

**COURSE TITLE : COMPUTRE SYSTEM HARDWARE**  
**COURSE CODE : 4131**  
**COURSE CATEGORY : A**  
**PERIODS/WEEK : 4**  
**PERIODS/SEMESTER : 60**  
**CREDITS : 4**

**TIME SCHEDULE**

MODULE	TOPICS	PERIODS
1	Inside PC	15
2	Power supply & Storage devices	15
3	External Peripherals	15
4	Laptops and other Portable devices	15

**Course General Outcomes:**

Sl.	G.O	On completion of this course the student will be able :
1	1	To understand the working of Personal Computer
	2	To understand the working and the components of Motherboard
2	1	To understand Powering up of Computer
	2	To understand Secondary Storage Devices
3	1	To understand Different Peripherals and Expansion
	2	To understand Different custom configuration PCs and Workstations
	3	To understand the Installing and Configuring Printers
4	1	To understand Laptops
	2	Describe portable computing devices

**Specific Outcomes:**

**MODULE –I Inside PC**

**1.1 To understand the working of Personal Computer**

- 1.1.1 To describe the working of Personal Computer
- 1.1.2 To list the major connectors and services of a typical PC

**1.2 To understand the working and the components of Motherboard**

- 1.2.1 To explain how the motherboard works
- 1.2.2 To explain the components of Motherboard
- 1.2.3 To explain the characteristics of Memory
- 1.2.4 To identify the different types of DRAM packaging
- 1.2.5 To explain the varieties of RAM
- 1.2.6 To explain the varieties of a modern CPU

- 1.2.7 To describe the relationship of CPU & Memory
- 1.2.8 To explain the function of BIOS
- 1.2.9 To distinguish among various CMOS setup utility options
- 1.2.10 To describe option ROM and device drivers

## **MODULE – II Power supply & Storage devices**

### **2.1 To understand Powering up of Computer**

- 2.1.1 To describe the Purpose and characteristics of Power Supplies
- 2.1.2 To explain the details about powering the PC

### **2.2 To understand Secondary Storage Devices**

- 2.2.1 To describe the Purpose and characteristics of Storage Devices
- 2.2.2 To explain how hard drives work
- 2.2.3 To explain the PATA and SATA hard drive interfaces
- 2.2.4 To explain SCSI hard drive Interface
- 2.2.5 To describe how to protect data with RAID
- 2.2.6 To describe the procedure for partitioning and formatting HDD
- 2.2.7 To list the variations among flash drives and other tiny devices
- 2.2.8 To describe Disk mirroring and disk duplexing

## **MODULE – III External Peripherals**

### **3.1 To understand Different Peripherals and Expansion**

- 3.1.1 To explain the Installing and Configuring Expansion Cards
- 3.1.2 To list the characteristics of Connectors and Cables
- 3.1.3 To explain the operation of various Input Devices
- 3.1.4 To explain the operation of various output Devices
- 3.1.5 To describe the Display types and its settings

### **3.2 To understand Different custom configuration PCs and Workstations**

- 3.2.1 To explain the organisation of CAD/ CAM design Workstations, Audio Video editing Workstations, Virtualisation Workstations, Gaming PCs, Hometheatre PCs, Standard Thick clients, Thin clients, Home Server PCs, etc.

### **3.3 To understand the Installing and Configuring Printers**

- 3.3.1 To list and explain the printer types and the process involved
- 3.3.2 To describe the installation and configuration of printers

## **MODULE –IV Laptops and other Portable devices**

### **4.1 To understand Laptops**

- 4.1.1 To describe the Laptop architecture
- 4.1.2 To explain the procedure for Disassembling and Reassembling of laptops

### **4.2 To Describe portable computing devices**

## **CONTENT DETAILS**

## **MODULE –I Inside PC**

Working of PC- Motherboard- Form factors-Components of Motherboard- Bus Architecture- Chipsets- Expansion Slots- Memory slots and Cache- CPU and Processor socket- BIOS and POST- CMOS and CMOS Battery- Purpose and characteristics of

Processors- Characteristics of Memory- types of memory- different types of DRAM- varieties of RAM- Memory packaging

#### **MODULE – II Power supply & Storage devices**

Purpose and characteristics of Power Supplies- power connectors- Replacement of Power Supplies

Purpose and characteristics of Storage devices- HDD Systems- Solid state Drives- Optical storage drives-Drive interfaces and RAID- SCSI Drives- Removable storage and media- Flash memory- Externally attached drives- Installing, Removing, and configuring storage devices

