

SEMESTER I

Core Paper - I

DIGITAL COMPUTER FUNDAMENTALS

Instructional Hrs. : 60

Sub. Code : 11CAPC101

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the basic concepts of Digital Computers.

UNIT I

12Hrs.

Binary Systems : Digital Computers and Digital Systems – Binary Numbers – Number base conversion – Octal and Hexadecimal Numbers – Complements – Binary Codes. **Boolean Algebra and Logic Gates :** Basic Definitions – Axiomatic Definition of Boolean Algebra – Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Canonical and Standard Forms – *Other Logic Operations* – Digital Logic Gates.

UNIT II

12Hrs.

Simplification of Boolean Functions : The Map Methods – Two and Three Variable Maps – Product of Sums Simplification – NAND and *NOR* Implementations – Don't Care Conditions – The Tabulation Method – Determination of Prime-Implicants - Selection of Prime-Implicants .

UNIT III

12Hrs.

Combinational Logic : Introduction – Design Procedure – Adders – Subtractors – Code Conversion – Analysis Procedure – *Universal Gates* – Exclusive-OR and Equivalence Functions. **Combinational Logic with MSI and LSI :** Introduction – Binary Parallel Adder – Decimal Adder – Magnitude Comparator – Decoders - Demultiplexers - Encoders– Multiplexers.

UNIT IV

12Hrs.

Sequential Logic : Introduction – Flip-Flops – Triggering of Flip-Flops – Analysis of Clocked Sequential Circuits – State Reduction and Assignment – *Flip-Flop Excitation Tables* – Design Procedure - Design of Counters – Design with State Equations.

UNIT V

12Hrs.

Registers, Counters and the Memory Unit : Introduction – Registers – Shift Registers – Ripple Counters – Synchronous Counters – Timing Sequences – *The Memory Unit* – Examples of Random Access Memories.

Note : *Italics* denotes Topics for Self Study

TEXT BOOKS

1. **M. Morris Mano**, *Digital Logic and Computer Design*, PHI, New Delhi, 2005.

REFERENCE BOOKS

1. **Albert Paul Malvino, Donald P. Leach**, *Digital Principles and Applications*, Tata Mc Graw Hill Pub. Company Ltd., 5th Edition, 1995.
2. **Puri .V.K.**, *Digital Electronics – Circuits and Systems*, , Tata McGraw Hill, 2008.
3. **Roger L. Tokheim**, *Schaum's Outlines- Digital Principles* , Tata McGraw Hill, 2004.
4. **Thomas C. Bartee**, *Digital Computer Fundamentals*, Tata McGraw Hill Sixth Edition, 2005.

SEMESTER I
Core Paper - II
PROGRAMMING IN C

Instructional Hrs. : 60

Sub. Code : 09CAPC102

Max. Marks : CIA -25; ESE -75

Credits: 3

Objective : To make the students understand how to program in the C language

UNIT I

12Hrs.

Tutorial Introduction – Types, Operators and Expressions: Variable Names – Data Types and Sizes – Constants – Declarations – Arithmetic Operators – Relational and Logical Operators – Type Conversions – Increment and Decrement Operators – Bitwise Operators – *Assignment Operators and Expressions* – Conditional Expressions – Precedence and Order of Evaluation.

UNIT II

12Hrs.

Input and Output: Standard Input and Output – Formatted Output – printf – Variable–Length Argument Lists – Formatted Input – scanf.

Control Flow: Statements and Blocks – if ... else – else if – switch – Loops: while, for and *do ... while* – break and continue – go to Labels.

UNIT III

12Hrs.

Functions And Program Structure: Basics Of Functions – Functions Returning Non–Integers – External Variables – Scope Rules – Header Files – Static Variables – Register Variables – *Block Structure* – Initialization – Recursion – The C Preprocessor.

UNIT IV

12Hrs.

Pointers and Arrays: Pointers and Arrays – Pointers and Function Arguments - Pointers and Arrays – Address Arithmetic – Character Pointers and Functions – Pointers Arrays; Pointers to Pointers – *Multi Dimensional Arrays* – Command Line Arguments – Pointers to Functions – Complicated Declarations.

UNIT V

12Hrs.

Structures: Basics of Structures – Structures And Functions – Arrays of Structures – Pointers to Structures – Self-Referential Structures – *Table Lookup* – Typedef - Unions – Bit Fields. **Files:** File Access – Error Handling – Stderr and Exit – Line Input and Output – Miscellaneous Functions.

Note : *Italics* denotes Topics for Self Study

TEXT BOOK

1. **Brain W. Kernighan and Dennis M. Ritchie**, *The C Programming Language*, Second Edition, Prentice Hall of India Ltd, 2002.

REFERENCE BOOKS

1. **Ashok N. Kamthane**. *Programming with ANSI and Turbo C*. Pearson Education Asia, 2003.
2. **Balagurusamy E**, *Programming in ANSI C*, Tata McGraw Hill, 3rd Edition, 2004.
3. **Deitel & Deitel**, *C How to Program*, Fourth Edition, PHI/Pearson Education Asia, 2005.
4. **Yeswanth Kanetkar**, *Let us C*, BPB, 5th Edition, 2005.
5. **Yeswanth Kanetkar**, *Pointers in C*, BPB, 3rd Edition, 2001.
6. **Yeswanth Kanetkar**, *TSR through C*, BPB, 2002.
7. **www.spoken-tutorial.org**.

