BHUPAL NOBLES' UNIVERSITY, UDAIPUR

FACULTY OF SCIENCE

DEPARTMENT OF

COMPUTER SCIENCE

&

APPLICATION

M.Sc. (Computer Science)

Semester 1

Course	Paper Name	No. of Credits	Max. Marks		Total
			Ext.	Int.	
CS611	Object Oriented Programming using C++	4	70	30	100
CS612	Design and Analysis of Algorithms	4	70	30	100
CS613	Computer Architecture & Parallel Processing	4	70	30	100
CS614	Advanced DBMS	4	70	30	100
CS615	Practical-I Object Oriented Programming using C++ Lab	2	70	30	100
CS616	Practical-II Advanced DBMS Lab	2	70	30	100
CS617	Business Functions	2	70	30	100

Semester 2

Course	Paper Name	No. of Credits	Max. Marks		Total
			Ext.	Int.	
CS621	Java Programming	4	70	30	100
CS622	Data Communication and Networks	4	70	30	100
CS623	Data Structure	4	70	30	100
CS624	Microprocessor and its Applications	4	70	30	100
CS625	Practical-I Java Programming	2	70	30	100
CS626	Practical-II Data Structure	2	70	30	100

Semester 3

Course	Paper Name	No. of Credits	Max. Marks		Total
			Ext.	Int.	
CS631	.NET Programming	4	70	30	100
CS632	Operating System	4	70	30	100
CS633 CS634	Elective -1 a. Mobile Computing b. E-Commerce	4	70	30	100
CS635 CS636	Elective-2 a. Software Engineering b. System Modelling & Simulation	4	70	30	100
CS637	Practical-I .NET Programming	2	70	30	100
CS638	Practical-II Operating System	2	70	30	100
CS639	Skill Course- Scientific Writing Skill(PRACTICAL)	2AC	70	30	100
CS6310	Practical-III: Minor Project	3	70	30	100

Semester 4

Course	Paper Name	No. of Credits	Max. Marks		Total
			Ext.	Int.	
CS641	Major Project	18	70	30	100

Semester I

CS611: Object Oriented Programming using C++

UNIT-I
Introduction to OOP: Overview of C++ - classes - structures - union - friend function - friend class - inline function - constructors - static members - scope resolution operator - passing objects to functions - function returning objects.

UNIT-II
Arrays - pointers - this pointer - references - dynamic memory allocation - functions overloading - default arguments - overloading constructors - pointers to functions.

UNIT-III
Operator overloading - member operator function - friend operator function - type conversion - inheritance - types of inheritance - virtual base class - polymorphism - virtual function.

UNIT-IV
Class templates and generic classes - function templates and generic functions -overloading a function templates - power of templates - exception handling - derived class exception - exception handling functions

UNIT-V
Streams - formatted I/O with its class functions and manipulators - creating own manipulators - file I/O - conversion functions - standard template library.

Recommended Books:
1. Balagurusamy E, "Object Oriented Programming with C++", 3/E, TMG, 2006. Reference
2. Hubbard,"Programming with C++", 2/e, Schaum Outline Series, TMH, 2006.
3. BjarneStroustrup, "The C++ Programming Language", Addison Wesley Publications, Second Edition, 1991.
4. SarangProonachandra,"Object Oriented Programming with C++", PHI, 2006.
5. Jagadev A K, Rath A M, and DehuriS,"Object Oriented Programming Using C++", PHI, 2007.

CS612: Design and Analysis of Algorithm

UNIT-I

Introduction - Algorithm - Specification - Performance Analysis - Divide - And Conquer - General Method - Binary Search - Finding the Maximum and Minimum - Merge Sort - Quick Sort.

UNIT-II

The Greedy Method - General Method - Knapsack Problem - Tree Vertex Splitting Dynamic Programming - General Method - Multistage Graphs - All pairs shortest paths - Single - Source Shortest paths - The traveling salesperson problem - Flow shop scheduling.

UNIT-III

Basic Traversal and Search Techniques - Binary Trees - Graphs - Connected Components and Spanning Trees - Biconnected Components.

