**KONGU ENGINEERING COLLEGE, PERUNDURAI, ERODE – 638 052**
**(An Autonomous Institution affiliated to Anna University Coimbatore)**

**M.Sc. DEGREE IN COMPUTER TECHNOLOGY (2 YEARS)**

**CURRICULUM**
(For the candidates admitted from academic year 2011 – 2012 onwards)

**SEMESTER – I**

| Course Code | Course Title | Hours / Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | ESE | Total |
| | **THEORY** | | | | | | | |
| 11PC101 | Theory of Computation | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC102 | Data Structures and Algorithms | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC103 | Object Oriented Programming | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC104 | Operating Systems | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC105 | Software Engineering | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC106 | Computer Architecture | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | | | | | | | | |
| | **PRACTICAL** | | | | | | | |
| 11PC107 | Data Structures and Algorithms Laboratory | 0 | 0 | 3 | 1 | 50 | 50 | 100 |
| 11PC108 | Object Oriented Programming Laboratory | 0 | 0 | 3 | 1 | 50 | 50 | 100 |
| | | | | **Total** | **20** | | | |

CA – Continuous Assessment, SE – End Semester Examination

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**CURRICULUM**
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**SEMESTER – II**

| Course Code | Course Title | Hours / Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | ESE | Total |
| | **THEORY** | | | | | | | |
| 11PC201 | Computer Networks | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC202 | Database Management Systems | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC203 | Open Source Systems | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC204 | Advanced Java Programming | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC205 | Object Oriented Analysis and Design | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | Elective – I | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | | | | | | | | |
| | **PRACTICAL** | | | | | | | |
| 11PC206 | RDBMS and Advanced Java Programming Laboratory | 0 | 0 | 3 | 1 | 50 | 50 | 100 |
| 11PC207 | Open Source Systems Laboratory | 0 | 0 | 3 | 1 | 50 | 50 | 100 |
| | Communication Skills Laboratory | 0 | 0 | 3 | -- | -- | -- | -- |
| | | | | **Total** | **20** | | | |

CA – Continuous Assessment, ESE – End Semester Examination

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**M.Sc. DEGREE IN COMPUTER TECHNOLOGY (2 YEARS)**

**CURRICULUM**
(For the candidates admitted from academic year 2011 – 2012 onwards)

**SEMESTER – III**

| Course Code | Course Title | Hours / Week | | | Credits | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | ESE | Total |
| | **THEORY** | | | | | | | |
| 11PC301 | .NET Programming | 3 | 1 | 0 | 3 | 50 | 50 | 100 |
| 11PC302 | Network Security | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC303 | Distributed Computing | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| 11PC304 | Unix Internals | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | Elective-II | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | Elective-III | 3 | 0 | 0 | 3 | 50 | 50 | 100 |
| | | | | | | | | |
| | **PRACTICAL** | | | | | | | |
| 11PC305 | .NET Programming Laboratory | 0 | 0 | 3 | 1 | 50 | 50 | 100 |
| 11PC306 | Unix Internals Laboratory | 0 | 0 | 3 | 1 | 50 | 50 | 100 |
| | | | | | **20** | | | |

CA – Continuous Assessment, ESE – End Semester Examination

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**M.Sc. DEGREE IN COMPUTER TECHNOLOGY (2 YEARS)**

**CURRICULUM**
(For the candidates admitted from academic year 2011 – 2012 onwards)

**SEMESTER – IV**

| Course Code | Course Title | Hours / Week | | | Credit | Maximum Marks | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | | CA | ESE | Total |
| | **PRACTICAL** | | | | | | | |
| 11PC401 | Dissertation and viva voce | 0 | 0 | 24 | 12 | 100 | 100 | 200 |
| | | | | **Total** | **12** | | | |

CA – Continuous Assessment, ESE – End Semester Examination

| LIST OF ELECTIVES | | | | | |
|---|---|---|---|---|---|
| **Course Code** | **Course Title** | **L** | **T** | **P** | **C** |
| 11PC011 | Enterprise Resource Planning | 3 | 0 | 0 | 3 |
| 11PC012 | Optimization Techniques | 3 | 0 | 0 | 3 |
| 11PC013 | Principles of Management | 3 | 0 | 0 | 3 |
| 11PC014 | E-Commerce | 3 | 0 | 0 | 3 |
| 11PC015 | Business Process Management | 3 | 0 | 0 | 3 |
| 11PC016 | Data Mining and Data Warehousing | 3 | 0 | 0 | 3 |
| 11PC017 | Computer Graphics and Multimedia Systems | 3 | 0 | 0 | 3 |
| 11PC018 | Knowledge Management | 3 | 0 | 0 | 3 |
| 11PC019 | Advanced Database Technology | 3 | 0 | 0 | 3 |
| 11PC020 | Information Storage and Management | 3 | 0 | 0 | 3 |
| 11PC021 | XML and Web Services | 3 | 0 | 0 | 3 |
| 11PC022 | Soft Computing | 3 | 0 | 0 | 3 |
| 11PC023 | Compiler Design | 3 | 0 | 0 | 3 |
| 11PC024 | Multicore Architecture & Programming | 3 | 0 | 0 | 3 |
| 11PC025 | Distributed Component Architecture | 3 | 0 | 0 | 3 |

## 11PC101 THEORY OF COMPUTATION

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- To teach the students how to construct correct mathematical arguments.
- To give an awareness of functions which transform a finite set into another finite set which relates to input and output functions.
- To have an understanding of finite state and pushdown automata.

**MODULE – I** **15**

**Logic:** Propositions – Connectives - Truth Table - Statement Formula - Tautologies and Contradictions - Equivalence of Formula - Tautological Implications - Normal Forms -Theory of Inference for Statement Calculus – Predicates - Statement Function-Quantifiers-Free and Bound Variables-Universe of Discourse-Inference Theory and Predicate Calculus.

**MODULE - II** **15**

**Set Theory & Functions:** Basic Concepts of Sets - Operations on Sets - Venn Diagram - Laws of Set Theory – Partition -Principle of Inclusion and Exclusion. Cartesian Product of Two Sets - Relations - Properties of Relations - Equivalence Relations - Relation Matrix and Graph of Relation - Functions - Types of Functions - Injective, Surjective and Bijective Functions – Inverse of Functions - Characteristic Function of a Set.

**MODULE- III** **15**

**Formal Languages and Automata Theory:** Four Classes of Grammars: Phrase Structure, Context Sensitive, Context Free, Regular – Rightmost, Leftmost Derivations – Unambiguity – Construction of Grammars for Languages – Derivation of Languages from Grammars - Definition of Deterministic Finite State Automata (DFA), Non-Deterministic Finite State Automata (NFA) – Equivalence of DFA And NFA – Equivalence of Regular Grammar and Finite Automata – Push Down Automata – Definition – Equivalence of acceptance by Final State and Empty Stack – Equivalence of PDA's and Context Free Languages.

**TOTAL : 45**

**REFERENCE BOOKS**


1 Hopcropt John.E., Motwani R, and Ullman Jeffrey D, "Introduction to Automata Theory Languages and Computation", Third Edition, Addison Wesley, 2006.

2 Tremblay J.P. and Manohar R., "Discrete Mathematical Structures with Applications to Computer Science", 33rd Reprint, Tata McGraw-Hill, New Delhi, 2008.

3 Rosen Kenneth. H, "Discrete Mathematics and its Applications", Tata McGraw Hill, New Delhi, 2006.

## 11PC102 DATA STRUCTURES AND ALGORITHMS

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- These courses explore fundamental data structures, algorithms for manipulating them and analyze and use lists, trees, and graphs.
- Apply common algorithm design techniques: divide-and-conquer, the greedy method and back tracking technique.

**MODULE – I - 15**

**Linear Data Structures and their Sequential storage representation** - Concepts and Terminology – Storage structures for arrays – Structures and arrays of structures – Stacks – Applications of stacks – Queues – Simulation – Priority Queues – Linear Data Structures and their Linked storage representation - Pointers and Linked allocation – Linked linear lists – Applications of linked linear lists – Non Linear Data Structures: Trees - Definitions and Concepts – Operations – Storage representation & Manipulation – Conversion – Other Representation - Applications.

**MODULE - II 15**

**Non Linear Data Structures and Sorting, Searching: Non Linear Data Structures**: Graphs and their representation – Matrix representation – List structures – Other Representations - Breadth First Search-Depth First Search-Spanning Tree - Applications Of Graph – Sorting: Notations And Concepts - Selection-Bubble - Merge-Tree-Partition-Exchange – Radix - Address Calculation - Searching – Sequential – Binary - Search Trees.

