

KALINGA INSTITUTE OF INDUSTRIAL TECHNOLOGY

**Deemed to be University**

BHUBANESWAR-751024

School of Computer Engineering Autumn Semester 2024-25

**Lesson plan**

1. **Course code :** CM30006
2. **Course Title : Compiler**

## LTP Structure :

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **L** | **T** | **P** | **Total** | **Credit** |
| 3 | 0 | 0 | 3 | 3 |

1. **Course Coordinator :** Mrs. Ronali Padhy
2. **Base-lined date : 25/06/2024**
3. **Course offered to the School :** Computer Engineering

The day-wise course coverage depicts the provisional date of covering individual topics of the subject in the academic session of Autumn 2021-2022 .

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| **Lecture** | **Date** | **Topics to be covered** |
| **Introduction** | | |
| **1** |  | Introduction to Language Processing System.Basics of compiler, loader, linker, assembler |
| **2** |  | Compiler phases in details |
| **3** |  | Compiler phases in details contd.. |
| **Lexical Analysis(Scanner)** | | |
| **4** |  | Introduction Lexical Analysis , Input Buffering, Specification of Tokens |
| **5** |  | Regular Language and Finite Automata |
| **6** |  | Finite state machines and their applications to lexical analysis. |
| **Syntax Analysis (Parser)** | | |
| **7** |  | Introduction Contest Free Grammar and Context Free Language |
| **8** |  | Removing ambiguity |
| **9** |  | Top-down parser and Bottom-up parser.(explain their basic concept and difference) |
| **10** |  | Variants of Top-down Parsing:1.Recursive descent parsing. |
| **11** |  | Problems on Recursive descent parsing |
| **12** |  | Variants of Top-down Parsing:2.Table driven predictive parser or LL (1) parser |
| **13** |  | Problems on LL(1) parser |
| **14** |  | Bottom-up Parsing: Shift-reduce parsing |
| **15** |  | SR Parsers examples |
| **16** |  | Efficient Bottom-up parsers (LR parsers) Using ambiguous and unambiguous  grammar |
| **17** |  | Problems on LR parsers |
| **18** |  | Canonical LR (LR(1). LALR(1). |
| **19** |  | Problems on LR(1) and LALR(1) |
| **20** |  | Error recovery in parsing, handling ambiguous grammar. compiler construction tools. |
| **Semantic Analysis** | | |
| **21** |  | Intermediate forms of source programs- Syntax tree |
| **22** |  | Three address code (Quadruples, Triples) |
| **23** |  | Prefix expression |
| **24** |  | Attribute Grammar and Syntax directed translation |
| **25** |  | Examples of SDT |
| **26** |  | Evaluation and flow of attributes in a syntax tree. |
| **27** |  | conversion of programming language constructs into intermediate code forms. |
| **28** |  | Symbol table organization, DAG representation. |
| **29** |  | Problems on various syntax trees |
| **Code Improvement (Optimization)** | | |
| **30** |  | Machine dependent and machine independent optimization |
| **31** |  | Local Optimization (common sub- expression elimination, Constant folding, replacing expensive operations). |
| **32** |  | Local Optimization (common sub- expression elimination, Constant folding,  replacing expensive operations). contd.. |
| **33** |  | Loop Optimization (Basic Block, Flow Graphs, Inner loops, Code Motion,  Induction Variable). |
| **34** |  | Loop Optimization (Basic Block, Flow Graphs, Inner loops, Code Motion,  Induction Variable) cont.. |
| **Code Generation** | | |
| **35** |  | Design of Code Generator, Machine dependent code optimization |
| **36** |  | register allocation and assignment, Code generation algorithm. |
| **Revision and Preparation for End Semester** | | |

## Text Book:

T1 . Compilers Principles, Techniques and Tools by Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffery D.

Ullman, Pearson Education, 2009.

**Reference Books:**

RB1. Compiler construction principles and practice by K. C. Louden, Brooks/Cole - Thomson Learning.

RB2. Engineering a Compiler by Keith Cooper, Linda Torczon, ISBN: 978-0-12-088478-0, Elsevier, Inc.

RB3. Introduction to Compiler Construction With Unix by Axel T. Schreiner, H. George

Friedman, ISBN: 978-0134743967, Prentice-Hall software series.

RB4. The Compiler Design Handbook by Y.N. Srikant , Priti Shankar, ISBN:978-1420043822, Taylor and

Francis.

## Reference Site:

RS1. NPTEL - https://onlinecourses.nptel.ac.in/explorer

RS2. Tutorials Point - https://[www.tutorialspoint.com/compiler\_Design/](http://www.tutorialspoint.com/data_structures_algorithms/) RS3. Geeks for geeks <http://www.geeksforgeeks.org/>

## Pre-requisites:

Computer Programming (CS-1093), Data Structures & Algorithms (CS-2001), formal language and automata (FLA)

**Course Management System:** SAP Portal - Is a software system designed to facilitate teachers in the management (instructional content, assessment and documentation) of the courses for their students, both teachers and students can monitor the system.

# RONALI PADHY

Course Coordinator