UNIT-IV

Backtracking - General Method - 8 Queens Problem - Graph Coloring - Branch and Bound - Method - 0/1 Knapsack Problem

UNIT-V

NP-Hard and NP-Complete Problem - Basic Concepts - Cooke's Theorem - NP-Hard Problems - Clique Decision Problem - Job Shop Scheduling - Code generation with Common Sub expressions - Approximation Algorithms - Introduction - Absolute Approximations - E-Approximations

Text Book:

Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, "Computer Algorithms", Galgotia Publications Pvt. Ltd., 2002

Reference Books:

1. Sara Baase and Allen Van Gelde, "Computer Algorithms, Introduction to Design and Analysis", 3rd Edition, Pearson Education, Delhi, 2002.
2. Aho, Hoporoft and Ullman, "The Design and Analysis of Computer Algorithm", Pearson Education, Delhi, 2001.
3. BasuS.K.,"Design Methods and Analysis of Algorithms", PHI, 2006.
4. Brassad and Bratley,"Fundamentals of Algorithms", PHI, 1995.
5. SanjoyDasgupta, Christos Papadimitriou, Umeshvazirani, "Algorithms", TMG, 2007.

CS613: Computer Architecture & Parallel Processing

UNIT-I

Central Processing Unit: General Register and Stack Organization - Instruction formats - Addressing Modes - Data Transfer and Manipulation - Program Control

UNIT-II

Input-Output organization - Peripheral devices - I/O Interface - Asynchronous Data Transfer - Modes of Transfer - Priority Interrupt - DMA - I/O Processor - Serial Communication - Memory Organization - Memory Hierarchy - Auxiliary Memory - Associative Memory and Virtual Memory

Unit III

Introduction to Parallel Processing: Flynn's classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors, Cache Memory, Multilevel caches, Cache write polices ,Cache Coherence. Cache performance issues.

UNIT IV

Pipelining: Basic Concepts of pipelining, Arithmetic Pipelining, Instruction Pipelining. Hazards, Reservation Tables, Collision, Latency, Dynamic pipeline, Vector processing & Vector processors.

Multiprocessor Architecture: Loosely Coupled & Tightly Coupled Systems, Concurrency & Synchronization, Scalability.

UNIT V

Need for Computational speed; Applications of parallel computers in various fields including Mathematics, Physics, Chemistry and Computer Science; Configuration of some existing Mainframe and Super Computers for parallel processing; issues in parallel processing.

Recommended Book:

1. Computer System Architecture : Morris Mano

2. Parallel Processing: Kai Wang

CS614: Advanced DBMS

UNIT-I

Relational Model: Introduction - Structure of Relational Data Base - Relational Algebra - Relational Calculus. Relational Query Languages - Introduction - Codd's Rules - Structured Query Language - Embedded Structured Query Language. ER Model - Basic Concepts - Conversion of ER Model into Relations - ER Diagram Symbols.

UNIT-II

Data Base Design: Introduction - Software Development Life Cycle - Database Development Life Cycle - Automated Design Tools. Functional Dependency and Decomposition. Normalization - Introduction - Normalization - Normal Forms - BCNF - 4 NF - 5 NF.

UNIT-III

Query Processing and Optimization: Introduction - Query Processing - Syntax Analyzer - Query Decomposition - Query Optimization. Transaction Processing and Concurrency Control: Transaction Concepts - Concurrency Control - Locking Methods - Timestamp Methods - Optimistic Methods.

UNIT-IV

Data Base Recovery Systems: Introduction - Recovery Concepts - Types of Failures - Types of Recovery - Recovery Techniques - Buffer Management. Data Base Security: Goals - Firewalls - Data Encryption.

UNIT-V

Distributed Data Base Systems: Introduction - Distributed Data Bases - Architecture of Distributed Data Bases - Distributed Data Base System Design - Distributed Query Processing. Emerging Data Base Technologies: Internet Data Bases - Digital Libraries - Multimedia Data Bases - Mobile Data Bases - Spatial Data Bases.

Text Books:
1. S.K. Singh, "Database Systems Concepts, Design and Applications", Pearson Education Pte. Ltd., New Delhi: 2006.
2. C.J. Date and others, "An Introduction to Database Systems", Eighth Edition, Pearson Education Pte. Ltd., New Delhi: 2006.

Reference Books:
1. Abraham Silberschatz, "Database Systems", McGraw Hill International, 1997.
2. Paneerselvam R, "Database management systems", PHI, 2005.
3. Narang Rajesh, "Database management systems", PHI, 2005.
4. ISRD Group, "Introduction to database management systems", TMG, 2006.
5. Ramakrishnan, Gehrke, "Database management systems", 3/E, TMG, 2003.