**MODULE - III 15**

**Algorithms and Design Techniques: Algorithms** - Introduction - Algorithm - Specification - Performance Analysis-Divide and Conquer-General Method - Binary Search-Finding the Maximum and Minimum-Merge sort-Quick Sort – Greedy Method - The General Method – Knapsack Problem-Tree vertex Splitting – Job Sequence with deadlines-Minimum cost Spanning trees-Optimal storage on tapes-Optimal Merge Patterns – Single source shortest paths - Backtracking- The General Method - The 8-Queens Problem - Sum of Subsets - Graph Coloring - Hamiltonian Cycles

**TOTAL : 45**

**REFERENCE BOOKS**


1 Tremblay Jean-Paul, and Sorenson Paul G., ”An Introduction To Data Structures With Applications”, Second Edition, Tata McGraw-Hill Edition, New Delhi, 2007.

2 Horowitz, Ellis., Sahni, Sartaj and Rajasekaran, Sanguthevar., “Computer Algorithms”, Second Edition, Galgotia Publications, New Delhi, 2007.

## 11PC103 OBJECT ORIENTED PROGRAMMING

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- Gain a strong foundation in Object Oriented Programming Concepts.
- Students are able to implement any Software using OOP concepts.

**MODULE – I** **15**

**Introduction To C++ and Operator Overloading:** Introduction – Structured Programming Vs Object Oriented Programming – Basic Concepts of OOP. C++ Programming Basics – Loops and Decisions – Structures – Functions – Preprocessor. Objects and Classes – Constructors – Arrays and Strings – Operator Overloading – Overloading Unary and Binary Operators for Friend and Member functions – Data Conversion – Operator Overloading and Conversion

**MODULE - II** **15**

**Inheritance, Pointer and Virtual Function:** Inheritance – Types of Inheritance – Access Specifiers - Pointers – Pointer and Address – Pointer and Arrays – Pointer and Functions – Pointer and Strings – Memory Management – Pointer to Objects – Example – Pointer to Pointer – Virtual Functions – Polymorphism – Friend Functions – Static Functions – this Pointer – Dynamic Type Information.

**MODULE - III** **15**

**Streams, I/O, Templates, Exception and STL:** Stream Classes – Stream Error – File I/O with Streams - File Pointer – Error Handling in File I/O – File I/O with Member Functions – Overloading the Extraction and Insertion Operator – Multiple Programs. Template – Function Templates – Class Templates – Exceptions in C++ - Introduction to STL – Algorithms – Sequential Containers – Iterators – Runtime Type ID and the Casting Operator – Name Space and Conversion Functions.

**TOTAL : 45**

**REFERENCE BOOKS**


1 Lafore Robert, "Object Oriented Programming in C++", Fourth Edition, Galgotia Publications Pvt. Ltd. New Delhi, 2009.

2 Balagurusamy E., "Object Oriented Programming with C++", Second Edition, Tata McGraw Hill Publications, New Delhi, 2005.

3 Schildt Herbert, "C++: The Complete Reference", Fourth Edition, Tata McGraw-Hill Publications, New Delhi, 2007.

## 11PC104 OPERATING SYSTEMS

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- To learn the basic concepts, various scheduling algorithms, memory management techniques, disk structure and management.

**MODULE – I** **15**

**Introduction and Process Management:** Operating-System Services- User Operating-System Interface.- System Calls - Types of System Calls - System Programs - Operating System Design and implementation - Operating - System Structure - Virtual Machines – Process Concept- Process Scheduling - Operations on Processes - Interprocess Communication - Threads – Overview - Multithreading Models - Thread Libraries and Threading Issues - CPU Scheduling.

**MODULE-II** **15**

**Process Synchronization and Storage Management:** Process Synchronization – Background - The Critical-Section Problem - Peterson's Solution - Synchronization Hardware - Semaphores - Classic Problems of Synchronization – Monitors - Synchronization Examples - Atomic Transactions Deadlocks - System Model - Deadlock Characterization - Methods for Handling Deadlocks - Deadlock Prevention - Deadlock Avoidance - Deadlock Detection - Recovery from Deadlock - Main Memory – Background – Swapping - Contiguous Memory Allocation- Paging - Structure of the Page Table – Segmentation - Virtual Memory – Background - Demand Paging – Copy–on-Write - Page Replacement - Allocation of Frames – Thrashing - Memory-Mapped Files - Allocating Kernel Memory.

**MODULE- III** **15**

**File Management and I/O Systems:** File-System Interface - File Concept - Access Methods - Directory and Disk Structure - File-System Mounting - File-System Implementation - File-System Structure - Directory Implementation - Allocation Methods - Free-Space Management - Storage Structure - Overview of Mass - Storage Structure - Disk Structure - Disk Attachment - Disk Scheduling - Disk Management - Swap-Space Management - RAID Structure - I/O Systems – Overview - I/O Hardware Application - I/O Interface-Kernel I/O Subsystem - Case Study - LINUX System - Windows XP.

**TOTAL : 45**

**REFERENCE BOOKS**


1 Silberschatz, Abraham, Baergalvin, Peter And Gagne, Greg., "Operating System Concepts", Eighth edition, John Wiley And Sons, 2010.
2 Deitel, H.M., "Operating Systems", Second Edition, Pearson Education, New Delhi, 2002.
3 Sinha, Pradeep K., "Distributed Operating Systems, Concepts and Design", Prentice Hall of India, New Delhi, 2001.

## 11PC105 SOFTWARE ENGINEERING

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- To understand the concepts of software engineering processes and process management.
- To learn the aspects of Requirements analysis and software planning.
- To develop the students the ability of Designing and coding processes of software development.
- To learn the various testing methods and measuring the implementation.

**MODULE – I** **15**

**Introduction and Requirements Analysis and Design:** Introduction - A Generic view of Process - Process Models - An Agile View of Process - Software Requirements Analysis and Specification - Design: Function Oriented design - Detailed Design.

**MODULE - II** **15**

**Testing and Project Management:** Testing Strategies: Basics of testing, Test cases and Test Log - Unit Testing - Integration Testing - Regression Testing -Testing Tactics: Black-Box and White-box Testing - Object-Oriented testing - Project Management - Estimation - Project Scheduling - Risk Management.

**MODULE - III** **15**

**Quality Assurance and Reengineering:** Quality Management - Change Management - Clean room Software Engineering - Component Based Development - Reengineering - Reverse Engineering - Restructuring - Forward Engineering.

**TOTAL : 45**

**REFERENCE BOOKS**


1 Pressman, Roger.S., "Software Engineering", Tata McGraw-Hill, New Delhi, Sixth Edition,2005.

2 Jalote, Pankaj., "An Integrated Approach to Software Engineering", Narosa Publishing House, Delhi, 2000.(MODULE I)

## 11PC106 COMPUTER ARCHITECTURE

**3 0 0 3**

**Objective :**

- The purpose of this course is to provide a solid foundation in architecture of general purpose computers.
- It gives concrete idea of memory systems.
- The course introduces various I/O and, cache organizations.

**MODULE – I** **15**

**Basic Structure of Computers:** Functional Units – Basic operational concepts - Bus Structures – Software – Performance – Multiprocessor and Multicomputer – Machine Instructions and programs: Numbers, Arithmetic operations and characters – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly Language - Basic I/O operations – Stacks and Queues – Subroutines Additional Instructions – Encoding of Machine instructions.

**MODULE -II** **15**

**Arithmetic and Basic Processing Unit and Pipelining:** Arithmetic: Addition and subtraction of signed numbers – Design of Fast adders – Multiplication of positive numbers – Signed–operand multiplication: Booth Algorithm – Fast Multiplication: Bit-Pair Recoding of Multipliers – Carry-save Addition of summands – Integer Division – Floating –Point numbers and operations - Basic Processing unit: Fundamental Concepts – Execution of complete instructions – Multiple Bus organization – Hardwired control – Micro programmed control – Pipelining: Basic Concepts – Data Hazards – Instruction Hazards – Influence on Instruction sets – Data path and Control Considerations – Performance considerations.

**MODULE- III** **15**

**The Memory System and I/O Organization:** The Memory System: Basic Concepts – Semiconductor RAM Memories – Read-Only Memories: ROM – PROM – EPROM – EEPROM – Flash memory – Speed, Size, and Cost – Cache Memories – Performance considerations – Virtual Memories –Memory management requirements – Secondary storage: Magnetic Hard Disks – Optical Disks – Magnetic Tape systems - I/O Organization: Accessing I/O Devices – Interrupts: Interrupt Hardware – Enabling and Disabling Interrupts – Handling Multiple Devices – Controlling Device Requests – Exceptions – Use of Interrupt in Operating Systems – Direct Memory Access – Buses: Synchronous Bus – Asynchronous – Interface Circuits – Standard I/O Interfaces: Peripheral Component Interconnect (PCI) Bus – SCSI Bus – Universal Serial Bus (USB).

**TOTAL : 45**

**REFERENCE BOOKS**


1. Hamacher Carl, Zvonko Vranesic and Zaky Safwat, “Computer Organization”, Fifth Edition, McGraw – Hill, New York, 2002.
2. Stallings. Williams, “Computer Organization and Architecture – Designing for Performance”, Sixth Edition, Pearson Education, New Delhi, 2008.


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## 11PC107 DATA STRUCTURES AND ALGORITHMS LABORATORY

(Common to M.Sc Computer Technology and Information Technology)

**0 0 3 1**

**Objective :**

- To learn about the basic data structures and algorithms to implement the various design techniques.

