AFFILIATED INSTITUTIONS

ANNA UNIVERSITY, CHENNAI

REGULATIONS – 2009

CURRICULAM AND SYLLABI

M.SC. COMPUTER TECHNOLOGY (2 YEARS)

SEMESTER I

Course Code	Course Title	L	T	P	C
Theory					
BCT 011	Foundations of computer science	3	1	0	3
BCT 012	Data Structures	3	1	0	3
BCT 013	Computer Architecture	3	1	0	3
BCT 014	Database Management Systems	3	1	0	3
BCT 015	Internet and Java Programming	3	1	0	3
Practical					
BCT 017	Data Structures Laboratory	0	0	3	2
BCT 018	RDBMS Laboratory	0	0	3	2
BCT 019	Internet and Java Programming Laboratory	0	0	3	2
	TOTAL	15	5	9	21

SEMESTER II

Course Code	Course Title	L	T	P	C
Theory					
BCT 021	Software Engineering	3	1	0	3
BCT 022	Operating Systems	3	1	0	3
BCT 023	Computer Networks	3	1	0	3
BCT 024	Object Oriented Analysis and Design	3	1	0	3
E1	Elective I	3	0	0	3
Practical					
BCT 026	Operating System Laboratory	0	0	4	2
BCT 027	Network Laboratory	0	0	3	2
BCT 028	CASE Tools and UML Laboratory	0	0	3	2
BCT 029	Communication Laboratory	0	0	4	2
	TOTAL	15	4	14	23

III SEMESTER

Course Code	Course Title	L	T	P	C
Theory					
BCT 031	Extreme Programming	3	2	0	3
BCT 032	Compiler Design	3	2	0	3
BCT 033	Distributed Operating Systems	3	2	0	3
BCT 034	Network Security	3	2	0	3
E2	Elective II	3	0	0	3
Practical					
BCT 036	Extreme Programming Laboratory	0	0	3	2
BCT 037	Software Laboratory	0	0	3	2
BCT 038	Mini Project and Seminar	0	0	3	2
	TOTAL	15	8	9	21

IV SEMESTER

Course Code	Course Title	L	T	P	C
BCT 041	Project Work	0	0	24	12
	TOTAL	0	0	24	12

TOTAL CREDITS TO BE EARNED FOR THE AWARD OF THE DEGREE = 88

LIST OF ELECTIVES - I

Course Code	Course Title	L	T	P	C
Theory					
BCT 001	Network Protocols	3	0	0	2
BCT 002	Mobile Computing	3	1	0	2
BCT 003	Web Technology	3	1	0	2
BCT 004	XML and Web Services	3	0	0	2
BCT 005	Middle-Ware Technologies	3	0	0	2

ELECTIVE - II

Course Code	Course Title	L	T	P	C
Theory					
BCT 006	Business Data Processing	3	0	0	2
BCT 007	Artificial Intelligence	3	0	0	2
BCT 008	Image Processing	3	0	0	2
BCT 009	Data Mining and Data Warehousing	3	1	0	2
BCT 010	PC Testing and Trouble shooting	3	1	0	2

BCT 011　　　　　　**FOUNDATIONS OF COMPUTER SCIENCE**　　　**L　T　P　C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　3　1　0　4

UNIT I MATRIX ALGEBRA　　　　　　　　　　　　　　　　　　　**12**
Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem

UNIT II BASIC SET THEORY　　　　　　　　　　　　　　　　　　**12**
 Basic Definitions - Venn Diagrams and set operations - Laws of set theory – Principle of inclusion and exclusion - partitions- Permutation and Combination - Relations-Properties of relations - Matrices of relations - Closure operations on relations -Functions - injective, surjective and bijective functions.

UNIT III MATHEMATICAL LOGIC　　　　　　　　　　　　　　　　**12**
Propositions and logical operators - Truth table - Propositions generated by a set,Equivalence and implication - Basic laws- Some more connectives – Functionally complete set of connectives- Normal forms - Proofs in Propositional calculus - Predicate calculus.

UNIT IV TRANSPORTATION AND ASSIGNMENT MODELS　　　　**12**
Mathematical formulation of transportation problem – methods for finding initial basic feasible solution – optimal solution – degeneracy - Mathematical formulation of Assignment models – Hungarian algorithm – variants of the assignments problems.

UNIT V SCHEDULING BY PERT AND CPM　　　　　　　　　　**12**
Network construction – Critical path method – Project Evaluation and Review Technique - Resource Analysis in Network Scheduling

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REFERENCE BOOKS :
1. Kenneth H.Rosen, "Discrete Mathematics and Its Applications", Tata McGraw Hill, Fourth Edition, 2002 (Unit 1,2 & 3).
2. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, "Operation Research", Pearson Education, Asia, 2005. (Units 4 & 5)
3. A.Tamilarasi & A.M.Natarajan, "Discrete Mathematics and its Application",Khanna Publishers, 2nd Edition 2005.
4. M.K.Venkataraman "Engineering Mathematics", Volume II, National Publishing Company, 2nd Edition, 1989.

BCT 012	**DATA STRUCTURES**	L	T	P	C
		3	1	0	4

UNIT I 12

Introduction – Structure and Problem Solving – Storage of Information – Linear Data Structures and their sequential storage representation – concepts and Terminology – Storage structure for arrays – Structures and Arrays of Structures – Stacks – Application of Stacks.

UNIT II 12

Queues – Simulation – Priority Queues Linear Data Structures and their linked storage representation – Pointers and Linked Allocation – Linked Linear Lists – Applications of Linked Linear Lists – Polynomial Manipulation.

UNIT III 12

Nonlinear Data Structures – Trees – Definition Operations on Binary Trees – Linked Storage representation for Binary Trees – Applications of Trees – Manipulation of Arithmetic Expressions – Symbol Talk construction.

UNIT IV 12

Graphs and their representation – Matrix representation – List structures – Breadth First Search – Depth First Search spanning Trees – Application of Graphs – PERT and Related Techniques.