CS617: Business Functions
UNIT-I
Accounting : Meaning and scope, Branches of Accounting , Book- keeping v/s Accountancy , Accounting Cycle-cash Book , journal , Ledger, Trial Balance, Trading Account, Profit & Loss Account and Balance sheet

UNIT-II
Taxation: - Direct Tax and Indirect Tax (GST& Custom)

Income Tax :- Introduction and Definitions. Heads of Income , Exempted Income, Deemed Income.

Deductions from G. T. I. , Tax rates, Rebates 87(A).

G. S. T. -- Introduction and Overview.

UNIT-III
Management concept and significance, process and Roles. Function of Management Emerging horizons and modern Management techniques (BPR and TQM). Forms of Business Organization:- sole proprietorship , partnership , OPC, HUF, AOP and company

UNIT-IV
Marketing: Introduction, nature and Scope , Marketing concept, Marketing Environment, consumer Behaviour , Advertising, Latest Trends in Marketing :- Retail, Rural , Green Marketing , E-Marketing . International Marketing

UNIT-V
Banking : Structure, role and functions of commercial bank in India, E-banking concept. MICR Cheque transactions . Electronic fund transfer:- ECS, NEFT, RTGS, SWIFT, and EFTPOS. Internet Banking , Mobile banking, virtual and Universal banking, core banking, role of RBI in Indian Banking System.

PRACTICALS
CS615: Object Oriented Programming using C++ Lab

1. Classes and objects
2. Function overloading
3. Constructors
4. Friend function
5. Inline function
6. Operator overloading
7. Conversion function
8. Inheritance
9. Polymorphism

CS616: Advanced DBMS Lab

SQL
1. Simple Queries using DDL, DML and DCL
2. SQL Aggregate Functions
3. SET Operations
4. Views
5. Multiple Tables and Nested Queries

PL/SQL
6. PL/SQL Block
7. Function and Procedures
8. Subprograms and Packages
9. Triggers
10. Cursors

Semester II
CS621: Java Programming

UNIT-I
Introduction to Java: Bytecode, features of Java, data types, variables and arrays, operators, control statements. Objects & Classes: Object Oriented Programming, defining classes, static fields and methods, object construction

UNIT-II
Inheritance: Basics, using super, method overriding, using abstract classes, using final with inheritance. Packages and Interfaces: Defining a package, importing package, defining an interface, implementing and applying interfaces.

UNIT-III
Exception Handling: Fundamentals, exception types, using try and cache. Multithreaded Programming: Creating a single and multiple threads, thread priorities, synchronization.

UNIT-IV
Applets: Applets basics, applets architecture, applets skeleton, the html applet tag, passing parameters in applets. Event Handling: Event classes and event listener interfaces.

UNIT-V
Graphic Programming: Introduction to swings.

Recommended Books :
1. P. Naughton and H. Schildt: The complete reference to Java, Tata Mc-Graw Hill.
2. Deitel and Dietel: How to program in Java

CS622: Data Communication and Networks

UNIT-I

Data Communications and Networking Overview: A Communication Model - Data Communications - Data Communication Networking. Protocol Architecture: Need - A Simple Protocol Architecture - OSI - TCP/IP Protocol Architecture. Guided Transmission Media - Wireless Transmission.

UNIT-II

Digital Data Communication Techniques: Asynchronous and Synchronous Transmission - Types of Errors - Error Detection - Error Correction - Line Configuration - Interfacing. Data Link Control Protocols: Flow Control - Error Control – High - Level Data Link Control.

UNIT-III

Circuit Switching and Packet Switching: Switched Communication Networks - Circuit - Switching Networks - Concepts - Packet-Switching Principles - X.25 - Frame Relay. Routing in Switched Networks: Routing in Circuit - Switching Networks - Routing in Packet-Switching Networks - Least-Cost Algorithms. Congestion in Data Networks: Effects of Congestion - Congestion Control - Traffic Management.

UNIT-IV

Local Area Network Overview - Background - Topologies and Transmission Media - LAN Protocol Architecture - Bridges. High-Speed LANs - The Emergence - Ethernet - Token Ring - Fiber Channel. Wireless LAN Technology.