**LIST OF EXPERIMENTS**

1. Stack operations.
2. Queue operations.
3. Application of stacks and queues.
4. Linked list operations
5. Operations on Binary tree traversals.
6. Breadth first search.
7 Depth first search.
8. Quick sort using divide and conquer techniques.
9. Merge sort using divide and conquer techniques
10. Finding maximum and minimum using divide and conquer techniques
11. Knapsack problem using greedy method.
12. Minimum cost spanning tree using greedy method.
13. Shortest path algorithm.
14. Sorting technique.
15. Searching techniques.

**REFERENCES / MANUALS/SOFTWARE:**

1 G.A.V.Pai, "Data Structures and Algorithms - Concepts, Techniques and Applications", Tata McGraw Hill Edition, New Delhi 2009

2 www.mhhe.com

## 11PC108 OBJECT ORIENTED PROGRAMMING LABORATORY

(Common to M.Sc Computer Technology and Information Technology)

**0 0 3 1**

**Objective:**

- To enable the student to develop software using Object Oriented Concepts using C++

**LIST OF EXPERIMENTS**

1. Create a class to find the area of square, rectangle and triangle by using the concept of function overloading i.e. the same function name area is used to calculate the areas of shapes according to type and size of parameters you passed.
2. Write a function to read a matrix of size m * n from the user and find sum of the first diagonal of the matrix and display it on the screen.
3. Write a program to find the sum of two complex numbers using the concept of operator overloading
4. Write a program to find the multiplication of two matrices using the concept of operator overloading.
5. Define a class String. Use overloaded = = operator to compare two string
6. Create a class float that contains one float data member. Overload all the four arithmetic operators so that they operate on the object of float
7. Write a program which having 3 classes student, test and result, student class having method to accept enrollment number, test class accept student marks in 3 subjects which is inherited by class student and result class having methods to find sum of marks and displays, which is inherited by class test. Now by using the object of result class call the methods from other classes.
8. Write a program in C++ in which the both base and derived class use the same function name and the object of the base class as well as the derived class will be associated to the function during run time (use the virtual function concept to solve the problem)
9. Create an abstract class, which contains one method, which will be derived by the two classes and the function in the abstract class over rides from these derived classes (use the pure virtual function concept)
10. Create a swap function template the will swap two values of any data type
11. Write a C++ program to create a template function for Quick Sort and demonstrate sorting of integers and doubles
12. With the use of vector class template for performing the scalar product of int type
13. Write a program that copies the contents of a character file to another file invoke the program with two command line arguments .The source file and destination file.
14. Create a student class, which reads and display the roll number, name and marks in 3 subjects of students. Store the details in student data file
15. Modify the above problem to read the data from data file and display the total marks, average and grade (i.e. average<50 fail otherwise pass) on the screen

**REFERENCES / MANUALS/SOFTWARE:**


1. Robert Lafore, “Object Oriented Programming in C++”, Third Edition, Galgotia Publications Pvt. Ltd. 2003
2. www.cplusplus.com
3. www.intap.net/~drw/cpp
4. www.learncpp.com

## 11PC201 COMPUTER NETWORKS

**3 0 0 3**

**Objective :**

- To study the network architecture and the tasks of each layer in detail
- To understand the various routing techniques and algorithms
- To study how the data is presented and formatted
- To understand various applications of networks.

**MODULE – I** **15**

**Network Essentials and Switching:** Applications-Requirements-Network Architecture-Implementing Network Software-Performance-Hardware Building Blocks-Encoding-Framing-PPP-HDLC-SONET-Error Detection-Reliable Transmission-Ethernet-Rings-Wireless. Switching and Forwarding-Bridges and LAN Switches-Cell Switching ATM - Implementation and Performance.

**MODULE - II** **15**

**Routing and End-to-End protocols:** Simple Networking-Routing-Global Internet-Simple Demultiplexer UDP- Reliable Byte Stream TCP-Remote Procedure Call-Transport for Real-time Applications-Performance-Issues in Resource Allocation-Queuing Disciplines- TCP Congestion Control- Congestion Avoidance Mechanism-QOS.

**MODULE-III** **15**

**Presentation Formatting and Applications:** Presentation and Formatting –Data Compression - Traditional Applications- SMTP, MIME, IMAP-WWW-DNS-Network Management –Web Services-Custom Application Protocol-Generic Application Protocol-REST-Multimedia Applications-Session Control and Call Control-Resource Allocation For Multimedia Applications-Overlay Networks

**TOTAL : 45**

**REFERENCE BOOKS**


1. Davie, Bruce S. and Peterson, Larry L., “Computer Networks”, Fourth Edition, Harcourt Asia Pvt. Ltd, Singapore, 2007.
2. Forouzan, Behrouz A, “Data Communications and Networking”, Fourth Edition, Tata Mcgraw-Hill, New Delhi, 2007.

## 11PC202 DATABASE MANAGEMENT SYSTEMS

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- To understand the basic principles of database management systems
- To gain knowledge about various database models, Query Languages, and concurrency control techniques.

**MODULE – I** **15**

**Introduction:** Database System Applications- purpose - View of Data - Data Models- Database - Transaction Management - Database Architecture- Relational Model: Structure of Relational Databases-Relational Algebra operations- SQL – Data Definition – Basic Queries – Complex Queries.

**MODULE - II** **15**

**Relational-Database Design:** Advanced SQL - Embedded SQL-Dynamic SQL - Domain Constraints - Referential Integrity – Assertions – Triggers - Security and Authorization – Database Design: ER model – Relational Database Design: Features of good Relational designs - 1NF-Functional Dependencies-Decomposition using Functional Dependencies Boyce-Codd Normal Form-3NF-4NF-More Normal Forms- Database Design Process.

**MODULE -III** **15**

**Transaction and Concurrency Control:** Storage and File structures - RAID-Tertiary Storage-Storage Access-File Organization-Organization of Records -Data Dictionary Storage -Indexing and Hashing: Ordered Indices-Static Hashing-Dynamic Hashing-Comparison of Ordered Indexing and Hashing- Transaction management: Transaction concept, States - Concurrent Executions - Serializability – Recoverability - Testing for Serializability - Concurrency Control: Lock-Based Protocols - Timestamp - Based Protocols - Validation Based Protocols -Multiple Granularity-Multiversion Schemes - Deadlock Handling – Recovery System: Log based Recovery – recovery with concurrent Transactions – Buffer Management.

**TOTAL : 45**

**REFERENCE BOOKS**


1 Silberschatz, Abraham, Korth, Henry F., S.Sudarshan, “Database System Concepts”, Fifth Edition, Mc Graw Hill, 2006.

2 Ramez Elmasri, Shamkanth B.Navathe, “Fundamentals of Database Systems,” Fifth Edition, Pearson Education, 2008

## 11PC203 OPEN SOURCE SYSTEMS

**3 0 0 3**

**Objective:**

- Students can learn about the architecture of Linux
- Acquire knowledge on design a web application using PHP.
- Enable the students to know about MySQL.

**MODULE – I** **15**

**Introduction To Linux And Linux File Structure**: Introduction to Linux: Linux distribution, Operating Systems and Linux, History of Linux and Unix, Linux Overview, Open Source Software, Linux Software – Getting Started: Installing Issues, Accessing your Linux system, The GNOME and KDE Desktops, Desktop Operations, Help Resources, Software Repositories, Windows Access and Applications – The Shell – The Shell Scripts and Programming – Shell Configuration – Linux Files, Directories and Archives – The X Window System, Xorg and Display Managers – GNOME - KDE

**MODULE – II** **15**

**PHP Programming**: Introduction – Operators and Expressions – Control Statements – Functions – Arrays – Classes and Objects – I/O and Disk Access – Browser I/O – Operating System – Network I/O – Date – Encoding and Decoding – Math – Date – Database: DBM-style database abstraction, DBX, LDAP, MySQL, ODBC, Oracle, Postgres, Sybase and Microsoft SQL Server.

**MODULE – III** **15**

**MySQL:** Introduction to MySQL – Installing MySQL – Getting stated with Database Design – Getting Hands-On with MySQL – MySQL data types – Manipulating Database – Inserting and Updating Data – Querying Data – Joins and Indexes – Operators and Functions in MySQL – Using PHP – Using the Perl DB – Using the C API Security.

**TOTAL : 45**

**REFERENCE BOOKS**


1 Richard Petersen, “Linux: The Complete Reference”, Tata McGraw Hill, New Delhi, Sixth Edition, 2008. (MODULE - I)

2 Leon Atkinson, Zeev Suraksi, “Core PHP Programming”, Pearson Education, Third Edition , New Delhi, 2004. (MODULE – II)

3 Anthony Butcher, “MySQL”, Pearson Education, New Delhi, 2004. (MODULE – III)

## 11PC204 ADVANCED JAVA PROGRAMMING

**3 0 0 3**

**Objective:**

- Gain a strong foundation in GUI design using Swing Components.
- Learn how to implement database programs using the JDBC technique.
  Enable the students to apply Servlet program to develop a dynamic web pages.