#### **MODULE – III External Peripherals**

Installing and Configuring Expansion Cards- Video- Multimedia- I/O- Communications- Characteristics of Connectors and Cables- Device connector types- Common peripheral Cables and their Interfaces- Video display Cables and connectors- Input devices- Mouse- Keyboard- scanner- Barcode reader-digitizer-Biometric devices- Touch screens- Gamepads and Joysticks- Multimedia input devices- Web cams- MIDI devices- Digital Cameras and Camcoders- Output devices- Printers- Speakers- Display devices- Display types and settings- Video display Types- Adjusting display settings- Video standards and Technologies- Advanced Video resolutions and concepts

CAD/ CAM design Workstations-Audio Video editing Workstations- Virtualisation Workstations- Gaming PCs- Hometheatre PCs- Standard Thick clients- Thin clients- Home Server PCs

Printer types- Impact Printers- Inkjet- Laser Printers-Installing and configuring printers

#### **MODULE –IV Laptops and other Portable devices**

Laptop architecture- Laptop vs. Desktops- Motherboards and Processors- Memory- Input devices- Expansion Buses and Ports- Docking stations- Power systems- Laptop displays- Disassembling and Reassembling of laptops

Netbooks- Ultrabooks- Tablet PCs- Features and capabilities of Mobile Devices- Touchscreen technology- Enhancing Hardware- Configuration- Security

#### **TEXT BOOK(S)**

1. Computer Installation and Servicing D.Balasubramanian TataMc-Graw Hill, New Delhi 2010
2. Troubleshooting, Maintaining and Repairing PCs Stephen J.Bigelow TMH, New Delhi Fifth Edition

#### **REFERENCES**

1. PC Repair and Maintenance Joel Rosenthal- Fire wall Media,First Edition
2. Comdex Hardware and Networking Course Kit Vikas Gupta DreamTech Press -2011
3. Modern Computer Hardware Course Manahar Lotai,Pradeep Niar,BPB Publication ,2011
4. Troubleshooting, Maintaining and Repairing PCs Stephen J.Bigelow TMH, New Delhi Fifth Edition
5. PC Hardware in a nutshell Robert Bruce and Co O' Reilly, Shroff Publishers and Distributors -2008.

**COURSE TITLE** : **DATA COMMUNICATION**  
**COURSE CODE** : **4132**  
**COURSE CATEGORY** : **B**  
**PERIODS/WEEK** : **4**  
**PERIODS/SEMESTER** : **60**  
**CREDITS** : **4**

**TIME SCHEDULE**

<b>MODULE</b>	<b>TOPICS</b>	<b>PERIODS</b>
<b>1</b>	<b>Concepts of Data Communication</b>	<b>15</b>
<b>2</b>	<b>Physical Layer</b>	<b>15</b>
<b>3</b>	<b>Transmission Media</b>	<b>15</b>
<b>4</b>	<b>Data Link Layer</b>	<b>15</b>

**Course General Outcomes:**

<b>Sl.</b>	<b>G.O</b>	<b>On completion of this course the student will be able :</b>
1	1	Understand the concept of Data Communication
	2	Understand the concept of networks
	3	Understand the concept of network model
2	1	Understand Data and Signals
	2	Understand Digital and Analog Transmission
	3	Understand Bandwidth Utilization -Multiplexing
3	1	Understand Guided and Unguided transmission media
	2	Understand Switched Networks.
4	1	Understand Error Detection and Correction
	2	Understand Data Link Controls

### **Specific Outcomes:**

#### **Module I. Overview of Data Communication and Networking.**

- 1.1 Understand the concept of Data Communication.
  - 1.1.1 Explain data communication concepts.
  - 1.1.2 Explain briefly components of data communication.
  - 1.1.3 Discuss different data representation forms.
  - 1.1.4 Discuss different data flow methods.
  
- 1.2 Understand the concept of networks.
  - 1.2.1 Define different network attributes.
  - 1.2.2 Discuss different physical structures of network.
  - 1.2.3 Discuss categories of networks.
  - 1.2.4 Explain interconnection of Networks.
  - 1.2.5 Define protocol.
  - 1.2.6 Discuss various standards.
  
- 1.3 Understand the concept of network model
  - 1.3.1 Discuss the layered approach.
  - 1.3.2 Explain ISO OSI layered architecture.
  - 1.3.3 Describe the functions of layers in OSI model.

#### **Module II. The Physical Layer.**

- 2.1 Understand Data and Signals.
  - 2.1.1 Differentiate Analog and Digital Data and signals.
  - 2.1.2 Explain Periodic analog signals.
  - 2.1.3 Define the terms sine wave, Phase, Wave length, time and frequency domains, and bandwidth.
  - 2.1.4 Explain Digital signals.
  - 2.1.5 Define the terms bit rate and bit length.
  - 2.1.6 Describe digital signals transmission.
  - 2.1.7 Describe Transmission impairments and various types.
  
