SARDAR PATEL UNIVERSITY
B.Sc. Computer Science
IV Semester

Course : US04CCS01
(Advanced C Programming and Introduction to Data Structures)

Credits : 3
Lectures per week : 3
University examination duration : 3 Hours
All units carry equal weightage.

Unit 1. *Usage of Pointers*

- Introduction and usage of pointers
- Declaration, initialization and dereferencing of pointer variables
- Pointers and addresses
- Pointers and function arguments
- Returning multiple values through pointers, Dynamic memory allocation, Pointers and arrays, Pointer arithmetic

Unit 2. *Structures and Unions*

- Basics of structures, Structures and functions, Structures and arrays, Pointers to structures, Nested structures
- Unions
- Typedefs

Unit 3. *File Handling*

- Introduction and Usage
- Operations on files, File access modes, Handling text files

Unit 4. *Introduction to Data Structures*

- Introduction to data structures, their usage, applications and advantages
- Primitive and non-primitive data structures and operations on them
- Linear and non-linear data structures

Unit 5. *Linked Lists*

- Introduction to linked lists
- Types of linked lists
- Singly linked lists, Doubly linked lists, Circular linked lists
- Applications of linked lists

Unit 6. *Stacks and Queues .*

- Introduction to stacks, operations on stacks
- Applications of stacks
- Queues and their uses
- Types of queues : Simple queues, Circular queues, Double ended queues

MAIN REFERENCE BOOKS :

1. Kernighan B., Ritchie D. : The C Programming Language, Prentice Hall, 1988
2. Cooper H. & Mullish H : The Sprit of C, Jaico Publication House, New Delhi.
3. Balaguruswami : Programming in ANSI C., Tata McGraw Hill Publication.

Course : US04CCS02
(Operating Systems)

Credits : 3
Lectures per week : 3
University examination duration : 3 Hours
All units carry equal weightage.

Unit 1. Introduction
- Introduction to Operating System
- Functions of OS
- Different types of Operating Systems: Real time, Multi-user, Time sharing
- OS Structure – Monolithic, Layered, Virtual Machine, Client-Server

Unit 2. I/O Management
- I/O Devices
- Organization of the I/O function
- Operating System design issues
- I/O Buffering

Unit 3. Scheduling
- CPU Scheduling: Introduction to process, process control block, process scheduling
- FCFS Scheduling, SJF scheduling, Priority scheduling, Round Robin scheduling

Unit 4. Memory Management-I
- Concept
- Logical Vs physical address space
- Swapping
- Contiguous allocation
- Paging
- Segmentation

Unit 5. Memory Management-II
- Virtual Memory System
- Demand Paging
- Page replacement algorithms:
    a) The Optimal Page Replacement Algorithm
    b) The LRU Page Replacement Algorithm
    c) The FIFO Page Replacement Algorithm
    d) The second change Page Replacement Algorithm
    e) The clock Page Replacement Algorithm

Unit 6. Process Synchronization and Deadlocks
- Introduction to Cooperating process
- Process Synchronization,
- Critical Section Problem
- Two process solution, Multiple process solution
- Deadlock and characterization

MAIN REFERENCE BOOKS:

1. Andrew S. Tanenbaum: Operating System deign & Implementation, Prentice Hall International.
2. James Peterson and Abraham Silberschatz: Operating System Concept, Addition Wesley.
3. William Stallings : Operating Systems, Prentice Hall India, Second Edition.

Course : US04CCS03
(Practicals)

Credits : 3
No. of laboratory hours per week : 6

University examination duration : 3 Hours

- **Practical Based on US04CCS01.**

Course : US04ECS01
(Basics of Linux Operating Systems)

Credits : 2
Lectures per week : 2
University examination duration : 2 Hours
All units carry equal weightage.

Unit 1. LINUX System

- Introduction to Linux System & History
- Features of Linux
- Design principles
- Introduction to File System

Unit 2. Process and Memory management

- Process management
    - Fork/Exec process model
    - Process and threads
- Scheduling
    - Kernel synchronization
- Memory management
    - Management of physical memory
    - Virtual memory

Unit 3. Basic Commands

- login, logout, date, cal, man, pwd, who, who am i, dir, ls, cd, mkdir, rmdir
- Use of Wild card characters and introduction to vi editor
- Introduction to environment variable like HOME, PATH, PS1
- Types of FAP, use of chmod command
- Basic commands like cp, mv, rm, rev, file redirection
- Grep, cut, paste, find sort commands with example

Unit 4. Introduction to Shell Scripting

- Introduction to shell script: execution of it, shell script variable, expr, test commands
- Control structure: if, if..else, case structure
- Iteration: while, for construct, break, continue, exit commands
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MAIN REFERENCE BOOKS :

1. Andrew S. Tanenbaum: Operating System deign & Implementation, Prentice Hall International
2. James Peterson and Abraham Silberschatz: Operating System Concept, Addition Wesley
3. Linux Commands Instant reference – Bryan Pfaffenberger BPB Publication
4. Advanced Linux Programming – Samuel, Techmedia Publications

Course : US04ECS02
(RDBMS for small scale organization)

Credits : 2
Lectures per week : 2
University examination duration : 2 Hours
All units carry equal weightage.

Unit 1. *Introduction to the RDBMS Package*

- RDBMS for small scale organizations – Introduction and applications
- Working with menus, toolbars and other components
- Working with databases – creation and saving
- Creating a table object

Unit 2. *Working with Data Operations and Establishing Relationships*

- Inserting data into tables
- Operations on data – adding, deleting, editing, sorting, etc.
- Creating a primary key
- Creating Relationship between tables

Unit 3. *Working with Queries, Forms and Reports*

- Working with Query – creation, editing, saving, specifying criteria, multiple-table queries, different types of queries
- Using forms and reports – creating, modifying, saving, etc.
- Using AutoForm, AutoReport

Unit 4. *Using Miscellaneous Features*

- Creating mailing labels and charts
- Data Import and Export facility
- Database security
- Database utilities
- Overview of macros and modules

MAIN REFERENCE BOOKS :

1. Virginia Andersen : Microsoft Office Access 2003 : The complete reference, McGraw Hill, 2003
2. Progue, Irwin, Roardon : Microsoft Office Access 2003 Bible, Wiley Publishing Inc., 2004
3. Manuals of relevant software packages

Course : US04ECS03
(Information Technology in Business)

Credits : 2
Lectures per week : 2
University examination duration : 2 Hours
All units carry equal weightage.

Unit 1. *Introduction to Information Systems - I*

- Categories of information, the data pyramid
- Information systems and technologies
- Importance of information systems in businesses
- Information system activities – input, processing, output, storage, control of system performance

Unit 2. *Introduction to Information Systems - II*

- Components of an information system
- Information system resources – people, hardware, software, data, network
- Gaining strategic advantage through IT
- Managerial Challenges of IT

Unit 3. *Functional Business Systems*

- An introduction to information systems for manufacturing, marketing, accounting, human resources management, financial management, inventory management, etc.

Unit 4. *Introduction to Enterprise Applications*

- An introduction to Enterprise Resource Planning, Customer Relationship Management, Supply Chain Management, E-commerce systems

MAIN REFERENCE BOOKS :

1. O'Brien J. : Management Information Systems, Tata McGraw-Hill, 2004
2. Jessup L., Valacich J. : Information Systems Today – Why IS Matters, Pearson Education, 2006