PC 101 IT   PROGRAMMING IN C AND DATA STRUCTURES
Credits: 4

Instruction: (4L) hrs per week   *Duration of SEE: 3 hours*
CIE: 30 marks   *SEE: 70 marks*

UNIT – I
Introduction to C Language - Background, C Identifiers, Data Types, Operators, Variables, Constants, Input / Output, Expressions, C Programs, Precedence and Associativity, Evaluating Expressions, Type Conversion, Statements, Bitwise Operators.
Selection: Logical Data and Operators, if-else, switch Statements, Standard Functions.
Repetition: loops, while, for, do-while statements, Loop examples, break, continue, go to.
UNIT-II
Arrays - Concepts, Using Arrays in C, Inter-Function Communication, Array Applications, Two- Dimensional Arrays, Multidimensional Arrays, Linear and Binary Search, Selection, Bubble, Insertion Sorts.
Functions: Functions Basics, User Defined Functions, Inter Function Communication, Standard Functions, Scope, Storage Classes-Auto, Register, Static, Extern, Scope Rules, and Type Qualifiers.
Recursion- Recursive Functions, Terminating Condition, Preprocessor Commands.
UNIT – III
Pointers - Introduction, Pointers to Pointers, Compatibility, L value and R value, Arrays and Pointers, Pointer Arithmetic and Arrays.
Call-by-reference: Passing Arrays to a Function, **Dynamic Memory Allocation:** Memory Allocation Functions, Array of Pointers.
Strings - Concepts, String Input/Output Functions, Arrays of Strings, String Manipulation Functions, The Type Definition (type def), Enumerated Types.
UNIT - IV
Structure: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures and Unions.
Input and Output: Files, Streams, Standard library Input Output Functions, Character Input Output Functions.
UNIT - V
Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation, Queues-operations, array and linked representations.
Suggested Reading:
1. B.A.Forouzan and R.F. Gilberg , *C Programming and Data Structures*, 3rd Edition, Cengage Learning, 2007.
2. Kernighan BW and Ritchie DM, "The C Programming Language", 2nd Edition, Prentice Hall of India, 2006.

PC 102 IT　　　　　　　**ELEMENTS OF INFORMATION TECHNOLOGY**
Credits: 4

Instruction: (4L) hrs per week　　　　　　　*Duration of SEE: 3 hours*
CIE: 30 marks　　　　　　　　　　　　　　　*SEE: 70 marks*

UNIT-I
Information Concepts and Processing: Definition, Need, Qualities, value of information. Categories of information in business organization, levels of information, data concepts, logical and physical concepts, data processing, Introduction to office automation.

Number Systems: Binary numbers, octal numbers, hexadecimal numbers, Radix- decimal, octal, hexadecimal, conversion from one form to another-Examples, Representation of decimal, octal, hexadecimal numbers: fractional numbers and signed numbers, 1's and 2's complement forms, Binary arithmetic-addition, subtraction ,multiplication and division-Examples. Codes-Various types- ASCII and 8 bit EBCDIC

UNIT –II
An overview of Computer System: Components of a computer system, various I/O and auxiliary storage devices, system software, Introduction to system software, Distinction between systems software and Application software. Introductory ideas of loaders and linkers, High level languages. Different languages, Introduction to Assemblers, Compilers and Interpreters, relative merits of compilers v/s interpreters.

UNIT-III
Operating Systems: Evolution, introduction to Operating System, functions and facilities, single tasking and multitasking OS, single user and multi-user OS, characteristics of MS-DOS and Unix operating systems , DOS and UNIX commands for file and process management.

UNIT-IV
Text editors: overview of editing process Graphical User Interfaces- Introduction to Windows, Word processing software packages and features, spread sheet packages and features.
Database : Introduction to database and database packages. Desktop Publishing: Introduction to desktop publishing and desk top publishing packages.