- 2.2 Understand Digital and Analog Transmission
  - 2.2.1 Explain Analog to Digital Conversion
  - 2.2.2 Explain Transmission modes
  - 2.2.3 Explain Digital to Analog Conversion
  - 2.2.4 Explain Analog to Analog Conversion.
  
- 2.3 Understand Bandwidth Utilization -Multiplexing
  - 2.3.1 Explain Frequency Division Multiplexing.
  - 2.3.2 Explain Wavelength Division Multiplexing.
  - 2.3.3 Explain Time Division Multiplexing.

#### **Module III. The Transmission Media.**

- 3.1 Understand Guided transmission media.
  - 3.1.1 Explain about Twisted pair cable.

- 3.1.2 Explain about Coaxial Cable.
- 3.1.3 Explain about Optical fiber cables.

### 3.2 Understand Unguided media.

- 3.2.1 Describe wireless propagation.
- 3.2.2 Describe Radio Waves.
- 3.2.3 Describe Micro Waves.
- 3.2.4 Describe Infrared Waves.

### 3.3 Understand Switched Networks.

- 3.3.1 Explain Circuit switched Networks.
- 3.3.2 Explain Packet switching – datagram, virtual circuit.
- 3.3.3 Explain the structure of a switch.

## **Module IV. Data Link Layer Services**

### 4.1 Understand Error Detection and Correction

- 4.1.1. Define Key terms related to error detection and correction.
- 4.1.2. Explain different coding schemes
- 4.1.3. Discuss block codes
- 4.1.4. Discuss cyclic codes
- 4.1.5. Explain error detection and correction methods
- 4.1.6. Explain check sum error detection
- 4.1.7. Explain forward error correction methods

### 4.2 Understand Data Link Controls

- 4.2.1. Explain the framing concepts
- 4.2.2. Discuss flow and error control
- 4.2.3 Discuss Data link layer protocols
- 4.2.4 Explain HDLC
- 4.2.5 Explain point to point protocol

### 4.3 Understand random access protocols like ALOHA, CSMA, CSMA/CD

## **CONTENT DETAILS**

### **MODULE I – CONCEPTS OF DATA COMMUNICATION**

Concepts – components of communication - representation- text, numbers, images, audio, video – Data flow – simplex, half duplex, full duplex – Network attributes – performance, reliability, security – Physical structure – type of connections, topology – Categories – LAN, WAN, MAN – Inter connection - circuit, packet – protocols – standards – layered approach – ISO OSI model – functions of layers.

## **MODULE II – PHYSICAL LAYER**

Analog and digital – data, signals – Periodic analog signals – sine wave, phase, wave length, time and frequency domains, bandwidth – digital signals – bit rate, bit length – digital transmission – base band, broad band – impairments – attenuation, distortion, noise – analog to digital – PCM– Transmission modes – parallel, serial , asynchronous, synchronous – digital to analog – ASK, FSK, PSK – analog to analog – AM, FM, PM – Multiplexing – FDM, WDM, TDM

## **MODULE III – TRANSMISSION MEDIA**

Guided – twisted pair, co-axial, fiber optic – unguided – wireless – radio, micro wave, infrared – switched networks – circuit switched – packet switched – datagram, virtual circuit – switch – structure – space division – time division – structure of packet switch

## **MODULE IV – DATA LINK LAYER SERVICES**

Error detection and correction – terms – types of errors, redundancy, detection versus correction, coding – coding schemes – block code , parity check – cyclic codes – CRC– check sum – forward error correction – framing – character oriented, bit oriented – flow and error control – DLL protocols – Simple, Stop and wait – HDLC – Point to point protocol– ALOHA, CSMA, CSMA/CD.

### **Text Book(s):**

1 . Data Communications and Networking – Behrouz A. Forouzan – McGraw Hill Edn.-Fourth Edition/Fifth Edition

### **REFERENCES:**

1. Computer Networks – Andrew S. Tanenbaum – Prentice Hall-Fifth Edition
2. Data Communication & Networks - William Stalling- Prentice Hall-Tenth Edition
3. Data Communications, Computer Networks and Open Systems –Fred Halsall , Addison-Wesley, 1996

**COURSE TITLE** : **DATA STRUCTURES**  
**COURSE CODE** : **4133**  
**COURSE CATEGORY** : **A**  
**PERIODS/WEEK** : **5**  
**PERIODS/SEMESTER** : **75**  
**CREDITS** : **5**

