2.6.6.Detailed Syllabus

Part 1 – Computer Organization

(i) Basic Structure of Computers

Structure of a Computer System, Arithmetic Logic Unit, Control Unit, Bus Structure, Von Neumann Architecture.

(ii) Computer Arithmetic Operations

Introduction to logic gates, Boolean algebra, Data Representation-Number system, Fixed and Floating point numbers, Floating point representation, Signed numbers, Binary Arithmetic, 1's and 2's Complements Arithmetic, Binary adder, 2's Complement method for multiplication, Map Simplefication.

(iii) Central Processing Unit and Instructions:

General Register Organization, Types of Instructions, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Instruction cycle.

(iv) Memory Organization:

Characteristics of Memory Systems, Type of memories, Main memory, Static & Dynamic memories, Secondary Memory, Performance Considerations, Cache Memory with mapping, Virtual Memory, Address memory used pages, page replacement, Introduction to RAID.

(v) I/O Organization

Peripheral Devices, Input-Output Interface, Asynchronous Data Transfer Modes, Interrupt handling, Types of Interrupts, Priority Interrupt, Direct Memory Access, Input-Output Processor (IOP), Synchronous and Asynchronous Data Transfer.

Part 2 – Operating System

(vi) Operating Systems Overview:

Overview of Computer Operating Systems, Types of OS, Functions of OS, Protection and Security, Distributed Operating Systems, System Calls, Scheduling algorithms, memory management, threads.

(vii) Linux Basics

Open source, Overview of Linux, Basic Linux commands, structure of kernel and shell, Getting help, Linux File System, Some Important Directories, Inodes, Current Working Directory, File and Directory Names, Absolute and Relative Pathnames, Creating and Removing Directories, Changing Directories, Listing Directory Contents, Creating and Removing Files, Copying Files and Directories, Moving and Renaming Files and Directories, fundamental file types, Hard Links, Symbolic (or soft) Links, Viewing and working with large

Text files – cat, more, less, head, tail, cut commands, search text within a file, grep.

(viii) Process Management and Shell Script

Processes: Definition, Process Relationship, Process states, Process State transitions, Process Control Block, Context switching – Threads – Concept of multithreads, Listing Processes, Finding Processes, Foreground and background processes, Interactive Process management tools, Sending signals to processes. Shell Script, shell variables, control structure using variables in shell script.

(ix) Users, Groups and Permissions

Users, Groups, Linux File Security, Examining Permissions, accessing root user, creating user and groups, Changing File Ownership, Changing Permissions – Symbolic Method, Numeric Method, /etc/passwd, /etc/shadow and /etc/group files, Monitoring Logins, Default Permissions, Special Permissions umask, passwd.

(x) Standard I/O and Pipes

Standard Input and Output, Redirecting Output to a File, Redirecting STDOUT to a Program(Piping), Combining Output and Errors, Redirecting to Multiple Targets (tee), Redirecting STDIN from a file.

(xi) Finding and Processing Files

Locate, find, Basic find Examples, find and Logical Operators, find and Permissions, find and Access Times.

2.6.7.Reference Books/Study Material

1. Operating System Concepts by Peter B. Galvin, Greg Gagne and Abraham Silberschatz
2. Computer System Architecture by Morris Mano