

**I YEAR-I SEMESTER  
COURSE CODE: 7MCE1C4**

**CORE COURSE-IV-PRINCIPLES OF COMPILER DESIGN**

**Unit I**

Introduction to Compilers: Compilers and Translators – Lexical analysis – Syntax analysis – Intermediate code generation – Optimization – code generation – Bookkeeping – Error handling – compiler writing tools.

Finite Automata and Lexical Analysis: The role of the lexical analyzer – the design of the lexical analyzers – Regular expressions – Finite automata – From regular expressions to finite automata – Minimizing the number of states of a DFA – A language for specifying lexical analyzers – Implementation of a lexical analyzer.

**Unit II**

The syntactic specification of Programming Languages: Context – free grammars – Derivations and parse trees – Capabilities of context – free grammars.

Basic Parsing Techniques: Parses – Shift – reduce parsing – Operator – precedence parsing – Top-down parsing – Predictive parsers.

Automatic construction of efficient parsers: LR parsers – Constructing SLR parsing tables – Constructing LALR parsing tables.

**Unit III**

Syntax – Directed translation: Syntax Directed translation schemes – Implementation of syntax – directed translators – Intermediate code – Postfix notation – Parse trees and syntax trees – Three – address code, quadruples, and triples – Translation of assignment statements – Boolean expressions – Statements that alter the flow of control – Postfix translations – Translation with a top-down parser.

**Unit IV**

Symbol Tables: The contents of a symbol table – Data structures for symbol tables – Representing scope information.

Run time storage administration: Implementation of a simple stack allocation scheme – Implementation of block – structured languages – Storage allocation in block – structured languages.

Error Detection and Recovery: Errors – lexical – phase errors – Syntactic phase errors – Semantic errors.

**Unit V**

Introduction to code optimization:- The principal sources of optimization – loop optimization– The DAG Representation of basic blocks.

Code generation: object programs – Problems in code generation – A machine model – A simple code generator – Register allocation and assignment – Code generation from DAG's –Peephole optimization.

**Text Book:**

1. “Principles of Compiler Design” by Alfred V. Aho Jeffrey D. Ullman, Narosa Publishing House, 1989 Reprint 2002

**Books for Reference:**

1. “Compiler Construction Principles and Practice”, by Dhamdhare D. M, 1981, Macmillan India.  
“Compiler Design”, by Reinhard Wilhelm, Director Mauser, 1995, Addison Wesley