UNIT-V
Computer Communications: Computer to computer communication through networking, Introduction to computer networks and networking software, Types of Networks, Internet and Intranet , Electronic mail.
Multimedia and Virtual reality: Introduction to Multimedia and Virtual reality Specifications of a typical desktop computer system, Recent Developments in ICT Recommended

Suggested Reading:
1. Satish Jain , *Information Technology* , BPB Publications, 2015.
2. Alexis Leon and Mathews Leon, *Fundamentals Of Information Technology,* 2nd Edition, Vikas publishers, 2009.
3. V.Rajaraman, *Fundamentals of Computers,* 5th Edition, Prentice Hall India, 2011

PC103IT   **OPERATING SYSTEMS**

Credits: 3

Instruction: *(4L) hrs per week*   *Duration of SEE*: *3 hours*
CIE: *30 marks*   *SEE*: *70 marks*

UNIT I

Introduction to Operating Systems: OS structure and strategies, Process concept, Interprocess communication, Threads, Multithreaded Programming. **Process Scheduling**: Scheduling Criteria, Scheduling Algorithms, Multi Processor scheduling, Thread Scheduling.

UNIT II

Memory Management: Swapping, Contiguous allocation, Paging, Static and dynamic partition, Demand paging, Page replacement Algorithms, Thrashing, Segmentation, Segmentation with Paging.

File System Interface: File Concept, Access Methods, Directory Structure, File System Mounting, File Sharing, and Protection.

File System Implementation: File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, and Free Space management, Efficiency and Performance, Recovery.

UNIT III

Process synchronization: Critical Section Problem, Semaphores, Monitors.

Deadlocks: Necessary conditions, Resource Allocation Graph, Methods for handling deadlocks, preventions, avoidance, detection and recovery. **Protection:** Goal, domain of protection, access matrix.

UNIT IV

Device Management: Disk Structure, Disk Attachment, Disk Scheduling, Disk Management, Swap Space Management, RAID structure and Storage Implementation.

I/O System: I/O hardware, Application TO Interface, Kernel I/O Subsystem, Transforming; I/O request to hardware. operation, STREAM

UNIT V

Case Studies: Linux System: Design Principles, Kernel Modules, Process Management, Scheduling Memory Management, File Systems, Input and Output, Inter-Process Communication, Network Structure, Security. **Windows XP**: General Architecture. The NT Kernel, The NT Executive.

Suggested Reading:

1. Abraham Silberschatz, Peter B Galvin, Greg Gagne, "*Operating System Concepts*", 9th Edition, Wiley India, 2016.
2. Andres S Tanenbaum, "*Modern Operating Systems*", 4th Edition, PHI, 2016.
3. Robert Love, "*Linux Kernel Development*", Pearson Education, 2004.
4. William Stallings, "*Operating Systems*", 7th Edition, PHI, 2012.

PC 104 IT   DATABASE MANAGEMENT SYSTEMS
                                Credits: 4

Instruction: (4L) hrs per week   *Duration of SEE: 3 hours*
CIE: 30 marks   *SEE: 70 marks*

UNIT-I
Introduction to DBMS and ER Model: File Systems versus DBMS, Advantages of DBMS, Database Design and E-R Diagrams, Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design with the ER Model.
The Relational Model: Introduction to Relational Model, Integrity Constraints over Relations, Logical Database Design (ER to Relational), Introduction to Views, Destroying / Altering Tables & Views.
Schema Refinement and Normal Forms: Schema Refinement, Functional Dependencies, Normal Forms, Normalization, Schema Refinement in Database Design.

