

**NOORUL ISLAM CENTRE FOR HIGHER EDUCATION**  
**NOORUL ISLAM UNIVERSITY, KUMARACOIL**  
**MASTER OF COMPUTER APPLICATIONS (M.C.A)**  
**CURRICULUM & SYLLABUS**  
**SEMESTER I**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1	CA1501	Problem Solving and Programming in C	3	1	0	4
2	CA1502	Computer Architecture	3	1	0	4
3	CA1503	Operating Systems	3	0	0	3
4	CA1504	Data Structures	3	1	0	4
5	MA1504	Discrete Structures	3	1	0	4
<b>PRACTICAL</b>						
6	CA1571	C Programming Lab	0	1	2	2
7	CA1572	Data Structures Lab	0	1	2	2
<b>TOTAL</b>			15	6	4	23

**AIM:**

To provide an awareness to solve the problems and programming in C.

**OBJECTIVES:**

- To know the correct and efficient ways of solving problems.
- To enable the students to learn the basics of programming.
- To learn the programming in 'C'.

**UNIT I INTRODUCTION TO COMPUTER PROBLEM SOLVING 9**

Introduction – The Problem Solving Aspect – Top Down Design – Implementation of Algorithms – Program Verification – Efficiency of Algorithms – Analysis of Algorithms.

**UNIT II C FUNDAMENTALS 9**

Overview of C – Structure of C Programs – Character sets, Constants, Variables and Data types – Operators and Expressions – Arithmetic Operators, Relational Operators, Logical Operators, Other Operators – Managing Formatted I/O Operations.

**UNIT III CONTROL STRUCTURES, ARRAY & FUNCTIONS 9**

Decision Making & Branching – if, if-else, else if ladder, nested if, Switch, Conditional statement, Go to statement, Decision Making & looping – While, do, for, do....while - Arrays – Dynamic and Multi Dimension arrays – Character Arrays and Strings – String Handling functions- Functions – User Defined Functions – Types of Functions- Recursion – Passing Arrays to functions – Passing Strings to Functions.

**UNIT IV STRUCTURES, UNION & POINTERS 9**

Structures – Defining, Declaring, Accessing, Initializing a Structure – Array of Structures – Array within Structures – Structure and Functions – Union – Pointers – Declaration, Accessing a Variable – Pointer to function and Structures.

**UNIT V FILE MANAGEMENT 9**

File Management in C – Random Access to file – Defining and Opening to File – I/O Operations on file – Command line arguments- Dynamic Memory Allocation - Linked Lists – Preprocessor – Macro Substitution – File Inclusion – Compiler Control Directives.

**L: 45 + T: 15, TOTAL: 60 PERIODS**

**REFERENCES:**

1. R.G. Dromey."How to Solve it by Computer", PHI, 1998.
2. E.Balagurusamy " Programming in ANSI C", Tata Mc Graw Hill, 2004.
3. Deitel and Deitel" C How to Program", Addison Wesley, 2001.
4. Brian W.Kernighan & Dennis Ritchie " C Programming Language", PHI 1990
5. Byron.S.Gottfried" Schaum's Outline of Programming with C", 2<sup>nd</sup> Edition, 1996.

**AIM:**

To do a detailed study on data representation concepts, digital components, CPU organization, I/O organization and memory organization.

**OBJECTIVES:**

- To gain system oriented knowledge.
- To study computer organization concepts.
- To study about digital components.
- To study data representation methods.

**UNIT I COMPUTER FUNDAMENTALS AND DIGITAL LOGIC CIRCUITS 9**

Introduction to digital computers - Types of computers – Architecture of a computer- Components of digital computer - Data Representation-Data types-Complements–Arithmetic Operation–Fixed and Floating point representation. Binary Codes, Digital Logic Circuits- Logic Gates. Boolean Algebra–Map Simplification–Combinational Circuits–Half Adder, Full Adder – Flip-flops – Sequential Circuits.

