

**M.Sc. COMPUTER SCIENCE DEGREE COURSE
(SEMESTER SYSTEM WITH CHOICE-BASED CREDIT SYSTEM)**

(Effective from the Academic Year 2012-2013 and afterwards)

SYLLABUS

I YEAR - I SEMESTER

CCI : MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

UNIT – I: FUNDAMENTAL STRUCTURES

Set Theory:- Relationships between Sets - Operations on Sets - Set Identities - Principle of Inclusion and Exclusion. Relations: Binary Relations - Partial Orderings - Equivalence Relations. Functions:- Properties of Functions - Composition of functions – Inverse Functions - Permutation Functions.

UNIT – II: LOGIC

Propositional Logic – Logical Connectives – Truth Tables – Normal forms (Conjunctive and Disjunctive) - Predicate Logic - Universal and Existential Quantifiers - Proof Techniques – Direct and Indirect – Proof by Contradiction – Mathematical Induction.

UNIT – III: COMBINATORICS

Basics of Counting – Counting Arguments – Pigeonhole Principle -Permutations and Combinations - Recursion and Recurrence Relations – Generating Functions.

UNIT – IV: MODELING COMPUTATION AND LANGUAGES

Finite State Machines – Deterministic and Non- Deterministic Finite State Machines – Turing Machines - Formal Languages – Classes of Grammars – Type_0 – Context-Sensitive – Context-Free – Regular Grammars – Ambiguity

UNIT – V: DISCRETE PROBABILITY

Finite Probability - Probability Distributions - Conditional Probability – Independence - Bayes' Theorem - Mathematical Expectation.

TEXT BOOKS:

1. JUDITH L. GERSTING, “MATHEMATICAL STRUCTURES FOR COMPUTER SCIENCE”, FIFTH EDITION, W.H. FREEMAN AND COMPANY, NY, 2003.

REFERENCE BOOKS:

1. J.P. Tremblay and R. Manohar, “Discrete Mathematical Structures with Applications to Computer Science”, TMH, 2008.
2. Kenneth H. Rosen, “Discrete Mathematics and its Applications”, 6th Edition, TMH, 2008.
3. R.P. Grimaldi, “Discrete and Combinatorial Mathematics”, 5th Edition, Pearson Edition, 2007.
4. M.K. Venkataraman, N. Sridharan and N. Chandrasekaran, “Discrete Mathematics”, The National Publishing Company, 2007.

CC II: DATA STRUCTURES AND ALGORITHMS

UNIT - I

Introduction - Definition of Algorithm - Pseudocode Conventions - Recursive Algorithms - Space and Time Complexities – Asymptotic Notation (O , Ω , θ) - Practical Complexities - Randomized Algorithms – Identifying the Repeated Element - Primality Testing - Divide and Conquer : General Method - Finding the Maximum and Minimum – Merge Sort – Quick Sort -Selection.

UNIT - II

Arrays – Ordered Lists – Sparse Matrices – Representation of Arrays – Linked Lists – Singly Linked Lists – Doubly Linked Lists and Dynamic Storage Management – Generalized Lists – Garbage Collection and Compaction.

UNIT - III

Trees – Binary Trees – Threaded Binary Trees – Applications of Trees : Set Representation – Graphs – Graphs Representations – Traversals, Connected Components and Spanning Trees – Shortest Paths and Transitive Closure – Activity Networks, Topological Sort and Critical Paths – Files – Index Techniques : Cylinder-Surface Indexing – Hashed Indexes – Tree Indexing—B-Trees.

UNIT - IV

Divide and Conquer contd. - Strassen's Matrix Multiplication - Greedy Method : General Method - Knapsack Problem - Job Sequencing with Deadlines - Optimal Storage on Tapes. Dynamic Programming: General Method - Multistage Graphs – All-Pairs Shortest Paths – Single-Source Shortest Paths : General Weights.

UNIT - V

Search Techniques for Graphs - DFS - BFS - Connected Components and Spanning Trees - Biconnected Components and DFS - Backtracking: General Method – 8-Queens Problem - Sum of Subsets - Branch and Bound Method - Traveling Salesperson Problem.

TEXT BOOKS:

1. E. Horowitz, S. Sahni and S. Rajasekaran, “Fundamentals of Computer Algorithms”, 2nd Edition, Universities Press (India) Pvt. Ltd., 2007.
2. E. Horowitz and S. Sahni, “Fundamentals of Data Structures”, Galgotia Booksource Press Pvt. Ltd., 1976.

REFERENCE BOOKS:

1. Seymour Lipschutz, “Data Structures”, Schaum’s Outlines, Tata McGraw-Hill, 2006.
2. G. A. V. Pai, “Data Structures and Algorithms – Concepts, Techniques and Applications”, Tata McGraw-Hill, 2008.
3. G. Brassard and P Bratley , “Fundamentals of Algorithmics”, Prentice-Hall of India, 1997.

4. A.V. Aho, J.E. Hopcroft and J. D. Ullman, “ The Design and Analysis of Computer Algorithms”, Pearson Education, 2007.
5. T. H. Cormen, C.E. Leiserson, R.L Rivest and C. Stein, “Introduction to Algorithms”, 2nd Edition, PHI, 2007.

CC III : ADVANCED JAVA PROGRAMMING

UNIT - I

Servlet Overview – The Java Web Server – Servlet Chaining – Server Side Includes - Session Management – Security – HTML Forms – Using JDBC in Servlets – Applet to Servlet Communication.

UNIT - II

Java Beans: The Software Component Assembly Model - The Java Beans Development kit- Developing Beans – Notable Beans – Using Infobus - Glasgow Developments - Application Builder Tool- JAR Files - Introspection-Bound Properties - Persistence-Customizes - Java Beans API.

UNIT - III

EJB: EJB Architecture - EJB Requirements – Design and Implementation – EJB Session Beans - EJB Entity Beans - EJB Clients – Deployment Tips, Tricks and Traps for Building Distributed and Other Systems – Implementation and Future Directions of EJB - Variable in Perl - Perl Control Structures and Operators – Functions and Scope

UNIT - IV

RMI – Overview – Developing Applications with RMI: Declaring & Implementing Remote Interfaces- Stubs & Skeletons, Registering Remote Objects, Writing RMI Clients –Pushing Data from RMI Servlet – RMI over Inter-ORB Protocol

UNIT - V

JSP – Introduction JSP - Examining MVC and JSP - JSP Scripting Elements & Directives - Working with Variables Scopes - Error Pages - Using Java Beans in JSP, Working with JavaMail - Understanding Protocols in JavaMail – Components - JavaMail API - Integrating into J2EE - Understanding Java Messaging Services - Transactions.

TEXT BOOKS:

1. J. McGovern, R. Adatia ,Y. Fain and et al, “ J2EE 1.4 Bible”, Wiley India Pvt. Ltd; 2003.
2. H. Schildt, “ Java 2 : “The Complete Reference”, 5th Edition, Tata McGraw -Hill, 2002.

REFERENCE BOOKS:

1. Janson Hunter, “Java Servlet Programming”, 2nd Edition, O’ Reilly Media, 2007.
2. H. M. Deitel and P. J. Deitel, “JAVA: How to Program”, 6th Edition, PHI, 2005.
3. D. R. Callaway, “ Inside Servlets”, Pearson Education, 2007.

4. Joseph O'Neil, "JavaBeans from the Ground Up", Tata McGraw - Hill, 1998.
5. Tom Valesky, "Enterprise JavaBeans", Pearson Education, 2008.
6. Cay S Horstmann & Gary Cornell, "Core Java Vol II - Advanced Features", 8th Edition, Prentice-Hall (Pearson Education), 2008.
7. Budi Kurniawan, "Java for the Web with Servlets, JSP, and EJB", Techmedia, 2002.