UNIT V 12

Dynamic storage Management – Fixed Block Storage Allocation – First –fit Storage Allocation – Buddy System – File Structures – External Storage Devices – Sequential Files – Structure – Processing Indexed Sequential Files – Structure – Processing Direct Files – Structure Processing.

TOTAL : 60 PERIODS

REFERENCE BOOKS :
1. Tremblay J.P. and Sorenson, P.G., "An Introduction to Data Structures with Applications", II edition, Tata McGraw Hill Publication Company Ltd., New Delhi, 2007.
2. E. Balagurusamy, "C and Data Structures", Tata McGraw Hill Pub. Co., New Delhi, 2002.
3. Aho A V, Hopcroft J E, Ullman J D, "Data Structures using C ", Pearson Education, 1st edition, 2007.

BCT 013 **COMPUTER ARCHITECTURE** **L T P C**

                                              3 1 0 4

UNIT I **12**
Basic Structure of computers – Functional Units – Bus Structures – Performance –Evolution - Machine Instructions and programs – Memory operations – Instruction and instruction sequencing – addressing modes – Basic I/O operations – stacks and queues – subroutines – Encoding of Machine instructions.

UNIT II **12**
Arithmetic – Design of fast adders – Binary Multiplication – Division – Floating point numbers and operations.

UNIT III **12**
Processing unit – Fundamental concepts – Execution of a complete instruction –Multiple bus organization – Hardwired control - Microprogrammed control –pipelining – Basic concepts – Hazards – Inference on instruction sets. Data path and control considerations – Performance issues.

UNIT IV **12**
Memory System – RAM and ROM – Cache memories – Performance considerations – Virtual memories - secondary storage devices – Associative memories.

UNIT V **12**
Input / Output organization – Accessing I/O devices – Interrupts – DMA – Buses – Interface circuits – standard I/O Interfaces. Case study of one RISC and one CISC Processor.

TOTAL : 60 PERIODS

REFERENCE BOOKS :
1. Carl Hamacher, Zvonko Uranesic, Safvat Zaby, "Computer Organisation", 5th Edition, McGraw Hill, 2002.
2. John P Hayes, "Computer Architecture and Organisation", 3rd edition, McGraw Hill, 1998.

BCT 014	DATABASE MANAGEMENT SYSTEMS	L	T	P	C
		3	1	0	4

UNIT I INTRODUCTION 12
File systems versus Database systems – Data Models – DBMS Architecture – Data Independence – Data Modeling using Entity – Relationship Model – Enhanced E-R Modeling.

UNIT – II STORAGE STRUCTURES 12
Secondary storage Devices – RAID Technology – File operations – Hashing Techniques – Indexing – Single level and Multi-level Indexes – B+ tree – Indexes on Multiple Keys.

UNIT III RELATIONAL MODEL 12
Relational Model Concepts – Relational Algebra – SQL – Basic Queries – Complex SQL Queries – Views – Constraints – Relational Calculus – Tuple Relational Calculus – Domain Relational Calculus – overview of commercial RDBMSs –Database Design – Functional Dependencies – Normal Forms – 1NF – 2NF-3NFBCNF – 4NF-5NF – Database Tuning.

UNIT IV QUERY AND TRANSACTION PROCESSING 12
Algorithms for Executing Query Operations – using Hermistics in Query operations – Cost Estimation – Semantic Query Optimization – Transaction Processing – Properties of Transactions - Serializability – Transaction support in SQL.

UNIT V CONCURRENCY, RECOVERY AND SECURITY 12
Locking Techniques – Time Stamp ordering – Validation Techniques – Granularity of Data Items – Recovery concepts – Shadow paging – Log Based Recovery – Database Security Issues – Access control – Statistical Database Security.

TOTAL : 60 PERIODS

REFERENCE BOOKS :
1. Ramez Elamassri and Shankant B-Navathe, "Fundamentals of Database Systems", Third Edition, Pearson Education, Delhi, 2002.
2. Abraham Silberschatz, Henry F.Korth and S.Sundarshan "Database System Concepts", Fourth Edition, McGraw Hill, 2002.

BCT 015   **INTERNET AND JAVA PROGRAMMING**   **L T P C**
                                                               4 0 0 4

UNIT I INTRODUCTION   12

Java Features – comparison of Java with C and C++ - Java and Internet – Java Environment – Java Program structure – Java Tokens – Implementing a Java Program – Java Virtual Machine – Constants – Variables – Data Types – Scope of Variables – Type casting – Operators and expressions – Decision Making, Branching
and Looping.

UNIT II CLASSES AND ARRAYS   12

Defining a class – Constructors – Methods – overloading – static Members – Nesting of Methods – Overriding methods – Final Classes – Abstract Class – Visibility control – Arrays – creating an array – Two Dimensional arrays – Strings – String Arrays – String Methods – String Buffer Class – Vectors – Wrapper Classes.

UNIT III INHERITANCE, INTERFACES AND PACKAGES   12

Defining a subclass – Subclass constructor – Multilevel inheritance – Hierarchical Inheritance – Defining Interfaces – Extending Interfaces – Implementing Interfaces –Java APF Packages – creating a package – Accessing and Using a package –
Adding a class to a package – Hiding Classes.

UNIT IV MULTITHREADING EXCEPTION HANDLING AND FILES CREATING THREADS   12

Extending the Thread class – Thread Life cycle – Thread Exception – Thread priority – Synchronization – Runnable Interface – Exceptions – Throwing own Exceptions – Concepts of streams – stream classes – Byte Stream Classes – Character stream Classes – Using Streams – Using file Class –Other Stream Classes.

UNIT V APPLET PROGRAMMING   12

Difference between Application and Applets – Applet Life cycle – creating an Executable Applet – Designing a Web Page – Adding Applet to HTML File – Passing Parameters to Applets.

                                                    TOTAL : 60 PERIODS

REFERENCE BOOKS :
1. E. Balagurusamy, "Programming with Java – A primer", Second Edition, Tata McGraw Hill Publishing Company, Delhi, 2002
2. Herbert Schildt, "The complete Reference – Java 2", Fifth Edition, Tata McGraw Hill Publishing Company, Delhi, 2002.
3. Deitel , " Java How to pogram ", 6th edition, Pearson Education, 2006.