**UNIT II DIGITAL COMPONENTS - REGISTER TRANSFER & MICRO OPERATIONS 9**

Digital Components- ICs – Decoders – Multiplexers – Registers – Shift Registers – Binary Counters – Memory Unit. Register Transfer language and Micro operations -Register Transfer Language – Register Transfer Bus and Memory Transfers – Arithmetic, Logic and Shift Micro Operations, Arithmetic logic Shift Unit.

**UNIT III CENTRAL PROCESSING UNIT 9**

General Register Organization – Stack Organization – Instruction Format – Addressing Modes – Data Transfer and Manipulation – Program Control.

**UNIT IV INPUT OUTPUT ORGANIZATION 9**

Peripheral Devices – Input – Output Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupt – DMA – IOP – Serial Communication.

**UNIT V MEMORY ORGANIZATION 9**

Memory Hierarchy – Main Memory – Auxiliary Memory – Associative memory – Cache Memory – Virtual Memory – Memory Management Hardware.

**L: 45 + T: 15, TOTAL: 60 PERIODS**

**REFERENCES:**

1. Mr.M.Morris Mano, “Computer System Architecture”. Pearson Education, 2006.
2. William Stallings, “Computer Organization and Architecture”, Pearson Education Asia, 2001.
3. John.P.Hayes, “Computer Architecture and Organization“, Tata McGraw Hill, 1996
4. Thomas C. Barte, “Computer Architecture and Logic Design”, Tata McGraw Hill, 1991.

**AIM:**

To have a thorough knowledge of processes, scheduling concepts, memory management, I/O and file systems in an operating system.

**OBJECTIVES:**

1. To have an overview of different types of operating systems
2. To know the components of an operating system.
3. To have a thorough knowledge of process management
4. To have a thorough knowledge of storage management
5. To know the concepts of I/O and file systems.

**UNIT I INTRODUCTION****9**

Definition of OS-Mainframe System-Desktop Systems-Multi processor System-Distributed-Clustered-Real time Systems-Handheld Systems-Operating System Structure-System Components-Services-System Calls-System Programs-System Design and Implementation

**UNIT II PROCESS MANAGEMENT****9**

Concepts-Process Scheduling-Operations on Processes-Co-operating Processes-Inter Process Communication-CPU Scheduling-Scheduling Concepts-Criteria-Scheduling Algorithms-Multiprocessor Scheduling-Real time Scheduling

**UNIT III PROCESS SYNCHRONIZATION****9**

Critical Section-Synchronization Hardware-Semaphores-Problems of Synchronization-Critical Regions-Monitors-Deadlocks-Characterization-Handling Deadlocks-Deadlock Prevention-Avoidance-Detection-Deadlock Recovery

**UNIT IV MEMORY MANAGEMENT****9**

Storage Hierarchy-Storage Management Strategies-Contiguous-Non Contiguous Storage Allocation-Single User-Fixed Partition-Variable Partition-Swapping-Virtual Memory-Basic Concepts-Multilevel Organization-Block Mapping-Paging-Segmentation-Page Replacement Methods-Locality-Working Sets

**UNIT V I/O AND FILE SYSTEMS****9**

Linux System : History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File system, Interprocess Communication, Network Structure, Security.

**TOTAL: 45 PERIODS****REFERENCES**

1. Silberschatz and Galvin, Operating System Concepts, 6<sup>th</sup> Edition, John Wiley & Sons, Inc., 2004
2. Milankovic M., Operating System Concepts and Design, 2<sup>nd</sup> Edition, McGraw Hill, 1992
3. P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall Of India, 2004

**Aim:**

To study the basic data structures like Arrays, Stacks, Queues, Linked list, Trees and Graphs.

**Objectives:**

- To understand the difference between various data structures.
- To study how to write large, reliable programs composed from reusable pieces.