CC IV : PRACTICAL – I : ADVANCED JAVA PROGRAMMING LAB

1. HTML to Servlet Applications
2. Applet to Servlet Communication
3. Designing Online Applications with JSP
4. Creating JSP program using JavaBeans
5. Working with Enterprise JavaBeans
6. Performing Java Database Connectivity.
7. Creating Web Services with RMI.
8. Creating and Sending Email with Java
9. Building Web Applications
10. Chat Programming Using Servlet.
11. Update a given Table using Batch Update.
12. Designing Employee Details Applications with ISP.
13. Program for Payroll using JDBC.
14. Program for CURSOR
15. Creating College Admission Registration Form in JSP.
16. Create University Mark Sheet using Tables with JSP.

EC I: Elective I : SCIENTIFIC COMPUTING AND SIMULATION

UNIT - I: Roots of Equations and Linear Algebraic Equations

Roots of Equations by Graphical Method - Bisection Method — Simple Fixed-Point Iteration Method and Newton-Raphson Method – Ideal and Non-ideal Gas Laws – Solution to Linear Systems of Equations by Matrix Inversion – Gauss Elimination - Gauss-Jordan Methods – Gauss-Seidel and Jacobi Iterative Methods.

UNIT – II: Interpolation

Least-Squares Regression – Newton’s Divided-Difference Interpolating Polynomials – Lagrange’s and Hermite’s Polynomials – Newton’s Forward and Backward Differences Formulae – Stirling’s and Bessel’s Central Difference Formulae.

UNIT – III: Numerical Differentiation and Integration

Numerical Differentiation with Interpolating Polynomials - Errors in Numerical Differentiation – Numerical Integration by Trapezoidal and Simpson’s Rules – Two and Three-Point Gaussian Quadrature Formulae – Double Integral using Trapezoidal and Simpson’s Rules – Numerical Solution to Ordinary Differential Equations: Euler’s and Runge-Kutta Methods.

UNIT – IV: System Modelling and Simulation

System Models – System Studies – System Simulation – Continuous System Simulation – System Dynamics – Discrete System Simulation.

UNIT – V: Simulation Languages and Techniques

Introduction to GPSS – GPSS Examples – Introduction to SIMSCRIPT – Simulation Programming Techniques – Analysis of Simulation Output.

TEXT BOOKS:

1. Steven C. Chapra, and Raymond P. Canale, “Numerical Methods for Engineering”, 5th Edition, Tata McGraw-Hill, 2008.
2. S. S. Sastry, “ Introductory Methods of Numerical Analysis”, 4th Edition, Prentice-Hall of India, 2008.
3. Geoffrey Gordon, “System Simulation”, Second Edition, PHI, 2008.
(for Units IV & V).

REFERENCE BOOKS:

1. M. K. Jain, S. R. K. Iyengar and R. K. Jain, “Numerical Methods for Scientific and Engineering Computation”, 5th Edition, New Age International (P) Ltd, 2007.

2. S. Arumugam, A. Thangapandi Issac and A. Somasundaram, “Numerical Methods”, 2nd Edition, Scitech Publications Pvt. Ltd, 2008.
3. Narsingh Deo, “System Simulation with Digital Computer”, PHI, 2007.
4. Jerry Banks, J.S. Carson II, B. L. Nelson and D.M. Nicol, “ Discrete-Event System Simulation”, 4th Edition, Prentice-Hall of India, 2008.
5. A.M. Law, “Simulation Modeling and Analysis”, Tata McGraw- Hill, 2008.
6. F.L. Serverance, “System Modeling and Simulation”, John Wiley & Sons Ltd, 2001.
7. V. Rajaraman, “Computer Oriented Numerical Methods”, 3rd Edition, PHI, 2005.

EC I : Elective –I : WEB SERVICES

UNIT – I: XML Technology Family

XML - Benefits – Advantages of XML over HTML, EDI, Databases - XML based Standards – DTD - XML Schema – XML Processing – DOM – SAX - Presentation Technologies – XSL – XFORMS – XHTML – VoiceXML – Transformation – XSLT – XLINK – XPATH – XQuery

UNIT – II: Architecting Web Services

Business Motivations for Web Services - B2B E-Commerce – Technical Motivations – Limitations of CORBA and DCOM – Service-Oriented Architecture (SOA) – Architecting Web Services – Implementation View – Web Services Technology Stack – Logical View – Composition of Web Services – Deployment View – From Application Servers to Peer to Peer – Process View : Life in the Runtime

UNIT – III: Web Services Building Block

Transport Protocols for Web Services – Messaging with Web Services – Protocols – SOAP – Describing Web Services – WSDL – Anatomy of WSDL – Manipulating WSDL – Web Service Policy – Discovering Web Services – UDDI – Anatomy of UDDI – Web Service Inspection – Ad-Hoc Discovery – Securing Web Services

UNIT – IV: Implementing XML in E-Business

B2B – B2C Applications – Different Types of B2B Interaction – Components of E-Business XML Systems – ebXML – RosettaNet – Applied XML in Vertical Industry – Web Services for Mobile Devices.

UNIT – V: XML and Content Management

Semantic Web – Role of Meta Data in Web Content – Resource Description Framework – RDF Scheme – Architecture of Semantic Web – Content Management Workflow – XLANG – WSFL.

TEXT BOOKS:

1. R. Schmelzer, T. Vandersypen, J. Bloomberg and et al, “XML and Web Services”,

Pearson Education, 2002.

2. Sandeep Chatterjee and James Webber, “Developing Enterprise Web Services : An Architect’s Guide”, Pearson Education, 2004.

REFERENCES:

1. Frank P. Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, 2008
2. B.V. Kumar, “Web Services : An Introduction”, Tata McGraw-Hill, 2004.
3. Will Iverson, “Real World Web Services”, O’Reilly, 2005.

EC I : Elective –I : .NET TECHNOLOGY

UNIT – I

Introduction – Object Oriented Software Development - .Net Framework – CLR – Understanding Assemblies, Elements of VB.Net – Attributes, Data types – Type Conversion, Operators – Conditional Statements, loops – Methods – Methods Access Characteristics.

UNIT – II

Introduction to Error Handling – Class, Objects Structure – the Object Reference model – Interfaces – Implicit Interfaces - Explicit Interfaces – Interface Design and Implementation, Arrays and Collection Name Spaces – Arrays – the Array Class – Array Exception – Advance Design – Link lists and Trees.

UNIT – III

Introduction to ASP.Net – Setting up ASP.Net and IIS – Installing IIS, IIS Manager - Create virtual Directory & Applications – Developing ASP.Net Applications – File Types, Bin Directory Code behind. Web form Fundamentals, Sever Controls, View State, Events. Web Controls Validation and Rich Controls – State Management (View State).

UNIT – IV

ADO.Net Data Access – Accessing Data the easy way, Creating connection. Data Binding – Data list, Data Grid, Repeater – Web Services – Basics, Web Services in ASP.Net. – Implementing Security.

UNIT – V

Creation of C# - Arrays and Strings – Operator Overloading – Indexers and Properties – Delegate and Events – Multithread Programming, Thread Class Create Multiple threads, Synchronization – Non Generic Collection Classes, Array List, Stack, Queue.

TEXT BOOKS

1. Jeffrey R. Shapiro, “ Visual Basic.Net :The Complete Reference”, Tata McGraw-Hill, 2008.
2. Matthew MacDonald, “ASP.Net :The Complete Reference”, Tata McGraw-Hill, 2007.
3. Herbert Schildt, “ C# : The Complete Reference ”, Tata McGraw-Hill, 2008.