UNIT-V

Internet Protocols: Basic Protocol Functions - Principles of Internetworking - Connectionless Internetworking - Internet Protocol. Network Security - Security Requirements and Attacks - Confidentiality with Symmetric Encryption - Message Authentication and Hash Function - Public - Key Encryption and Digital Signatures.

Text Books:
1. Wiliam Stallings, "Data Computer Communications", Seventh Edition, Pearson Education Pte. Ltd., New Delhi: 2004.
2. Behrouz and Forouzan, "Introduction to Data Communication and Networking", Tata McGraW Hill Publishing Company Ltd., New Delhi: 1999.

Reference Books:
1. ISRD Group, "Data communication and computer networks", TMG, 2007.
2. Gupta P.C., "Data Communications and Computer Networks", PHI, 2006.
3. Singh Brijendra, "Data Communications and Computer Networks", 2/E.PHI, 2006.

CS623: Data Structure

UNIT-I
Data Type - Data Object - Data Structure : Data abstraction and abstract data type; Notion of an algorithm - Complexity measures : Rate of growth, basic time analysis of an algorithm; ordering notion - detailed timing analysis - space complexity. Arrays: Arrays and their representation-Single and multidimensional arrays-row major and column major ordering-address calculation. Linked lists: Pointers and their uses. Singly and doubly linked lists-Operations on lists-representation of Sparse matrices and polynomials using lists Circular lists-generalized lists

UNIT-II
Storage management: Dynamic storage management-Reclamation and compaction Boundary Tag method. Stacks and Queues: Stacks and Queues-representation using arrays and Manipulation-Uses of stacks and Queues-Recursion, polish expressions

UNIT-III
Trees: Trees-Binary and N-ary trees-Representation of trees-Tree traversal algorithms Threaded trees and advantages-Conversion of general trees to Binary trees-B trees Applications: Decision trees, Game trees and expression parsing.

UNIT-IV
Graphs: Graphs and their representations: Matrix representation-List structure-Graph traversal algorithm, Application of graphs. Strings and their features: Strings-Representation and Manipulation using Arrays and lists String matching algorithms. Brute force, Knuth-Morris-Pratt and Boyer-Moore strategies.

UNIT-V
Sorting and Searching: Searching and sorting-Sequential, Binary and hashed Searching, Bubble sort, Insertion sort, shell sort, Merge sort and Quick sort-Comparison.

Recommended Books :
1. Aho A.V. & Ullman J.E. : Data Structure & Algorithms
2. Aron M. Tannenbaum& Others : Data Structures using C
3. Mary E.S. Loomis : Data Management & File Structures
4. Bhagat Singh & Thomas Naps : Intrioduction to Data Structures
5. Trembley& Sorenson : An Introduction to Data Structures with Applications

CS624: Microprocessor and its Applications

UNIT-I

Microcomputer, microprocessor and assembly language - microprocessor architecture and its operations - memory input/output - interfacing devices - 8085 based microcomputer system - addressing modes - instruction classification, format, timings and operation status.

UNIT-II

Instruction set - Data transfer instructions: Arithmetic operations - logic and branch operation - Looping, counting and indexing - 16 bit arithmetic instructions - arithmetic operation related to memory - logic operations: rotate, compare, counters and time delays.

UNIT-III

Stack - subroutine - call and Return instruction - parallel input/output - 8255 programmable peripheral interface - 8253 Programmable timer - The 8085 Interrupts: 8259 programmable interrupt controller - Direct Memory Access - 8257 DMA controller - Restart as software instruction.

UNIT-IV

Basic concepts of advanced microprocessors - concepts of arithmetic coprocessor - The 80x87 architecture - Introduction to 80386 microprocessor - 80386 Memory management - The memory paging mechanism Introduction to the 80486 microprocessor. Introduction to the Pentium Microprocessor.

UNIT-V

Microprocessor Applications: Interfacing keyboards, displays, A/D and D/A converters, stepper motor control.

Text Book:
1. Ramesh Goankar S, Microprocessor Architecture, Programming and Applications with 8085/8080 A, Wiley Eastern limited, 1986.

