



C. U. SHAH UNIVERSITY – WADHWAN CITY

FACULTY OF TECHNOLOGY AND ENGINEERING DEPARTMENT OF INFORMATION TECHNOLOGY B. TECH. SEMESTER: - VI

Subject Name: System Programming (SYP)

Subject Code: 4TE06SYP1

Teaching & Evaluation Scheme: -

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
4TE06SYP1	System Programming (SYP)	3	0	2	5	4	30	1.5	70	3	-	20	30	150

Objectives:

- To introduce students the concepts and principles of system programming and to enable them to understand the duties and scope of a system programmer.
- To provide students the knowledge about both theoretical and practical aspects of system programming, teaching them the methods and techniques for designing and implementing system-level programs.
- To train students in developing skills for writing system software

Prerequisites:

- Basic concepts of operating system, Assembly language.

Course outline:

Sr. No.	Course Contents	Total Hrs.
1	Introduction: Different Languages, System Programming, Types of program – System program and Application program. Elements of Programming environment - Editor, Preprocessor, Assembler, Compiler, Interpreter, Linker and Loader, Debugger, Device drivers, Operating System.	6
2	Language Processors: Language Processor, Language Processing Activities, Fundamental of Language Processing: phases and passes of compiler and role of each analyzer, Fundamental of Language Specification.	4

3	Scanning and Parsing: Programming language grammars, Classification of Grammars, Scanning, The Scanning Process, An elementary Scanner Design and Its Implementation, The role of a parser, Top down parsing, Recursive descent parser, LL (1) parser, Bottom up parsing, simple precedence grammars, Operator Precedence Parsing.	12
4	Assembler: Features of Assembler, Basic Features of Assembly Language, a simple Assemble Scheme, Overview of Pass Structure of Assembler, Design of assembler – Analysis Phase and Synthesis Phase, Design of 2-Pass Assembler – Pass-I and Pass-II, Problems of 1-Pass assembler - forward reference, efficiency, Table of Incomplete Instructions, Intermediate Code – Need, Forms-variant I and Variant II.	8
5	Macro Processors: Definition, Macro definition and call, Features of Macro, Different parameters, Nested macro calls, Nested macro Definition, Advanced macro facilities – alteration of flow of control during expansion, expansion time variable, conditional expansion, expansion time loops, Macro expansion, Design of macro preprocessor–Pass-I and Pass-II, Macro assembler – Comparison of macro preprocessor and macro assembler, Pass structure of macro assembler.	6
6	Loader & Linker: Introduction, Types of Loaders, Relocation and Linking Concepts, Design of Linker, Self-Relocating Programs, Linking for Overlays, Static Linking, Dynamic Linking.	6
7	Software Tools: Software Tool, Software Tools for Program Development, Editors, Debug Monitors.	3
Total		45

Learning Outcomes:

At the end of this module the students will be well familiar with:

- Organizing the functionalities and components of a computer system into different layers, and have a good understanding of the role of system programming and the scope of duties and tasks of a system programmer.
- The concepts and principles, and be familiar with the approaches and methods of developing system-level software (e.g., compiler, Interpreter, Assembler etc.).

Books Recommended:

- System Programming & Operating System 3rd Edition by **D M Dhamdhare**, Tata Mc-Graw Hill.
- System Programming 3rd Edition by John J. Donovan Tata Mc-Graw Hill.
- System Software 3rd Edition by **Beck & Manjula**, Pearson Education.
- System Programming and Compiler Construction 3rd Edition by **R.K. Maurya**, Wiley dreamtech.