SEMESTER I
Core Paper - III
COMPUTER ORGANIZATION AND ARCHITECTURE

Instructional Hrs. : 60

Sub. Code : 11CAPC103

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the organization and architecture of a computer.

UNIT I

12Hrs.

Register Transfer and Microoperations: Register Transfer Language-Register Transfer- Bus and Memory Transfer-Arithmetic Microoperations – Logic Microoperations – Logic Microoperations – Shift Microoperations – Arithmetic Logic Shift Unit.

Basic Computer Organization and Design : Instruction Codes- Computer Registers – Computer Instructions – Timing and Control – Instruction Cycle.

UNIT II

12Hrs.

Central Processing Unit: Introduction- General Register Organizations – Stack Organization – Instruction Formats – Addressing Modes- Data Transfer and Manipulation – Program Control.

UNIT III

12Hrs.

Pipeline and Vector Processing: Parallel Processing – Pipelining- Arithmetic Pipeline – Instruction Pipeline – RISC pipeline – Vector Processing – Array Processors.

Computer Arithmetic: Introduction – Addition and Subtraction.

UNIT IV

12Hrs.

Input – output Organization: Peripheral Devices – Input- output Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupt – Direct Memory Access(DMA) – Input – Output Processor (IOP).

UNIT V

12Hrs.

Memory Organization : Memory Hierarchy – Main Memory – Auxiliary Memory – Cache Memory – Virtual Memory.

Note : *Italics* denotes Topics for Self Study

TEXT BOOK

1. **Morris M. Mano**, *Computer System Architecture*, Pearson Education, Third Edition, 2000.

REFERENCE BOOKS

1. **Hayes J.P.**, *Computer Architecture and Organization* - Tata McGraw Hill Publications Company Ltd., 3rd Edition, 1998.
2. **Nicholas Carter**, *Computer Architecture Schaum's outlines* , Tata McGraw Hill, 2006.
2. **William Stallings**, *Computer Organization and Architecture – Designing for Performance*, Pearson Education, 6th Edition, 2002.

SEMESTER I

Core Paper – IV

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Instructional Hrs. : 60

Sub. Code : 09CAPC104

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the basics of mathematical logic, graph theory and automata theory

UNIT I

12Hrs.

Mathematical Logic: Connectives – NAND and *NOR Connectives*, Functionally Complete Set of Connectives, Logical Networks, Principle Conjunctive and Disjunctive Normal Forms, Equivalence of Statements, Formulae Derivations – Conditional Proof, Indirect Method of Proof, Automatic Theorem Proving.

UNIT II

12Hrs.

Graph Theory: Basic Concepts of Graph Theory –Path, Reachability and Connectedness – *Matrix Representation of Graphs* – Trees – Storage Representation and Manipulation of Graphs.

UNIT III

12Hrs.

Univariate Distribution – Frequency Distribution – Grouped and Ungrouped Distributions – Measures of Central Tendency – Measure of Dispersion – Coefficient of Variation.

Bivariate Distribution: Correlation - Types of Correlation – Karl Pearson's Coefficient of Correlation – *Rank Correlation* – Regression – Regression Equations – Methods of Solving Regression Equations.

UNIT IV

12Hrs.

Numerical Methods: Finding Roots, *Bisection*, Regula-Falsi, Newton Raphson Methods, Solutions of Simultaneous Linear Equations, Gaussian Elimination, Gauss-Siedal Methods.

UNIT V

12Hrs.

Introduction to Automata Theory: Finite State Automata – Deterministic and *Non-Deterministic*, Regular Expressions.

Note : *Italics* denotes Topics for Self Study

REFERENCE BOOKS

1. **Gupta S.P**, *Statistics Methods*, Sultan & Chand, 2006.
2. **Gupta S.C and Kapoor V.K**, *Fundamental of Mathematics Statistics*. Sultan Chand & Sons, 11th Edition, 2005.
3. **Hopcroft and Ullman**, *Introduction to Automata Theory, Languages and Computation*, 2nd Edition, 2001, Pearson Education.
4. **Kandaswamy P, Thialkavathy K and Ganavathi K**, *Numerical Methods*, S. C. Chand & Company Limited, New Delhi, 2nd Edition, 2002.
5. **Prof. Sunderasen. V, Ganapathy Subramanian K.S, Ganesan K**, *Discrete Mathematics*, A.R. Publications, 2001.
6. **Trembley and Monohar**, *Discrete Mathematical Structures with Application to Computer Science*, McGraw-Hill, 2006.
7. **Venkataraman M.K**, *Numerical Methods in Science and Engineering*. National Publishing Company, 5th Edition, 1999

SEMESTER I
Practical - I
C PROGRAMMING LAB

Instructional Hrs. : 75

Sub. Code 09CAPCP01

Max. Marks : CIA -40; ESE -60

Credits: 3

Objective : To make the students to understand how to program in C.

