

GUJARAT TECHNOLOGICAL UNIVERSITY

MASTER OF COMPUTER APPLICATION (COURSE CODE-6)

Year – II (Semester – III) (W.E.F. JULY 2013)

Subject: System Software (SS)

Subject Code: 2630005

Learning Objectives:

- To understand the relationship between system software and machine architecture.
- To understand the processing of an HLL program for execution on a computer system.
- To understand the process of scanning and parsing.
- To know the design and implementation of assemblers, macro processor, linker and compiler.
- To have an understanding of loader, system software tools.

Prerequisites:

Fundamentals of C Programming and Computer Architecture

Course Content:

Sr. No.	Course Content	Hours
1	Introduction to System Software and Software Tools Introduction to Systems Programming, Computers and Human Beings, Concept of Hardware, Machine Structure, System Software Concepts, Introduction to Language Processor, Language Processing Activities, Fundamentals of Language Processing, Fundamentals of Language Specification, Language Processor Development Tools, Allocation Data Structures, Search Data Structures, Software Tools for Program Development, Editors, Debug Monitors, Programming Environments, User Interfaces	07
2	Assemblers Elements of Assembly Language Programming, A Simple Assembly Structure, Pass Structure of Assemblers, Design of a Two Pass Assembler	07
3	Macro Processors Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Activities and Data Structures Involved in Designing a Macro Processor	07

4	Scanning, Parsing, Compilers and Interpreters Scanning, Generate NFA/DFA, Approaches of Parsing, Types of Parsing viz. Recursive Decent Parser & LL(1) Parser (First and Follow Technique for Parse Table Generation to be covered) & Operator Precedence Parser, Aspects of Compilation, Memory Allocation, Compilation of Expressions and Control Structures, Code Optimization, Interpreters : Use and Overview, Pure and Impure Interpreters	15
5	Linkers and Loaders Introduction to Linkers, Relocation and Linking Concepts, Design of a Linker, Self-Relocating Programs, Linking for Overlays, Linker for MS-DOS, Introduction to Loaders, Programs in Memory, Linkers vs Loaders, Different Loading Schemes, Types of Loaders, Linking Loaders, Overlay, Binder, Dynamic Loader	12

Text Book(s):

1. Systems Programming and Operating Systems by D M Dhamdhare, Tata McGraw Hill Education Private Limited, 2nd Revised Edition
2. Systems Programming by Srimanta Pal, Oxford University Press

Reference Books:

1. System Software - An Introduction to Systems Programming by Leland L. Beck, Pearson Education Asia, 3rd Edition, 2000
2. System Software by Shantanu Chattopadhyay, Prentice-Hall India, 2007
3. Compilers: Principles, Techniques, and Tools by Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, Pearson Education Asia, 2nd Edition
4. Compiler Construction: Principles and Practice by Kenneth C. Loudon, Thomson/Cengage

Chapter-wise coverage from the textbooks:

Unit #	Chapters
Unit 1	Book # 1 : Chp. 1, 2, 8 Book # 2 : Chp. 1
Unit 2	Book # 1 : Chp. 4 upto 4.4
Unit 3	Book # 1 : Chp. 5 upto 5.5.5
Unit 4	Book # 1 : Chp. 3, 6
Unit 5	Book # 1 : Chp. 7 Book # 2 : Chp. 14 till 14.17

Accomplishments of the student after completing the course:

After completion of the course the students would be equipped with the -

- Ability to understand the execution process of HLL programs
- Ability to understand the working of scanners and parsers
- Ability to understand the basic design of various system software
- Ability to implement various system software
- Ability to design and implement efficient programs/applications