UNIT-II
Relational Algebra and Calculus: Preliminaries, Relational Algebra, Relational Calculus, Expressive Power of Algebra and Calculus.
SQL: Queries, Constraints, Triggers: The Form of Basic SQL Query, Set Operators, Nested Queries, Aggregate Operators, Null Values, Triggers and Active Databases, Designing Active Databases, Accessing Databases from Applications using Embedded SQL, Cursors, Dynamic SQL.
UNIT-III
Overview of Storage and Indexing: File Organizations and Indexing, Index Data Structures, Comparison of File Organizations.
Tree-Structured Indexing: Indexed Sequential Access Method (ISAM), B+ Trees, Search, Insert Delete, B+ Trees in Practice.
Hash-Based Indexing: Static Hashing, Extendible Hashing, Linear Hashing, Extendible versus Linear Hashing.
 UNIT-IV
Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock-Based Concurrency Control.
Concurrency Control: 2PL, Serializablity, and Recoverablity, Introduction to Lock Management, Dealing with Deadlock, Specialized Locking Techniques, Concurrency Control without Locking.
UNIT-V
Crash Recovery: Introduction to ARIES, The Log, Other Recovery Related Structures, The W AL, Check pointing, Recovering from a System Crash, Media Recovery.
Security and Authorization: Introduction to Database Security, Access Control, Discretionary Access Control, Mandatory Access Control, Additional Issues related to Security.

Suggested Reading:

1. Raghu Ramakrishnan, Johannes Gehrke, "*Database Management Systems*", 3rd Edition, McGraw Hill, 2003.
 2. Abraham Silberschatz, Henry F Korth, S Sudharshan, "*Database System Concepts*", 6th Edition, McGraw-Hill International Edition, 2011
3. Peter Rob, Carlos Coronel, "*Database System Concepts*", Cengage Learning, 2008
4. Ramez Elmasri, Durvasul VLN Somayajulu, Shamkant B Navathe,. Shyam K Gupta, "*Fundamentals of Database Systems*", 6th Edition, Addison Wesley, 2011.

PC 151 IT   **C AND DATA STRUCTURES LAB**
Credits: 2

Instruction: (4 P) hrs per week   *Duration of SEE: 3 hours*
CIE: 25 marks   *SEE: 50 marks*

1. Finding the maximum and minimum of given set of numbers

2. Finding Roots of a Quadratic Equation

3. Sin x and Cos x values using series expansion

4. Conversion of Binary to Decimal, Octal, Hexa and Vice versa

5. Generating a Pascal triangle and Pyramid of numbers

6. Recursion: Factorial, Fibonacci, GCD

7. Matrix addition and multiplication using arrays

8. Bubble Sort, Selection Sort

9. Programs on Linear Search and Binary Search using recursive and non-recursive procedures.

10. Programs using functions for string manipulation operations.

11. Find the No. of characters, words and lines in a given text file

12. File Handling programs.

13. Implementation of Stacks using Arrays and Linked lists representation

14. Implementation of Queues using Linked Representation

15. Program on Single Linked List Operations.

16. Program on Binary Tree Traversal Techniques

PC152IT   **ELEMENTS OF INFORMATION TECHNOLOGY LAB**
Credits: 2

Instruction: (4 P) hrs per week   *Duration of SEE: 3 hours*
CIE: 25 marks   *SEE: 50 marks*

Syllabus:

1.   System Assembling , Disassembling and identification of Parts / Peripherals

2.   Operating System Installation – Install Operating Systems like Windows, Linux along with necessary Device Drivers.

3.   MS-Office / Open Office
        a. Word – Formatting Page Borders, Reviewing Equations, symbols
        b. Spread Sheet – organize data, usage of formula graphs charts
        c. Power point – features of power point, guidelines for preparing an effective presentation
        d. Access – creation of database, validate data

4.   Network Configuration & Software Installation : Configuring TCP/IP, proxy and firewall settings. Installing application software system software & tools.

5.   Internet and World Wide Web-Search Engines. Types of search engines, netiquette, Cyber hygiene.

6.   Trouble Shooting – Hardware trouble shooting, Software trouble shooting.

Suggested Reading:

1.   K. L. James, *Computer Hardware, Installation, Interfacing Troubleshooting and Maintenance*, Eastern Economy Edition.

