

### Compiler Design

<b>Course Code</b>	20CS3601	<b>Year</b>	III	<b>Semester</b>	II
<b>Course Category</b>	PCC	<b>Branch</b>	CSE	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L-T-P</b>	3-0-0	<b>Prerequisites</b>	Formal Languages and Automata Theory
<b>Continuous Evaluation :</b>	30	<b>Semester End Evaluation:</b>	70	<b>Total Marks:</b>	100

#### Course Outcomes

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Understand the fundamental concepts of Compiler Design.	<b>L2</b>
<b>CO2</b>	Apply top-down parsing techniques to generate the parse trees.	<b>L3</b>
<b>CO3</b>	Apply bottom up parsing techniques to generate parse tree for the given grammar.	<b>L3</b>
<b>CO4</b>	Apply various code optimization techniques for intermediate code forms and Code Generation.	<b>L3</b>
<b>CO5</b>	Analyze the given grammar and apply suitable parsing techniques.	<b>L4</b>

#### Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3:Substantial, 2: Moderate, 1:Slight)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	3													
<b>CO2</b>													2	
<b>CO3</b>														3
<b>CO4</b>	2													
<b>CO5</b>		2							1	1				

Course Content		Mapped CO
<b>UNIT-1</b>	<p><b>Language Processors:</b> Overview of language processing system: – preprocessors, compiler, assembler, linkers &amp; loaders-difference between compiler and interpreter- structure of a compiler:–phases of a compiler.</p> <p><b>Lexical Analysis:</b> - Role of Lexical Analysis – Input Buffering – Specification of Tokens – Recognition of Token – The Lexical Analyzer Generator (LEX).</p>	<b>CO1</b>

<b>UNIT-2</b>	<p><b>Syntax Analysis:</b>–Introduction: - Role of a parser – Context Free Grammar – Writing Grammar.</p> <p><b>Top Down Parsing:</b> – Recursive Descent Parsing-FIRST and FOLLOW - LL(1) Grammar – Non recursive Predictive Parsing- Error Recovery in Predictive Parsing.</p>	<b>CO1,CO2, CO5</b>
<b>UNIT-3</b>	<p><b>Bottom up Parsing:</b> – Reductions – Handle Pruning - Shift Reduce Parsing – Conflicts During Shift–Reduce Parsing.</p> <p><b>Introduction to simple LR Parsing:</b> – Why LR Parsers – Items and LR(0) Automaton- LR Parsing Algorithm– Construction of SLR parsing Tables.</p>	<b>CO1,CO3, CO5</b>
<b>UNIT-4</b>	<p><b>More powerful LR parsers:</b> -Canonical LR(1) items, Constructing LR(1) sets of items, Canonical LR(1) parsing table – Construction of LALR Parsing tables.</p> <p><b>Runtime Environment:</b> - Storage organization – Static versus Dynamic Storage Allocation, Stack allocation of Space -- Heap management</p> <p><b>Intermediate code:</b> - Variants of Syntax Trees - Three address code – Quadruples - Triples - Indirect Triples.</p>	<b>CO1,CO3, CO4, CO5</b>
<b>UNIT-5</b>	<p><b>Code Generation:-</b></p> <p><b>Basic Blocks and Flow Graphs</b>-Basic Blocks, Next use Information, Flow Graphs, Representation of Flow Graph, Loops.</p> <p><b>Optimization of Basic Blocks:</b> – DAG representation of basic block.</p> <p><b>Machine independent optimization</b> – Principle sources of Optimization- Causes of Redundancy, Running example: Quick Sort, Semantic Preserving transformations, Global common sub expressions, copy propagation, dead code elimination, code motion, induction variables, and reduction in strength.</p> <p><b>Machine dependent code optimization:-</b> Peephole optimization – Register allocation and Assignment.</p>	<b>CO1,CO4</b>
<b>Learning Resources</b>		
<b>Text Books</b>	1. Compilers: Principles, Techniques and Tools, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Second Edition, Pearson Education.	
<b>Reference Books</b>	1. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University. 2. Principles of compiler design, V. Raghavan, Second edition, 2011, TMH. 3. Compiler Design, Muneeswaran K. First Edition, 2012, Oxford University Press.	
<b>e-Resources &amp; other digital material</b>	1. <a href="http://www.nptel.iitm.ac.in/downloads/106108052/">http://www.nptel.iitm.ac.in/downloads/106108052/</a> 2. <a href="http://www.vssut.ac.in/lecture_notes/lecture1422914957.pdf">http://www.vssut.ac.in/lecture_notes/lecture1422914957.pdf</a>	