**UNIT I Lists, Stacks and Queues****9**

The List ADT: Arrays, Linked List, Doubly Linked List, Circularly Linked List, Cursor Implementation of Linked Lists; The Stack ADT: Stack Model, Implementation and Applications; The Queue ADT: Queue model, Implementation and Applications.

**UNIT II Trees and Hashing****9**

Preliminaries – Implementation of Trees – Binary Trees – Binary search Trees – AVL Trees – Splay Trees – B-Trees; Hashing: Hash Function, Separate chaining, Open Addressing, Rehashing.

**UNIT III Sorting and Searching****9**

Sorting- Preliminaries, Insertion sort, Shell sort, merge sort, Quick sort, Bucket sort, External sorting; Searching- Sequential search, Binary search, Comparison Trees.

**UNIT IV Graphs****9**

Graphs – Mathematical Background – Computer Representation – Graph Traversals – Shortest paths: Dijkstra's Algorithm – Minimal spanning Tree: Prim's and Kruskal's Algorithms – Graphs and datastructures.

**UNIT V Storage Management****9**

General Lists: Operations, linked list representation, using lists, Freeing list nodes - Automatic list Management: Reference count method, Garbage Collection, Algorithms, Collection and compaction

**TUTORIAL: 15****TOTAL: 60****REFERENCES**

1. Weiss "Data Structures and Algorithm Analysis in C" Addison Wesley, Second edition 1997.
2. Robert Kruse & Clovis L. Tondo "Data Structures and program design in C" Prentice hall, 2<sup>nd</sup> edition, 1991.
3. Tanaenbaum A.S.,Langram Y. Augestein M.J " Data Structures using C" Pearson Education , 2004

**AIM:**

To have a fundamental knowledge of the concepts needed to test the logic of a program, the applications in database and graphical structures.

**OBJECTIVE:**

This course introduces most of the basic terminologies used in computer science and applications of computation and graph theory.

**UNIT I LOGIC****9**

Propositional logic – Logical connectives – Truth tables – Normal forms –Consistency – Predicate Logic – Universal and Existential quantifiers – Proof techniques – direct and indirect methods.

**UNIT II SETS AND RELATIONS****9**

Set theory: - Types of sets – Operations on sets- Set identities –Principles of Inclusion and Exclusion-Relations: - Binary relations –Types of relations and their properties Relational matrix and the graph of a relation-Partitions– Equivalence relations.- Partial ordering –Poset-Hasse diagram.

**UNIT III FUNCTIONS****9**

Definitions of functions- Classifications of functions-Types of functions-Examples-Compositions of functions-Inverse of functions-Binary operations -Characteristic function of a set-Permutation function.

**UNIT IV GRAPH THEORY****9**

Basic definitions and examples – Graph terminology –Sub graphs – Operations on Graphs- Graph Isomorphism – Connectivity- Eulerian and Hamiltonian graphs - Matrix Representation of graphs.

**UNIT V LANGUAGES AND FINITE STATE AUTOMATA****9**

Formal languages – Classes of Grammars - Type 0 – Context Sensitive – Context – Free – Regular Grammars – Ambiguity-Finite state automata – Deterministic Finite state Automata (DFA) – Non - Deterministic Finite state Automata (NFA) – Equivalence of DFA and NFA.

**L: 45 + T: 15, TOTAL: 60 PERIODS****REFERENCES:**

1. J.P.Trembley and R.Manohar, “Discrete Mathematical Structure with Applications to computer science”, TMH.
2. Kenneth H. Rosen, “Discrete Mathematics and its Applications” Fifth Edition, TMH, 2003.
3. M.K. Venkataraman, N. Sridharan and N.Chandarasekaran,” Discrete Mathematics” The National publishing company,2003
4. Narsingh Deo,“Graph Theory with applications to Engineering and Computer Science” , Prentice Hall of India – New Delhi 2000

**CA1571**

**C PROGRAMMING LAB**

**L T P C**  
**0 1 2 2**

**AIM:**

To implement the concept in C programming and Data base management systems.