REFERENCE BOOKS

1. Francesco Balena, "Programming Microsoft VB.Net", Microsoft Press, 2003.
2. A. Homer, D. Sussman, R. Harard, B. Francis, K. Watson and R. Anderson, "Professional ASP.Net 1.1", Wiley, 2004.
3. Yeshavant Kanetkar, "C#.NET Fundas", BPB Publications, 2002.
4. R. Cameron and D. Michalk, "Pro ASP.NET 3.5 Server Controls and AJAX Components", Apress, 2008.
5. T. Archer and A. Whitechapel, "Inside C#", 2nd Edition, Microsoft Press, 2002.

CC V : Practical : II – Based on CCII and Elective-I

(Title: Algorithms and Scientific Computing/ Web Services/ NET Technology)

Part I: Algorithms

1. Tree Traversal
2. Quick Sort
3. Finding Minimum Maximum
4. Knapsack Problem
5. All pairs shortest path problem
6. Minimum spanning tree
7. BFS and DFS
8. Sum of subsets

Part II: (Any one of the following subjects)

1. Scientific Computing

1. Bisection Method
2. Newton-Raphson Method
3. Gauss Elimination Method
4. Least square curve fitting method
5. Lagrange's Interpolation
6. Trapezoidal Rule
7. Euler Method
8. Runge-Kutta – 4th order Method

2. Web Services

1. Web service for temperature conversion with appropriate client program
2. Web service for currency conversion (at five currencies) with appropriate client program
3. XML document to store resumes for a job website and create the DTD files
4. XML document to store information about books and create the DTD files
5. Searching personal details using XML database connectivity
6. Displaying XML doc using XML DOM and VB script
7. Develop and demonstrate an RMI program for reading a file from a remote-server
8. Create a COM object in VB6 for database query and use it in VBscript client

3. .NET Technology

ASP.net

1. Temperature conversion
2. Login control
3. Display records by using database
4. Databinding using dropdownlist and datagrid control
5. Student mark sheet processing using ADO.net

C#

6. Delegates and Events
7. Generate random password
8. Hit counter of a website (to display the number of times the page has been visited)

I YEAR - II SEMESTER
CC VI : COMPUTER NETWORKS

UNIT – I

Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP Models – Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer – Theoretical Basis for Data Communication - Guided Transmission Media

UNIT - II

Wireless Transmission - Communication Satellites – Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues – Error Detection and Correction.

UNIT - III

Elementary Data Link Protocols - Sliding Window Protocols – Data Link Layer in the Internet - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols – Bluetooth.

UNIT - IV

Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms – IP Protocol – IP Addresses – Internet Control Protocols.

UNIT - V

Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection – Simple Transport Protocol – Internet Transport Protocols (ITP) - Network Security: Cryptography.

TEXT BOOK:

1. A. S. Tanenbaum, “Computer Networks”, 4th Edition, Prentice-Hall of India, 2008.

REFERENCE BOOKS:

1. **B. A. Forouzan, “Data Communications and Networking”, Tata McGraw Hill, 4th Edition, 2007.**
2. F. Halsall, “Data Communications, Computer Networks and Open Systems”, Pearson Education, 2008.
3. D. Bertsekas and R. Gallager, “Data Networks”, 2nd Edition, PHI, 2008.

4. Lamarca, "Communication Networks", Tata McGraw- Hill, 2002

CC VII : ADVANCED MICROPROCESSORS ARCHITECTURE

UNIT - I

Introduction to 8086 Assembly Language Programming -Development Steps – Construction - Writing Programs and Development Tools – Standard Program Structures – Simple Sequence Programs – Jump – While-Do – Repeat-Until Programs - Delay Loops.

UNIT - II

Strings – Procedures – Macros – Instruction Descriptions – Assembler Directives.

UNIT - III

8086 Microcomputer – Observing Bus Signals – Minimum-mode System – Troubleshooting – 8086 Interrupts – Interrupt Applications – Programmable Timer/Counter – Interrupt Controller.

UNIT - IV

Parallel Ports – Handshaking – Interfacing Digital Devices – Analog Interfacing – Industrial Control.

UNIT - V

DMA – DRAMS – Cache Memories – Coprocessors – EDA Tools – 80286, 80386 and 80486 Microprocessors – Pentium Processors.

TEXTS BOOKS:

D. V. Hall , “Microprocessors and Interfacing”, Revised 2nd Edition, Tata McGraw-Hill, 2006.

REFERENCE BOOKS:

1. K. Udaya Kumar and B.S. Uma Shankar, “Advanced Microprocessors and IBM-PC Assembly Language Programming”, Tata McGraw-Hill, 1998.
2. A. P. Mathur, “Introduction to Microprocessors”, 3rd Edn., Tata McGraw-Hill, 1989.
3. Yu Cheng Liu and Glenn A Gibson – “Microcomputer Systems 8086/8088 Family”, 2nd Edition, PHI, 2005.
4. A.K. Roy and K. M. Bhurchandi, “Advanced Microprocessors and Peripherals”, 2nd Edition , Tata McGraw-Hill, 2006.
5. Barry B. Brey, “ The Intel Microprocessors: Architecture, Programming and Interfacing”, 2nd Edition , PHI, 2006.
6. Walter A. Triebel and Avtar Singh, “The 8088 and 8086 Microprocessors”, 4th Edition, Pearson Education, 2007.

CC VIII: PRACTICAL - III : ADVANCED MICROPROCESSORS LAB

Using 8086 Microprocessor Kit / MASM Software.

1. Multibyte Addition/Subtraction of Signed Numbers.
2. Computing LCM.
3. Computing GCD of n Numbers.
4. Insertion Sort.
5. Selection Sort.
6. Linear Search.
7. Matrix Multiplication.
8. Computing Factorial.
9. Computing nC_r .
10. Computing Fibonacci Number.
11. String Manipulation Operations.
12. Clearing Screen.
13. Moving String of Characters on the CRT.
14. Checking Password.
15. Displaying Command Line Parameter.
16. Interfacing with Peripherals Devices like 8255, 8253, 8279 and 8251.

EC II: Elective –II: GRAPH THEORY

UNIT – I: Introduction

Graphs – Introduction – Isomorphism – Sub graphs – Walks, Paths, Circuits - Connectedness – Components – Euler Graphs – Hamiltonian Paths and Circuits – Trees – Properties of Trees – Distance and Centers in a Tree – Rooted and Binary Trees.

UNIT – II: Trees, Connectivity and Planarity

Spanning Trees – Fundamental Circuits – Spanning Trees in a Weighted Graph – Cut- Sets – Properties of a Cut Set – All Cut - Sets – Fundamental Circuits and Cut-Sets – Connectivity and Separability – Network flows – 1-Isomorphism – 2-Isomorphism – Combinational Vs. Geometric Graphs – Planer Graphs – Different Representations of a Planer Graph.

UNIT – III: Matrices, Colouring and Directed Graphs

Incidence Matrix – Submatrices – Circuit Matrix – Path Matrix – Adjacency Matrix – Chromatic Number – Chromatic Partitioning – Chromatic Polynomial – Matchings – Coverings – Four Color Problem – Directed Graphs – Types of Directed Graphs – Digraphs and Binary Relations – Directed Paths and Connectedness – Euler Digraphs – Adjacency Matrix of a Digraph.

UNIT – IV: Algorithms

Algorithms: Connectedness and Components – Spanning tree – Finding all Spanning Trees of a Graph – Set of Fundamental Circuits – Cut Vertices and Separability – Directed Circuits.