**TIME SCHEDULE**

MODULE	TOPICS	PERIODS
1	STACK AND QUEUE	19
2	LIST AND LINKED LIST	19
3	TREES	19
4	GRAPH	18

**Course General Outcomes:**

Sl.	G.O	On completion of this course the student will be able :
1	1	Introduction to different Data Structures
	2	Understanding Stack and its operations
	3	Understanding Queues and its operations
2	1	Understanding list and its operations
	2	Understanding linked list and its operations
3	1	To understand non linear data structure - trees
4	1	To understand non linear data structure - graphs
	2	To understand different sorting and searching concepts

**Specific outcomes:**

**MODULE I STACK AND QUEUE**

1.1 Introduction to different Data Structures

- 1.1.1 Explain efficiency of algorithms, complexity and big O notation.
- 1.1.2 Describe different data structures-linear and non linear
- 1.1.3 Describe basic data structure operations – insertion, deletion, search, traverse
- 1.1.4 Explain about Abstract Data Types (ADTs) and C++ classes
- 1.1.5 Explain the use of iterators
- 1.1.6 Describe the Array as an ADT with printArray() operation.

1.2 Understanding Stack and its operations

- 1.2.1 Describe Stack and its operations - Push and Pop.
- 1.2.2 Explain about array representation of stacks
- 1.2.3 Describe Stack ADT with push(), pop(), stackfull() and stackempty()



- 1.2.4 Describe infix, prefix and postfix Expressions
- 1.2.5 Explain infix to postfix conversion using Stack ADT
- 1.2.6 Explain evaluation of postfox expression using stack ADT

### 1.3 Understanding Queues and its operations

- 1.3.1 Describe Queue and its operations – Insert and Delete.
- 1.3.2 Describe circular queue and its array representation
- 1.3.3 Describe Queue ADT (for circular queue) with insert(), delete(), QEmpty() and QFull().
- 1.3.4 Describe Priority Queue and Dequeue

## **MODULE II LIST AND LINKED LIST**

### 2.1 Understanding list and its operations

- 2.1.1 Describe list (using array) and its operations – Find, MakeEmpty, PrintList etc.
- 2.1.2 Describe List ADT with find(), makeEmpty(), printList(), findKth() etc.

### 2.2 Understanding linked list and its operations

- 2.2.1 Explain linked list and its operations – Find, MakeEmpty, PrintList, FindKth, Insert, Delete, Successor, Predecessor etc.
- 2.2.2 Describe the methods of memory allocation and deallocation for nodes.
- 2.2.3 Describe LinkedList ADT with find(), makeEmpty(), printList(), findKth(), insert(), delete() etc.
- 2.2.4 Describe algorithm for implementing stack with LinkedList ADT.
- 2.2.5 Describe algorithm for implementing queue with LinkedList ADT.
- 2.2.6 Discribe about doubly linked lists and circular linked lists.

## **MODULE III TREES**

### 3.1 Understanding Trees and its operations

- 3.1.1 Explain binary tree, key terms related to trees and traversal methods.
- 3.1.2 Explain Linked representation of binary trees
- 3.1.3 Explain binary search trees (BST) and its operations – traversals, insertion, deletion and find.
- 3.1.4 Describe BST ADT with inOrder(), preOrder(), postOrder(), insert(), delete(), find() etc.
- 3.1.5 Describe Expression trees and Threaded binary trees.

## **MODULE IV GRAPH**

### 4.1 Understanding Graph and its operations

- 4.1.1 Explain graph and key terms related to graphs
- 4.1.2 Explain graph representations – adjacency matrix mehod and adjacency list method.
- 4.1.3 Describe graph traversals – DFS and BFS
- 4.1.4 Describe Graph ADT with dfs() and bfs() methods.
- 4.1.5 Describe and implement Warshall's algorithm for all-pairs shortest path

### 4.2 Understanding Searching and Sorting

- 4.2.1 Explain and implement linear search and binary search algorithms
- 4.2.2 Explain and implement bubble sort and quick sort algorithms

## CONTENT DETAILS

### **MODULE I : STACK AND QUEUE**

Efficiency of algorithm-complexity- Data structures-linear and non linear-insertion, deletion, search, traverse- Iterators- Abstract Data Types (ADTs) – Array as an ADT .

Stack- representation- stack as an ADT - push() and pop() operations -Infix, Prefix, Postfix Expressions- Applications of stack-infix to postfix conversion-postfix evaluation.

Queue-Array representation of circular queue- queue as an ADT - insert() and delete() operations - Priority Queue and Dequeue.