**MODULE – I** **15**

**Core Java**: Java Features - Java Environment – Java Program structure - Java Virtual Machine - Classes and Objects – Constructors – Methods – Final Classes – Abstract Class – Visibility control – Arrays – Strings and its methods – Vectors – Wrapper Classes – Inheritance – Packages – Multithreading and Exception.

**MODULE- II** **15**

**Streams and Swing**: Simple file I/O – Stream input and output classes for byte manipulation - Stream input and output classes for character manipulation – Object streams for serialization. Swing Components - Event handling: Event driven programming – Event delegation models – Event types – Adjustment types.

**MODULE-III** **15**

**Network Programming, Servlets and Database Connectivity**: Basic Network concepts – Basic web concepts – Looking up Internet Addressing – Retrieving data with URL's – Sockets for Clients – Sockets for Servers – UDP datagram and Sockets – Multicast Socket – The URL Connection class. Introduction – HTTP Servlet Basics – Web Application, Support of Servlet, Power of Servlet – The Servlet Life Cycle – Retrieving Information – Sending HTML Information – Session Tracking – Security. Database Connectivity – Rational Database – API, Database Objects, Transaction, JDBC.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Naughton. Patrick, and Schildt Herbert, "Java 2: The Complete Reference", Third Edition, Tata McGraw-Hill, 2007. (MODULE I & MODULE II)
2. Zukowski. John, "Mastering Java 2", BPB Publications, New Delhi, 2000.(MODULE II)
3. Harold, Elliotte Rusty, "Java Network Programming", Second Edition, Shroff publishers and Distributors, New Delhi, 2004. (MODULE III)
4. Hunter. Jason and Crawford William, "Java Servlet Programming", Second Edition, Shroff publishers and Distributors, New Delhi, 2004. (MODULE III)

## 11PC205 OBJECT ORIENTED ANALYSIS AND DESIGN

**3 0 0 3**

**Objective :**

- To enable the students to learn the basic functions, principles and concepts of object oriented analysis and design
- To understand the object oriented system development and different views.
- To learn drawing UML diagrams, UML Class diagrams and Use Case diagrams.

**MODULE – I** **15**

**Introduction and Object Modeling Techniques**: Object Basics: Object Oriented Philosophy – Objects – Object Grouped in Classes – Attributes – Object Behaviors and Methods – Object Respond to Messages - Encapsulation and Information Hiding - Class Hierarchy – Polymorphism - Object Relationship and Associations - Aggregation and Object Containment - Advanced Topics. Object-Oriented Systems Development Life Cycle: Software Development Process – Building High-Quality Software – OOSD: Use-Case Driven Approach – Reusability. Object Oriented Methodologies: Introduction – Survey - Rumbaugh Object Modeling Technique - Booch Methodology - Jacobson Methodology – Patterns - Frameworks - Unified Approach.

**MODULE - II** **15**

**Unified Modeling Language and Object-Oriented Analysis Process**: Unified Modeling Language: Static and Dynamic Models – Modeling – Introduction to UML – UML Diagrams – UML Class Diagram – Use-Case Diagram – UML Dynamic Modeling – Model Management – UML Extensibility – UML Meta-Model. Object Analysis Process: Business Object Analysis – Use-Case Driven Object-Oriented Analysis – Business Processing Modeling – Use-Case Model – Developing Effective Documentation – Case Study: ViaNet Bank ATM. Object Analysis: Classification: Classification Theory – Approaches for Identifying Classes - Noun Phrase Approach - Common Class Pattern Approach – Classes, Responsibilities and Collaborators.

**MODULE- III** **15**

**Object Oriented Analysis & Design and Design Axioms**: Identifying Object Relationships, Attributes and Methods: Associations – Super-Sub Class Relationships – Aggregation – Class Responsibilities and Defining Attributes & Methods. Object-Oriented Design Process and Design Axioms: Object Oriented Design Process – Object Oriented Design Axioms - Corollaries – Design patterns. Designing Classes: OOD Philosophy – UML- OCL – Designing Classes – Class Visibility - Refining Attributes - Refining Attributes for the ViaNet Bank Objects - Designing Methods and Protocols - Defining Attributes for the ViaNet Bank Objects - Packages and Managing Classes.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Bahrami, Ali. “Object Oriented Systems Development”, Tata McGraw-Hill, New Delhi, 2008.
2. Booch. Grady, “Object Oriented Analysis and Design with Applications”, Second Edition, Pearson Education Asia, Singapore, 2002.

## 11PC206 RDBMS AND ADVANCED JAVA PROGRAMMING LABORATORY

**0 0 3 1**

**OBJECTIVE:**

- To make the student to familiarize in writing database queries, network programming, Internet Protocols and web development concepts using JSP.

**LIST OF EXPERIMENTS**

1. DML and DCL Commands
2. PL/SQL Cursor, Triggers, Procedures and Functions
3. Programs on class and object, String and StringBuffer class methods.
4. Programs on Interface and Package.
5. Programs on Thread.
6. Programs on Streams.
7. Programs on serialization and StreamTokenizer.
8. Write programs in Java to do the following features:
   Set the URL of another server. Download the homepage of the server. Display the contents of home page with date, content type and expiry date. Last modified and length of home page.
9. Write programs in Java using sockets to implement the following :
   HTTP request , FTP, SMTP, POP3
10. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
11. Program to connect Ms Access with java using JDBC.
12. Write programs in Java using Servlets:
    To invoke servlets from HTML forms. To invoke servlets from Applets
13. Write programs in Java to create three tier applications using servlets:
    For conducting on-line examination. For displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
14. Program for invoking JSP page
15. Develop a code for JDBC with JSP

**REFERENCES / MANUALS/SOFTWARE:**


1. Harold Elliotte Rusty, "Java Network Programming", Second Edition, Shroff publishers and Distributors Pvt Ltd, 2004.
2. Hunter Jason, and Crawford William, "Java Servlet Programming", Second Edition, Shroff publishers and Distributors Pvt Ltd, Mumbai, 2004.
3. www.java.sun.com
4. www.javapassion.com

## 11PC207 OPEN SOURCE SYSTEMS LABORATORY

**0 0 3 1**

**OBJECTIVE:**

- To make the student to familiarize in Linux
- To learn about scripting in PHP
- To have exposure to web programming using PHP
- To Know the application of MySQL.

**LIST OF EXPERIMENTS**

1. Basic shell commands in linux.
2. Write a program in PHP with the use of control, looping structures.
3. Programs for writing PHP functions.
4. Write a program to do the file operations.
5. Generate an advertisement using PHP.
6. Develop a script in PHP to accept the input from client.
7. Develop a program to validate the input form.
8. Create a web page to accept the bio data.
9. Basic commands of MySQL such as creating a database, Table and queries for Insertion, deletion and update record to a database.
10. Simple SQL queries using PHP.
11. Create a web page to automate the library management system.
12. Design a code to publish the result of a student.
13. Create a web page to automate the process of a sales and Marketing system.
14. Write a program to create a Cookies using PHP.
15. Create a mail server in PHP and enable to send the message from the client machine.

**REFERENCES / MANUALS/SOFTWARE:**


1. Luke Welling, Laura Thomson, "PHP and MySQL Web Development" Pearson education – 2003.
2. www.amazon.com/PHP-MySQL-Development
3. www.sourcecode.com
4. www.linux.ie/newusers/beginners-linux

## 11PC301 .NET PROGRAMMING

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective:**

- Students can get the strong foundation in .NET framework.
- Understanding C#
- Students can learn how to design a dynamic web page using ASP.NET.
- Acquire advanced web page designing techniques that are used in professional applications.

**MODULE – I** **15**

**.NET Overview and Introduction to C#:** The origin of .Net – The .Net framework overview - .Net framework base classes, user and program interfaces, XML as the .Net meta-language. Introduction to CLR – the anatomy of .Net Applications, Common type system, metadata managed data, IL Disassembler. An introduction to C# - C# and MS .Net, data types in C#, control flow, C# classes, advanced C# features

**MODULE - II** **15**

**. NET Class Framework and Introduction to ASP.NET**: Inside the .Net class framework, ASP.NET, new version of ASP, difference of ASP and ASP.net, Features of ASP. Net – ASP.Net pages, Programming with code-behind, ASP.Net web services, ASP.Net web services, ASP.Net configuration, ASP.Net Application and session state, ADO.Net, Caching, Error handling and debugging Techniques, security, creating own custom controls.

**MODULE - III** **15**

**Building .NET Components and ADO.NET:** Web Services – Started with web services, developing a weather information web service, designing web services, Windows forms Assemblies – writing business objects – cross-language inheritance, working with unmanaged code. ADO.NET object model, ADO.Net capabilities, ASP.Net Case study.

**TOTAL : 45**

**REFERENCE BOOKS**


1 James Konard, Patrick Dengler, Brain Francis “Introducing .NET”, Shroff publishers & Distributors Pvt. Ltd., Mumbai 2008.