UNIT – V: Algorithms

Algorithms: Shortest Path Algorithms – Depth-First Search – Planarity Testing – Isomorphism.

TEXT BOOKS:

1. Narsingh Deo, “Graph Theory : with Applications to Engineering and Computer Science”, Prentice-Hall of India, 2003.

REFERENCE BOOKS:

1. R.J. Wilson , “Introduction to Graph Theory”, 4th Edition, Pearson Education, 2008.
2. Douglas B. West, ”Introduction to Graph Theory”, 2nd Edition, PHI, 2006.
3. J. A. Bondy and U. S. R. Murthy, “Graph Theory with Applications”, North-Holland, 1982.
4. J. Clark and D. A. Holton, “Graph Theory”, World Scientific, 1991.
5. G. Agnarsson and R. Greenlaw, “Graph Theory”, Pearson Education, 2007.
6. G. Chartrand and P. Zhang, “Introduction to Graph Theory”, Tata McGraw-Hill, 2005.

EC II : Elective –II : OPEN SOURCE TECHNOLOGIES

Unit 1 : OPEN SOURCE

Introduction : Open Source – open source vs. commercial software – What is Linux ? – Free Software – Where I can use Linux ? Linux kernel – Linux distributions.

Unit 2 : LINUX

Introduction : Linux Essential Commands – File System concept – Standard Files – The Linux Security Model – vi Editor – Partitions creation – Shell Introduction – String processing – Investigating and Managing Processes – Network Clients – Installing Application.

Unit 3 : APACHE

Introduction : Apache Explained – Starting, Stopping and Restarting Apache – Modifying the Default configuration – Securing Apache – Set user and Group – Consider allowing access to local documentation – Don't allow public-html web sites – Apache control with htaccess.

Unit 4 : MySQL

Introduction to MySQL – The show databases and table – The USE command – Create Database and Tables – Describe Table – Select, Insert, Update and Delete statement – Some administrative detail – Table joins – Loading and Dumping a database.

Unit 5 : PHP

PHP Introduction – General Syntactic characteristics – PHP scripting – Commenting your code- Primitives, Operations and Expressions – PHP variables – Operations and Expressions Control Statement – Array – Functions – Basic Form processing – File and Folder Access – Cookies – Sessions – Database Access with PHP – MySQL, MySQL Functions – Inserting Records – Selecting Records – Deleting Records – Update Records.

Text Books

1. “Open Source Web Development with LAMP using LINUX, Apache, MySQL, Perl and PHP”, James Lee and Brent Ware, Dorling Kindersley (India) Pvt. Ltd, 2008.

Reference Books

1. “Setting up LAMP: Getting Linux, Apache, MySQL and PHP and working together”, Eric Rosebrock, Eric Filson, Published by John Wiley and Sons, 2004.
2. Sams, Teach Yourself MySQL in 21 days, 2nd Edition, Anthony Butcher – Sams Publication.
3. Apache Administratpor's Handbook – Rich Bower, Daniel Lopez Ridreejo, Alian Liska – Sams Publication.
4. RedHat Enterprise Linux 5 Administration Unleashed – Tammy Fox, Sams Publication.
5. Beginning PHP5, Apache, MySQL Web Development, Naramore Eligabette, Gerner Jason, Wrox Press, Wiley Dreamtech Press, 2005.
6. PHP :The Complete Reference – Stever Holzner.
7. The Complete Reference MySQL, Vikram Vaswami, Tata McGraw Hill.

EC II : Elective –II : WINDOWS PROGRAMMING

Unit I: Windows Fundamentals – Programming Concepts and Vocabulary for Windows – Windows Development Tools – Resource Information.

Unit II: Application Framework- Project Utility – Writing Windows Programming (Procedure Oriented) – Pie-chart Application.

Unit III: MFC Library – MFC Design Considerations – Key features of MFC Library – C Object – Simple Application and Template- Drawing in Client Area- Fourier Series application with Resources- Bar Chart with Resources.

Unit IV: Graph Applications – Word Processor Applications – OLE Features and Specifications - Container Application.

Unit V: Active X Controls – Create simple Active X Controls with MFC – Customizing Controls – COM – DHTML- ATL vs. ActiveX.

RECOMMENDED TEXTS

1. L. Klander, 2000, Core Visual C++ 6, First Indian reprint, Addison Wesley, Boston.

REFERENCE BOOKS

1. C.H.Pappas and W.H.Murray, 1999, Visual C++ 6 (The Complete Reference), Tata McGraw Hill, New Delhi.

2. H. Schildt, 1999, Windows 98 Programming from the GroundUp, Tata McGraw Hill, New Delhi.

EC III : Practical – IV : Based on Elective – II : GRAPH ALGORITHMS LAB
(Using C++)

1. Connectedness and Components of a Graph
2. Hamiltonian Path in a Undirected Graph
3. Directed Hamiltonian Paths in a Digraph
4. Spanning Trees in a Graph
5. Minimal-Spanning Tree – Kruskal's Algorithm
6. Minimal-Spanning Tree in a Graph – Prim's Algorithm
7. Fundamental Circuits in a Graph
8. Incidence Matrix of a Graph
9. Directed Circuits in a Digraph
10. Chromatic Number of a Graph (Graph Coloring)
11. Cut-Set Matrix of a Graph
12. Shortest Path Algorithm – Dijkstra's Algorithm
13. Shortest Path from a Specified Vertex to Another Specified Vertex
14. Maximal Complete Sub-graph
15. Planarity Testing in a Graph
16. Isomorphism in Planar Graphs

EC III : Practical – IV : Based on Elective II : OPEN SOURCE TECHNOLOGIES LAB

1. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.
2. Write a PHP program that adds products that are selected from a web page to a shopping cart.
3. Write a PHP program to access the data stored in a MySQL table.
4. Write a PHP program interface to create a database and to insert a table into it.
 - i). Write a PHP program using classes to create a table.
 - ii). Write a PHP program to upload a file to the server.
5. Write a PHP program to create a directory, and to read contents from the directory.
6. Write a shell program to find the details of an user session.
7. Write a shell program to change the extension of a given file.
8. Create a MySQL table and execute queries to read, add, remove and modify a record from that table.

EC III : Practical – IV : Based on Elective II : WINDOWS PROGRAMMING LAB

1. SDK program for window creation and display.
2. Window Creation using CFrame wind
3. Usage of Mouse Routines.
4. Creating Menus for windows.
5. Implementing keyboard Accelerator.
6. Checking/ Unchecking and Enabling/Disabling Menus.
7. Inserting and Removing Menus at Runtime.
8. Floating Pop-up Menu.
9. MDI with cascaded and tiled window.
10. Creating modal and modeless Dialog box.
11. Creating Status Bar.
12. Using List Box with CList Box Class.
13. Using Edit Box with CEdit Class.
14. Working of Spin Button Controls.
15. Creating Graphics Editor.

EDC I: Extra-Disciplinary Subject – I: DIGITAL SIGNAL PROCESSING

UNIT - I: Signals and Systems

Basic Elements of Digital Signal Processing – Concept of Frequency in Continuous Time and Discrete Time Signals – Sampling Theorem – Discrete Time Signals. Discrete Time Systems – Analysis of Linear Time Invariant Systems – z-Transform – Convolution and Correlation.

UNIT - II: FFT

Introduction To DFT – Properties of DFT - Efficient Computation of DFT: FFT Algorithms - Radix-2 and Radix-4 FFT Algorithms – Decimation in Time – Decimation in Frequency Algorithms – Use of FFT Algorithms in Linear Filtering and Correlation.