### **MODULE II : LIST AND LINKED LIST**

List using array – List ADT – find(), makeEmpty(), printList() and findKth() operations. Linked List - Memory allocation and de-allocation – LinkedList ADT – find(), makeEmpty(), printList(), findKth(), insert() operations – stack with LinkedList, queue with LinkedList – doubly linked list and circular list

### **MODULE III : TREES**

Binary trees – key terms - Linked representation -binary search trees, BST ADT- inOrder(), preOrder(), postOrder(), insert(), delete(), find() operations – Expression trees and Threaded binary trees

### **MODULE IV : GRAPH**

Graph Definition- Key terms - Representations – Traversal Algorithms – BFS,DFS – Graph ADT – All-pairs Shortest Path Algorithm.

Searching and Sorting Algorithms-Linear search and Binary search - Bubble sort and Quick sort algorithms.

### **TEXTBOOK**

1. Fundamentals of Data Structures in C++, E.Horowitz- S.Sahni, Galgotia-2006
2. Data Structures and Algorithm Analysis in C++, M.A.Weiss, Pearson Education-Fourth Edition

### **REFERENCES**

1. Data Structures, Algorithms and Applications in C++, Sartaj Sahni, University Press
2. **Data Structures using C and C++ by Yedidyah Langsam, Moshe J. Augenstein and Aron M. Tananbaum, PHI.2002**

**COURSE TITLE** : **OPERATING SYSTEMS**  
**COURSE CODE** : **4134**  
**COURSE CATEGORY** : **B**  
**PERIODS/WEEK** : **4**  
**PERIODS/SEMESTER** : **60**  
**CREDITS** : **4**

**TIME SCHEDULE**

<b>MODULE</b>	<b>TOPICS</b>	<b>PERIODS</b>
<b>1</b>	Introduction to Operating System	<b>15</b>
<b>2</b>	Process Management	<b>15</b>
<b>3</b>	Memory Management	<b>15</b>
<b>4</b>	File Systems and I/O Systems	<b>15</b>

**Course General Outcomes:**

<b>Sl.</b>	<b>G.O</b>	<b>On completion of this course the student will be able :</b>
<b>1</b>	1	To understand The concept of System Software
	2	To Understand Operating System
<b>2</b>	1	To understand process and threads
	2	To understand CPU scheduling
<b>3</b>	1	Understand memory management
	2	Understand virtual memory
<b>4</b>	1	Understand the file system
	2	Understand I/O systems

## **Specific Outcomes:**

### **Module I - INTRODUCTION TO OPERATING SYSTEM.**

- 1.1 To understand the Concept of System Software
  - 1.1.1 State system software.
  - 1.1.2 Discuss assembler and its functions
  - 1.1.3 Discuss loader and its functions
  - 1.1.4 Discuss compilers and interpreters and their functions
  - 1.1.5 Discuss operating system and its functions
- 1.2 To Understand operating systems
  - 1.2.1 Discuss different features of operating systems
  - 1.2.2 List the functions of Operating Systems
  - 1.2.3 Discuss batch systems
  - 1.2.4 Discuss multiprogramming systems
  - 1.2.5 Discuss time sharing
  - 1.2.6 Describe multiprocessor systems
  - 1.2.7 Describe real time systems
  - 1.2.8 Discuss Unix, Windows, and Linux operating systems

### **MODULE II: PROCESS MANAGEMENT**

- 2.1 To Understand processes and threads
  - 2.1.1 Define process
  - 2.1.2 Describe process control block (PCB) and its general structure.
  - 2.1.3 Explain the different states of a process with the help of state diagram.
  - 2.1.4 Define a thread
  - 2.1.5 Compare between threads and processes
  - 2.1.6 Explain multi-threading.
- 2.2 To Understand CPU scheduling
  - 2.2.1 Discuss about various schedulers – long, medium and short term.
  - 2.2.2 Explain context switching
  - 2.2.3 Describe CPU and I/O burst cycles
  - 2.2.4 Explain CPU bound and I/O bound processes
  - 2.2.5 Discuss the difference between preemptive and non-preemptive scheduling
  - 2.2.6 Discuss various scheduling criteria
  - 2.2.7 Explain FCFS, SJF, Priority, and RR scheduling algorithms and their Gantt charts
  - 2.2.8 Discuss Multilevel queue and Multilevel feedback queue scheduling
- 2.3 To Understand Process synchronization
  - 2.3.1 Discuss co-operating processes
  - 2.3.2 Explain race condition
  - 2.3.3 Explain critical section of processes
  - 2.3.4 Define Critical Section Problem and its solutions
  - 2.3.5 Explain resource allocation graphs
  - 2.3.6 Explain deadlock and its causes
  - 2.3.7 Discuss deadlock avoidance, prevention and detection & recovery.