2 Duthie G Andrew, “Microsoft ASP.NET Programming With Microsoft Visual C#.Net”, Prentice Hall of India Pvt Ltd , New Delhi 2004

## 11PC302 NETWORK SECURITY

**3 0 0 3**

**Objective :**

- This course presents an idea on different threats and security issues
- To enable the students to familiar about authentication applications, web security, intruders and viruses.

**MODULE – I** **15**

**Introduction:** Attacks – Services – Mechanisms – OSI Security Architecture – Model for network security – symmetric cipher model – substitution and transposition techniques – Rotor machines – Steganography – Block cipher principles – DES – Strengths - Cryptanalysis – Block Cipher design principles- Advanced Encryption Standard.

**MODULE - II** **15**

**Public Key Encryption:** Principles of public key crypto systems - RSA algorithm - Key management - Diffie Hellman key Exchange-Elliptic curve arithmetic, cryptography. Authentication Requirements - functions – Message Authentication code (MAC) – Hash functions – security of hash functions and MAC – MD5 message digest – Secure Hash Algorithms – HMAC – Digital Signatures – Authentication protocols -Digital signature standards.

**MODULE- III** **15**

**Network Security Practice:** Kerberos – X.509 Authentication Service – Public key Infrastructure-Pretty Good Privacy – S/MIME – IP security: overview and architecture – authentication header – ESP – security associations – key management. Intruders – Intrusion detection – password management –Malicious software- viruses – related threats –virus counter measures – Firewalls-firewall design principles – Trusted systems.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Stallings, William, "Cryptography and Network Security: Principles and Practice", Fourth Edition, Prentice Hall of India, New Delhi, 2006.
2. Kaufman Charlie, Perlman, Radia and Speciner, Mike., "Network Security", Second Edition, Pearson Education, New Delhi, 2008.

## 11PC303 DISTRIBUTED COMPUTING

**3 0 0 3**

**Objective:**

- Enable to learn about distributed environment
- To Manage resources in distributed systems
- To create distributed applications

**MODULE – I** **15**

**Communication in Distributed Environment & Distributed Operating Systems:** Introduction – Various Paradigms in Distributed Applications – Remote Procedure Call – Remote Object Invocation – Message-Oriented Communication – Unicasting, Multicasting and Broadcasting – Group Communication. Issues in Distributed Operating System – Threads in Distributed Systems – Clock Synchronization – Causal Ordering – Global States – Election Algorithms –Distributed Mutual Exclusion – Distributed Transactions – Distributed Deadlock – Agreement Protocols .

**MODULE - II** **15**

**Distributed Resource Management:** Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models – Ivy – Munin – Distributed Scheduling – Distributed File Systems – Sun NFS.

**MODULE-III** **15**

**Fault Tolerance And Consensus & Case Studies:** Introduction to Fault Tolerance – Distributed Commit Protocols – Byzantine Fault Tolerance – Impossibilities in Fault Tolerance. Distributed Object-Based System – CORBA – COM+ – Distributed Coordination-Based System – JINI.

**TOTAL : 45**

**REFERENCE BOOKS**


1. George Coulouris, Jean Dollimore, Tim Kindberg, “Distributed Systems Concepts and Design”, Third Edition, Pearson Education Asia, 2008.
2. Mukesh Singhal, “Advanced Concepts In Operating Systems”, McGraw Hill Series in Computer Science, 2004.

## 11PC304 UNIX INTERNALS

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- To understand the internal representation of Unix System
- To understand the process communication
- To understand sockets

**MODULE – I** **15**

**Overview of The System and Internal Representation of Files:** System Structure – User Perspective – Operating System Services – Assumption About Hardware. Introduction to the Kernel: Architecture of the Unix Operating System – Kernel Data Structures – System Administration. The Buffer Cache: Buffer Headers – Structure of the Buffer Pool – Scenarios for Retrieval of A Buffer – Reading and Writing Disk Blocks – Advantage and Disadvantage of the Buffer Cache. Inodes – Structure of a Regular File – Directories – Conversion of a Path Name to an Inode – Super Block – Inode Assignment to a New File – Allocation of Disk Blocks.

**MODULE– II** **15**

**System Calls and The Process:** System Calls For The File System - The Structure Of Process: – Process States And Transitions – Layout of System Memory – The Context of a Process – Saving the Context of a Process – Manipulation of the Process Address Space – Sleep. Process Control: Process Creation – Signals - Process Termination – Awaiting Process Termination – Invoking Other Programs – The User ID of the Process – The Shell – System Boot and INIT Process.

**MODULE– III** **15**

**Memory Management and Interprocess Communication:** Swapping – Demand Paging – A Hybrid System With Swapping and Demand Paging. The I/O Subsystems: Driver Interfaces – Disk Drivers – Terminal Drivers – Streams. Process Tracing – System V IPC – Network Communications – Sockets. Multiprocessor Systems: Problem – Solution With Master And Slave Processors – Solution with Semaphores. Distributed Unix Systems: Satellite Processors – The New Castle Connection – Transparent Distributed File Systems – A Transparent Distributed Model Without Stub Processes

**TOTAL : 45**

**REFERENCE BOOKS**


1. Bach Maurice J., “The Design of the Unix Operating System”, Prentice Hall of India, New Delhi, 2010.
2. Vahalia, Uresh, “Unix Internals: New Frontiers”, Pearson Education, New Delhi, 2006.

## 11PC305 .NET PROGRAMMING LABORATORY

(Common to M.Sc Computer Technology and Information Technology)

**0 0 3 1**

**Objective:**

- Students can get the strong foundation in .NET framework.
- Students can learn how to design a dynamic web page using ASP.NET.
- Acquire advanced web page designing techniques that are used in professional applications.

**LAB EXPERIMENTS**

1. Program using control structures
2. Functions and subroutines
3. Program using ASP.Net classes
4. ASP. Net program for creating simple page applet
5. Program using HTML control classes
6. ASP.Net program for illustrating web controls classes and web control events
7. Creating web forms using visual studio.Net
8. Designing web form using rich controls and writing code for validating the form
9. Program for exceptions
10. Create a simple application for connecting database using ADO.Net

**REFERENCE BOOKS**


1 MacDonald, Matthew, "ASP.NET: Complete Reference", Tata McGraw-Hill, New Delhi, 2005.

2 Homer, Alex , "ASP .Net 1.1: Insider Solutions", New Delhi: Pearson Education Inc, 2004.

## 11PC306 UNIX INTERNALS LABORATORY

(Common to M.Sc Computer Technology and Information Technology)

**0 0 3 1**

**Objective:**

- To familiarize with Unix Commands
- To Understand the implementation of CPU scheduling
- To Understand and write shell scripts in UNIX

**LIST OF EXPERIMENTS /EXERCISES**

1. Basic UNIX Commands
2. Shell program using redirecting standard I/O
3. Shell programming – Device Driver
4. Program for parallel execution
5. Program using control structure
6. Program using passing parameters
7. Program for pattern matching
8. Implementation of CPU Scheduling – FCFS
9. Implementation of CPU Scheduling – SJF
10. .Implementation of CPU Scheduling – RR
11. Implement Best fit, First Fit & Worst-fit Algorithm for Memory Management
12. Implement Inter Process Communication Problem (Producer-Consumer / Reader- Writer Problem ) Using Semaphores
13. Producer Consumer Problem using Shared Buffer
14. Implement FIFO page Replacement Algorithm
15. Implement LRU page Replacement Algorithm

**REFERENCES / MANUALS/SOFTWARE:**

1. Stephen G. Kochen, Patrich Wood, "Unix Shell programming " Third Edition Sams Publishing 2003
2. www.dreamsoft.com

## 11PC011 ENTERPRISE RESOURCE PLANNING

**3 0 0 3**

**Objective:**

- This course presents the introduction to ERP, ERP and related technologies, ERP Market, Vendors.
- To enable the students to aware of some popular products in the area of ERP and to learn the current and future trends in ERP.

**MODULE – I** **15**

**ERP and Management:** Introduction to ERP - Integrated Management Information – Seamless Integration – Supply Chain Management – Resource Management – Integrated data model- Benefits of ERP – Business Engineering and ERP – Definition of Business Engineering – Significance of Business Engineering – Principles of Business Engineering - Business Engineering with Information Technology- Business modeling for ERP: Building the Business model - ERP implementation - An overview - role of customers, vendors and users - Customization - Precautions - ERP post implementation options - ERP implementation Technology - Guidelines for ERP implementation.

**MODULE - II** **15**

**ERP Applications and Case Studies:** Enterprise resource planning and Competitive Advantage - Overview-ERP Domain – MPG/PRO – IFS/ Avalon – Industrial and financial systems – Baan IV -SAP – Market dynamic and Competitive strategy. Case Studies: Mercedes-Benz-Kee Hin Industries-Twentieth century Companies-Indian Renewable Energy Development Companies(IREDA)-Iron and Steel company-Soaps and associate companies-Bull Electronics Angers Plant manufacturers.