UNIT - III: IIR Filter Design

Structure for IIR Systems - Design of Discrete Time IIR Filter from Continuous Time Filter – IIR Filter Design by Impulse Invariance – Bilinear Transformation – Approximation Derivatives – Design of IIR Filter in the Frequency Domain.

UNIT - IV: FIR Filter Design

Symmetric and Antisymmetric FIR filters – Linear Phase Filter – Windows Technique – Rectangular–Kaiser Windows – Frequency Sampling Technique – Structure for FIR Systems.

UNIT - V: Finite Word Length Effects

Quantization Noise – Derivation for Quantization Noise Power – Fixed Point and Binary Floating Point Number Representation – Comparison – Over Flow Error – Truncation Error – Co-efficient Quantization Error – Limit Cycle Oscillation – Signal Scaling – Analytical Model of Sample and Hold Operations – Application of DSP – Model of Speech Wave Form – Vocoder.

TEXT BOOKS:

1. John G Proakis and Dimitris G. Manolakis, “ Digital Signal Processing: Principles, Algorithms and Applications”, 4th Edition, PHI,2007.
2. Sanjit K. Mitra, “Digital Signal Processing : A Computer Based Approach”, 3rd Edition, Tata McGraw – Hill, 2008.

REFERENCE BOOKS:

1. Alan V. Oppenheim, Ronald W. Schaffer and John R. Buck, "Discrete Time Signal Processing", Pearson Education, 2008.
2. Johnny R. Johnson, "Introduction to Digital Signal Processing", PHI, 1989.
3. John G. Proakis and Vinay K. Ingle, "A Self – Study Guide for Digital Signal Processing", Pearson Education, 2004.
4. E. C. Ifeachor and B. W. Jervis, "Digital Signal Processing", 2nd Edition, Pearson Education, 2002.

EDC I: Extra-Disciplinary Subject – I : CYBER-SECURITY

UNIT – I: Introduction

Defining Security – The Two Views of Network Security – The Organizational Security Process. Basic Security Architecture - Secure Network Layouts – Firewalls. Physical Security: Dealing with Theft and Vandalism – Protecting the System Console – Managing System Failure – Providing Physical Security.

UNIT – II: Network Architecture and Security

Network Design Architecture – Network Device Security – Virtual Private Network Security – Wireless Network Security – Intrusion - Detection Systems – Integrity and Availability Architecture – Network Role-based Security.

UNIT - III: Operating System Security Models

Operating System Models – Classic Security Models - Trustworthy Computing – Linux Security - IP Restricting – Create a Centralized Log Server.

UNIT – IV: Windows and Novell Operating Systems Security

Windows Security: Six Basics of Security applied to Windows Systems – Threat Analysis, Windows System Specifics – Mitigation Possibilities, Windows style.

Novell Security: NetWare Overview – Novell Directory Services (NDS) – NDS Security – Tips and Best Practices for Securing NetWare.

UNIT – V: Application Security, Attacks , Countermeasures and Legal Issues

Web Application Security – Regular Application Security - Attacks – Countermeasures. Legal Issues : The Laws Affecting Information – Network Regulations – Intrusions and Network Attacks – Unauthorized Access to Electronic Communications – Other Cyber Crimes – Information Security Regulations.

TEXT BOOKS:

1. Jan L. Harrington, “Network Security: A Practical Approach”, Morgan Kaufmann Publishers, 2006. (for Unit I)
2. Roberta Bragg, Mark Phodes–Ousley and Keith Strassberg, “Network Security: The Complete Reference”, Tata McGraw-Hill, 2004.

REFERENCE BOOKS:

1. William Stallings, “Cryptography and Network Security”, PHI, 2006.
2. Bruce Schneier, “Applied Cryptography”, 2nd Edition, Wiley, 2006.
3. Bruce Schneier and Niels Ferguson, “Practical Cryptography”, Wiley, 2003.

EDC I: Extra-Disciplinary Subject – I : INTERNET PROGRAMMING AND APPLICATIONS

(to be offered to the other Departments)

UNIT– I: OOP Concepts and Java Fundamentals

Basics Concepts of Object-Oriented Programming-Overview of Java Language-Constants, Variables and Data types-Operators and Expressions -Decision Making and Branching-Decision Making and Looping-Classes, Objects and Methods-Arrays, Strings and Vectors.

UNIT– II: Interfaces, Applications and Applets in Java

Interfaces: Multiple Inheritance-Packages-Multithreaded Programming-Managing Errors and Exceptions-Applet Programming.

UNIT– III: Internet, E-mail, Chatting and Conferencing

Connecting to Internet : Introduction - Internet Connection Concepts – Working of Domain Name System – Configuring Internet Connection. Exchanging E-mail, E-mail Concepts – Configuring E-mail Program – Sending and Receiving Files by E-mail – Online Chatting, Messaging and Conferencing Concepts – E-mail Mailing Lists – Internet Relay Chat (IRC) – Voice and Video Conferencing.

UNIT– IV: Viewing World Wide Web

World Wide Web Concepts – Streamlining Browsing – Keeping Track of Web Sites – Web Security, Privacy and Site–Blocking – Searching Audio and Video on the Web.

UNIT– V: Creating and Maintaining Web Sites

Web Site Creation Concepts – Creating Web Pages – Web Page Editors – Creating and Optimizing Web Graphics.

Note: All units need an approach through practical exposure.

TEXT BOOKS:

1. E. Balagurusamy, “Programming with JAVA : A Primer”, 3rd Edition, TMH, 2007.
1. M. L. Young, “Internet : The Complete Reference”, 2nd Edition, TMH, 2002.

REFERENCE BOOKS:

1. C. Muthu, “Programming with Java”, 2nd Edition, McGraw-Hill Education (India)

Pvt. Ltd., 2008.

2. M. P. Bhawe and S. A. Patekar, "Programming with Java", Pearson Education, 2009.
3. H. Schildt, "Java 2 : The Complete Reference", 5th Edition, TMH, 2002.
4. Harley Hahn, "The Internet: Complete Reference", 2nd Edition, TMH, 2006.
5. Ramesh Bangia, "Internet and Web Design", 2nd Edition, Firewall Media, 2006.
6. P.J. Deitel and H. M. Deitel, "Internet & World Wide Web: How to Program", 5th Edition, Pearson Education, 2004.

EDC I : Extra-Disciplinary Subject – I : RESOURCE MANAGEMENT TECHNIQUES

(to be offered by the Department / Department of Mathematics)

Unit – I

Basics of Operation Research – Characteristics – OR and decision making – Role of computers in OR. Linear Programming: Formulation and Graphical solution (2 variables) – Canonical and standard form of LPP.

Unit – II

Algebraic solution: Simplex Methods – Big M method – Two phase method – Concept of duality – Dual Simplex method.

Unit – III

Transportation problems : Definition – Formulation – North West Corner Rule – Row minima – Column minima method – matrix minima – VAM – Assignment problems.

Unit – IV

Sequencing problem: Processing n jobs through 2 machines – Processing n jobs through 3 machines – Processing 2 jobs through m machines – Processing n jobs through m machines – Travelling salesman problem.

Unit – V

Game theory: Characteristics of games – Maximin, Minimax criteria of optimality - Dominance property – Algebraic and graphical method of solving 2x2 games. PERT – CPM : Networks – Measure of activity – PERT computation – CPM computation – Resource scheduling.

