



**Department of Computer Science and Engineering**  
**Rajiv Gandhi Institute of Petroleum Technology, Jais**

## Course Handout

<b>Course Name and Code</b>	<b>Compiler Design (CS 312)</b>
<b>Course Credit C</b>	<b>11 [LTP: 3-0-2]</b>
<b>Program</b>	<b>B. Tech. (CSE+IDD+IT); AY: 2025-26 (Even Semester)</b>
<b>Instructor(s)</b>	<b>Dr. Kalka Dubey</b>

### Course Objectives and Pedagogy:

The objective of this course is to provide basic definitions that are associated with compiler design and to give an overview of the applications and environment of the compiler.

#### The key objectives of the course are:

- ☞ To study how a high-level programming language is translated into machine code through different phases such as lexical analysis, syntax analysis, semantic analysis, optimization, and code generation.
- ☞ To learn the principles, algorithms, and data structures required to design and implement various components of a compiler, including symbol tables, parsing techniques, and error handling mechanisms.

### Evaluation:

Participants would be assessed through their involvement in class discussions, quizzes, submission of assignments, mid-term and end-term examinations. The tentative weights for these segments would be as follows:

Quizzes/class tests 20% Mid-Semester Examination 30% End-Semester Examination  
50%

### Suggested Books:

#### Text Books

- ✓ *Compilers: Principles, Techniques, and Tools* by Alfred V. Aho, Monica S. Lam, Ravi Sethi & Jeffrey D. Ullman.
- ✓ *Engineering a Compiler* by Keith D. Cooper & Linda Torczon.

#### Supplementary Readings

- ✓ *Modern Compiler Implementation* by Andrew W. Appel (available in Java, ML, or C editions)
- ✓ *The Art of Compiler Design, Theory and Practice* by Thomas Pittman and James F. Peters.

### Detailed Session Plan for ***Compiler Design (CS 312)***

<b>Lectures</b>	<b>Topics</b>	<b>Readings</b>	<b>Chapter</b>
<b>1-7</b>	<b>Introduction s of Compiler Design, and Phases of Compiler</b>	Language and Syntax, Regular Language, Analysis of Context-free Language, Attributed Grammars and Semantics, Problem of Compilation i.e. Translation, Analysis-Synthesis Technique for Language Processing, Natural and Programming Languages, Compiler, Assembler and Interpreters, passes of a compiler/interpreter.	C-1,2 Page no. 1-81 of Alfred V. Aho, Monica S. Lam, Ravi Sethi & Jeffrey D. Ullman
<b>7-13</b>	<b>Lexical analysis</b>	Lexical or Tokens, Symbol Table, Hashing, Specification of token, Recognition of token, A language for specifying lexical analyzer, Finite automat, From a regular expression to an NFA, Optimization of DFA-based pattern matcher	C-3 page no. 81-157 of Alfred V. Aho, Monica S. Lam, Ravi Sethi & Jeffrey D. Ullman.
<b>13-23</b>	<b>Parser and Syntax Tree</b>	Formal Grammar and Languages, BNF and Syntax diagram. Notation for Formal Grammar, Shift Reduce Parser- (SLR, LALR etc.). Precedence Parsing Techniques, Recursive Descent parsing etc.	C-4 page 158-277 of Alfred V. Aho, Monica S. Lam, Ravi Sethi & Jeffrey D. Ullman.
<b>23-31</b>	<b>Semantic Analysis</b>	Internal Form, Polish Strings, Syntax Trees Quadruples Triples and Indirect Triples.	C-5 of page no. 279-340 Alfred V. Aho, Monica S. Lam, Ravi Sethi & Jeffrey D. Ullman.

31-39	<b>Code optimization and generation</b>	Synthesis, Code Optimization and Generation, Run Time Storage Handling, Error Detection, Correction and Reporting.	C-8-10 of page no. 463-598 Alfred V. Aho, Monica S. Lam, Ravi Sethi & Jeffrey D. Ullman.
40	<b>Course Review</b>		

**Teaching Scheme:** Lectures: 3 hrs./ week  
LAB: 2 hr./ week

**Make-up Examination:** According to Rules and Regulations of the Institute. **Notices:** All information regarding the course will be available in ([Compiler Design Classroom](#))

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**Note:**

- Each lecture/tutorial will be of 55 minutes duration.
- The Institute's attendance rules will be strictly enforced.
- Students are expected to spend time in the library to develop the habit of independent reading related to the lecture topics and to work on the assigned problems.
- The evaluation scheme is provisional and may be modified in accordance with the Institute's policies.