



GUJARAT TECHNOLOGICAL UNIVERSITY

Syllabus for Integrated MSc, 6th Semester

Branch: Computer Science

Subject Name: Compiler Design

Subject Code: 1360304

Teaching and Examination Scheme:

Teaching Scheme			Credits C	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical Marks		
				ESE(E)	PA (M)	PA (I)	ESE (V)	
4	0	2	5	70	30	20	30	150

Content:

Sr. No.	Content	Teaching Hours	(%)Module Weightage
1.	Overview of the Compiler and its Structure: Language processor, Applications of language processors, Definition-Structure-Working of compiler, the science of building compilers, Basic understanding of interpreter and assembler. Difference between interpreter and compiler. Compilation of source code into target language, Cousins of compiler, Types of compiler	7	20%
2.	Lexical Analysis: The Role of the Lexical Analyzer, Specification of Tokens, Recognition of Tokens, Input Buffering, elementary scanner design and its implementation (Lex), Applying concepts of Finite Automata for recognition of tokens.	7	20%
3.	Syntax Analysis: Understanding Parser and CFG(Context Free Grammars), Left Recursion and Left Factoring of grammar Top Down and Bottom up Parsing Algorithms, Operator-Precedence Parsing, LR Parsers, Using Ambiguous Grammars, Parser Generators, Automatic Generation of Parsers. Syntax-Directed Definitions, Construction of Syntax Trees, L-Attributed Definitions, syntax directed definitions and translation schemes	10	25%
4.	Error Recovery Error Detection & Recovery, Ad-Hoc and Systematic Methods	4	10%
5.	Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Translation of Expressions, Type Checking, Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator	7	15%
6.	Run-Time Environments: Source Language Issues, Storage Organization. Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management	5	10%

Reference Books:

1. Modern Compiler Design - Dick Grune, Henri E. Bal, Jacob, Langendoen, WILEY India
2. Compiler Construction - Waite W.N. And Goos G., Springer Verlag



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3. Compiler Construction-Principles And Practices - D.M.Dhamdhere, Mcmillian
4. Principles of Compiler Design, V. Raghavan, McGrawHill

Course Outcome:

CO-1	Understand the basic concepts; ability to apply automata theory and knowledge on formal languages.
CO-2	Ability to identify and select suitable parsing strategies for a compiler for various cases. Knowledge in alternative methods (top-down or bottom-up, etc).
CO-3	Understand backend of compiler: intermediate code, Code optimization Techniques and Error Recovery mechanisms
CO-4	Understand issues of run time environments