Reference:
1. Badri Ram, Fundamentals of Microprocessor and Microcomputer, DhanparRai Sons, 1988.
2. Douglas V.Hall, Digital System and Microprocessors, McGraw Hill, 1996.
3. Yu chang Liu and Glenn A.Gibson, Microcomputer System. The 8086/8088 family, Prentice Hall of India 1991.
4. B.Govindarajalu, IBM PC and CLONES, Tata McGraw Hill 1991.
5. Barry B. Brey. The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, And Pentium Pro Processor Architecture, Programming and Interfacing 7th Edition, PHI, 2006.

PRACTICALS
CS625: Java Programming

1. Write programs in Java to demonstrate the use of following components Text fields, buttons, Scrollbar, Choice, List and Check box
2. Write Java programs to demonstrate the use of various Layouts like Flow Layout, Border Layout, Grid layout, Grid bag layout and card layout
3. Write programs in Java to create applets incorporating the following features:
   a. Create a color palette with matrix of buttons
   b. Set background and foreground of the control text area by selecting a color from color palette.
   c. In order to select Foreground or background use check box control as radio buttons
   d. To set background images
4. Write programs in Java to do the following.
   a. Set the URL of another server.
   b. Download the homepage of the server.
   c. Display the contents of home page with date, content type, and Expiration date. Last modified and length of the home page.
5. Write programs in Java using sockets to implement the following:
   a. HTTP request
   b. FTP
   c. SMTP
   d. POP3
6. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
7. Write programs in Java using Servlets:
   a. To invoke servlets from HTML forms
   b. To invoke servlets from Applets
8. Write programs in Java to create three-tier applications using servlets
   a. for conducting on-line examination.
   b. for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.

CS626: Data Structure

1. Write a program to search an element from a list. Give user the option to perform Linear or Binary search. Use Template functions.
2. WAP using templates to sort a list of elements. Give user the option to perform sorting using Insertion sort, Bubble sort or Selection sort.
3. Implement Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +).
4. Implement Doubly Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
5. Implement Circular Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
6. Perform Stack operations using Linked List implementation.
7. Perform Stack operations using Array implementation. Use Templates.
8. Perform Queues operations using Circular Array implementation. Use Templates.
9. WAP to calculate factorial and to compute the factors of a given no. (i)using recursion, (ii) using iteration
10. WAP to display fibonacci series (i)using recursion, (ii) using iteration
11. WAP to calculate GCD of 2 number (i) with recursion (ii) without recursion
12. WAP to convert the Sparse Matrix into non-zero form and vice-versa.
13. WAP to reverse the order of the elements in the stack using additional stack.
14. WAP to reverse the order of the elements in the stack using additional Queue.
15. WAP to implement Diagonal Matrix using one-dimensional array.
16. WAP to implement Lower Triangular Matrix using one-dimensional array.
17. WAP to implement Upper Triangular Matrix using one-dimensional array.
18. WAP to implement Symmetric Matrix using one-dimensional array

Semester III

CS631: .NET PROGRAMMING

UNIT – I

Microsoft .NET Framework - . The .NET Framework classes –Common Language Runtime – Common Type system and Common Language specification – Visual studio .NET IDE. Visual Basic .NET – Visual Basic .NET IDE –Variables – Data types – Constants – Arrays – Dynamic arrays- Controlling the flow – if statement – select case – Loops.

UNIT – II

Procedures: modular coding, arguments – Structures- Collections: Advanced array, Arraylist and hash table. Lists- sorted list. Creating custom class, adding methods and properties. Building Windows Applications – working with forms.

UNIT – III

Basic windows controls- common dialog controls- Rich text box control- Debugging and Error Handling: types of errors, Exceptions and structured exception handling – Accessing databases – Building Database applications with ADO .Net- ADO .Net objects.

UNIT – IV

ASP .NET – Introducing web developer tools – Introduction to ASP .NET server Programming – Using variables and constants in web forms – Working with web objects to store data – Designing .NET web Applications –Programming with Visual Basic .NET – Advanced web controls – Managing data with ASP .NET

UNIT – V

C# Programming – Evolution of C# and .NET – Why C# - Elements of C# program – Programming Example – Data types and Expressions – Making decisions – Repeating Instructions – Arrays and Collection – Controls – Programming based on events – Database access with ADO .NET

Text Books:
1. EvangelosPetroutsos, Mastering Visual Basic .NET , BPB Publications.
2. Barbara Doyle, Programming in C# , Cengage Learning publications – First Edition – 2008
3. Kathleen Kalata , Web Applications using ASP .NET 2.0 , Cengage Learning publications.