Text Books

1. K. Swarup, P.K. Gupta and Man Mohan, Operation Research, Sultan Chand and Sons.

Reference Books

1. A. Taha. Operation Research – An Introduction, PHI. 5th Edition, New Delhi, 1996.
2. Resource Management Techniques – Sundaresan.V, Ganapathy Subramaniam K.S, K.Ganesan, A.R. Publications, 2000
3. Operation Research – P.K. Gupta and D.S.Hira, S. Chand & Co.Ltd., 2001.
4. Theory and Problems of Operations Research, Schaum’s outline series, 2nd edition, Tata McGraw Hill, 1997.
5. Operations Research – S. Kalavathy, Vikas Publishing House Pvt. Ltd.

II YEAR - III SEMESTER

CC IX: DISTRIBUTED OPERATING SYSTEMS

UNIT - I

Introduction to Distributed Systems: Goals – Hardware Concepts – Software Concepts – Design Issues. Communication in Distributed Systems: Layered Protocols – Asynchronous Transfer Mode Networks – The Client-Server Model – Remote Procedure Call – Group Communication

UNIT - II

Synchronization in Distributed Systems: Clock Synchronization – Mutual Exclusion – Election Algorithms – Deadlocks in Distributed Systems. Processes and Processors in Distributed Systems: Threads – System Models - Processor Allocation – Scheduling in Distributed Systems – Fault Tolerance - Real-Time Distributed Systems.

UNIT - III

Distributed File Systems: Distributed File System Design - Distributed File System Implementation -Trends in Distributed File Systems - Distributed Shared Memory: Introduction - Shared Memory – Consistency Models – PageBased Distributed Shared Memory – Object-Based Distributed Shared Memory.

UNIT - IV

Amoeba: Introduction to Amoeba - Objects and Capabilities in Amoeba – Process Management in Amoeba – Memory Management in Amoeba – Communication in Amoeba - The Amoeba Servers.

UNIT - V

Chorus: Introduction to Chorus –Process Management in Chorus – Memory Management in Chorus – Communication in Chorus – Unix Emulation in Chorus – Comparison of Amoeba, Mach and Chorus.

TEXT BOOKS:

1. Andrew S. Tanenbaum , “Distributed Operating Systems” , Pearson Edition, 2006.

REFERENCE BOOKS:

1. R. Chow and T. Johnson , “Distributed Operating Systems and Algorithms”, Addison-Wesley Publishing Co.,1997.
2. G. Coulouris, J. Dollimore and T. Kindlerg , “Distributed Systems : Concepts and Design”, 3rd Editon, Addison-Wesley Publishers, 2001.
3. Pradeep K. Sinha, “Distributed Operating Systems”, PHI, 2007.

CC X : ARTIFICIAL INTELLIGENCE AND INTELLIGENT SYSTEMS

UNIT - I : Introduction

Intelligence - Artificial Intelligence (AI) – Progress of AI – Intelligent Systems. Knowledge Representation: Preposition and Predicate Calculus – Rule-based Knowledge Representation – Issues – Knowledge Acquisition.

UNIT - II : Searching Techniques

Fundamentals of Search – Heuristic Search: Techniques and Implementation – Admissibility, Monotonicity and Informedness. State Space Search: Strategies and Implementation – Graph Search – Recursion–based Search – Pattern–directed Search – Model for Machine Learning – Natural Language Processing - Applications of Search-Alpha-Beta Pruning - Specific Games.

UNIT - III : Expert Systems

General Features – Characteristics – Architecture – Goals - Advantages - Difference between Expert Systems and Conventional Methods – Development Stages of an Expert System – Probability–based Expert Systems – Expert System Tools – Difficulties and Applications

UNIT – IV : Artificial Neural Networks

Neuron Physiology – Artificial Neurons - Artificial Neural Networks (ANN) – Architecture, Learning and Types – Features – Back Propagation Training Algorithms - Functional Neural Networks – Cascade Correlation Neural Networks.

UNIT – V : Genetic Algorithms

Fundamentals of the Genetic Algorithm(GA) – Different Types of Genetic Representations and Selection Mechanisms – Genetic Operators: Different Types of Crossover and Mutation – Natural Inheritance Operators – Working of GAs – Logic behind GAs – Applications – Traveling Salesman Problem – Optimization of Weights in ANNs – Machine Learning Classifier System.

TEXT BOOKS:

- 1.N. P. Padhay, “Artificial Intelligence and Intelligent Systems”, Oxford University Press, 2005.

REFERENCE BOOKS:

1. Elaine Rich & Kevin Knight, “Artificial Intelligence”, 2nd Edition, Tata McGraw-Hill, 2000.
2. S. Russell and P. Norvig, “Artificial Intelligence : A Modern Approach”, 2nd Edition, PHI, 2007.
3. S. Rajasekaran & G. A. Vijayalakshmi Pai, “Neural Networks, Fuzzy Logic, and Genetic Algorithms”, PHI, 2007.
4. Sathish Kumar, “Neural Networks”, Tata McGraw-Hill, 2004.
5. David E. Goldberg, “Genetic Algorithms in Search Optimization, and Machine Learning”, Pearson Education, 2008.
6. Nils J. Nilsson, “Artificial Intelligence: A New Synthesis”, Harcourt Asia Pvt. Ltd., 2000.
7. George F. Luger, “Artificial Intelligence: Structures and Strategies for Complex Problem Solving”, Pearson Education, 2002.

CC XI: ADVANCED DATABASE TECHNOLOGY

UNIT – I: Introduction

Database Concepts: Database systems– Data Models – Advanced Data Modeling

UNIT – II:

Advanced Design and Implementation: Introduction to Structured Query Language (SQL) – Advanced SQL – Database Design.

UNIT – III:

Advanced Database Concepts: Transaction Management and Concurrency Control – Database Performance Tuning and Query Optimization.

UNIT – IV:

Distributed Database Management Systems: The Evolution of DDBMS – DDBMS Advantages and Disadvantages – Characteristics of DDBMS – DDBMS Components – Distribution Transparency – Transaction Transparency.

UNIT – V:

Data Warehouse: The Data Warehouse – Online Analytical Processing – Star Schemas. Data Mining – SQL Extensions for OLAP – Database Administration Tools.

TEXT BOOKS:

1. Peter Rob and Carlos Coronel, “Database Systems”, Cengage Learning, 7th Edition, 2007.

REFERNCE BOOKS:

1. Abraham Silberschatz, Henry F Korth, and S. Sudharshan, “Database System Concepts”, 5th Edition, McGraw Hill, 2006.
2. R. Elmasri and S. B. Navathe, “Fundamentals of Database Systems”, 5th Edition, Pearson Education, 2008.

3. Raghu Ramakrishnan and Johannes Gehrke, “Database Management Systems”, McGraw-Hill, 3rd Edition, 2004.
4. C. S. R. Prabhu, “Object-Oriented Database Systems”, 2nd Edition, Prentice-Hall of India, 2008.
5. Carlo Zaniolo, Stefano Ceri, Christos Faloutsos, R.T.Snodgrass and V. S. Subrahmanian, “Advanced Database Systems”, Morgan Kaufman, 1997.
6. Elisa Bertino, Barbara Catania and Gian Piero Zarri, “Intelligent Database Systems”, Addison-Wesley, 2001.
7. N. Tamer Ozsu, and Patrick Valduriez, “Principles of Distributed Database Systems”, Pearson Education , 2006.

CC XII : PRACTICAL – V : ADVANCED DATABASE TECHNOLOGY LAB

(Front-End Tools – Visual Basic / Developer 2000)

1. Data Definition of Base Tables and Views.
2. Data Manipulation of Base Tables and Views.
3. Data Control of Base Tables and Views.
4. High Level Programming Language Extensions – PL/SQL.
5. High Level Programming Language Extensions – PL/SQL using Cursors.
6. High Level Programming Language Extensions – Embedding with C/JAVA.
7. Stored Procedures.
8. Database Triggers.
9. Working with Forms.
10. Working with Menus.
11. Working with Reports.