1. Program using Control Structures.
2. Program using Arrays.
3. Program using Structure.
4. Program using Functions.
5. Program using Pointers.
6. Program using Files.
7. Programs based on Numerical Algorithms and statistics.

SEMESTER I
Practical – II
LINUX LAB (Script)

Instructional Hrs. : 75

Sub. Code : 11CAPCP02

Max. Marks : CIA -40; ESE -60

Credits: 3

Objective : To make the students to understand about the usage of Linux Operating System.

1. To implement the following commands in Linux.
Banner, cal, cat, cmp, diff, grep, head, tail, echo, who.
2. To implement the following commands in Linux.
 - a. List Linux files.
 - b. Display Linux files.
 - c. Copying and Renaming files.
 - d. Change the file permissions.
3. Write a Shell Script to implement the following : pipes, Redirection, tee and filter commands.
4. Write a shell script for displaying current date, user name, file listing and directories by getting user choice.
5. Write a Shell Script to print the given string in a reverse order.
6. Write a Shell Script to sort the given 5 numbers.
7. Write a shell script to find the sum of the individual digits of a given number.
8. Write a shell script to find the greatest among the given set of numbers using command line arguments.
9. Write a shell script to print the multiplication table of the given argument using for loop.
10. Write a shell script for palindrome checking.

SEMESTER II

Core Paper - V

OBJECT ORIENTED PROGRAMMING WITH C++

Instructional Hrs. : 60

Sub. Code : 10CAPC205

Max. Marks : CIA - 25; ESE - 75

Credits: 3

Objective : To make the students understand the basic concepts of object oriented Programming and C++.

UNIT I

12Hrs.

Need For Object Oriented Programming – Characteristics of Object Oriented Languages – **C++ Programming Basics – Loops And Decisions – Structures:** A Simple Structure – Defining the Structure – Defining A Structure Variable – Accessing Structure Members – *Other Structure Features* – Structures Within Structures – **Functions:** Simple Function – Overloaded Functions – Inline Functions – Default Arguments.

UNIT II

12Hrs.

Objects And Classes: A Simple Class – C++ Objects as Data Types – Constructors – Destructors – Objects as Function Arguments – The Default Copy Constructors – Returning Objects From Functions – Structures And Classes – Classes Objects and Memory – Static Class Data – **Arrays:** *Array Fundamentals* – Array as Class Member Data – Arrays Of Objects – Strings as Class Members – A User Defined String Type.

UNIT III

12Hrs.

Operator Overloading: Overloading Unary Operators – Overloading Binary Operators – Data Conversion – Pitfalls of Operator Overloading and Conversion – **Inheritance:** Derived Class and Base Class – Derived Class Constructors – Overriding Member Functions – Class Hierarchies – Public and Private Inheritance – Levels of Inheritance – Multiple Inheritance – Ambiguity in Multiple Inheritance – Containership.

UNIT IV

12Hrs.

Pointers: Addresses and Pointers – Memory Management – Pointers to Objects – Pointers to Pointers – **Virtual Functions** – Friend Functions – Static Functions – Overloading the Assignment Operator – The Copy Constructor- Accessing Member Data with *This* Pointer – Using *This* for Returning Values.

UNIT V

12Hrs.

Files: Streams – String I/O – Character I/O – Object I/O – I/O With Multiple Objects – File Pointers – Disk I/O with Member Functions – Error Handling – **Templates:** Function Templates – Class Templates.

Note : *Italics* denotes Topics for Self Study

TEXTBOOK

1. **Robert Lafore**, *Object Oriented Programming in C++*, Techmedia Publications Pvt.Ltd., 4th Edition.

REFERENCE BOOKS

1. **Ashok N. Kamthane**, *Object Oriented Programming with ANSI & Turbo C++*, Pearson Education, 2005.
2. **Balagurusamy E**, *Object Oriented Programming with C++*, TMCH, 2nd Edition.
3. **Bjarne Stroustrup** *The C++ Programming Language*, Special Edition, Pearson Education, 2002.
4. **Ravichandran D**, *Programming with C++*, TMCH Publication, 1999.
5. **Venugopal K.R, Rajkumar & Ravishankar T**, *Mastering C++*, TMCH Publications, 1999.
6. **www.spoken-tutorial.org**.

SEMESTER II
Core Paper - VI
DATA STRUCTURES AND ALGORITHMS

Instructional Hrs. : 60

Sub. Code : 11CAPC206

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand about how to handle the different data structures and algorithms.

UNIT I

12Hrs.

Introduction to Algorithms, Creation and Analysis of Algorithms. Array – Representation of Arrays – Stacks – Queues. Evaluation of Expression - Infix to Postfix Conversion- Multiple Stacks and Queues – *Application* – Towers of Hanoi.

UNIT II

12Hrs.

Linked List: Singly Linked List – Linked Stacks and Queues – Polynomial Addition – More on Linked Lists – *Sparse Matrices* – Doubly Linked List – Dynamic Storage Management – Garbage Collection and Compaction.

UNIT III

12Hrs.