PRACTICALS

BCT 017 **DATA STRUCTURES LABORATORY** | L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

LIST OF EXERCISES

(USING C LANGUAGE) DATA STRUCTURES:
Arrays and Structures in C, Infix, Postfix, Prefix expressions using stack, Recursion, Linked list, Circular linked list, Queues as circular list, Operation on binary trees – Insort, Quicksort, Heapsort, Shell sort, Sequential search and binary search.

TOTAL : 45 PERIODS

BCT 018 **RDBMS LABORATORY** | L | T | P | C |
|---|---|---|---|
| 0 | 0 | 3 | 1.5 |

LIST OF EXERCISES
1. Library Information Processing
2. Students Mark sheet processing
3. Telephone Directory maintenance
4. Gas booking and delivering system
5. Electricity Bill Processing
6. Bank Transactions.
7. Pay roll processing
8. Personal Information System
9. Question Database and Conducting quiz.

TOTAL : 45 PERIODS

BCT 019 **INTERNET AND JAVA PROGRAMMING LABORATORY** | L | T | P | C |
|---|---|---|---|
| 0 | | 3 | 1.5 |

LIST OF EXERCISES (2 EXPERIMENTS UNDER EACH OF THE FOLLOWING)
1. Classes and Objects
2. Inheritance and Polymorphism
3. Multithreading
4. Exception handling
5. Applet programming
6. Client side / Server side scripting programs for the Web Pages.
7. Experiments with Active / JAVA server pages.
8. Socket Programming.
9. JAVA Servlets.
10. On-line Transactions – Database connectivity.

TOTAL : 45 PERIODS

BCT 021   **SOFTWARE ENGINEERING**   **L   T   P   C**
                                                                              3   1   0   4

UNIT I SOFTWARE PROCESS   12

Introduction –S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) – system engineering – computer based system – verification – validation – life cycle process – development process –system engineering hierarchy.

UNIT II SOFTWARE REQUIREMENTS   12

Functional and non-functional - user – system –requirement engineering process – feasibility studies – requirements – elicitation – validation and management – software prototyping – prototyping in the software process – rapid prototyping techniques – user interface prototyping - S/W document. Analysis and modeling – data, functional and behavioral models – structured analysis and data dictionary.

UNIT – III DESIGN CONCEPTS AND PRINCIPLES   12

Design process and concepts – modular design – design heuristic – design model and document. Architectural design – software architecture – data design – architectural design – transform and transaction mapping – user interface design – user interface design principles. Real time systems - Real time software design – system design – real time executives – data acquisition system - monitoring and
control system. SCM – Need for SCM – Version control – Introduction to SCM
process – Software configuration items.

UNIT IV TESTING   12

Taxonomy of software testing – levels – test activities – types of s/w test – black box testing – testing boundary conditions – structural testing – test coverage criteria based on data flow mechanisms – regression testing – testing in the large. S/W testing strategies – strategic approach and issues - unit testing – integration testing – validation testing – system testing and debugging.

UNIT V SOFTWARE PROJECT MANAGEMENT   12

Measures and measurements – S/W complexity and science measure – size measure – data and logic structure measure – information flow measure. Software cost estimation – function point models – COCOMO model- Delphi method.- Defining a Task Network – Scheduling – Earned Value Analysis – Error Tracking – Software changes – program evolution dynamics – software maintenance – Architectural evolution. Taxonomy of CASE tools.

                                                                 TOTAL : 60 PERIODS

REFERENCE BOOKS :

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Edition, 5th edition, 2001.
2. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
3. Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag,1997.
4. James F Peters and Witold Pedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
5. Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxford University Press, New Delhi, 1996.

BCT 022   **OPERATING SYSTEMS**   **L   T   P   C**
                                                                       3   1   0   4

UNIT I   **12**
Introduction - Mainframe systems – Desktop Systems – Multiprocessor Systems – Distributed Systems – Clustered Systems – Real Time Systems – Handheld Systems - Hardware Protection - System Components – Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication.

UNIT II   **12**
Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Critical regions – Monitors.

UNIT III   **12**
System Model – Deadlock Characterization – Methods for handling Deadlocks - Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks - Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Segmentation with Paging.

UNIT IV   **12**
Virtual Memory – Demand Paging – Process creation – Page Replacement –Allocation of frames – Thrashing - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection

UNIT V   **12**
File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management. Kernel I/O Subsystems – Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management. Case Study: The Linux System, Windows

                                                                  TOTAL : 60 PERIODS

REFERENCE BOOKS :

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, "Operating System Concepts", Sixth Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2003.
2. Harvey M. Deitel, "Operating Systems", Second Edition, Pearson Education Pvt. Ltd, 2002.
3. Andrew S. Tanenbaum, "Modern Operating Systems", Prentice Hall of India Pvt. Ltd, 2003.
4. William Stallings, "Operating System", Prentice Hall of India, 4th Edition, 2003.
5. Pramod Chandra P. Bhatt – "An Introduction to Operating Systems, Concepts and Practice", PHI, 2003.

BCT 023   **COMPUTER NETWORKS**   **L   T   P   C**
                                                                            3   1   0   4

UNIT I DATA COMMUNICATIONS   11
Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Coaxial Cable – Fiber Optics – Line Coding – Modems – RS232 Interfacing sequences.

UNIT II DATA LINK LAYER   13
Error – detection and correction – Parity – LRC – CRC – Hamming code – low Control and Error control - stop and wait – go back-N ARQ – selective repeat ARQsliding window – HDLC. - LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - IEEE 802.11 – FDDI - SONET – Bridges.

UNIT III NETWORK LAYER   13
Internetworks – Packet Switching and Datagram approach – IP addressing methods – Subnetting – Routing – Distance Vector Routing – Link State Routing – Routers.

UNIT IV TRANSPORT LAYER   12
Duties of transport layer – Multiplexing – Demultiplexing – Sockets – User Datagram Protocol (UDP) – Transmission Control Protocol (TCP) – Congestion Control – Quality of services (QOS) – Integrated Services.