**OBJECTIVES:**

- To know the basic concepts of ‘C’ Language.
  - To study the structures, union, pointers and files.
1. Programs using control structures ( ie., using Branching Statements if- block if-nested if- goto – switch – while – continue and etc..)
  2. Programs using arrays ( ie.,using single and Multi dimensional arrays)
  3. Programs using functions (ie. using function-Recursion-Passing Arrays to functions-Passing Strings to Functions)
  4. Programs using structures (ie. using structure-array of structures-Structure and Functions).
  5. Programs using pointers (ie. processing pointers-pointers in function-Dynamic memory Allocation-pointers and array).
  6. Programs using file handling ( ie.,Opening and Closing a Data file-Creating a Data file- processing a Data File-Unformatted Data files).

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. E.Balagurusamy “ Programming in ANSI C”, Tata Mc Graw Hill, 2004.
2. Deitel and Deitel” C How to Program”, Addison Wesley, 2001.

**CA1572**

**DATA STRUCTURES LAB**

**L T P C**  
**0 1 2 2**

**AIM:**

To study the different operations performed on various ADT.

**OBJECTIVES:**

The main objective of this course to perform effective implementations of the various operations in different abstract data types.

1. Represent the given sparse matrix using one dimensional array and linked list.
2. Create a Stack and do the following operations using arrays and linked lists  
(i)Push (ii) Pop (iii) Peep
3. Create a Queue and do the following operations using arrays and linked lists  
(i)Add (ii) Remove
4. Implement the operations on singly linked list, doubly linked list and circular linked list.
5. Create a binary search tree and do the following traversals  
(i)In-order (ii) Pre order (iii) Post order
6. Implement the following operations on a binary search tree.  
(i) Insert a node (ii) Delete a node
7. Sort the given list of numbers using heap and quick sort.
8. Perform the following operations in a given graph  
(i) Depth first search (ii) Breadth first search
9. Find the shortest path in a given graph using Dijkstra algorithm

**TOTAL: 45 PERIODS**

## **REFERENCES**

1. Tanaenbaum A.S.,Langram Y. Augestein M.J “ Data Structures using C” Pearson Education , 2004
2. Robert Kruse & Clovis L. Tondo “Data Structures and program design in C” Prentice hall, 2<sup>nd</sup> edition, 1991.
3. Weiss “Data Structures and Algorithm Analysis in C” Addison Wesley, Second edition 1997.



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**CURRICULUM & SYLLABUS**

**MASTER OF COMPUTER APPLICATIONS (M.C.A)**

**SEMESTER II**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1	CA1505	Object Oriented Programming	3	1	0	4
2	CA1506	Software Engineering	3	0	0	3
3	CA1507	Database Management System	3	1	0	4
4	CA1508	Algorithm Analysis and Design	3	1	0	4
5	CA1509	Computer Networks	3	1	0	4
<b>PRACTICAL</b>						
6	CA1573	Object Oriented Programming Lab	0	1	2	2
7	CA1574	DBMS Lab	0	1	2	2
8	CA1575	Algorithms Lab	0	1	2	2
<b>TOTAL</b>			15	7	6	25

**AIM:**

To present the concept of object oriented programming and discuss the important elements of C++.

**OBJECTIVES:**

Since C++ plays a predominant role in software development it is felt that the following objectives can be achieved after studying this subject.

- i) Understand the concepts of Object oriented Programming.
- ii) Write simple applications using C++.
- iii) Important features of C++.
- iv) Design Concepts of C++.