### **MODULE III: MEMORY MANAGEMENT**

- 3.1 To Understand memory management
  - 3.1.1 Discuss different address bindings – compile, link and run time bindings
  - 3.1.2 Differentiate the logical address and physical address.
  - 3.1.3 Explain contiguous memory allocation – fixed partition and variable partition
  - 3.1.4 Explain first fit, best fit and worst fit allocation strategies
  - 3.1.5 Define fragmentation – internal and external, and suggest solutions
  - 3.1.6 Explain paging and paging hardware
  - 3.1.7 Discuss segmentation, and the advantages of segmentation over paging
- 3.2 Understand virtual memory
  - 3.2.1 Discuss the concept of virtual memory
  - 3.2.2 Explain demand paging
  - 3.2.3 Explain page-faults and how to handle page faults.
  - 3.2.4 Discuss page replacement algorithms: FIFO, optimal, LRU,
  - 3.2.5 Explain the concept of thrashing

### **MODULE IV: FILE SYSTEMS AND I/O SYSTEMS**

- 4.1 Understand the file system
  - 4.1.1 Discuss the concept of file and directory
  - 4.1.2 Discuss the various file operations
  - 4.1.3 Describe the file organization concepts – sequential and indexed
  - 4.1.4 Explain about different directory structures – single level, two-level, and tree structured directories
  - 4.1.5 Explain about different allocation methods – contiguous, linked and indexed allocations
- 4.2 Understand Virtualization
  - 4.2.1 Discuss the concept of virtualization
  - 4.2.2 Discuss different types of virtualization
  - 4.2.3 Discuss the overview of Vmware
  - 4.2.4 Explain virtual Box
  - 4.2.5 Explain about thin client

### **CONTENT DETAILS**

#### **MODULE I**

Introduction to systems software – assembler, loader, compilers, interpreters and their functions. Operating system – definition - goals of OS - different types of Operating Systems - batch systems - multiprogramming systems - time sharing - multiprocessor systems - real time systems. Comparison of DOS, Unix, Windows, and Linux operating systems - Operating System components

## **MODULE II**

Define process - process control block (PCB) and its general structure - different states of a process with the help of state diagram.- Define a thread – Comparison between threads and processes. - Multi-threading.

Schedulers – long, medium and short term- queuing diagrams. - context switching. CPU and I/O burst cycles - CPU bound and I/O bound processes- difference between preemptive and non-preemptive scheduling- Various scheduling criteria - FCFS, SJF, Priority, and RR scheduling algorithms and their Gantt charts - Multilevel queue and Multilevel feedback queue scheduling

Process synchronization - Co-operating processes - Race condition - Critical section of processes - Critical Section Problem and its solutions- Resource allocation graphs - Deadlock and its causes – Deadlock avoidance, prevention and detection & recovery.

## **MODULE III**

Memory management - Different address bindings – compile, link and run time bindings. - Difference between logical address and physical address - Contiguous memory allocation – fixed partition and variable partition – Allocation Strategies - first fit, best fit and worst fit - Define fragmentation – internal and external, and suggest solutions - Paging and paging hardware - Segmentation, and the advantages of segmentation over paging

Concept of virtual memory - Demand paging - Page-faults and how to handle page faults. - Page replacement algorithms: FIFO, optimal, LRU, LRU Approximation, Counting based (LFU and MFU) - Learn the concept of thrashing

## **MODULE IV**

File system - Concept of file and directory - Various file operations - File organization concepts – sequential and indexed. Different directory structures – single level, two-level, and tree structured directories. - Different allocation methods – contiguous, linked and indexed allocations.

Virtualization : Need of virtualization – cost , administration , fast deployment , reduce infrastructure cost – limitations.. Types of hardware virtualization: Full virtualization - partial virtualization - para virtualization. Desktop virtualization: Software virtualization – Memory virtualization - Storage virtualization – Data virtualization – Network virtualization..Vmware features and infrastructure – Virtual Box - Thin client

### **Text Book(s)**

1. Operating System Concepts – Abraham Silberschatz, Peter Gaer Galvin and Greg Gagne. Wiley Publicaions-Eighth Edition
2. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter TATA McGraw- Hill , 2010

### **References**

1. Operating Systems-Internals and Design Principles – William Stallings . – PEARSON Publicaions- **Seventh Edition**
2. Operating Systems - Rohit Khurana, Vikas Publshing-Second Edition  
Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008

<b>COURSE TITLE</b>	<b>:</b>	<b>APPLICATION DEVELOPMENT USING JAVA</b>
<b>COURSE CODE</b>	<b>:</b>	<b>4136</b>
<b>COURSE CATEGORY</b>	<b>:</b>	<b>A</b>
<b>PERIODS/WEEK</b>	<b>:</b>	<b>5 Days</b>
<b>PERIODS/SEMESTER</b>	<b>:</b>	<b>35</b>
<b>CREDITS</b>	<b>:</b>	<b>5</b>

**Software Requirement: Java with GUI**

**General Outcomes:**

**To develop a menu driven, GUI based user friendly database application using Java**

**Specific Outcomes:**

**To Understand Fundamentals of GUI Programming**

- 1.1. Familiarisation with an IDE (such as Eclipse / net beans / qt)
- 1.2. Use of Controls such as buttons, text field, text area, check box, radio buttons, lists, scroll bar, list box, combo box etc
- 1.3. Concept of Event Handling
- 1.4. Develop simple programs using the above controls.