Trees : Basic Terminology – Binary Trees – Binary Tree Representation – Traversals – More on Binary Trees – Threaded Binary Trees – Binary Tree Representation of Trees – Counting Binary Trees-*Application* – Game Trees. **Graphs:** Terminology and Representation- Traversals – Connected Components – Spanning Trees – Shortest Path and Transitive Closure.

UNIT IV

12Hrs.

Internal Sorting: Insertion Sort – Quick Sort – 2way Merge Sort – Heap Sort – Shell Sort – Sorting on Several Keys. **External Sorting:** *Storage Devices* – Sorting With Disks: K- Way Merging – Sorting with Tapes.

UNIT V

12Hrs.

Symbol Tables: Static Tree Tables – Dynamic Tree Tables. Hash Tables: Hashing Functions – Overflow Handling. **Files:** Files, Queries and *Sequential Organizations* – Index Techniques - File Organizations.

Note : *Italics* denotes Topics for Self Study

TEXT BOOK

1. Ellis Horowitz, Sartaj Shani, *Data and File Structures*, Galgotia Publication.

REFERENCE BOOKS

1. Robert L. Kruse, C.L. Tondo, Bruce Leung *Data Structures and Program Design in C*, PHI, 2nd Edition, 1997.
2. Trembly & Sorenson, *Data Structures with Applications*, Tata McGraw Hill Company, 2nd Edition, 1991 (only for Queue application).
3. Yashwant P. Kanetkar, *Data Structures through C*, BPB Publications, 1999

SEMESTER II

Core Paper - VII

OPERATIONS RESEARCH

(Derivations Not Included Problems Only)

Instructional Hrs. : 75

Sub. Code : 09CAPC207

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the basic concepts of Operations Research

UNIT I

15Hrs.

Linear Programming: Formulation of LPP – Graphical solutions to LPP – Simplex Method – Big-M method – Two – Phase Simplex Method – Duality in Linear Programming: Primal & Dual Problems – *Dual Simplex Method.*

UNIT II

15Hrs.

The Transportation Problem: Introduction – Mathematical Formulation – Finding Initial Basic Feasible Solutions – Moving towards Optimality – Unbalanced Transportation Problems – Degeneracy. **The Assignment Problem:** Introduction – Mathematical formulation – Hungarian Assignment Method – Maximization in Assignment Problem – Unbalanced Assignment Problem – *Impossible Assignment.*

UNIT III

15Hrs.

Inventory Control: Introduction – Costs involved in Inventory – Deterministic Models: EOQ Models without and *with Shortage* – Buffer Stock and Reorder Level – Price Break Models – ABC Analysis.

UNIT IV

15Hrs.

Replacement Model: Introduction – Replacement of Items that Deteriorates Gradually: Value of Money Does Not Change with Time – Value of Money Changes with Time – Replacement of Items that Fails Suddenly: Individual Replacement –

Group Replacement. PERT / CPM: Introduction – Construction of Network – CPM Calculations – PERT Calculations.

UNIT – V

15Hrs.

Queuing Theory: Introduction – Characteristics of Queuing System – Problems of Single Server with Finite / Infinite Population Model – Problems of Multi Server with Finite / *Infinite Population Model*.

Note : *Italics* denotes Topics for Self Study

TEXT BOOKS

1. **Gupta P.K, Hira D.S**, Problems in Operations Research -S. Chand & Co., 2003.
2. **Kant Swarup, Gupta P.K, Man Mohan**, “Operations Research” -Sultan Chand & Sons, 9th Ed, 2001.

REFERENCE BOOKS

1. **Hamdy A. Taha**, *Operations Research–An Introduction* -7th Ed., PHI/Pearson Ed, 2003.
2. **Hillier S, Gerald J. Lieberman**, *Introduction to Operations Research* - Frederick Tata McGraw Hill Pub Company Ltd., 7th Edition.
3. **Sharma J.K**, *Operations Research Theory and Applications* - Macmillan India Ltd., 2nd Edition.

SEMESTER II
Practical – III
OOPS AND C++ LAB

Instructional Hrs. : 75

Sub. Code : 10CAPCP03

Max. Marks : CIA -40; ESE -60

Credits: 3

Objective : To make the students understand the basic concepts of object oriented programming and C++

1. Program using Classes & Objects.
2. Program using Function Overloading
3. Program using Friend function
4. Program using Operator overloading functions
5. Program using Type Conversion
6. Program using String Manipulation functions
7. Program using Inheritance
8. Program using Files
9. Program using Pointers
10. Program using Virtual Function
11. Program using Templates

SEMESTER II
Practical – IV
DATA STRUCTURES LAB

Instructional Hrs. : 75

Sub. Code : 11CAPCP04

Max. Marks : CIA -40; ESE -60

Credits: 3

Objective : To make the students to implement the manipulation of different data structures using C.

1. Creation and manipulations of array, stack, queue and circular queue.
2. Conversion of infix to postfix.
3. Addition of 2 polynomials.
4. Operations on strings.
5. Create and manipulate singly linked list, doubly linked list.
6. Sequential search, Binary search.
7. Tree traversal.
8. Quick sort, heap sort, radix sort, shell sort.
9. Binary tree construction.
10. Shortest path in graph

SEMESTER III
Core Paper - VIII
ADVANCED JAVA

Instructional Hrs. : 60

Sub. Code: 11CAPC308/11CSPC206

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the advanced concepts of java.