UNIT V APPLICATION LAYER   11
Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography.

                                                                    TOTAL : 60 PERIODS

REFERENCE BOOKS :
1. Behrouz A. Forouzan, "Data communication and Networking", Tata McGraw- Hill, 2004.
2. James F. Kurose and Keith W. Ross, "Computer Networking: A Top-Down Approach Featuring the Internet", Pearson Education, 2003.
3. Larry L.Peterson and Peter S. Davie, "Computer Networks", Harcourt Asia Pvt. Ltd., Second Edition.
4. Andrew S. Tanenbaum, "Computer Networks", PHI, Fourth Edition, 2003.
5. William Stallings, "Data and Computer Communication", Sixth Edition, Pearson Education, 2000.

BCT 024　　　　　　　**OBJECT ORIENTED ANALYSIS AND DESIGN**　　　**L　T　P　C**
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　3　1　0　4

UNIT I INTRODUCTION　　　　　　　　　　　　　　　　　　　　　　　**11**
An Overview of Object Oriented Systems Development - Object Basics – Object Oriented Systems Development Life Cycle.

UNIT II OBJECT ORIENTED METHODOLOGIES　　　　　　　　　　　**15**
Rumbaugh Methodology - Booch Methodology - Jacobson Methodology - Patterns – Frameworks – Unified Approach – Unified Modeling Language – Use case – class diagram - Interactive Diagram - Package Diagram - Collaboration Diagram – State Diagram - Activity Diagram.

UNIT III OBJECT ORIENTED ANALYSIS　　　　　　　　　　　　　**12**
Identifying use cases - Object Analysis - Classification – Identifying Object relationships - Attributes and Methods.

UNIT IV OBJECT ORIENTED DESIGN　　　　　　　　　　　　　　**11**
Design axioms - Designing Classes – Access Layer - Object Storage – Object Interoperability.

UNIT V SOFTWARE QUALITY AND USABILITY　　　　　　　　　**11**
Designing Interface Objects – Software Quality Assurance – System Usability - Measuring User Satisfaction

　　　　　　　　　　　　　　　　　　　　　　　　　　　TOTAL : 60 PERIODS

REFERENCE BOOKS :
1. Ali Bahrami, "Object Oriented Systems Development", Tata McGraw-Hill, 1999 (Unit I, III, IV, V).
2. Martin Fowler, "UML Distilled", Second Edition, PHI/Pearson Education, 2002. (UNIT II)
3. Stephen R. Schach, "Introduction to Object Oriented Analysis and Design", Tata McGraw-Hill, 2003.
4. James Rumbaugh, Ivar Jacobson, Grady Booch "The Unified Modeling Language Reference Manual", Addison Wesley, 1999.
5. Hans-Erik Eriksson, Magnus Penker, Brain Lyons, David Fado, "UML Toolkit", OMG Press Wiley Publishing Inc., 2004.

BCT 026   **OPERATING SYSTEM LABORATORY**   **L T P C**
                                                                0 0 3 2

LIST OF EXERCISES
(Implement the following on LINUX platform. Use C for high level language implementation)

1 Shell programming
   - command syntax
   - write simple functions
   - basic tests

2 Shell programming
   - loops
   - patterns
   - expansions
   - substitutions

3 Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close, stat, opendir, readdir

4 Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)

5 Write C programs to simulate UNIX commands like ls, grep, etc.

6.Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time

7 Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time

8 Implement the Producer – Consumer problem using semaphores.

9 Implement some memory management schemes – I

10 Implement some memory management schemes – II

EXAMPLE FOR EXPT 9 & 10 :
Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space.

When a process finishes (taken as input) the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit

                                                    TOTAL : 45 PERIODS

BCT 027	NETWORK LABORATORY	L	T	P	C
		0	0	3	1.5

LIST OF EXERCISES
 (ALL THE PROGRAMS ARE TO BE WRITTEN USING C)
1 Simulation of ARP / RARP.
2 Write a program that takes a binary file as input and performs bit stuffing and CRC Computation.
3 Develop an application for transferring files over RS232.
4 Simulation of Sliding-Window protocol.
5 Simulation of BGP / OSPF routing protocol.
6 Develop a Client – Server application for chat.
7 Develop a Client that contacts a given DNS Server to resolve a given host name.
8 Write a Client to download a file from a HTTP Server.
9 Study of Network Simulators like NS2/Glomosim / OPNET

TOTAL : 45 PERIODS

BCT 028	CASE TOOLS AND UML LABORATORY	L	T	P	C
		0	0	3	1.5

LIST OF EXERCISES
1. Prepare the following documents for two or three of the experiments listed below and develop the software engineering methodology.
2. Program Analysis and Project Planning.Thorough study of the problem – Identify project scope, Objectives, Infrastructure.
3. Software requirement Analysis Describe the individual Phases / Modules of the project, Identify deliverables.
4. Data Modeling Use work products – Data dictionary, Use diagrams and activity diagrams, build and test lass diagrams, Sequence diagrams and add interface to class diagrams.
5. Software Development and Debugging
6. Software Testing Prepare test plan, perform validation testing, Coverage analysis, memory leaks,
develop test case hierarchy, Site check and Site monitor.

TOTAL : 45 PERIODS

SUGGESTED LIST OF APPLICATIONS
1. Student Marks Analyzing System
2. Quiz System
3. Online Ticket Reservation System
4. Payroll System
5. Course Registration System
6. Expert Systems
7. ATM Systems
8. Stock Maintenance
9. Real-Time Scheduler
10. Remote Procedure Call Implementation

BCT 029	**COMMUNICATION LABORATORY**	**L**	**T**	**P**	**C**
		0	**0**	**4**	**2**

AIM:
To give oral practice in the use of the English language for Science Communication.

OBJECTIVES:
- To familarize students with different rhetorical functions of scientific English.
- To initiate group discussions for developing communication skills.

Presentation on science-related topics – Just a minute talk – Interview – Group discussion – Strategies for gropu discussion – Body language – Narrating skills – Biographies of Scientists / Social awareness of Scientific issues.

