

## List of New Courses Introduced in the Academic Year 2017-2018

### ODD SEM

S.No	Course Code	Name of the Course
1	SCS1301	Compiler Design
2	SCS1304	System Software

SCS1303	COMPILER DESIGN	L	T	P	Credits	Total Marks
		3	0	0	3	100

#### UNIT 1 INTRODUCTION

9 Hrs.

Components of system software - editor - debugger - linker - loader - assembler - case study.

#### UNIT 2 BASICS OF COMPILER

9 Hrs.

Compiler - Structure Of Compiler - Phases - Representation Of Lexical Phase Using Regular Expression - Representation Of Regular Expression - Finite Automata to Design Lexical Phase - Minimized DFA Algorithm.

#### UNIT 3 PARSER

9 Hrs.

Types Of Parser - Shift Reduce Parsing - Operator Precedence Parsing - Recursive Decent Parser - Non-Recursive Decent Parser.

#### UNIT 4 INTERMEDIATE CODE GENERATION

9 Hrs.

Intermediate code generation for assignment statements - Boolean statements - switch case statement - symbol table generation.

#### UNIT 5 OPTIMIZATION

9 Hrs.

Optimization - issues related to optimization - loop optimization - peep hole optimization - three address code generation algorithm - examples.

Max. 45 Hours

#### COURSE OUTCOMES

On completion of the course, student will be able to

CO1 : Model a finite automata for any given regular expression.

CO2 : Analyze various Parsing methods.

CO3 : Generate the intermediate code and symbol table.

CO4 : Apply code optimization methods to improve efficiency of the code

CO5 : Formulate the issues involved in code Generation Process.

CO6 : Construct the target code for given source code.

#### TEXT / REFERENCE BOOKS

1. D M. Dhamdhere , “System Programming”, 2nd Edition, Tata McGraw Hill Publishing, 1999.
2. Alfred V.Aho, Jeffery D.Ullman & Ravi Sethi, ” Compiler Principles, Techniques & Tools”, Addison-Wesley Publishing Company, 1986
3. Alfred V.Aho, Jeffery D.Ullman “Principles of Compiler Design”, Narosa Publihing House, 15th reprint, 1996.

#### END SEMESTER EXAM QUESTION PAPER PATTERN

Max. Marks : 100

Exam Duration : 3 Hrs.

PART A : 10 questions of 2 marks each- No choice

20 Marks

PART B : 2 questions from each unit of internal choice, each carrying 16 marks

80 Marks

SCS1304	SYSTEM SOFTWARE	L	T	P	Credits	Total Marks
		3	0	0	3	100

### COURSE OBJECTIVES

- To understand, design and implement a lexical analyzer.
- To understand, design and implement a parser.
- To understand, design code generation schemes.
- To understand optimization of codes and runtime environment.
- To familiarize Assemblers, Macroprocessor and Loaders.

### UNIT 1 COMPILERS - LEXICAL ANALYSIS

7 Hrs.

Structure of compiler - Role of lexical analyzer - Regular expression - Finite automata - Regular expression to finite automata - Minimizing DFA - Introduction to LEX and YACC programming

### UNIT 2 PARSE

8 Hrs.

Context free grammar - Derivations - Parse trees - Capabilities of context free grammar - Types of parser - Shift reduce parsing - Operator precedence parsing - Recursive decent parser - Non-recursive decent parser.

### UNIT 3 INTERMEDIATE CODE GENERATION

10 Hrs.

Syntax directed translation scheme - Types of translation scheme - Implementation of desktop calculator - Types of intermediate codes- Postfix notation - Parse trees - Syntax trees - Three address code - Quadruples - Triple - Translation of assignment statements - control flow statements - Backpatching - Boolean statements - Procedure call - switch case statements - Symbol table.

### UNIT 4 CODE GENERATION AND OPTIMIZATION

10 Hrs.

Principles of source of optimization - Loop optimization - DAG representation of basic block - Value number and algebraic laws - Global data flow analysis - Dominators - Reducible flow graph - Depth first search - Loop invariant computations - Induction variable elimination - Peephole optimization - Issues in code generation- Code generation algorithm.

### UNIT 5 ASSEMBLER, MACROPROCESSORS, LOADER

10 Hrs.

Assembler - Elements of ALP - Pass structure of assembler - Design of two pass assembler. Macro definition and call - Macro expansion - Nested macro call - Advanced macro facilities - Design of macro - Preprocessor - Relocation and linking concepts - Design of linker and loader.

Max. 45 Hours

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2. Alfred V. Aho,Jeffery D. Ullman, "Principles of Compiler Design", Narosa Publihing House, 15<sup>th</sup> reprint, 1996. 3 Alfred V.Aho, Jeffery D.Ullman & Ravi Sethi, " Compiler Principles, Techniques & Tools", Addison- Wesley Publishing Company 1986.

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