

COMPILER DESIGN

Paper Code: ETCS-302
Paper: Compiler Design

L	T/P	C
3	1	4

INSTRUCTIONS TO PAPER SETTERS:

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This course aims to teach students the principles involved in compiler design. It will cover all the basic components of a compiler, its optimizations and machine code generation. Students will be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.

UNIT- I

Brief overview of the compilation process, structure of compiler & its different phases, lexical analyzer, cross compiler, Bootstrapping, quick & dirty compiler, Shift-reduce parsing, operator- precedence parsing, top-down parsing, predictive parsing, LL(1) and LL(k) grammar, bottom up parsing, SLR, LR(0), LALR parsing techniques.

[T1][T2][R1][No. of Hrs. 12]

UNIT- II

Design and implementation of a lexical analyzer and parsing using automated compiler construction tools(eg. Lex, YACC, PLY), Syntax-directed translation schemes, implementation of syntax directed translations, intermediate code, postfix notation, three address code, quadruples, and triples, translation of assignment statements, Boolean expressions, control statements, Semantic Analysis, Type Systems, Type Expressions, Type Checker, Type Conversion

[T2][R1][R3][R4][R5][No. of Hrs. 12]

UNIT- III

Symbol table, data structures and implementation of symbol tables, representing scope information.

Run Time Storage Administration, implementation of a simple stack allocation scheme, storage allocation in block structured languages and non block structured languages, Error, Lexical-phase errors, syntactic-phase errors, semantic errors.

[T1][T2][R2][No. of Hrs. 10]

UNIT-IV

The principle sources of optimization, loop optimization, the DAG representation of basic blocks, value number and algebraic laws, global dataflow analysis, Object programs, problems in code generation, a machine model, a single code generator, register allocation and assignment, code generation from DAGs, peephole optimization.

[T1][T2] [No. of Hrs. 10]

Text Books:

- [T1] Alfred V. Aho & J.D. Ullman, "Compiler Principles, Techniques & Tools", Pearson
[T2] Kenneth C. Louden, "Compiler Design", Cengage Publication

Reference Books:

- [R1] Kakde O.G., "Compiler Design", Laxmi Publication
[R2] Trembley and Sorenson, "Theory and Practice of Compiler Writing", McGraw Hill
[R3] Vinu V. DAS, "Compiler Design Using FLEX and YACC", PHI
[R4] Jhon R. Levine, Tony Mason and Doug Brown, "Lex & Yacc", O'Reilly.pdf
[R5] Andrew W. Appel, Maia Ginsburg, "Modern Compiler Implementation in C", Cambridge University Press