PC153IT

DATABASE MANAGEMENT SYSTEMS LAB
Credits: 2

Instruction: (4 P) hrs per week   *Duration of SEE: 3 hours*
CIE: 25 marks   *SEE: 50 marks*

I. SQLIPL- SQL:

1. Creation of database (exercising the commands for creation)

2. Simple to complex condition query creation using SQL plus

3. Demonstration of blocks, cursors & database triggers.

II. Forms / Reports :

4. Creation of forms for the case study assigned.

5. Creation of Reports based on different queries.

6. Creating password and security features for applications.

7. Usage of file locking and table locking facilities in applications.

 8. Creation of Small full fledged database application spreading over to 3 sessions.

Note :

(i)   Use Case Studies as Library Information Studies, Pay roll System, Bank Information System, Reservation System, Inventory System, etc.

(ii)   The creation of Sample database, for the purpose of the experiments is expected to be decided by the instructor based on the case study assigned to the students.

(iii)   Oracle DBMS package should be used to carry the Lab experiments.

PC 201 IT   **COMPUTER NETWORKS**
                                 Credits: 4

Instruction: (4L) hrs per week   *Duration of SEE: 3 hours*
CIE: 30 marks   *SEE: 70 marks*

UNIT-I

Data Communications : Components - Direction of Data flow - networks -Components and Categories - types of Connections - Topologies -Protocols and Standards - ISO/OSI model, TCP/IP. Transmission Media - Coaxial Cable - Fiber Optics - Line Coding - Modems - RS232 Interfacing.

UNIT II

Datalink Layer : Error detection and correction, CRC, Hamming code, Flow Control and Error control - stop and wait - go back-N ARQ - selective repeat ARQ-sliding window - HDLC.

MAC Layer : LAN - Pure and Slotted ALOHA, Ethernet IEEE 802.3 -IEEE 802.4 -IEEE 802.5, Bridges.

UNIT-III

Network Layer : Internetworks - virtual circuit and Datagram approach, Routers IP addressing, Subnetting, CIDR. Routing - Distance Vector Routing, Link State Routing, OSPF and BGP.

UNIT-IV

Transport Layer : Services of transport layer, Multiplexing. Transmission Control Protocol (TCP) - Congestion Control, Time management, Quality of services (QOS) and User Datagram Protocol (UDP)

UNIT-V

Application Layer : Domain Name Space (DNS) - SMTP - FTP - HTTP - WWW.

Suggested Reading:

1. Andrew S. Tanenbaum, "*Computer Networks*", Pearson Education; Fourth Edition, 2008.

2. Behrouz A. Forouzan, "*Data Communication and Networking*", Tata McGraw-Hill, 2009.

3. James F. Kurose and Keith W. Ross, "*Computer Networking: A Top-Down Approach Featuring the Internet*", Pearson Education, 2006.

PC 202 IT
PRINCIPLES OF OBJECT ORIENTED PROGRAMMING USING JAVA

Instruction	4 periods per week
Duration of university Examination	3 hours
University Examination	70 Marks
Sessional	30 Marks

UNIT-I
Object Oriented System Development: Understanding Object Oriented Development, Understanding Object Oriented Concepts, Benefits of Object Oriented Development.

Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables and Arrays, Operators, Control Statements, Classes, Methods, Inheritance, Packages and Interfaces.

UNIT-II
Exception Handling, Multithreaded Programming, 110 basics, Reading console input and output , Reading and Writing Files, Print Writer Class, String Handling.

UNIT-III
Exploring Java Language, Collection Overview, Collections Interfaces, Collection Classes, Iterators, Random Access Interface, Maps, Comparators, Arrays, Legacy classes and Interfaces, String Tokenizer, Bit Set, Date, Calendar observable, Timer.

UNIT-IV
Java I/0 classes and Interfaces, Files, Stream and Byte Classes, Character Streams, Serialization.

UNIT-V
GU [and Event Driven Programming : Applet Class, Event Handling, Delegation event model, event classes, event listener Interfaces. Customizing Frame Windows, GUI Programming Basics, Text Related GUI Components, Layout Managers, Effective use of Nested panels, Other GUI components, Menus and Handling Mouse Events.