TOTAL : 60 PERIODS

BCT 031	**EXTREME PROGRAMMING**	**L**	**T**	**P**	**C**
		3	**2**	**0**	**5**

UNIT I INTRODUCTION TO C#
Introducing C#, Understanding .NET, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations.

UNIT II OBJECT ORIENTED ASPECTS OF C#
Classes, Objects, Inheritance, Polymorphism, Interfaces, Operator Overloading, Delegates, Events, Errors and Exceptions.

UNIT III APPLICATION DEVELOPMENT ON .NET
Building Windows Applications, Accessing Data with ADO.NET.

UNIT IV WEB BASED APPLICATION DEVELOPMENT ON .NET 8
Programming Web Applications with Web Forms, Programming Web Services.

UNIT V THE CLR AND THE .NET FRAMEWORK 12
Assemblies, Versioning, Attributes, Reflection, Viewing MetaData, Type Discovery, Reflecting on a Type, Marshaling, Remoting, Understanding Server Object Types, Specifying a Server with an Interface, Building a Server, Building the Client, Using SingleCall, Threads.

TOTAL : 75 PERIODS

REFERENCE BOOKS
1. E. Balagurusamy, "Programming in C#", Tata McGraw-Hill, 2004. (Unit I, II)
2. J. Liberty, "Programming C#", 2nd ed., O'Reilly, 2002. (Unit III, IV, V)
3. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2004.
4. Robinson et al, "Professional C#", 2nd ed., Wrox Press, 2002.
5. Andrew Troelsen, "C# and the .NET Platform", A! Press, 2003.
6. S. Thamarai Selvi, R. Murugesan, "A Textbook on C#", Pearson Education,2003.

BCT 032   **COMPILER DESIGN**   **L   T   P   C**
                                                            3   2   0   5

UNIT I INTRODUCTION TO COMPILING
Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens.

UNIT II SYNTAX ANALYSIS
Role of the parser –Writing Grammars –Context-Free Grammars – Top Down parsing – Recursive Descent Parsing – Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing – Operator Precedent Parsing – LR Parsers – SLR Parser – Canonical LR Parser – LALR Parser.

UNIT III INTERMEDIATE CODE GENERATION
Intermediate languages – Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

UNIT IV CODE GENERATION
Issues in the design of code generator – The target machine – Runtime Storage management – Basic Blocks and Flow Graphs – Next-use Information – A simple Code generator – DAG representation of Basic Blocks – Peephole Optimization.

UNIT V CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS
Introduction– Principal Sources of Optimization – Optimization of basic Blocks – Introduction to Global Data Flow Analysis – Runtime Environments – Source Language issues – Storage Organization – Storage Allocation strategies – Access to non-local names – Parameter Passing.

TOTAL : 75 PERIODS

REFERENCE BOOKS
1. Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education Asia, 2003.
2. Allen I. Holub "Compiler Design in C", Prentice Hall of India, 2003.
3. C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", Benjamin Cummings, 2003.
4. J.P. Bennet, "Introduction to Compiler Techniques", Second Edition, Tata McGraw-Hill, 2003.

BCT 033	**DISTRIBUTED OPERATING SYSTEM**	L	T	P	C
		3	2	0	5

UNIT I

Fundamentals – evolution – System Models – Distributed operating System – Issues – Distributed Computing environment Message passing – Introduction – Features – Issues – Synchronization – Buffering – Message – Encoding – Decoding – Process addressing – Failure Handling.

UNIT II

Remote Procedure calls – Introduction – Model – Transparency – Implementation – Stub Generation – Messages – Marshaling Arguments and results –server Management – Parameter passing Semantics - Call Semantics – Communication Protocols – Complicated RPC's – Client – Server Binding – Exception handling – Security Distributed shared Memory – Introduction – Architecture – Issues – Granularity
Structure – Consistency Models – Replacement Strategy – Thrashing.

UNIT III

Synchronization – Introduction – Clock Synchronization – Event ordering – Mutual Exclusion – Deadlock – Election Algorithms.

UNIT IV

Resource Management – Introduction – Features – Task Assignment approach – Load-Balancing Approach - Load -Sharing Approach Process Management – Introduction – Process Migration – Threads.

UNIT V

Distributed File Systems – Introduction – Features – File Models – Accessing Models – Sharing Semantics – Caching Schemes – File Replication – Fault Tolerance – Atomic Transactions – Design Principles Naming – Introduction – Features – Terminologies – Concepts.

TOTAL : 75 PERIODS

REFERENCE BOOK
1. Pradeep K. Sinha, "Distributed Operating Systems, Concepts and Design" Prentice Hall of India, New Delhi, 2001.
2. Andrew S. Tanenbaum "Distributed Operating Systems", Pearson Education, New Delhi, 2002
3. Mukesh Singhal and Nirajan G.Shivaratri "Advanced Concepts in Operating Systems", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2001

BCT 034	NETWORK SECURITY	L	T	P	C
		3	2	0	5

UNIT I INTRODUCTION

Attacks - Services - Mechanisms - Conventional Encryption - Classical And Modern Techniques – Encryption Algorithms - Confidentiality.

UNIT II PUBLIC KEY ENCRYPTION

RSA - Elliptic Curve Cryptography - Number Theory Concepts

UNIT III MESSAGE AUTHENTICATION

Hash Functions - Digest Functions - Digital Signatures - Authentication Protocols.

UNIT IV NETWORK SECURITY PRACTICE

Authentication, Applications - Electronic Mail Security - IP Security - Web Security.

UNIT V SYSTEM SECURITY

Intruders – Viruses – Worms – Firewalls Design Principles – Trusted Systems.

TOTAL : 75 PERIODS

REFERENCE BOOKS:
1. Stallings, Cryptography & Network Security - Principles & Practice, Prentice Hall,3rd Edition 2002.
2. Bruce, Schneier, Applied Cryptography, 2nd Edition, Toha Wiley & Sons, 1996.
3. Man Young Rhee, "Internet Security", Wiley, 2003.
4. Pfleeger & Pfleeger, "Security in Computing", Pearson Education, 3rd Edition, 2003.