UNIT I **12Hrs.**

Introducing classes – A closer look at methods and classes – Inheritance.

UNIT II **12Hrs.**

Packages and interfaces – Multithreading – I/O Applets and other Topics

UNIT III **12Hrs.**

Applet class – Event handling – Introducing the AWT: working with windows, graphics and text.

UNIT IV **12Hrs.**

Using AWT controls, Layout managers and Menus – Swing

UNIT V **12Hrs.**

Introduction to servlets: why Servlets? – Servlet basics – servlet API basics – Writing your first Servlet – Running Servlets.

Note : *Italics* denotes Topics for Self Study

TEXT BOOK

1. **Herbert Schildt,** *The complete Reference Java 2*, TMH Publishing Company Ltd., New Delhi, 5th Edition.(I-IV unit)
2. **Dustin R.Gallaway,** *Inside servlets server side programming for the Java platform*, Pearson Education.(V unit)

REFERENCE BOOKS

1. **Bhava M.P., & Patekar S.A,** *Programming with Java*, Pearson Education, First Edition.
2. **Herbert Schildt,** *Swing A Beginner's guide*, TMH edition, Second Reprint 2009
3. **Krishnamoorthi R, Prabhu S,** *Internet & Java Programming Java 2*, New Age international (P) Ltd, Publishers New delhi .
4. **www.spoken-tutorial.org.**

SEMESTER III
Core Paper - X
SYSTEM SOFTWARE

Instructional Hrs. : 60

Sub. Code : 11CAPC309

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the basic concepts of system software.

UNIT I

12Hrs.

Language Processors: Introduction – Language Processing Activities – Fundamentals of Language Processing – Fundamentals of Language Specification – *Language Processor Development Tools*. **Scanning and Parsing :** Scanning – Parsing. **Assemblers :** Elements of Assembly Language Programming – A Simple Assembly Scheme – Pass Structure of Assemblers – Design of a Two Pass Assembler.

UNIT II

12Hrs.

Macros and Macro Processors : Macro Definition and Call – Macro Expansion – Nested Macro Calls – Advanced Macro Facilities – Design of a Macro Preprocessor. **Compilers and Interpreters :** Aspects of Compilation – Memory Allocation – Compilation of Expressions – Compilation of Control Structures – Code Optimization – Interpreters – *Overview of Interpretation*.

UNIT III

12Hrs.

Linkers : Relocation and Linking Concepts – Design of a Linker – Self Relocating Programs – Linker for Overlays – Loaders.

Operating System Overview : Operating System Objectives and Functions – *Evolution of Operating Systems*. **Process Management:** Process States – Principles of Concurrency – Mutual Exclusion – Semaphores.

UNIT IV

12Hrs.

Deadlock: Principles of Deadlock – Prevention – Detection – Avoidance. **Memory Management:** Memory Management Requirements – Loading Programs into Main Memory – **Virtual Memory:** *Hardware and Control Structures*

UNIT V

12Hrs.

Uniprocessor Scheduling: Types of Scheduling – Scheduling Algorithms. **File Management:** File Organization and Access – *Directories* – File Sharing. **Secondary Storage Management**

Note : *Italics* denotes Topics for Self Study

TEXT BOOKS

1. **Dhamdhare D.M,** *Systems Programming and Operating Systems*, TMH Publishing Company Ltd., New Delhi, 2nd Edition, 1997. (Units I , II & III)
2. **William Stallings,** *Operating Systems*, 2nd Edition, PHI, 2001 - (Unit III, IV & V)

REFERENCE BOOKS

1. **Andrew S. Tanenbaum,** *Modern operating System* – Pearson Education, Asia, 2nd Edition, Indian reprint, 2002.
2. **Crowley,** *Design of Operating System*, TMH, New Delhi, 1999.
3. **Harvey M.Deitel,** *An Introduction to Operating System*, Addison Wesley Publishing, New Delhi, 2nd Edition, 1990.
4. **Silberschatz, Galvin, Gagne,** *Operating System Concepts*, Addison Wesley Publishing, New Delhi, 6th Edition.

SEMESTER III

Core Paper – IX

RELATIONAL DATABASE MANAGEMENT SYSTEMS

Instructional Hrs. : 75

Sub. Code : 11CAPC310

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the basic concepts of data base management systems

UNIT I

15Hrs.

Introduction : Database-System Applications – Purpose of Database Systems – View of Data – Database Languages – Relational Databases – Database Design – Object-Based and Semi-Structured Databases – Data Storage and Querying – Transaction Management – Data Mining and Analysis – Database Architecture – Database Users and Administrators – *History of Database Systems.*

Relational Model : Structure of Relational Databases – Fundamental Relational-Algebra Operations – Additional Relational-Algebra Operations – Extended Relational –Algebra Operations – Null Values – Modification of the Database.

UNIT II

15Hrs.