Suggested Reading:
1. Patrick Naughton , *JAVA 2, The Complete Reference*, Tata McGraw Hill, 2005.
2.   Richard A. Johnson, *Java Programming and Object-Oriented Applications Development*,
     Cengage Learning, India Edition, 2009.
3. John Dean and Raymond Dean, *Introduction to Programming with JAVA A Problem Solving*
     Approach, McGraw Hill, 2008.
4. Joe Wigglesworth and Paula McMillan, *Java Programming Advanced Topics*" Cengage
     Learning, 3rd Edition, 2009.

PC 20 3IT   SOFTWARE ENGINEERING AND OBJECT ORIENTED ANALYSIS AND DESIGN

Credits: 3

Instruction: (4L) hrs per week   *Duration of SEE: 3 hours*
CIE: 30 marks   *SEE: 70 marks*

UNIT-I
Software Processes: - Process and project, Component Software Processes, Software Development Process Models, Project Management Process.
Software Requirements Analysis and Specification: Value of a good SRS, Requirements Process, Requirements Specification, Functional Specification with Use Cases, Other approaches for analysis

UNIT-II
Software Architecture: Role of Software Architecture Views, Component and connector view, Architectural styles for C & C view, Documenting Architecture Design, Evaluating Architectures.
Planning a Software Project: Effort Estimation, Project Schedule and staffing, Quality Planning, Risk Management Planning, Project Monitoring Plan, Detailed Scheduling.   **Design**: Design concepts, Function Oriented Design, Object Oriented Design, Detailed Design, Verification, Metrics.

UNIT-III
Coding and Unit Testing: Programming Principles and Guidelines, Incrementally developing code, managing evolving code, unit testing, code inspection, Metrics
Testing: Testing Concepts, Testing Process, Black Box testing, White box testing, Metrics.

UNIT-IV
Maintenance and Re-engineering: Software Maintenance, supportability, Reengineering, Business process Reengineering, Software reengineering, Reverse engineering; Restructuring, Forward engineering, Economics of Reengineering.
UML Introduction : Why we model, Introducing the UML, Hello World. Basic Structural Modeling: Classes, Relationships, Common Mechanisms, Diagrams, Class Diagrams.

UNIT-V
Unified Software Development Process: The Unified Process, The Four Ps, A Use- Case- Driven Process, An Architecture, An Architecture – Centric Process, An Iterative and incremental Process. **Core Workflows:** Requirements Capture, Capturing Requirements as Use Cases, Analysis, Design, Implementation, Test.

Suggested Reading:
1. Pankaj Jalote, "*Software Engineering- A Precise Approach*", Wiley India, 2010.
2. Roger. S.Pressman , "*Software Engineering - A Practitioner's Approach*", 7th Edition, McGraw Hill Higher Education, 2010.
3. Deepak Jain, "*Software Engineering*", Oxford University Press, 2008
4. Ivor Jacbson, Grady Booch, James Rumbaugh, The Unified Software Development Process, Pearson Education, India, 2008.

PC204IT   **WEB PROGRAMMING**
                                               Credits: 4

Instruction: (4L) hrs per week   *Duration of SEE: 3 hours*
CIE: 30 marks   *SEE: 70 marks*

UNIT-I

HTML: Markup languages, common tags, header, test styling, linking images Formatting text, Unordered lists, nested and ordered list, Tabs-and formatting, Basic forms; Complex forms linking, Meta Tags. Dynamic HTML: Cascading style sheets in line styles, style element External Style sheet, text flow and Box model, user style sheets.

UNIT-II

Object model and collections: Object referencing, collections all, children frames, navigator object. Event model: ONCLICK, ONLOAD, Error Handling, ON ERRORS ONMUOUSEMOVE, ONMUSEOVER, ONMOUSEOUT, ONFOCUS, ONBLUR, ONSUBMIT. Dynamic HTML: Filters and transitions, Data binding with Tabular data control binding to IMO, TABLE, Structured graphics, Active controls.