BCT 036   **EXTREME PROGRAMMING LABORATORY**   **L   T   P   C**
                                                                0   0   3   1.5

1. Programs Using Branching, Looping,
2. Programs Using Methods, Arrays, Strings,
3. Programs using Structures, Enumerations.
4. Programs Using Inheritance
5. Programs using Polymorphism
6. Programs using Interfaces
7. Programs using Operator overloading
8. Programs using delegates, events, errors and exceptions.
9. Programs using application development on .net
10. Programs using Web applications

                                                    TOTAL : 45 PERIODS

BCT037   **SOFTWARES LABORATORY**   **L   T   P   C**
                                                      0   0   3   1.5

1. Study of case tools such as rational rose or equivalent tools

2. REQUIREMENTS
Implementation of requirements engineering activities such as elicitation, validation, management using case tools

4. ANALYSIS AND DESIGN
Implementation of analysis and design using case tools.
5. Study and usage of software project management tools such cost estimates and scheduling
6. Documentation generators - Study and practice of Documentation generators.
7. Data modeling using automated tools.
8. Practice reverse engineering and re engineering using tools.
9. Exposure towards test plan generators, test case generators, test coverage and software metrics.
10. Meta modeling and software life cycle management.

                                                    TOTAL : 45 PERIODS

BCT 038	MINI PROJECT AND SEMINAR	L	T	P	C
		0	0	20	10

The Project will be of one semester duration. The students have to do the Mini Project as per the interest and Specialization of students. The students have to present atleast two seminar in the semester. The student have to submit report at the end of the semester.

BCT 041	PROJECT WORK	L	T	P	C
		0	0	20	10

The project will be of one semester duration. The students will be sent to different organizations involved in science communication activities as per interest and specialization of students, mostly located in the place of the study. They will have to carry out a research project related to the area of interest and submit a research project report at the end of the semester. The students shall defend their dissertation in front of experts during viva-voce Examination.

BCT 001	NETWORK PROTOCOLS	L	T	P	C
		3	0	0	3

UNIT I INTRODUCTION
Internetworking concepts and architectural model- classful Internet address – CIDRSubnetting and Supernetting –ARP- RARP- IP – IP Routing –ICMP – Ipv6

UNIT II TCP
Services – header – connection establishment and termination- interactive data flowbulk data flow- timeout and retransmission – persist timer - keepalive timer- futures and performance

UNIT III IP IMPLEMENTATION
IP global software organization – routing table- routing algorithms-fragmentation and reassembly- error processing (ICMP) –Multicast Processing (IGMP)

UNIT IV TCP IMPLEMENTATION I
Data structure and input processing – transmission control blocks- segment formatcomparison-finite state machine implementation-Output processing- mutual exclusioncomputing the TCP data length

UNIT V TCP IMPLEMENTATION II
Timers-events and messages- timer process- deleting and inserting timer event- flow control and adaptive retransmission-congestion avoidance and control – urgent data processing and push function.

TOTAL : 45 PERIODS

REFERENCE BOOKS
1. Douglas E.Comer – "Internetworking with TCP/IP Principles, Protocols and Architecture", Vol. 1 & 2 fourth edition, Pearson Education Asia, 2003 (Unit I in Comer Vol. I, Units II, IV & V – Comer Vol. II)
2. W.Richard Stevens "TCP/IP illustrated" Volume 1 Pearson Education, 2003 (Unit II)
3. TCP/IP protocol suite, Forouzan, 2nd edition, TMH, 2003
4. W.Richard Stevens "TCP/IP illustrated" Volume 2 Pearson Education 2003.

BCT 002   **MOBILE COMPUTING**   **L T P C**
                                                                    3 1 0 4

UNIT I WIRELESS COMMUNICATION FUNDAMENTALS
Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum – MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

UNIT II TELECOMMUNICATION NETWORKS
Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 – Satellite Networks **-** Basics – Parameters and Configurations – Capacity Allocation – FAMA and DAMA – Broadcast Systems – DAB - DVB.

UNIT III WIRLESS LAN
Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE 802.11a - 02.11b standards – HIPERLAN – Blue Tooth.

UNIT IV MOBILE NETWORK LAYER
Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR – Alternative Metrics.

UNIT V TRANSPORT AND APPLICATION LAYERS
Traditional TCP – Classical TCP improvements – WAP, WAP 2.0.

TOTAL : 60 PERIODS

REFERENCE BOOKS
1. Jochen Schiller, "Mobile Communications", PHI/Pearson Education, Second Edition, 2003. (Unit I Chap 1,2 &3- Unit II chap 4,5 &6-Unit III Chap 7.Unit IV Chap 8- Unit V Chap 9&10.)
2. William Stallings, "Wireless Communications and Networks", PHI/Pearson Education, 2002. (Unit I Chapter – 7&10-Unit II Chap 9)
3. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", PHI/Pearson Education, 2003.
4. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer, New York, 2003.
5. Hazysztof Wesolowshi, "Mobile Communication Systems", John Wiley and Sons Ltd, 2002.

BCT 003	WEB TECHNOLOGY	L	T	P	C
		3	1	0	4

UNIT I INTRODUCTION

Introduction – Network concepts – Web concepts – Internet addresses - Retrieving Data with URL – HTML – DHTML: Cascading Style Sheets - Scripting Languages: Javascript – Vbscript.

UNIT II COMMON GATEWAY INTERFACE

Common Gateway Interface: Programming CGI Scripts – HTML Forms – Custom Database Query Scripts – Server Side Includes – Server security issues – XML.

UNIT III JAVA PROGRAMMING

Java fundamentals: Classes – Inheritance – Packages – Interfaces – Exceptions Handling – Multi threading - Applets

UNIT IV SERVER SIDE PROGRAMMING

Server side Programming – Active server pages – Java server pages – Java Servlets: Servlet container – Exceptions – Sessions and Session Tracking – Using Servlet context – Dynamic Content Generation – Servlet Chaining and Communications.