Reference Books:
1. David Chappell, Understanding .NET , Pearson education, 2002
2. David.S.Platt, Introducing Microsoft .Net , PHI, 2003.
3. G.AndrwDuthie , Microsoft ASP .NET Programming with Microsoft Visual C# .NET step by step , PHI ,2003.
4. George Shepherd, Microsoft ASP .NET 3.5 , PHI, New Delhi, 2008.
5. Steven Holzner, Visual Basic .NET Programming Black Book ,Dreamtech Press.

CS632: Operating System

UNIT-I

Introduction:
Evolution of operating systems.Types of operating systems. Different views of the operating system, operating system concepts and structure.

UNIT-II

Processes:
The Process concept, systems programmer's view of processes. The operating system services for process management. Scheduling algorithms.Performance evaluation.

UNIT-III

Memory Management:
Memory management without swapping or paging, swapping, virtual memory, page replacement algorithms, modeling paging algorithms, design issues for paging systems, segmentation.

UNIT-IV

File Systems:
File systems, directories, file system implementation, security protection mechanisms.

Input/ Output:
Principles of I/O Hardware: I/O devices, device controllers, direct memory access. Principles of I/O Software : Goals, interrupt handlers, device drivers, device independent I/O software. User space I/O software.

UNIT-V

Case study: Linux
Linux History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Input and Output, Inter process Communication, Network Structure, Security Summary.

Reference Books:
1. Deitel. H.M .. "An Introduction to Operating Systems". Addison Wesley Publishing Company 1984.
2. Milenkovic, M., "Operating Systems· Concepts and Design". McGraw Hill International Edition Computer Science series 1992.
3. Peterson, J.L .. Abraham Silberschatz. "Operating System Concepts". Addison Wesley Publishing Company. 1989.
4. Tanenbaum, A.S., "Modem Operating Systems", Prentice Hall of India Pvt. Ltd. 1995.
5. Jason Cannon, Linux for Beginners: An Introduction to the Linux Operating System and Command Line

CS 633: Mobile Computing (Elective 1)

UNIT-I
Introduction: Medium Access Control: Motivation for Specialized MAC - SDMA - FDMA - TDMA - CDMA - Comparison of Access mechanisms - Tele communications: GSM - DECT - TETRA - UMTS - IMT - 200 - Satellite Systems: Basics - Routing - Localization - Handover - Broadcast Systems: Overview - Cyclic Repetition of Data - Digital Audio Broadcasting - Digital Video Broadcasting.

UNIT-II
Wireless Networks: Wireless LAN: Infrared Vs Radio Transmission - Infrastructure Networks - Ad hoc Networks - IEEE 802.11 - HIPERLAN - Bluetooth - Wireless ATM: Working Group - Services - Reference Model - Functions - Radio Access Layer - Handover - Location Management - Addressing Mobile Quality of Service - Access Point Control Protocol.

UNIT-III
Mobile Network Layer: Mobile IP: Goals - Assumptions and Requirement - Entities - IP packet Delivery - Agent Advertisement and Discovery - Registration - Tunneling and Encapsulation - Optimization - Reverse Tunneling - IPv6 - DHCP - Ad hoc Networks.

UNIT-IV
Mobile Transport Layer: Traditional TCP - Indirect TCP - Snooping TCP - Mobile TCP - Fast retransmit/ Fast Recovery - Transmission/ Timeout Freezing - Selective Retransmission - Transaction Oriented TCP.

UNIT-V
WAP: Architecture - Datagram Protocol - Transport Layer Security - Transaction Protocol - Session Protocol - Application Environment - Wireless Telephony Application.

Text Books:
1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

Reference Books:
2. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
3. William Stallings, Wireless Communication and Networks, PHI/ Pearson Education, 2003.
4. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.
5. Asoke K Talukder, Roopa R Yavagal, "Mobile computing", TMG, 2006

CS 634: E-Commerce (Elective 1)

UNIT-I
Basic Concepts: Introduction, Definition, Objectives, Advantages and Disadvantages, Forces driving E- Commerce, Traditional commerce Vs. E-Commerce, E-Commerce opportunities for industries, Growth of E-Commerce,

UNIT-II
Electronic data Interchange: Concepts of EDI and Limitations, Applications of EDI, Disadvantages of EDI, EDI Models, EDI Implementation, MIME and Value Added Networks, Internet based EDI.