EC IV: Elective –III: EMBEDDED SYSTEMS

UNIT - I: Introduction to Embedded Systems

Embedded Systems: Definition and Classification - Processor Embedded into a System - Embedded Hardware Units and Devices in a System - Embedded Software in a System – Examples of Embedded Systems - Embedded System-on-a Chip (SoC) and the Use of VLSI Circuit Design Technology – 8051 Architecture – Real World Interfacing.

UNIT - II: Devices and Communication Buses for Devices Network

I/O Devices - I/O Types and Examples – Serial Communication Devices: Synchronous – Iso-synchronous and Asynchronous Communications from Serial Devices - RS232C / RS445 Communication - UART and HDLC Protocol - Parallel Device Ports - Sophisticated Interfacing Features in Device Ports - Timer and Counting Devices – Serial Bus Communication Protocols: 'I²C', 'CAN', 'USB', 'FireWire'- IEEE 1394 Bus Standard and Advanced Serial High Speed Buses – Parallel Bus Device Protocols: ISA, PCI, PCI / X, ARM and Advanced Parallel High Speed Buses.

UNIT - III: Embedded Programming

Programming in Assembly Language (ALP) vs. in High Level Language – C Program Elements: Header, Source Files, Macros and Functions – Use of Pointers and NULL Pointers – Use of Function Calls – Multiple Functions Calls in Cyclic Order - Function Pointers – Functions Queues and Interrupt Service Routines(ISR) Queues – Object-Oriented Programming - Embedded Programming in C++ – Optimization of Codes in Embedded C++ Programs.

UNIT - IV: Real Time Operating Systems - Part-I

RTOS - OS Services – Interrupt Routines and Handling - Task Scheduling Models – Interrupt, Latency and Response Times of the Tasks as Performance Metrics – Inter Process Communication and Synchronization: Shared Data: Problem of Sharing Data – Application of Semaphores – Priority Inversion

Problem and Deadlock Situations – IPC – Signal Function – Semaphore Functions – Message Queue Functions – Mailbox Functions – Pipe Functions – Socket Functions – RPC Functions.

UNIT - V: Real Time Operating Systems - Part-II

RTOS Programming: RTOS VxWorks: Basic Features – Task Management Library at the System Library Header File – VxWorks System Functions and System Tasks – Inter Process Communication (IPC) Functions – Case Study of Coding for Sending Application Layer Byte Streams on a TCP/IP Network using RTOS VxWorks.

TEXT BOOKS:

1. Raj Kamal, “Embedded Systems : Architecture, Programming and Design”, Tata McGraw-Hill, 2nd Edition, 2008.

REFERENCE BOOKS:

1. David E. Simon, “An Embedded Software Primer”, Pearson Education, 1999.
2. Tammy Noergaard, “Embedded Systems Architecture”, Elsevier, 2006.
3. Arnold S. Berger, “Embedded Systems Design”, CMP Books, 2005.
4. Dr. K. V. K. Prasad, “Embedded / Real-Time Systems: Concepts, Design and Programming”, Dreamtech Press, 2008.

EC IV : Elective –III: MOBILE COMPUTING

UNIT – I:

Introduction: Applications: Mobile and Wireless Devices – A Simplified Reference Model – Wireless Transmission: Multiplexing – Spread Spectrum - Cellular Systems - Medium Access Control: SDMA – FDMA – TDMA – CDMA - Comparison of S / T / F / CDMA.

UNIT – II:

Telecommunication Systems : GSM: System Architecture – Protocols – Handover - Security – New Data Services - UMTS and IMT–2000 – Satellite Systems.

UNIT – III:

Wireless LAN: IEEE 802.11 – HIPERLAN – Bluetooth: Link Manager Protocol - Security.

UNIT – IV:

Mobile Network Layer: Mobile IP: Goals – IP Packet Delivery – Registration – Tunneling and Encapsulation - Reverse Tunneling – Mobile Ad-hoc Networks: Routing .

UNIT – V:

Mobile Transport Layer: Traditional TCP: Congestion Control – Classical TCP Improvements: Indirect TCP – Snooping TCP – Mobile TCP – Transaction-Oriented TCP - TCP over 2.5 / 3G Wireless Networks– Performance Enhancing Proxies.

TEXT BOOKS:

1. Jochen Schiller, “ Mobile Communications ”, 2nd Edition, Pearson Education, 2003.

REFERENCE BOOKS:

1. William C. Y. Lee, “Mobile Communications Engineering”, 2nd Edition, Tata McGraw-Hill, 2008.
2. W. Stallings, “Wireless Communications and Networks”, 2nd Edition, Pearson Education, 2004.
3. U. Hansmann, L. Merk, M. S. Nicklous and T. Stober, “Principles of Mobile Computing”, 2nd Edition, Springer (India), 2008.
4. K. Pahlavan and P. Krishnamurthy, “Principle of Wireless Networks : A Unified Approach”, PHI, 2008.
5. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007.

EC IV : Elective - III : SOFTWARE TESTING

UNIT - I

Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style

UNIT - II

Flow/Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques – Data Flow Testing Strategies

UNIT - III

Domain Testing: Domains and Paths – Domains and Interface Testing – Linguistic –Metrics – Structural Metric – Path Products and Path Expressions.

UNIT - IV

Syntax Testing – Formats – Test Cases – Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.

UNIT - V

Verification and Validation – Fundamental Tools - Levels of Testing – Testing Approaches – Types of Testing – Test Plan – Software Testing Tools: WinRunner – Silk Test.

TEXT BOOKS:

1. Boris Beizer, “Software Testing Techniques”, 2nd Edition, Dreamtech Press, 2008.
2. K. V. K. K. Prasad, “Software Testing Tools”, Dreamtech Press, 2008.

REFERENCE BOOKS:

1. I. Burnstein, ” Practical Software Testing”, Springer, 2003.
2. E. Kit, “Software Testing in the Real World: Improving the Process”, Pearson Education, 2008.
3. R. Rajani and P. Oak, “Software Testing”, Tata McGraw- Hill, 2004.
4. S. Desikan and G. Ramesh, “Software Testing: Principles & Practices”, Pearson Education, 2006.
5. William E. Perry, “Effective Methods for Software Testing”, 3rd Edition, 2006.
6. Aditya P. Mathur, “Foundations of Software Testing”, Pearson Education, 2008.

EDC II: Extra-Disciplinary Subject – II: GEOGRAPHICAL INFORMATION SYSTEMS

UNIT - I: Introduction

Introduction to GIS –Definition Of GIS –Components of GIS – Spatial Data – Maps and their Influence on the Character of Spatial Data – Thematic Characteristics of Spatial Data – Spatial Data Modeling –Entity Definition – Spatial Data Models and Structure – Modeling Surfaces.

UNIT - II: Data Management

Introduction to Attribute Data Management – Database Data Models – GIS Database Applications – Developments in Databases – Methods of Data Input – Data Editing – Towards an Integrated Database – Data Analysis – Measurements in GIS – Queries – Reclassification - Buffering and Neighborhood Function – Integrating Data Map Overlay – Spatial Interpolation – Analysis of Surface – Network Analysis.

UNIT - III: Analytical Modeling

Analytical Modeling in GIS – Process Models – Modeling Physical and Environmental Process – Modeling Human Process – Modeling Decision Making Process - New Maps to Enhance Decisions – Non-Cartographic Output – Spatial Multimedia – GIS and Spatial Decision Support.