UNIT V APPLICATIONS

Simple applications – Internet Commerce – Database connectivity – Online databases – EDI Applications in Business – Plug-ins – Firewalls

TOTAL: 60 PERIODS

REFERENCE BOOKS:

1. Deitel, Deitel and Neito, "INTERNET and WORLD WIDE WEB – How to program", Pearson education asia, 2002
2. D.Norton and H. Schildt, "Java 2: The complete Reference", Fifth Edition, TMH.
3. Elliotte Rusty Herold , "Java Network Programming", O'Reilly Publications, 3rd Edition, 2004.
4. Eric Ladd and Jim O'Donnell, et al, "USING HTML 4, XML, and JAVA1.2", PHI publications, 2003.
5. Jeffy Dwight, Michael Erwin and Robert Nikes "USING CGI", PHI Publications, 1997

BCT 004   **XML AND WEB SERVICES**   **L   T   P   C**
                                                                        3   0   0   3

UNIT I INTRODUCTION
Role Of XML – XML and The Web – XML Language Basics – SOAP – Web Services – Revolutions Of XML – Service Oriented Architecture (SOA).

UNIT II XML TECHNOLOGY
XML – Name Spaces – Structuring With Schemas and DTD – Presentation Techniques – Transformation – XML Infrastructure.

UNIT III SOAP
Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments.

UNIT IV WEB SERVICES
Overview – Architecture – Key Technologies - UDDI – WSDL – ebXML – SOAP And Web Services In E-Com – Overview Of .NET And J2EE.

UNIT V XML SECURITY
Security Overview – Canonicalization – XML Security Framework – XML Encryption – XML Digital Signature – XKMS Structure – Guidelines For Signing XML Documents – XML In Practice.

TOTAL: 45 PERIODS

REFERENCE BOOKS:
1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2002.
2. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, " Developing Java Web Services", Wiley Publishing Inc., 2004.
3. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.
4. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmann Publishers,2005.

BCT 005 **MIDDLE-WARE TECHNOLOGIES** **L T P C**
3 0 0 3

UNIT I INTRODUCTION

Software Components – objects – fundamental properties of Component technology – modules – interfaces – callbacks – directory services – component architecture – components and middleware.

UNIT II JAVA COMPONENT TECHNOLOGIES

Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP.

UNIT III CORBA TECHNOLOGIES

Java and CORBA – Interface Definition language – Object Request Broker – system object model – portable object adapter – CORBA services – CORBA component model – containers – Application server – model driven architecture.

UNIT IV COM AND .NET TECHNOLOGIES

COM – Distributed COM – object reuse – interfaces and versioning – dispatch interfaces – connectable objects – OLE containers and servers – Active X controls – .NET components - assemblies – appdomains – contexts – reflection – remoting.

UNIT V COMPONENT FRAMEWORKS AND DEVELOPMENT

Connectors – contexts – EJB containers – CLR contexts and channels – Black Box component framework – directory objects – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools.

TOTAL: 45 PERIODS

REFERENCE BOOKS:
1. Clemens Szyperski, "Component Software: Beyond Object-Oriented Programming", Addison Wesley, 2nd Edition 2002.
2. Ed Roman, "Enterprise Java Beans",3rd Edition, Wiley, 2004.
3. Andreas Vogel, Keith Duddy, "Java Programming with CORBA", John Wiley & Sons 1998
4. Corry, Mayfield, Cadman, "COM/DCOM Primer Plu

BCT 006 **BUSINESS DATA PROCESSING** **L T P C**
3 0 0 3

UNIT I INTRODUCTION
Organizational behaviour- Foundations of Individual behavior-Perception and Individual decision making-values, attitude and job satisfaction.

UNIT II GROUPS IN ORGANISATION
Foundations of group behaviour- Understanding work teams- Communication – Leadership.

UNIT III ORGANISATION SYSTEM 9
Foundations of organization structure – Technology – Work design and stress – Human resource policies and practices – Organisational Culture.

UNIT IV BUSINESS PROCESS RE-ENGINEERING AND IT
Basic concepts and the need for BPR-Principles of BPR and the role of IT- BPR and restructuring the organization.

UNIT V NETWORK ORGANIZATIONS
Networked organization- virtual corporations.

TOTAL : 45 PERIODS

REFERENCE BOOKS
1. Stephen P.Robbins "Organizational behavior", PHI, 12th edition, 2006.
2. Turban,Mclean,wetherbe,"Information Technology for management" John Wiely and Sons, 2001.
3. Ravi Kalakota and Marcia Robinson, "E-Business; Roadmap for Success; Pearson Education, 2000.
4. Vikram Sethi & William R King, " Organizational transformation through business process reengineering", Pearson education, 2006.

BCT 007   **ARTIFICIAL INTELLIGENCE**   **L   T   P   C**
                                                                        3   0   0   3

UNIT I INTRODUCTION
Intelligent Agents – Agents and environments - Good behavior – The nature of environments – structure of agents - Problem Solving - problem solving agents – example problems – searching for solutions – uniformed search strategies – avoiding repeated states – searching with partial information.

UNIT II SEARCHING TECHNIQUES
Informed search and exploration – Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments - Constraint satisfaction problems (CSP) – Backtracking search and Local search for CSP – Structure of problems - Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision – games that include an element of chance.

UNIT III KNOWLEDGE REPRESENTATION
First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic – prepositional versus first order logic – unification and lifting – forward chaining – backward chaining - Resolution - Knowledge representation – Ontological Engineering - Categories and objects – Actions - Simulation and events - Mental events and mental objects

UNIT IV LEARNING
Learning from observations - forms of learning - Inductive learning - Learning decision trees - Ensemble learning - Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming - Statistical learning methods - Learning with complete data – Learning with hidden variable - EM algorithm - Instance based learning - Neural networks - Reinforcement learning – Passive reinforcement learning - Active reinforcement
learning - Generalization in reinforcement learning.

UNIT V APPLICATIONS
Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar induction – Probabilistic language processing - Probabilistic language models – Information retrieval – Information Extraction – Machine translation.

                                                                TOTAL : 45 PERIODS
REFERENE BOOKS
1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", 2nd Edition, Pearson Education / Prentice Hall of India, 2004.
2. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.
3. Elaine Rich and Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata McGraw- Hill, 2003.
4. George F. Luger, "Artificial Intelligence-Structures And Strategies For Complex Problem Solving", Pearson Education / PHI, 2002.