UNIT-III
E-Commerce Models: B2C, B2B, C2C, C2B, other models- Brokerage model, aggregator Model, Info-mediary model, community model and value chain model, Advertise model.

Electronic payment system: Special Features required in payment systems, Types of E-payment systems, E-cash, E-cheque, credit card, smart card, electronic purses, e-billing, E-e-Micropayments, Point of sales systems (POS) - Meaning, uses, structure.

UNIT-IV
Customer Relationship Management & technologies: E-Transition Challenges in Indian Corporate, E-Commerce and WWW, e- marketing, E- Customer Relationship Management, E-CRM problems and solutions, CRM capabilities and customer life cycle, E- supply chain management. E- Strategy: Planning the E-commerce Project, E-commerce strategy and Knowledge management, E- business Strategy and Data Warehousing & Mining. ERP for E-commerce.Customer effective Web design –Requirement, Strategy and Model.

UNIT-V
m- Commerce: Overview of mobile-commerce, Mobile delivery technology & Switching Methods, Attributes of m- Commerce, Drivers of m- commerce, m-commerce Security issues, Mobile ATM(ICICI Bank Case Study). Applications of m-commerce: Mobile Financial Applications, m-wallet, Mobile shopping, Advertising and Content provision.

Reference Books:
1. Bharat Bhaskar: Electronic Commerce- Framework Technologies and Applications, TATA McGraw Hill
2. Ravi Kalakota& A.B. Whinston: Frontiers of Electronic Commerce, Pearson education
3. Ravi Kalakota& A.B. Whinston : Electronic Commerce –A   Manager's Guide,education.
4. AgarwalaKamlesh N and AgarwalaDeeksha : Business on the Net Introduction to the E-Com., Macmillan India
5. P.T. Joseph: E- Commerce - A Managerial Perspective, PHI 2002

CS 635: Software Engineering (Elective 2)

UNIT I

Software: Characteristics, Components Applications, Software Process Models: Waterfall, Spiral, Prototyping, Concepts of Project Management, Role Of Metrics And Measurement.

UNIT II

S/W Project Planning: Objectives, Decomposition Techniques: S/W Sizing, Problem Based Estimation, Process Based Estimation, Cost Estimation Models: COCOMO Model

System Analysis: Principles Of Structured Analysis, Requirement Analysis, DFD, Entity Relationship Diagram, Data Dictionary.

UNIT III

S/W Design: Objectives, Principles, Concepts, Design Methodologies: Data Design, Architecture Design, Procedural Design, Object –Oriented Concepts.

UNIT IV

Testing Fundamentals: Objectives, Principles, Testability, Test Case Design: White Box & Black Box testing, Testing Strategies: Verification & Validation, Unit Testing, Integration Testing, Validation Testing, System Testing.

UNIT V

Advanced topics in Software Engineering: Reengineering: Reverse Engineering, Restructuring, Forward Engineering.

Suggested Books:

1. Roger S. Pressman, "Software Engineering – A Practitioner's Approach ", Sixth Edition,McGraw Hill

2. R.E. Fairley, "Software Engineering Concepts", Paperback Edition, McGraw Hill.

3. Jalota, "An Integrated Approach to Software Engineering", Third Edition, Narosa Publishing House

CS 636: System Modelling & Simulation (Elective 2)

UNIT-I

Systems and environment: Concept of model and model building, model classification and representation, Use of simulation as a tool, steps in simulation study.

UNIT-II

Continuous-time and Discrete-time systems: Laplace transform, transfer functions, statespace models, order of systems, z-transform, feedback systems, stability, observability, controllability. Statistical Models in Simulation: Common discrete and continuous distributions, Poisson process, empirical distributions

UNIT-III

Random Numbers: Properties of random numbers, generation of pseudo random numbers, techniques of random number generation, tests for randomness, random variate generation using inverse transformation, direct transformation, convolution method, acceptance-rejection

UNIT-IV

Design and Analysis of simulation experiments: Data collection, identifying distributions with data, parameter estimation, goodness of fit tests, selecting input models without data, multivariate an time series input models, verification and validation of models, static and dynamic simulation output analysis, steady-state simulation, terminating simulation, confidence interval estimation, Output analysis for steady state simulation, variance reduction techniques