SQL : Background – Data Definition – Basic Structure of SQL Queries – Set Operations – *Aggregate Functions* – Null Values – Nested Subqueries – Complex Queries – Views – Modification of the Database – Joined Relations.

Advanced SQL : SQL Data Types and Schemas – Integrity Constraints – Authorization – Embedded SQL – Functions and Procedural Constructs – Recursive Queries – Advanced SQL Features – Triggers – Authorization in SQL.

UNIT III

15Hrs.

Database Design and the E-R Model : Overview of the Design Process – The Entity-Relationship Model – Constraints – Entity-Relationship Diagrams - Entity-Relationship Design Issues – Weak Entity Sets – Extended E-R Features – Database

Design for Banking Enterprise – Reduction to Relational Schemas – *Other Aspects of Database Design* – The Unified Modeling Language UML.

UNIT IV

15Hrs.

Relational Database Design : Features of Good Relational Designs – Atomic Domains and First Normal Form – Decomposition Using Functional Dependencies - Functional Dependency theory – Decomposition using Functional Dependencies – Decomposition Using Multivalued Dependencies – More Normal Forms – Database Design Process – *Modeling Temporal Data*.

UNIT V

15Hrs.

Object-Based Databases : Overview – Complex Data Types – Structured Types and Inheritance in SQL – Table Inheritance – *Object-Oriented versus Object-Relational*.

Decision-Support Systems – Data Warehousing – **Advanced Data Types and New Applications** : Motivation – Time in Databases – Spatial and Geographic Data – Multimedia Databases – Mobility and Personal Databases.

Note : *Italics* denotes Topics for Self Study

TEXT BOOK

1. **Abraham Silberschatz, Henry F. Korth, Sudarshan .S**, *Database System Concepts*, 5th Edition, MCGraw – Hill International Edition, 2006.

REFERENCE BOOKS

1. **Elmasri Navathe**, *Fundamentals of Database Systems*, 3rd Ed., Pearson Education, 2000.
2. **Kandare S.S**, *Database Management and Oracle Programming*, 1st Edition, 2004, S.Chand & Company Ltd.
3. **Nilesh Shah**, *Database Systems using Oracle*, Prentice Hall of India, 2002.
4. **Rajesh Narang**, *Database Management Systems*, Prentice Hall of India, 2004.

SEMESTER III
Core Paper - XI
SOFTWARE ENGINEERING

Instructional Hrs. : 60

Sub. Code : 11CAPC311

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the concepts software engineering

UNIT I

12Hrs.

The Product: The Evolving role of Software – Software Crisis – Software Myths – The Process: Layered Technology – Software Process – Software Process Models – Linear Sequential Model – Prototyping Model – *RAD Model* – Evolutionary Software Process Model – Component Based Development – Formal Methods Model – 4G Techniques.

UNIT II

12Hrs.

Software Project Planning – Observations on Estimating – Project Planning Objectives – *Software Scope* – Resources – Software Project Estimation – Decomposition Techniques – Empirical Estimation Models – The Make/Buy Decision – Automated Estimation Tools.

UNIT III

12Hrs.

Software Configuration Management: The SCM Process – Identification of Objects in the Software Configuration – *Version Control* – Change Control – Configuration Audit – Status Reporting – SCM Standards. **Analysis Concepts and Principles:** Requirement Analysis – Analysis Principles – Software Prototyping – Specification.

UNIT IV

12Hrs.

Design Concepts and Principles: The Design Process – Design Principles – Design Concepts – Effective Modular Design. **User Interface Design:** The Golden Rules – *User Interface Design* – Task Analysis and Modeling – Interface Design Activities – Implementation Tools – Design Evaluation.

UNIT V

12Hrs.

Software Testing Strategies: A Strategic Approach to Software Testing – Strategic Issues – *Unit Testing* – Integration Testing – Validation Testing – System Testing – Arts of Debugging.

Note : *Italics* denotes Topics for Self Study

TEXT BOOK

1. **Roger S. Pressman**, *Software Engineering a Practitioner's Approach*, Fifth Edition, McGraw-Hill, 2001.

REFERENCE BOOKS

1. **Richard Fairly**, *Software Engineering Concepts*, TMH Publication, New Delhi, 2000.
2. **Somerville**, *Software Engineering*, Pearson Education, New Delhi, 6th Edition, 2002.
3. **Wanman S. Jawadkee**, *Software Engineering Principles and Practice*, TMH, New Delhi, 2004.

SEMESTER III
Practical - V
ADVANCED JAVA LAB

Instructional Hrs. : 75

Sub. Code : 11CAPCP05

Max. Marks : CIA -40; ESE -60

Credits: 3

Objective : To make the students understand the programming in advanced Java

1. Classes and objects
2. Inheritance
3. Packages
4. Interfaces
5. Multithreading
6. Applets
7. AWT controls
8. Event handling
9. Menus
10. Layout Managers
11. Swing controls
12. Servlet

SEMESTER III

Practical – VI

RDBMS LAB

Instructional Hrs. : 75

**Sub. Code :11CAPCP06/
12CSPSP03**

Max. Marks : CIA -40; ESE -60

Credits: 3

Objective : To make the students how to implement the concepts of Relational Data Base Management

1. SQL

Table Management
Aggregate functions.
Set Operations
Triggers
Views

2. PL/ SQL

Functions
Procedure
Cursor
Packages
Exception Handling

SEMESTER IV
Core Paper - XII
COMPUTER NETWORKS

Instructional Hrs. : 75

Sub. Code : 11CAPC412

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the basic concepts of computer networks

UNIT I

15Hrs.

