SEMESTER S6

COMPILER DESIGN

Course Code	PEERT634	CIE Marks	40
Teaching Hours/Week (L: T:P: R)	3:0:0:0	ESE Marks	60
Credits	3	Exam Hours	2 Hrs. 30 Min.
Prerequisites (if any)	PCERT502	Course Type	Theory

Course Objectives:

1. To understand the structure and functionality of compilers, including lexical and syntax analysis, parsing techniques, and code optimization strategies.
2. To learn about implementing various phases of a compiler, from lexical analysis to code generation.

SYLLABUS

Module No.	Syllabus Description	Contact Hours
1	Analysis of the source program - Analysis and synthesis phases, Phases of a compiler. Lexical Analysis - Role of Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens.	9
2	Role of the Syntax Analyser. Review of Context Free Grammars -Derivation and Parse Trees. Basic parsing approaches - Eliminating left recursion, left factoring. Top-Down Parsing - Recursive Descent parsing, Predictive Parsing,LL(1) Grammars.	9
3	Handle Pruning. Shift Reduce parsing. LR parsing - Constructing SLR, LALR and canonical LR parsing tables. Syntax directed translation - Syntax directed definitions, S-attributed definitions, L-attributed definitions, Storage organization, Storage-allocation strategies.	9
4	Intermediate code generation- Intermediate languages, Graphical representations, Three-Address code, Quadruples, Triples. Code Optimization - Principal sources of optimization, Local and global optimizations. Code generation - Issues in the design of a code generator, Target Language, A simple code generator.	9

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Course Assessment Method
(CIE: 40 marks, ESE: 60 marks)

Continuous Internal Evaluation Marks (CIE):

Attendance	Assignment/ Microproject	Internal Examination-1 (Written)	Internal Examination- 2 (Written)	Total
5	15	10	10	40

End Semester Examination Marks (ESE)

In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions

Part A	Part B	Total
• 2 Questions from each module. • Total of 8 Questions, each carrying 3 marks **(8x3 =24marks)**	• Each question carries 9 marks. • Two questions will be given from each module, out of which 1 question should be answered. • Each question can have a maximum of 3 sub divisions. **(4x9 = 36 marks)**	**60**

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Course Outcomes (COs)

At the end of the course students should be able to:

Course Outcome		Bloom's Knowledge Level (KL)
CO1	Describe the phases in the compilation process (lexical analysis, syntax analysis, semantic analysis, intermediate code generation, code optimization, and code generation) and model a lexical analyzer.	**K3**
CO2	Describe the role of the syntax analyzer, review context-free grammars, and apply basic parsing approaches including top-down parsing techniques and LL (1) grammars.	**K3**
CO3	Illustrate handle pruning, shift-reduce parsing, LR parsing with SLR, LALR, and canonical LR tables, and apply syntax-directed translation concepts.	**K3**
CO4	demonstrate intermediate code generation techniques, including intermediate languages and three-address code, as well as discuss code optimization strategies and the issues involved in code generation and design.	**K3**

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

CO-PO Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	3	1	3							3
CO2	3	3	3	2	3							3
CO3	3	3	3	2	3							3
CO4	3	3	3	1								3

Text Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	Compilers – Principles Techniques and Tools	Aho A.V., Ravi Sethi and D. Ullman.	Addison Wesley	2006

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Reference Books				
Sl. No	**Title of the Book**	**Name of the Author/s**	**Name of the Publisher**	**Edition and Year**
1	System Programming and Operating Systems	D.M.Dhamdhere	Tata McGraw Hill & Company	1996
2	Compiler Construction – Principles and Practice	Kenneth C. Louden	Cengage Learning Indian Edition	2006
3	The Theory and Practice of Compiler Writing	Tremblay and Sorenson	Tata McGraw Hill& Company	1984

Video Links (NPTEL, SWAYAM…)	
Module No.	**Link ID**
1	https://archive.nptel.ac.in/courses/106/105/106105190/
2	https://archive.nptel.ac.in/courses/106/105/106105190/
3	https://archive.nptel.ac.in/courses/106/105/106105190/
4	https://archive.nptel.ac.in/courses/106/105/106105190/