UNIT-III

Introduction to scripting, Java Script, Data types, Arithmetic's Equality relational, assignment increment, decrement operators, Java Script Control Structures- if, if-else, while.
Java Script Control Structures: For, Switch, Do/while, break.
Programming modules, recursion, recursion vs iteration global functions arrays,. using arrays, Reference and reference parameters, passing arrays to functions, multiple subscripted arrays, objects-math, string. Boolean and number.

UNIT-IV

Client side scripting with VB Script, operations, Data types and control structures, Functions, Arrays, String manipulations, classes and objects. Web Servers : Personal Web server, Internet information server, Apache Web Server, Installation of a Web Server.

UNIT-V

Active Sever Pages, Client side Scripting vs Server side Scripting, Server side Active X Component, ADO, file system objects, Session tracking, CGI and PERL5, String. Processing and Regular Expressions, Server side includes, Cookies and PERL XML Document Type Definition, XML Parsers, Using XML with HTML.

Suggested Reading:

1. Deiterl, Deitel & NIETO, "*Internet & World Wide Web - How to Program*", Pearson Education, Third Edition, 2004.
2. Steven Holzner, "*HTML Black Book - Comprehensive Problem Server*", Dream Tech Press, 2000.
3. B Sosinsky, V Hilley, "*Programming the Web - An Introduction*", MGH, 2004.

PC 251 IT   **JAVA PROGRAMMING LAB**
                        Credits: 2

Instruction: (4 P) hrs per week   *Duration of SEE: 3 hours*
CIE: 25 marks   *SEE: 50 marks*

1. A program to illustrate the concept of class with constructors, methods and overloading.
2. A program to illustrate the concept of inheritance and dynamic polymorphism.
3. A program to illustrate the usage of abstract class.
4. A program to illustrate multithreading.
5. A program to illustrate thread synchronization.
6. A program to illustrate Exception handling.
7. A program to illustrate user-defined Exceptions
8. A program to demonstrate use of User-defined Packages.
9. A program using String Tokenize.
10. A program using Linked list class
11. A program using Tree Set class
12. A program using Hash Set and Iterator classes
13. A program using Map classes.
14. A program using Enumeration and Comparator interfaces.
15. A program using File and Filename Filter
16. A program to illustrate the usage of Byte and Character I/O streams.
17. A program to illustrate the usage of Serialization.
18. Program using Data class.
19. An application involving GUI with different controls, menus and event handling.
20. A program to implement an applet.

PC 252 IT
INTERNET AND WEB PROGRAMMING LAB
Credits: 2

Instruction: (4 P) hrs per week   *Duration of SEE: 3 hours*
CIE: 25 marks   *SEE: 50 marks*

1. Creating HTML pages to test different Tags.

   a) Headers
   b) Linking Images.
   c) Images as anchor.
   d) Text Formatting.
   e) HTML Table Formatting.
   f) Ordered and Unordered lists.

2. Creation of Frames.

3. Examination result in Java Script.

4. Creation of Quiz program.

5. Usage Data and the methods of Date and Time objects.

6. Floating alerts, aligning text and setting box dimension using CSS.

7. Demonstrating object hierarchy using collection children.

8. Using HTML Events.

9. Using Transition & Filters like Flip filter, Chrome filter, Shadow filter etc.,

10. VB script classes and regular expression.

11. Installing Web Server (PWS or IIS).

12. Guest book Active Server pages.

13. Creation of Small full fledged database application using ADO spreading over to 3 sessions.

PW 253 IT **MINI PROJECT-I**
Credits: 2

Instruction: (2P) hrs per week *Duration of SEE: 3 hours*
CIE: 25 marks *SEE: 50 marks*

The students are required to carry out mini project that involves usage of data mining tools, various algorithms to pre process and analysis related to the data mining problems.

The department will appoint a project coordinator who will be incharge of the following:

- Grouping of students (a maximum of three in group)
- Allotment of project guides
- Project monitoring at regular intervals

All the projects are to be evaluated by a monitoring committee comprising of project coordinator and the supervisor on the basis of an oral presentation, demonstration, mini project report and Viva-Voce.