Introduction: *Use of Computer Networks* – Network Hardware – Network Software-Reference Models .**The Physical Layer:** Guided Transmission Media – The Public Switched Telephone Network.

UNIT II

15Hrs.

Data Link Layer: Data Link Layer Design Issues – Error Detection and *Correction* – Elementary Data Link Protocols – Sliding Window Protocols – Protocol Verification.

UNIT III

15Hrs.

Network Layer: Network Layer Design Issues – **Routing Algorithms:** The optimality principle- Shortest path routing – Flooding – Distance vector routing – Link state routing – Hierarchical routing – Broadcast routing – Multicast Routing. Congestion, Control Algorithms – *Quality of Service* – Internetworking.

UNIT IV

15Hrs.

Transport Layer: The Transport Service – Elements of Transport Protocol – A Simple Transport Protocol -The Internet Transport Protocols: UDP – The Internet Transport Protocols: *TCP*.

UNIT V

15Hrs.

Application Layer: DNS –The World Wide Web – Multimedia – Cryptography- Symmetric Key Algorithms-Public Key Algorithms-*Digital Signature*.

Note : *Italics* denotes Topics for Self Study

TEXT BOOK

1. **Andrew S. Tanenbaum**, *Computer Networks*, Pearson Education, 4th Ed., 2003.

REFERENCE BOOKS

1. **Behrouz A. Forouzan**, *Data Communications and Networking*, TMH, New Delhi, 2nd Edition, 2006.
2. **Ed Tittel**, *Computer Networking*, TMH, New Delhi, 2007.

SEMESTER IV
Core Paper – XIII
DIGITAL IMAGE PROCESSING

Instructional Hrs. : 60

**Sub. Code : 12CAPC413 /
13CSPC207**

Max. Marks : CIA -25; ESE -75

Credits:4

Objective : To make the students understand the basic concepts of digital image processing.

UNIT I

12Hrs.

Introduction: What is Digital image processing – the origin of DIP – Examples of fields that use DIP – Fundamentals steps in DIP – Components of an image processing system. **Digital Image Fundamentals:** Elements of visual perception – Light and the electromagnetic spectrum – Image sensing and acquisition – Image sampling and Quantization – *Some Basic relationship between Pixels* – Linear & Nonlinear operations.

UNIT II

12Hrs.

Image Enhancement in the spatial domain: Background – some basic Gray level Transformations – Histogram Processing – *Enhancement using Arithmetic / Logic operations* – Basics of spatial filtering – Smoothing spatial filters – Sharpening spatial filters – Combining spatial enhancement methods.

UNIT III

12Hrs.

Image Restoration: A model of the Image Degradation / Restoration Process – Noise models – Restoration is the process of noise only – Spatial Filtering – Periodic Noise reduction by frequency domain filtering – Linear, Portion – Invariant Degradations – Estimating the degradation function – Inverse filtering – *Minimum mean square Error Filtering* – Constrained least squares filtering – Geometric mean filter – Geometric Transformations.

UNIT IV

12Hrs.

Image Compression: Fundamentals – *Image compression models* – Elements of Information Theory – Error Free compression – Lossy compression – Image compression standards.

UNIT V

12Hrs.

Image Segmentation: Detection and Discontinuities – Edge Linking and Boundary Deduction – Thresholding – Region – Based Segmentation – Segmentation by Morphological watersheds – *The use of Motion in Segmentation.*

Note : *Italics* denotes Topics for Self Study

TEXT BOOK

1. **Rafael C. Gonzalez, Richard E. Woods**, *Digital Image Processing*, PHI / Pearson Education, New Delhi, 2005.

REFERENCE BOOKS

1. **Chanda B, Dutta Majumder D**, *Digital Image Processing and Analysis*, PHI, New Delhi, 2003.
2. **Nick Efford**, *Digital Image Processing a practical introducing using Java*, Pearson Education, New Delhi, 2004.

SEMESTER IV
Practical – VII
DIGITAL IMAGE PROCESSING LAB

Instructional Hrs: 75

**Sub. Code: 12CAPCP07/
13CSPCP03**

Max.Marks: CIA-40; ESS-60

Credits: 3

Objective: To make the students understand the concepts of Digital Image Processing using MATLAB.