BCT 008   **IMAGE PROCESSING**   **L   T   P   C**
                                                              3   0   0   3

UNIT I DIGITAL IMAGE FUNDAMENTALS AND TRANSFORMS 9

Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations-Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT – Separable Image Transforms –Walsh – Hadamard – Discrete Cosine Transform, Haar, Slant – Karhunen – Loeve transforms.

UNIT II IMAGE ENHANCEMENT TECHNIQUES

Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters – Laplacian filters – Frequency domain filters : Smoothing – Sharpening filters – Homomorphic filtering.

UNIT III IMAGE RESTORATION

Model of Image Degradation/restoration process – Noise models – Inverse filtering - Least mean square filtering – Constrained least mean square filtering – Blind image restoration – Pseudo inverse – Singular value decomposition.

UNIT IV IMAGE COMPRESSION

Lossless compression: Variable length coding – LZW coding – Bit plane codingpredictive coding-DPCM.
Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG,Basics of Vector quantization.

UNIT V IMAGE SEGMENTATION AND REPRESENTATION

Edge detection –Thresholding - Region Based segmentation – Boundary representation: chair codes- Polygonal approximation –Boundary segments –boundary descriptors: Simple descriptors-Fourier descriptors - Regional descriptors –Simple descriptors- Texture

TOTAL : 45 PERIODS

REFERENCE BOOKS
1. Rafael C Gonzalez, Richard E Woods 2nd Edition, Digital Image Processing - Pearson Education 2003.
2. William K Pratt, Digital Image Processing John Willey (2001)
3. Image Processing Analysis and Machine Vision – Millman Sonka, Vaclav hlavac, Roger Boyle, Broos/colic, Thompson Learniy (1999).
4. A.K. Jain, PHI, New Delhi (1995)-Fundamentals of Digital Image Processing.
5. Chanda Dutta Magundar – Digital Image Processing and Applications, Prentice Hall of India, 2000

BCT 009	**DATA MINING AND DATA WAREHOUSING**	**L**	**T**	**P**	**C**
		3	**1**	**0**	**4**

UNIT I INTRODUCTION AND DATA WAREHOUSING

Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining

UNIT II DATA PREPROCESSING, LANGUAGE, ARCHITECTURES, CONCEPT DESCRIPTION

Why Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

UNIT III ASSOCIATION RULES

Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases

UNIT IV CLASSIFICATION AND CLUSTERING

Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods, Prediction, Classifier Accuracy, Cluster Analysis, Types of data, Categorisation of methods, Partitioning methods, Outlier Analysis.

UNIT V RECENT TRENDS

Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, World Wide Web, Applications and Trends in Data Mining

TOTAL : 60 PERIODS

REFERENCE BOOK

1. J. Han, M. Kamber, "Data Mining: Concepts and Techniques", Harcourt India /Morgan Kauffman, 2001.
2. Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education 2004.
3. Sam Anahory, Dennis Murry, "Data Warehousing in the real world", Pearson Education 2003.
4. David Hand, Heikki Manila, Padhraic Symth, "Principles of Data Mining", PHI 2004.
5. W.H.Inmon, "Building the Data Warehouse", 3rd Edition, Wiley, 2003.
6. Alex Bezon, Stephen J.Smith, "Data Warehousing, Data Mining & OLAP", MeGraw-Hill Edition, 2001.
7. Paulraj Ponniah, "Data Warehousing Fundamentals", Wiley-Interscience Publication, 2003.

BCT 010 **PC TESTING AND TROUBLE SHOOTING** **L   T   P   C**
  3   1   0   4

UNIT I
PC Hardware Introduction and Overview : Personal computing History, Types of systems, Documentation – Technical Reference Manuals – Hardware Maintenance Manuals System Teardown and Inspection : Hand Tools, Soldering and Desoldering Tools, Loop Back Connectors, Meters, Logic Probes and Logic Pulsers, Outlet Tester and Chemicals, Disassembly Procedures.

UNIT II
Primary System Components : Types of Motherboards, ROM BIOS Compatibility. Bus Slots and I/O Cards. The Processor Bus, the Memory Bus and the Address Bus, Expansion Slots. Types of I/O Buses : The ISA Bus, EISA Bus, VESA Bus and PCI Bus. I/O port Addresses and DMA Channels. PC System Memory : Base Memory, Upper Memory Area, Extended Memory, Expanded Memory, Total Installed Memory Versus Total Usable Memory. Physical Memory and Testing Memory.

UNIT III

Floppy Disk Drives : Types of Floppy Drives, Handling Recording Problems, Analysis Floppy Disk Construction, Drive Installation Procedure Trouble Shooting and Correcting Problems, Repairing Floppy Drives. Hard Disk Drives : Hard disk Interfaces and Installation procedure Hard Disk Trouble Shooting and Repair.

UNIT IV

System Assembly and Maintenance : System upgrades – Upgrades system Memory,Speeding up a system, upgrading the DOS Version. Preventive Maintenance : Active and Passive Preventive Maintenance Procedure – Power – Protection Systems – Surge suppressions, Phone line surge protectors, Line conditioners, Backup Power, dedicated data backup hardware.

UNIT V

Software and Hardware Diagnostic Tools: The power On self test (POST), General purpose Diagnostic Programs – AMI Diag, Checkit Pro-Norton Diagnostics, Qaplus,Norton utilities, Anti-Virus Tools.
Operating System and Trouble Shooting : DOS Components, The Basic process, How DOS Loads and starts, File Management, DOS File spared allocation, The DEBUG Program, Memory Resident Software Conflicts.

TOTAL : 60 PERIODS

REFERENCE BOOK
1. Scott Mueller "Upgrading and Repairing PCs", 14th Edition, Pearson Education, New Delhi, 2002.
2. Govindaraju B. "IBM PC and Clones : Hardware, Trouble Shooting and Maintenance", 2nd Edition, Tata McGraw Hill Pub. Co., New Delhi, 2002