs, ambiguity, associativity, precedence, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), YACC.

UNIT - III

Syntax directed definitions: inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions. Type checking: type system, type expressions, structural and name equivalence of types, type conversion, overloaded functions and operators, polymorphic functions.

UNIT - IV

Run time system: Storage organization, activation tree, activation record, parameter passing, symbol table, dynamic storage allocation. Intermediate code generation: intermediate representations, translation of declarations, assignments, control flow, Boolean expressions and procedure calls. Implementation issues.

UNIT - V

Code generation and instruction selection: Issues, basic blocks and flow graphs, register allocation, code generation, dag representation of programs, code generation from dags, peep hole optimization, code generator generators, specifications of machine.

TEXT BOOKS :

- 1. A. V. Aho, R. Sethi, and J. D. Ullman. Compilers: Principles, Techniques and Tools, 1st ed., Addison-Wesley, 1988.
- 2. C. Fischer and R. LeBlanc. Crafting a Compiler, 1st ed., Benjamin Cummings, 1991.

REFERENCES BOOKS :

- 1. C. Fischer and R. LeBlanc. Crafting a Compiler in C , Benjamin Cummings. A. C. Holub. Compiler Design in C , 1st ed., Prentice-Hall Inc., 1993.
- 2. Andren W.appel, "Modern Compiler Implemantation in C basic design 1st ed., cambridge press, 1997.
- 3. Andren W.appel, "Modern Compiler Implemantation in JAVA basic design 2nd ed., cambridge press, 2002.
- 4. David R. Hanson and christopher W. Fraser "A retargetable C compiler: Design and Implementation", 1st ed., Addsion-Wesley Professional, 1995.