**MODULE-III** **15**

**SAP Foundation and Design:** Building your Foundation for Support: Learning about Support: What does support mean? –The support model-Different kinds of support-Elements of Exceptional support-Understanding Integration within SAP – Integrating the Support Organization – Establishing an Overall Support Strategy-Elements of success-Communicating with the Customers-Various work Environment-Supporting the SAP Life Cycle: Supporting the Evaluation and Start-up Phase – Supporting the Design Phase – Supporting the Development Phase – Supporting the Testing and Training Phase – Supporting the Implementation.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Vinod Kumar Garg, and Venkita Krishnan, N.K., "Enterprise Resources Planning: Concepts and Practice", Prentice Hall of India, New Delhi, 2004.
2. Prince, Dennis L. Prince, "Supporting SAP R/3", Galgotia Publications Pvt. Ltd, New Delhi, 2003.
3. Leon, Alexis., "Enterprise Resource Planning", Tata McGraw Hill, New Delhi, 2007.

## 11PC012 OPTIMIZATION TECHNIQUES

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- To develop problem modeling and solving stills and to make intelligent decisions from the point of view of optimization.

**MODULE – I** **15**

**Linear Programming and Transportation Problem:** Mathematical Formulation of Linear Programming Problem – Graphical Solution – Simplex Method – Artificial Variable Technique – Big M Method – Two Phase Method – Simple Problems. Transportation Model – Initial Basic Feasible Solution – North West Corner Rule – Least Cost Method – Vogel's Approximation Method – MODI Method- Variants of Transportation Problem – Simple Problems.

**MODULE - II** **15**

**Assignment Problem and Network Models:** Assignment Model – Hungarian Algorithm – Unbalanced Assignment Problem- Maximization Assignment Problem- Impossible Assignment - Simple Problems. Shortest Route Problem –Dijkstra's Algorithm – Floyd's Algorithm-Network Construction - Critical Path Computation- Total , Free and Independent Floats- Three Time Estimates- Programme Evaluation and Review Technique- Simple Problems.

**MODULE - III** **15**

**Inventory Models and Queuing Models**: Deterministic Inventory Models – Static and Dynamic EOQ Models – with or without Shortage – Probabilistic Inventory Model – Discrete and Continuous Type - Simple Problems. Characterization of Queuing Models- Poisson Queues- (M/M/1): (FIFO/∝/∝), (M/M/1): (FIFO/N/∝), (M/M/C): (FIFO/∝/∝), and (M/M/C): (FIFO/N/∝) Models. Simple Problems.

**TOTAL: 45**

**REFERENCE BOOKS**


1. Natarajan, A. M., Balasubramani P. and Tamilarasi A., "Operations Research", Pearson Education, New Delhi, 2003.
2. Taha, H.A., "Operations Research: An Introduction", Eighth Edition, Pearson Education, New Delhi, 2009.

## 11PC013 PRINCIPLES OF MANAGEMENT

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- This course presents the management concepts planning organising, staffing and controlling.
- To learn the basic functions, principles of management.

**MODULE – I** **15**

**Nature and Functions of Management:** Management – Definition - Nature and Scope – Importance – History of Management – Contribution by Henry Fayol – Taylor – Scientific Management – Functions of the Manager. Planning: Meaning – Objectives - Importance – Steps in Planning – Types of plan – Objectives, Policies, Procedures and Methods.

**MODULE - II** **15**

**Decision Making and Organising:** Decision Making – Process of Decision Making – Types of Decisions – Factors involved in Decision Making. Organisation – Meaning - Types – Structure – Line and Staff Organisation - Functional Organisation – Committee Organisation –Matrix Organisation-Centralization and Decentralization – Departmentation. Delegation of authority.

**MODULE- III** **15**

**Staffing and Controlling**: Staffing - Recruitment –Source- Internal – External - Selection Process-Importance – Training - Needs of training - Methods of training. Directing: Meaning- Elements- Span of Control - Types – Communication - Meaning-nature – Elements – Types - Importance - Barriers – Controlling – Meaning – Control process – Budgetary and Non-budgetary control-Coordination— Need for Coordination - Mechanism.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Dinkar Pagare, "Business Management", Fifth Edition, Sulthon Chand & Sons , 2010.
2. Harold Koontz , Weihrigh Kaniz and Ramachandra Aryasri, " Principles of Management", Tata McGraw Hill 2004.

## 11PC014 E-COMMERCE

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective:**

- To enable the students to learn the basic functions, principles and concepts of E-commerce.
- To develop an understanding of the current practice and opportunities in E-Commerce.

**MODULE – I** **15**

**Introduction to E-Commerce and Framework:** E-Commerce Framework – E-commerce of Media Convergence – Anatomy of E-Commerce Applications – E-Commerce Consumer Applications – Components of I-way - Network Access Equipment. Global Information Distribution Networks – Internet Terminology-NSFNET: Architectural and Components-National Research and Education Network-World wide web: Background-Hypertext publishing-Technology behind the web-Security in web-Consumer Oriented applications – Mercantile models for consumer perspective, Mercantile models for merchant's perspective.

**MODULE - II** **15**

**Payment Systems and Data Interchange:** Types of Electronic Payment System – Pre-Paid and Post-Paid Electronic Payment System – Digital Token Based Electronic Payment Systems-Smart Cards and Electronic Payment Systems-Credit Card-Based Electronic Payment Systems-Risk and Electronic Payment System – Designing Electronic Payment Systems – Electronic Data Interchange – EDI Applications in Business – EDI: Legal, Security and Privacy Issues – EDI and E-Commerce-Standardization and EDI - EDI Software Implementation.

**MODULE-III** **15**

**E-commerce Implementation and Applications:** Internal Information System – Macro Forces and Internal Commerce – Work Flow Automation and Coordination – Customization and Internal Commerce - Supply Chain Management – Making a Business Case for a Document Library – Types of Digital Documents – Issues Behind Document Infrastructure –The New Age of Information Based Marketing – Advertising on The Internet – Charting, The On-Line Market Process – Search and Resource Discovery Paradigm – Information Search and Retrieval – E-Commerce Catalogs and Directories – Information Filtering – Consumer - Data Interfacing Tools.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Kalakota, Ravi and Whinston Andreq B. "Frontiers of E-Commerce", Pearson Education, Asia, 2004.
2. Rayport Jeffery F. and Jaworski Bernard J., "E-Commerce", Tata McGraw-Hill, New Delhi, 2008.

## 11PC015 BUSINESS PROCESS MANAGEMENT

**3 0 0 3**

**Objective:**

- To enable the students to learn the basic organizational behaviors.
- To develop an understanding of the methodologies of BPR and IT support.

**MODULE – I** **15**

**Organizational Behavior**: What Managers Do-Enter Organizational Behavior-Replacing Intuition-Challenges and Opportunities in OB-Contributing Disciplines to the OB field-Absolutes in OB-Development-Foundations of Individual behavior-Biographical characteristics – Learning - Attitudes and job satisfaction – Personality and values – Linking an individual personality and values to the workplace-Perception and Individual Decision making- Decision making in organizations – Influence on decision making – Ethics in decision making.

**MODULE – II** **15**

**Groups And Organization System**: Foundations of group behavior: Defining and Classifying Groups- Stages of Group Development – Group properties – Group Decision making – Communication – Direction of communication- Interpersonal and organizational communication – Communication channel – Barriers to effective communication – Basic approaches to leadership – Behavioral Theories – Contingency Theories – Leader member exchange theory – Decision theory – Foundations of organization structure – Introduction – Common organizational Designs – New design options – organizational designs and employee behavior-Organizational Culture.

**MODULE-III** **15**

**Business Process Re-Engineering and IT:** Introduction to Business Process Reengineering – Principles and Methods of BPR – Reengineering work – A methodology for reengineering Business – Broadening visions of Business Process Reengineering – BPR and Information Systems – Redesigning the organization through Information Technology – IT-enabled business transformation – The magic bullet theory in IT-Enabled transformation.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Robbins, Stephen P., "Organizational Behavior", PHI, 13th edition, 2007.Sethi, Vikram and King
2. William R, "Organizational Transformation through Business Process Reengineering", Pearson Education New Delhi, 2007.