UNIT-V

Queuing Models: Characteristics of queuing systems, notation, transient and steady-state behaviour, performance, network of queues

Large Scale systems: Model reduction, hierarchical control, decentralized control, structural properties of large scale systems

Reference Books:
1. Averill Law : Simulation Modeling and Analysis (3rd ed.), Tata McGraw-Hill, 2007
2. G. Gordan : System Simulation (2nd ed.), Pearson Education .
3. A.F. Seila, V. Ceric and P. Tadikamalla : Applied Simulation Modeling (International Student Edition), Thomson Learning, 2004
4. Jerry Banks : Handbook of Simulation: Principles, Methodology, Advances, Applications, and Practice, Wiley Inter Science.
5. J. Banks, J.S. Carson, B.L. Nelson : Discrete Event System Simulation (4th ed.), Prentice-Hall of India,2004.

PRACTICALS

CS 637: .NET Programming Lab

1. Create minimum two simple applications using controls. Eg: Calculator, Drawing Pictures using GDI, Animation and Trainer Kit.
2. Write a program to simulate MS – OFFICE word and Excel packages with minimum five features.
3. Develop minimum two database applications using ADO.Net.
   Example:
   i) Online Banking
   ii) Online Shopping
   iii) Online Recruitment System.
   iv) Online Railway Reservation System.
4. The application should be developed with the option of navigation in between forms. For eg. The online Banking should be developed with the web pages to look into the account details, deposit and withdraw.
5. Develop Console application.
   i) Using Structure
   ii) Using arrays
   iii) Creating functions and Procedures
   iv) Create a new class, add methods and properties.

CS 638: Operating System Lab

1. Study Linux operating system in terms of:
   a. Processor management
   b. Memory management
   c. File management
2. Write a shell script program to display list of user currently logged in.
3. Write a shell script program to display "HELLO WORLD".
4. Write a shell script program to develop a scientific calculator.
5. Write a shell script program to check whether the given number is even or odd.
6. Write a shell script program to search whether element is present is in the list or not.
7. Write a shell script program to check whether given file is a directory or not.
8. Write a shell script program to count number of files in a Directory.
9. Write a shell script program to copy contents of one file to another.

CS 639 - Scientific Writing

UNIT-I

English grammar and scientific writing: Basic elements of a sentence, clauses, true sentence, tenses, active and passive verbs, punctuation and parallelism, chronological sequencing in and of paragraphs and précis writing.

UNIT-II

Introduction: Types of scientific presentation: Oral, poster, written and audio-visual. Scientific writing –general concept .Difference between scientific writing and academic writing. Types of scientific writing –Research paper, review article, short communication, research report, scientific letters editorial note, monographs, case studies and magazine articles.

UNIT-III

Components of scientific manuscript - Title, author and affiliation/s, abstract, keywords, Introduction, materials and methods, observation, result and discussion, conclusion, acknowledgement and literature cited(references and bibliography). Writing references and citations of research papers, books edited books, thesis, magazine article, annual report and e-content in APA and MLA style

UNIT-IV

Presentation of scientific data using excel sheet –Tabulation of data, Illustration of data using graphs and charts-line graphs ,bar graphs and histograms, pie chart and Cartesian graphs Inserting different labels to graphs and charts Pictorial presentation of data using Photoshop , types of images, labeling of images and highlighting the important features.

UNIT-V

Scientific journals and Magazines: Journals ISSN number. Types of academic/scholarly journals-non open access and open access journals. Refereed, non-refereed and peer reviewed journals predatory journals and plagiarism. Journal impact factor and journal citation report (Thomson Reuter), ICI and h-index.

Suggested readings

- Day, Robert A.(1998). How to write and publish a scientific paper . ORYX Press, Phoenix,Az (5th ed).
- Day, Robert A.(1995). Scientific English. ORYX Press, Phoenix, AZ(2nd ed).
- How to write and publish a scientific paper.6th edition.Authors: Robert A.day and Barbara Gastel.ISBN: 0-313-33040-9

- Alley, M.2003. The craft of scientific presentations: critical steps to succeed and critical errors to avod. Springer, NY.241 pages.ISBN:0-387-95555-0.

CS 6310: Minor Project

Semester IV

CS 641 : Major Project