1. Image Enhancement (Contrast manipulation, Histogram Equalization, Gray-level Sliciy, Threshold operation.
2. Filtering Techniques.
3. Image Arithmetic.
4. Edge Detection.
5. Image Compression.
6. Binary Image Processing (Morphological Opeations)
7. Color Image Processing

REFERENCE BOOK

1. **Rafael C.Gonzalez (Stevan L.Eddins), Richard E.Woods, *Digital Image Processing using MATLAB*, Pearson Education 2006.**

SEMESTER IV
Practical – VIII
SOFTWARE TESTING LAB

Instructional Hrs. : 75

Sub. Code : 11CAPCP08

Max. Marks : CIA -40; ESE -60

Credits: 3

Objective : Various software testing can be done related to the methods given below using any of the software testing automated tools or manually.

Tools : Win Runner, Silk Test, SQL Robot, Load Runner, JMeter & QTP

1. Design Phase Testing.
2. Program Phase Testing.
3. Debugging.
4. Acceptance Testing.
5. Evaluation of test results.
6. Unit Testing.
7. System Testing.
8. Stress Testing.

SEMESTER V
Core Paper - XIV
.NET PROGRAMMING

Instructional Hrs: 75

**Sub Code: 12CAPC514 /
13CSPC309**

Max.Marks: CIA-25; ESS-75

Credits: 4

Objective: An understanding of the goals and objectives of the .NET Framework. A working knowledge of the VB.NET & C# programming language. An understanding of how to use forms to develop GUI programs under .NET.

UNIT I

15Hrs.

Getting started in VB.NET: starting VB.NET - creating and running the very first Applications – Testing a stand alone application. Setting properties using the properties window – *setting properties using event procedures* – Visual Basic .NET Programming Language I.

Unit II

15Hrs.

Visual Basic .NET Programming Language II – VB.NET Programming Language III –More Controls – Picture box Control – Group box control – Combo box control.

UNIT III

15Hrs.

Menus and Dialog boxes – structured programming – using built in functions – *Mathematical functions* – String handling functions – Date and Time handling functions – Data Type inspection functions – Data Type conversion functions.

UNIT IV

15Hrs.

Introduction to Visual C# 2005 : Introduction - features – creating applications – *variables* – scope of variables – Type conversion – creating arrays – enumerations – structures – collections – methods.

UNIT V

15Hrs.

Accessing data using ADO.NET – **Data Binding**: Introduction – Simple Data Binding – Complex Data Binding – Implementing Data Binding.

Note: *Italics* denotes Self Study Topics

TEXT BOOKS

1. **Shirish Chavan**, *VB.NET*, Third Impression 2009, Pearson Education (Unit I to III)
2. **Vikas Gupta & Kogent Solutions Inc**, *Comdex .NET Programming Course Kit* , Dreamtech Press 2007. (Unit IV & V)

REFERENCE BOOKS

1. **David I.Schneider**, *An Introduction to Programming using VB.NET*, First Edition, Prentice Hall of India Private Ltd., New Delhi.
2. **Burton Harvey, Simon Robinson, Julian Templeman,, Karli Watson**, *C# Programming with the Public Beta*, Shroff Publishers & Distribution Private Limited, Third Indian Reprint Apr 2001.

SEMESTER V

Core Paper – XV

ANALYSIS AND DESIGN OF INFORMATION SYSTEMS AND UML

Instructional Hrs. : 60

Sub. Code : 11CAPC515

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective : To make the students understand the basic concepts of analysis and design of information systems and Unified Modeling Language.

UNIT I **12 Hrs.**

Information and Management – Information systems Analysis overview – Information gathering.

UNIT II **12 Hrs.**

Data Flow Diagram – Process Specification – Decision Tables.

UNIT III **12 Hrs.**

Introduction - Use Cases – Class Diagrams: The Essentials – Interaction Diagrams.

UNIT IV **12 Hrs.**

Class Diagrams: Advanced Concepts - Packages and collaborations.

UNIT V **12Hrs.**

State Diagrams – Activity Diagrams – Physical Diagrams.

Note: *Italics* denotes Self Study Topics

TEXT BOOK

1. **Rajaraman V**, *Analysis and Design of Information System*, Prentice – Hall of India, 2nd Edition , 2004. (Unit I & II).
2. **Martin Fowler, Kendall Scott**, *UML Distilled*, Pearson Education, 2nd Edition. (Unit III , IV & V).

REFERENCE BOOK

1. **Eriksson**, *UML TOOL Kit*, Addison Wesley, New Delhi.
2. **Ivar Jacobson**, *Object Oriented Software Engineering; A Use Case Driven Approach*, Addison Wesley, 1994.
3. **James A Senn**, *Analysis & Design of Information Systems*, MCH International Edition, 2nd Edition.
4. **James Rumbough, Ivar Jacobson, Grady Booch**, *The Unified Modeling Language Reference Manual*, Addison Wesley, New Delhi, 1999.

SEMESTER V
Practical – IX
.NET PROGRAMMING LAB

Instructional Hrs. : 75

**Sub. Code : 11CAPCP09/
13CSPCP04**

Max. Marks : CIA -40; ESE -60

Credits: 3

Objective : To make the students understand the basics of .Net Programming.

1. Create a simple application using controls. (Any one of Calculator or Drawing pictures using GDI)
2. Preparation of Electricity bill.
3. Develop an application for Inventory.
4. Develop an application for Employee payroll system
5. Develop an application for Student information system
6. Develop an application for Library Management system.