## 11PC016 DATA MINING AND DATA WAREHOUSING

**3 0 0 3**

**Objective:**

- Understood the Data mining Techniques
- Learnt the Algorithms and Association rules
- Learnt the applications of Data mining and Data warehousing

**MODULE – I** **15**

**Introduction, Data Preprocessing and Data Warehousing:** Introduction: Motivation – Kind of data – Functionalities – Interesting Patterns - Classification – Data Mining - Task Primitives – Integration of a Data Mining System – Major issues in data mining – Data Preprocessing: Why preprocess the data? – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation – Data Warehouse and OLAP Technology : What is a Data Warehouse – A Multidimensional Data Model – Data Warehouse Architecture – Data Warehouse Implementation – From Data Warehousing to Data Mining

**MODULE - II** **15**

**Association Rule, Cluster Analysis and Methods:** Basic Concepts – Efficient and Scalable Frequent Itemset Mining Methods – Mining Various Kinds of Association Rules – From Association Mining to Correlation Analysis – Constraint-Based Association Mining - Cluster Analysis – Types of Data – A Categorization of Major Clustering Methods – Partitioning Methods – Hierarchical Methods – Density-Based Methods – Grid-Based Methods – Model-Based Clustering Methods – Clustering High-Dimensional Data – Constraint-Based Cluster Analysis-Outlier Analysis

**MODULE-III** **15**

**Classification and Prediction, Mining Different Data Type and Applications:** Classification and Prediction-Issues– Classification by Decision Tree Induction – Bayesian Classification – Rule-Based Classification – Classification by Back propagation – Associative Classification: Classification by Association Rule Analysis – Other Classification Methods – Prediction – Accuracy and Error Measures – Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Selection – Multidimensional Analysis and Descriptive Mining of Complex Data Objects – Spatial Data Mining – Multimedia Data Mining – Text Mining – Mining the World Wide Web - Data Mining Applications

**TOTAL : 45**

**REFERENCE BOOKS**


1. Han, J. and Kamber, M., “Data Mining: Concepts and Techniques”, Second Edition, Morgan Kaufmann Publishers, Elsevier India Private Limited, 2011.
2. Margaret, H. Dunham, “Data Mining: Introductory and Advanced Topics”, Pearson Education, New Delhi, 2004
3. Paulraj Ponniah, “Data Warehousing Fundamentals”, Wiley-Interscience Publication, 2003.

## 11PC017 COMPUTER GRAPHICS AND MULTIMEDIA SYSTEMS

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- It provides the knowledge about 2D and 3D Graphics.
- It provides the knowledge about digital representation of audio, video and Compression techniques

**MODULE – I** **15**

**Overview and 2D Transformations:** Overview of Computer Graphics System - Output Primitives and Attributes – DDA Line drawing algorithm – Bresenham's Line drawing algorithm, properties of circle – Circle and ellipse drawing algorithms - Two-dimensional Geometric Transformations – Windowing and Clipping – Clipping of lines - Cohen – Sutherland algorithm Sutherland polygon Clipping algorithm.

**MODULE - II** **15**

**3D Transformations and Color Models:** Three-dimensional Transformations - Geometric and Modeling transformations – Viewing - Parallel and perspective projections. - Visible Surface Detection Methods - Object-space Methods - Image-space Methods - Depth Sorting – Depth Buffer - Scan line - Octree Algorithms - Color models and Animation.

**MODULE - III** **15**

**Multimedia Systems**: Multimedia and Personalized computing – emerging applications - Perspective and challenges – Architecture and issues for distributed multimedia systems – synchronization and QOS – Standards and framework. Digital Video and image compression – Video compression techniques – JPEG – H.261 – MPEG – DVI Technology - Multimedia Devices, Presentations services and the user interface – multimedia services and window system, client, device control – Tool kits – Multimedia file systems and information models – File system support – data models – multimedia presentation and authoring – current state of the industry – Design paradigms and user interfaces.

**TOTAL :45**

**REFERENCE BOOKS**


1. Hearn, D. and Baker, M Pauline, "Computer Graphics (C-Version)", Second Edition, Pearson Education, New Delhi, 2008.
2. Koegel Buferd , "Multimedia Systems", Pearson Education, New Delhi, 2004.

## 11PC018 KNOWLEDGE MANAGEMENT

**3 0 0 3**

**Objective :**

- To learn about Knowledge management, knowledge models and techniques.
- To learn about Knowledge transfer, Knowledge Sharing and tools

**MODULE - I** **15**

**Knowledge and Knowledge Lifecycle**: Myths – Implications – Definitions – Types – Expert Knowledge – Human Thinking & Learning – Challenges – Conventional Vs KM Life Cycle – KMSLC – Knowledge Creation & Architecture – Nonaka's Model – Knowledge Architecture – Implications – Capturing Tacit Knowledge – Evaluating The Expert – Relationship with Expert – Fuzzy Reasoning & Quality Of Knowledge Capture – Guide to a Successful Interview – Prototyping – Implications.

**MODULE- II** **15**

**Knowledge Codification and System Implementation**: Other Knowledge Capture Techniques – Knowledge Codification – Modes – Tools &Procedures – Skill Set – Implications – System Testing & Deployment – Knowledge Testing – Approaches – Managing The Testing Phase – Issues – User Training and Deployment – Post Implementation Review.

**MODULE-III** **15**

**Knowledge Transfer and Knowledge Sharing**: Transfer Methods – Role of the Internet - Knowledge Transfer in E World – Learning From Data – Data Mining - Knowledge Management Tools and Knowledge Portals – Basics of Portals – Challenges – Technologies – Implications.

**TOTAL: 45**

**REFERENCE BOOKS**


1. Awad, Elias M. and Ghaziri, Hassan M., "Knowledge Management", Pearson Education, New Delhi, 2003.
2. Schreiber Guus, Akkermans Hans, Anjewierden Anjo, De Hoog Robert, Shadbolt Nigel, Walter Van de Velde and Bob Wielinga, "Knowledge Engineering and Management", Universities Press, 2001.

## 11PC019 ADVANCED DATABASE TECHNOLOGY

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- To understand the Transaction management Concepts, concurrency control techniques, distributed and parallel databases.
- To understand the basic concepts of Data Mining & Data Warehousing

**MODULE – I** **15**

**Query Optimization and Transaction concepts:** Query Processing - Query Optimization- cost based optimizations & Heuristics. Transactions: Transaction concept - Concurrent Executions – Serializability – Recoverability - Concurrency Control protocols – Deadlock Handling - Recovery System – Log based Recovery –Shadow Paging – Advanced Recovery Techniques.

**MODULE - II** **15**

**DBMS Architecture and Distributed Databases:** -Database System Architecture: Centralized and Client-Server Architectures-Server System Architectures - Parallel Systems - Distributed Systems - Network Types-Parallel Databases: Introduction - I/O Parallelism - Interquery Parallelism - Intraquery Parallelism - Intraoperation Parallelism- Interoperation Parallelism. Distributed databases – data storage – Distributed Transactions– Commit Protocols – concurrency control in Distributed databases.

**MODULE- III** **15**

**Data Mining and Information Retrieval :** Decision-Support Systems - Data Analysis and OLAP- Data Mining - Data Warehousing –Data Mining & Decision Tree Classifiers - Advanced Data types and New Applications: Motivation - Time in Databases - Spatial and Geographic Data - Multimedia Databases - Mobility and Personal Databases.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Silberschatz, Abraham and Korth Henry F., “Database System Concepts”, Bell Laboratories, Fifth Edition, McGraw Hill, New York, 2005.
2. Elamasri. Navathe., “Fundamentals of Database System”, Fifth Edition, McGraw-Hill, New York, 2005.

## 11PC020 INFORMATION STORAGE AND MANAGEMENT

**3 0 0 3**

**Objectives :**

- To learn in depth about information storage and management techniques.
- To learn the basic functions of DAS, SAN, NAS.

**MODULE – I** **15**

**Storage System:** Information Storage- Evolution of Storage Technology and Architecture-Data Center Infrastructure-Key Challenges in Managing Information- Information Lifecycle -Data Protection: RAID-Implementation of RAID-RAID Array Components-RAID Levels-RAID Comparison-RAID Impact on Disk Performance. Intelligent Storage System-Components of an Intelligent Storage System-Intelligent Storage Array.

**MODULE - II** **15**

**Storage Networking Technologies:** Direct-Attached Storage and Introduction to SCSI-Types of DAS-DAS Benefits and Limitations-Disk Drive Interfaces-Introduction to Parallel SCSI-SCSI Command Model. Storage Area Networks-Fibre Channel: Overview - The SAN and Its Evolution-Components of SAN-FC Connectivity-Fibre Channel Ports – Architecture-Zoning -Fibre Channel Login Types-FC Topologies. Network Attached Storage-IP SAN-Content-Addressed Storage.

**MODULE- III** **15**

**Managing and Monitoring:** Introduction to Business Continuity-Information Availability-BC Terminology - BC Planning Lifecycle -Failure Analysis-Business Impact Analysis- BC Technology Solutions- Securing the Storage Infrastructure-Storage Security Framework - Risk Triad-Storage Security Domains-Security Implementations in Storage Networking-Monitoring the Storage Infrastructure-Storage Management Activities-Storage Infrastructure Management Challenges-Developing an Ideal Solution-

**TOTAL : 45**

**REFERENCE BOOKS**


1. EMC, G. Somasundaram, Alok Shrivastava, “Information Storage And Management Storing, Managing, and Protecting Digital Information”, Wiley, 2009.
2. Marc Farley Osborne, “Building Storage Networks”, Tata Mac Graw Hill, 2001

## 11PC021 XML AND WEB SERVICES

**3 0 0 3**

**Objective :**

- To present knowledge about XML and web services, XML technology, SOAP and XML security.
- To provide a solid technical overview to the various XML related specifications and standardization relevant to web services.