**To explore the features of Advanced GUI Programming**

- 2.1 Develop menu driven programs - menus, menu bar, menu items, main menu
- 2.2 Implement Dialog boxes in programs

**[Note : At the end this module, students shall design and develop the user interfaces, menus for their application ]**

**To Implement Database Connectivity**

- 3.1 Implement database integration in applications - store, retrieve, modify databases from applications.
- 3.2 Implementation of database operations with necessary programming structures

**[Note : At the end this module, students shall design the database for their application and incorporate necessary database operations]**

**To Generate Reports**

- 4.1 Implementation of general application features such search, reports, backup etc
- 4.2 Create report
- 4.3 Converting reports to other format such as PDF
- 4.4 Implement backup & restore facility
- 4.5 Create executable programs

**[Note : At the end this module, students shall develop a complete database based application.]**

**Instructions :**

A simple application may be developed in any one of the domains such as Banking, Electricity Billing, Library management, Payroll, Insurance, Inventory, Health care etc. Application should developed by using an IDE (such as eclipse, net beans, qt etc).

Programming language JAVA must be used.

The course content given above is a general outline. The contents may be rearranged in tune with IDE/ Programming language/ Database selected for this lab without losing the course objective.

The lab record should contain all interim programs developed by the student during the development of the main application. The main application should be the last experiment.

**Before the end of semester, the student should develop a complete GUI based database application incorporating the features listed in the exercises above. In end semester examination the students will be evaluated based on the features listed above. Also the students have to demonstrate the database application software developed by them as part of the evaluation.**



COURSE TITLE : **COMPUTRE SYSTEM HARDWARE LAB**  
 COURSE CODE : 4137  
 COURSE CATEGORY : A  
 PERIODS/WEEK : 6  
 PERIODS/SEMESTER : 90  
 CREDITS : 3

**Course General Outcomes:**

Sl.	G.O	On completion of this course the student will be able :
1	1	Assembling and Disassembling desk top machine
2	1	Different peripheral Installation and Servicing:
3	1	Computer Servicing practical
4	1	Assembling and Disassembling lap top

**Specific Outcomes:**

**PART A – COMPUTER SERVICING PRACTICALS**

1. Identification of System Layout.
  - a) Front panel indicators & switches and Front side & rear side connectors.
  - b) Familiarize the computer system Layout:Marking positions of SMPS, Motherboard, FDD, HDD, CD, DVD and add on cards.
  - c) Configure BIOS setup program and troubleshoot the typical problems using BIOS utility.
2. HARD DISK
  - a) Install Hard Disk.
  - b) Configure CMOS-Setup.
  - c) Partition and Format Hard Disk.
  - d) Identify Master /Slave / IDE Devices.
  - e) Practice with scan disk, disk cleanup, disk De-fragmenter, Virus Detecting and Rectifying Software.
3.
  - a) Install and Configure a DVD Writer and a Blu-ray Disc writer.
  - b) Recording a Blank DVD and Blu-ray Disc.
4. Printer Installation and Servicing:
  - a) Head Cleaning in dot matrix printer
  - b) Install and configure Dot matrix printer and Laser printer
  - c) Troubleshoot the above printers.
  - d) Check and connect the data cable connectivity
5. Install and configure Scanner, Web cam, Cell phone and bio-metric device with system.  
 Troubleshoot the problems
6. Assemble a system with add on cards and check the working condition of the system and install OS.
7. Dual OS Installation
8. Assembling and Disassembling of Laptop to identify the parts and to install OS and configure it.