UNIT - IV: Handling Spatial Data

Introduction of Handling Spatial Data Manually – Development of Computer Methods for Handling Spatial Data – Development of GIS – Describing Data Quality and Errors – Source of Errors in GIS – Finding and Modeling Errors in GIS – Managing GIS Error.

UNIT - V: Applications

GIS Applications – GIS Users – Justifying the Investment in GIS – Choosing and Implementing a GIS – Organizational Changes due to GIS – Problem Identification in GIS Projects – Designing a Data Model – Project Management – Implementation Problems – Project Evaluation.

TEXT BOOKS:

1. Ian Heywood, Sarah Cornelius, Steve Carver and Srinivasa Raju, “An Introduction to Geographical Information Systems”, 2nd Edition, Pearson Education 2006.
2. Peter A .Burrough and Rachel A. McDonnell, ” Principles of Geographical Information Systems”, Oxford University Press,2000.

REFERENCE BOOKS :

1. T. M. Lillesand, R. W. Kiefer, “Remote Sensing and Image Interpretation”, Wiley,1987.
2. M. M. Demers, “ Fundamentals of Geographic Information Systems”, Wiley ,1997.
3. C. P. Lo. and Albert K. W. Yeung, “Concepts and Techniques of Geographic Information Systems”, PHI, 2006.

EDC II : Extra-Disciplinary Subject – II : BIO-INFORMATICS

UNIT – I: INTRODUCTION

The Central Dogma – Killer Application – Parallel Universes – Watson’s Definition – Top-Down versus Bottom-Up Approaches – Information Flow – Convergence.

UNIT – II: DATABASES AND NETWORKS

Databases: Definitions – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks: Communications Models – Transmissions Technology – Protocols – Bandwidth – Topology – Contents – Security – Ownership – Implementation.

UNIT – III: SEARCH ENGINES AND DATA VISUALIZATION

Search Process – Search Engine Technology – Searching and Information Theory – Computational Methods – Knowledge Management – Sequence Visualization – Structure Visualization – User Interface – Animation versus Simulation.

UNIT – IV: STATISTICS, DATA MINING AND PATTERN MATCHING

Statistical Concepts – Microarrays – Imperfect Data – Basics – Quantifying Randomness – Data Analysis – Tool Selection – Alignment – Clustering and Classification – Data Mining: Methods – Technology Overview – Infrastructure - Pattern Recognition and Discovery – Machine Learning – Text Mining – Pattern Matching: Fundamentals – Dot Matrix Analysis – Substitution Matrices – Dynamic Programming – Word Methods – Bayesian Methods – Multiple Sequence Alignment - Tools.

UNIT – V: MODELING, SIMULATION AND COLLABORATION

Drug Discovery - Fundamentals – Protein Structure – Systems Biology - Tools – Collaboration and Communications – Standards – Issues.

TEXT BOOKS:

1. Bryan Bergeron, “Bioinformatics Computing”, PHI Learning Pvt. Ltd., 2009.

REFERENCE BOOKS:

1. T. K. Attwood, D. J. Parry-Smith and Samiron Phukan, “Introduction to Bioinformatics”, Pearson Education, 2007.
2. Pierre Baldi and Soren Brunak, “Bioinformatics : The Machine Learning Approach”, 2nd Edition, First East-West Press, 2003.
3. Arthur M. Lesk, “ Introduction to Bioinformatics”, 2nd Edition, Oxford University Press, 2006.
4. David W. Mount, “ Bioinformatics : Sequence and Genome Analysis”, 2nd Edition, CBS Publishers and Distributors, 2004.
5. Orpita Bosu and S. K. Thukral, “Bioinformatics : Databases, Tools, Algorithms”, Oxford

University press, 2007.

EDC II : Extra-Disciplinary Subject – II : ADVANCED COMPUTING SKILLS

(to be offered to the other Departments)

UNIT - I : Word Processing with Word

Word Basics - Formatting Text – Working with Headers, Footers and Footnotes – Tabs, Tables and Sorting – Working with Graphics - Templates and Wizards –Introduction to Mail Merge.

UNIT - II : Working with Excel

Excel Basics – Rearranging Worksheets – Excel Formatting Tips and Techniques -Functions – Chart Features – Using Worksheets as Databases.

UNIT - III : Presenting with PowerPoint

PowerPoint Basics – Creating Presentations – Working with Text in PowerPoint – Importing Images and Inserting Photos, Videos and Sound in PowerPoint Presentation – Slide Show: Showing, Deleting, Printing and Sharing Presentations.

UNIT - IV : Managing Databases with Access

Introduction to Access – Creating a Simple Database and Tables – Forms – Entering and Editing Data – Finding, Sorting and Displaying Data – Printing Reports and Forms.

UNIT - V : Information Management

Microsoft Mail and Office Applications: Word Documents and E-Mail – Excel and Mail – PowerPoint and Mail – Overview of Object Linking and Embedding – Linking : To Link an Existing Object – Breaking Links – Locking and Unlocking Links – Troubleshooting Links – Embedding.

Note : All units need an approach through practical exposure.

TEXT BOOKS:

1. Ron Mansfield ,”Working in Microsoft Office”, Tata McGraw-Hill, 2008.

REFERENCE BOOKS:

1. Stephen L. Nelson and Julia Kelly, “Office XP: The Complete Reference”, Tata McGraw-Hill, 2006.
2. ISRD Group, “Introduction to Database Management Systems”, Tata McGraw-Hill, 2008.

2. Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill, 2002.

EDC II : Extra-Disciplinary Subject – II : HUMAN RESOURCE MANAGEMENT

(to be offered by the Department / Department of Commerce)

UNIT – 1

Humans and Other Physical Resources – Development of the Human Potential –HRM functions
– Link between Organization planning and HR planning.

UNIT – 2

Acquisitions and Maintenance of Personnel – Recruitment and Selection – Purpose and Methods
of recruitment and selection – Maintenance of Personnel – Motivation for increased Productivity
– QWL.

UNIT – 3

Rewards and Incentives – Financial and Non-financial incentives – Grievance procedure –
Conflict – Process – Stress – Sources – Resolution.

UNIT – 4

Performance Appraisal – Ranking, Rating scales, Critical incident method – Removing
Subjectivity from Evaluation – Criteria for Promotions and Job enrichment.

UNIT – 5

Human Development – Training – Need and Importance – Methods of Training – Designing
Training Programme – Executive Development – Organizational Change – Change agents –
Resistance to change – Managing the resistance.

TEXT BOOKS:

1. Dr. C.B.Gupta, "Human Resource Management", Sultan Chand & Sons, New Delhi.

REFERENCE BOOKS:

1. Dressler, "Human Resource Management", 8th Edition, Pearson Education, 2002.
2. De Cenzo and Robbins, "Personnel Human Resource Management", PHI, 1998.
3. S.K.Chakraborty, "Values and Ethics for Organization", Oxford University Press, 1999.
4. Aswathappa, "Human Resource and Personnel Management", Tata-McGraw Hill, New Delhi, 2002.

5. Dr.K.Sundar and Dr.J.Srinivasan, “Human Resource Management”, Himalaya Publishing House, 2011.
6. S.S.Khanka, “Human Resource Management”, S.Chand &Co., 2007.

II YEAR - IV SEMESTER
CC XIII : PROJECT WORK

Each student will develop and implement individually a Project work which is an application (software or hardware or both) based on any emerging latest technologies. The Project work is to be carried out either in an R & D section of any Industry or Research Institute or University or in the Institute itself (i.e., in which the candidate is studying) within the duration of IV Semester. The Project work report shall be submitted through the Guides / Supervisors to the Head of the Department and then to this college.