**MODULE – I** **15**

**XML Overview and Name Spaces:** XML Extending the enterprise-Role Of XML – XML and The Web – XML Language Basics – SOAP – Web Services– Revolutions Of XML: The Data, Architectural, Software Revolution – Design principles of web - Service Oriented Architecture (SOA). Leveraging the XML technology family – XML – Name Spaces – Structuring With Schemas and DTD.

**MODULE - II** **15**

**XML Technology and Soap:** Presentation Techniques – Transformation – XML Infrastructure technologies – RDF. Overview Of SOAP – HTTP – XML-RPC – SOAP: Protocol – Message Structure – Message paths –Intermediaries – Actors – Design Patterns And Faults – SOAP With Attachments. Overview – Web services technologies: Architecture – Key Technologies - UDDI – WSDL. ebXML – SOAP and Web Services In E-Com

**MODULE - III** **15**

**XML Security:** Overview Of .NET And J2EE. Security Overview – Canonicalization – XML Security Framework – XML Encryption– XML Digital Signature – XKMS Structure – Guidelines For Signing XML Documents – XML In Practice-The XML application spectrum-Vertical industry data descriptions- Configuration and action – Power through combination.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Coyle, Frank. P., "XML, Web Services and The Data Revolution", Pearson Education, New Delhi, 2007.
2. Nagappan, Ramesh., Skoczylas, Robert and Sriganesh, Rima Patel., "Developing Java Web Services", Wiley Publishing Inc., New York, 2008.

## 11PC022 SOFT COMPUTING

(Common to M.Sc Computer Technology and Information Technology)

**3 0 0 3**

**Objective :**

- To learn about artificial intelligence, search and fuzzy systems.
- To learn about genetic algorithms and swarm intelligence

**MODULE – I** **15**

**Artificial Intelligence and Search:** Artificial Intelligence: History and applications – Introduction – Intelligence – Artificial Intelligence – Progress of Artificial Intelligence – Modeling, Simulation and AI – Intelligent systems – Knowledge Representation: Introduction – Propositional calculus – Predicate Calculus – Rule-based Knowledge Representation – Symbolic Reasoning under Uncertainity – Basic Knowledge Representation Issues – Knowledge Acquisition- Heuristic Search : Search as a Problem Solving Technique – Heuristic Search – Techniques for Heuristic Search – Heuristic Classification – Intelligent Agents – State Space Search: Introduction – State Space Search – Strategies for State Space Search

**MODULE - II** **15**

**Fuzzy Systems and Genetic Algorithms :** Implementation of Graph Search – Search Based on Recursion – Pattern-directed Search – Learning- Fuzzy Systems : Foundation of Fuzzy Systems – Fuzzy Relations – Arithmetic Operations of Fuzzy Numbers – Linguistic Descriptions and their Analytical Forms – Defuzzication Methods – Fuzzy Logic in Control and Decision- Making Applications – Hardware Realization of the Analog Fuzzy Controller- Introduction – Genetic Algorithms - Procedures of Genetic Algorithms – The Working of Genetic Algorithms – The Logic Behind Genetic Algorithms.

**MODULE - III** **15**

**Swarm Intelligence :** Evolutionary Programming – The Working of Evolutionary Programming – Genetic Algorithm-based Machine Learning Classifier System- Introduction – Background of Ant Intelligent Systems – Importance of the Ant Colony Paradigm – Ant Colony Systems – Development of the Ant Colony System – Applications of Ant Colony Intelligence – The working of Ant Colony Systems – Particle Swarm Intelligent Systems – Engineering Applications of PSIS and Future Research.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Padhy N.P., “Artificial Intelligence and Intelligent Systems”, Oxford Higher Education, 2007
2. Russel Stuart and Norvig Peter, “Artificial Intelligence – A Modern Approach”, 2nd Edition, Prentice Hall of India, New Delhi, 2004.

## 11PC023 COMPILER DESIGN

**3 0 0 3**

**Objective :**

- To have basic introduction to compilers.
- To understand and implement parsing techniques.
- To understand, design Code generation and optimization.

**MODULE – I** **15**

**Basics of Compilers and Lexical Analyzer:** 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- Role of the parser – Writing Grammars –Context-Free Grammars.

**MODULE - II** **15**

**Syntax Analysis and Intermediate Code Generation:** 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. Intermediate languages – Three Address Code – Quadruples – Triples - Declarations – Assignment Statements – Boolean Expressions – Case Statements – Back patching – Procedure calls.

**MODULE- III** **15**

**Code Generation and Code Optimization:** 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. Principal Sources of Optimization – Optimization of basic Blocks –Loops in Flow Graph - Introduction to Global Data Flow Analysis – Iterative solutions of data-flow equations - Peephole Optimization.

**TOTAL : 45**

**REFERENCE BOOKS**


1. Aho, Alfred., Sethi, Ravi, and Ullman, Jeffrey D., “Compilers: Principles, Techniques and Tools”, Pearson Education Asia, Singapore, 2007.
2. Holub, Allen I., “Compiler Design in C”, Prentice Hall of India, New Delhi, 2003.

## 11PC024 MULTI-CORE ARCHITECTURE AND PROGRAMMING

**3 0 0 3**

**Objective:**

- To realize the difference between programming for serial processors and parallel processors
- To understand the challenges in parallel and multi-threaded programming
- To learn about the various parallel programming paradigms, and solutions

**MODULE - I** **15**

**Introduction to Multiprocessors and Scalability issues:** Scalable design principles – Principles of processor design – Instruction Level Parallelism, Thread level parallelism. Parallel computer models – - Symmetric and distributed shared memory architectures – Performance Issues – Multi-core Architectures - Software and hardware multithreading – SMT and CMP architectures – Design issues – Case studies – Intel Multi-core architecture – SUN CMP architecture

**Parallel Programming:** Fundamental concepts – Designing for threads. Threading and parallel programming constructs – Synchronization – Critical sections – Deadlock. Threading APIs.

**MODULE - II** **15**

**OpenMP Programming:** OpenMP – Threading a loop – Thread overheads – Performance issues – Library functions. Solutions to parallel programming problems – Data races, deadlocks and livelocks – Non-blocking algorithms – Memory and cache related issues

**MPI Programming:** MPI Model – Collective communication – Data decomposition – Communicators and topologies – Point-to-point communication – MPI Library

**MODULE - III** **15**

**Multithreaded Application Development:** Algorithms – loop parallelism – recursive range specifications – parallel algorithms for streams. Program development and performance tuning

**Case Studies:** Count strings – quick sort – better matrix multiplication (Strassen) – Advanced Task programming - Memory allocation

**TOTAL : 45**

**REFERENCE BOOKS**


1. ShameemAkhter and Jason Roberts, “Multi-core Programming”, Intel Press, 2006.
2. Quinn, Michael J., “Parallel programming in C with MPI and OpenMP”, Tata McGraw Hill, 2003.
3. Hennessey, John L. and Patterson, David A., “Computer Architecture: A Quantitative Approach”, Fourth. Edition, Morgan Kaufmann / Elsevier Publishers, Amsterdam, 2007.
4. Culler, David E. and Singh,Jaswinder Pal., “Parallel Computing Architecture: A Hardware / Software Approach”, Morgan Kaufmann / Elsevier Publishers, Amsterdam, 1999.

## 11PC025 DISTRIBUTED COMPONENT ARCHITECTURE

**3 0 0 3**

**Objective:**

- To learn reusability using CORBA
- To learn COM and DCOM services
- To develop component based applications

**MODULE – I** **15**

**Introduction and Corba Technologies**: Evolution of Distributed Systems – Distributed Objects – Issues in design of Distributed Object Systems – multi tier architectures – component concepts – Component based Software Development. OMA – CORBA architecture - Object Request Broker Structure – Interface Definition language — Portable Object Adapter – Object and invocation life cycles - Interceptors

**MODULE - II** **15**

**Services & COM and DCOM**: CORBA services – Object location service – messaging service – security service – CORBA Component Model - steps in creating a CORBA application using SII and DII. From COM to Distributed COM – OLE - ActiveX – ATL – DCOM – COM IDL – COM Interfaces – COM threading models - DCOM services – Security - MTS – Clustering – MSMQ - steps in creating and deploying COM using ATL.

**MODULE-III** **15**

**EJB and Other Distributed Object Models** Introduction – EJB architecture – types of beans – life cycle of beans – steps in creating and deploying an EJB application. Java RMI - Java Beans – MDA - .NET - Comparison between different distributed models and their interoperability

**TOTAL : 45**

**REFERENCE BOOKS**


1. G Sudha Sadasivam, " Distributed Component Architecture", Wiley India Pvt. Ltd., New Delhi, 2008
2. Ed Roman, "Enterprise Java Beans", Wiley, New York, 2007
3. Gerald Brose, Andreas Vogel, Keith Duddy, "Java Programming with CORBA", John Wiley, New York, 2004