**Hardware Requirement: Desk Top Computer components and Lap Top components**

<b>COURSE TITLE</b>	<b>:</b>	<b>DATA STRUCTURES LAB</b>
<b>COURSE CODE</b>	<b>:</b>	<b>4138</b>
<b>COURSE CATEGORY</b>	<b>:</b>	<b>A</b>
<b>PERIODS/WEEK</b>	<b>:</b>	<b>6</b>
<b>PERIODS/SEMESTER</b>	<b>:</b>	<b>90</b>
<b>CREDITS</b>	<b>:</b>	<b>3</b>

### **List of Experiments**

1. Implement Stack ADT using array.
2. Implement an algorithm to convert infix to postfix expression using Stack ADT
3. Implement an algorithm to evaluate a postfix expression using stack ADT
4. Implement an algorithm to convert decimal number to its binary equivalent using stack ADT
5. Implement a Queue ADT (circular queue) using array.
6. Implement a List ADT (using array) with operations find(), makeEmpty(), printList(), findKth() etc.
7. Implement a LinkedList ADT with operations find(), makeEmpty(), printList(), findKth(), insert(), delete() etc.
8. Implement a stack using LinkedList ADT
9. Implement a queue using LinkedList ADT
10. Implement a Binary Search Tree ADT with operations inOrder(), preOrder(), postOrder(), insert(), delete(), find() etc.
11. Implement a BST using BST ADT and find height of the tree
12. Implement a BST using BST ADT and determine the number of nodes
13. Implement Graph ADT with operations dfs() and bfs()
14. Implement Warshall's algorithm to find the shortest path using Graph ADT
15. Implement binary search algorithm
16. Implement Quick sort algorithm

Software Requirement : Linux operating System and gcc/g++

**COURSE TITLE** : **SYSTEM ADMINISTRATION LAB**  
**COURSE CODE** : **4139**  
**COURSE CATEGORY** : **B**  
**PERIODS/WEEK** : **6**  
**PERIODS/SEMESTER** : **90**  
**CREDITS** : **3**

**Course General Outcomes:**

Sl.	G.O	Student will be able
1	1	Install any Two Server Operating Systems
	2	Server Configuration
2	1	Design a Server Active Directory forest
3	1	Install and configure server hardware devices
4	1	Monitor server hardware
	2	Manage storage

Software Requirement: Linux Operating System, Any Other Server Software Like Windows server

**PART – A LINUX COMMANDS**

Write down the syntax and usage of the following exercise with all options. Check the commands with the system

- 1 (a) Logon to Linux and logoff.  
 (b) Usage of directory management commands: *ls, cd, pwd, mkdir, rmdir*  
 (c) Usage of File Management commands: *cat, chmod, cp, mv, rm, more, file* commands
2. Use the general purpose commnds: *wc, od, lp, cal, date, who, tty, ln*
3. Using the simple filters: *pr, head, tail, cut, paste, nl, sort*
4. Advanced filters : Search for a pattern using *grep, egrep & fgrep*
5. To know the details of process status- *ps* command , Process management commands: *&, nohup, kill, nice*
6. Communication Commands: *news, write, mail, wall, calendar*
7. Device pattern using meta character to match each of the following situation:-
  - a. All two character filenames.
  - b. All filenames consisting of two lowercase letters.
  - c. All filenames ending with c.
  - d. All filenames beginning with a c and ending with a digit.
  - e. All filenames beginning with p and having at somewhere.

**PART – B SHELL SCRIPTS**

1. Write a shell-script that accepts a numerical value N. Then display the decrementing value of N till it reaches 0.

2. Write a shell-script that takes three command line arguments. The first argument is the name of the destination file and the other two arguments are names of files to be placed in the destination file.
3. Write a Shell script to print contents of file from given line number to next given number of lines
4. a) Shell script to say Good morning/Afternoon/Evening as you log in to system  
b) Write a shell-script that print out date information in this order: time, day of the week, day number, year – that is like this. 13:55:00 IST Sun 9 Jun 2015
5. Write a shell-script that tells you its name and PID
6. Develop a Basic math Calculator using case statement
7. Write a shell-script that takes a login name as a command line argument and reports to you when that person logs in. Have it sent a greeting to that person.
8. Write a shell-script that takes a command line argument and reports on whether it is a directory, a file or something else.

#### **PART – C LINUX SERVER EXPERIMENTS**

1. Installation of Linux using Graphical mode.
2. Installation of Linux using command prompt
3. Creating a user in Linux server and assigning rights
4. a) Configuring and Troubleshooting of /etc/inittab.  
b) Configuring and Troubleshooting of /etc/passwd
5. Configuring and Troubleshooting of /etc/grub.conf
6. Linux TCP/IP Network Configuration
7. Installation of additional software
8. File Data Backup using tar

#### **PART – D SERVER EXPERIMENTS**

1. Installation of s Server.
2. Installing Hardware, Devices and Drivers using Device manager and Driver Query
3. Configure Active Directory Services, create a user and assign permissions using Logon Script and Group permissions.
4. Automated installation of Server using answer files.
5. Installing required server components using Control panel.
6. Installation and configuration of DHCP server.
7. Configuring Disks and Volumes and Managing disks and volumes from the command prompt.
8. Installation and Configuration of Mail Server in server environment.
9. Establish RAID configuration on server.
10. Configure a router to connect two different networks and transfer files between them.