**UNIT I OOP PARADIGAM****9**

Programming Paradigms-Procedural Programming-Modularity-Exception Handling-Data Abstraction-User Defined Types-Concrete Types-Abstract Types-Virtual Functions-Object Oriented Programming-Generic Programming-Containers-Algorithms

**UNIT II INTRODUCTION TO C++****9**

Overview of C++ - Classes and Objects - Constructor & Destructor -Friend Functions - Friend Classes - Inline Function - Default Argument - Static Members – Arrays – Pointers - References - Dynamic Allocation

**UNIT III OVERLOADING & INHERITANCE****9**

Function Overloading - Overloading Constructor Functions - Copy Constructors - Operator Overloading-Member Operator Overloading-Overloading new and delete-Inheritance-Base Class-Access Control-Virtual Functions-Pure Virtual Functions

**UNIT IV ADDITIONAL FEATURES****9**

Templates - Generic Functions - Applying Generic Functions - Generic Classes - Exception Handling - C++ I/O Streams - File I/O – STL-Overview - Container Classes – Lists – Maps - Algorithms Using Functions and Objects - String Class

**UNIT V DESIGN CONCEPTS****9**

Role of Classes-Kinds of Classes-Concrete Types-Abstract Types-Nodes-Changing Interfaces-Object I/O-Actions-Interface Classes-Handles-Use Counts Applications frame works

**L: 45 + T: 15, TOTAL: 60 PERIODS****REFERENCES**

1. E. Balaguruswamy “Object Oriented programming with C++” 4<sup>th</sup> Edition, 2011.
2. Herbert Schildt, ”C++ The Complete Reference”, Tata McGrawHill Edition, 2003

3. Bjarne Stroustrup, "The C++ Programming Language", 3<sup>rd</sup> Edition, Addison Wesley, 2000
4. Robert Lafore. "Waite Groups OOP in Turbo C++", Galgotia Publications, 2001
5. Stanley, B. Lippman, Jove Lagrie, "C++ Primer", 3<sup>rd</sup> Edition, Addison Wesley, 1998

**CA1506**

**SOFTWARE ENGINEERING**

**L T P C**  
**3 0 0 3**

**AIM:**

The main goal of this course is to give the knowledge of software development and its application in the real field. It is concerned with theories, methods and tools which are needed to develop the software.

**OBJECTIVES:**

- To discuss software engineering concept basic steps to develop software.
- To discuss the concept of requirement analysis, developing use cases and building analysis models.
- To discuss the design models and its analysis.
- To explain the different software testing methods and its usage
- To define the software quality assurance, Reliability and Quality standards.

**UNIT I INTRODUCTION**

**9**

A Generic View of Process – Process Models-The Waterfall Model-Incremental Model-Evolutionary Model-Specialized Model-The Unified Process–Agile Process – Agile Models – Software Cost Estimation – Planning – Risk Analysis – Software Project Scheduling.

**UNIT II REQUIREMENT ANALYSIS**

**9**

System Engineering Hierarchy – System Modeling – Requirements Engineering: Tasks-Initiating The Process-Eliciting Requirements-Developing Use Cases-Negotiating Requirements-Validating Requirements – Building the Analysis Models: Concepts

**UNIT III SOFTWARE DESIGN**

**9**

Design Concepts – Design Models – Pattern Based Design – Architectural Design – Component Level Design – Component – Class Based And Conventional Components Design – User Interface – Analysis And Design

**UNIT IV SOFTWARE TESTING**

**9**

Software Testing – Strategies: Conventional - Object Oriented – Validation Testing – Criteria – Alpha – Beta Testing- System Testing – Recovery – Security – Stress – Performance – Testing Tactics – Testing Fundamentals-Black Box – White Box – Basis Path-Control Structure

## UNIT V SCM AND QUALITY ASSURANCE

9

Software Configuration And Management-Features-SCM Process-Software Quality Concepts – Quality Assurance – Software Review–Technical Reviews – Formal Approach To Software Quality Assurance – Reliability – Quality Standards – Software Quality Assurance Plan

**TOTAL: 45 PERIODS**

### REFERENCES

1. Roger Pressman.S., “Software Engineering: A Practitioner’s Approach”, 6<sup>th</sup> Edition, Mcgraw Hill, 2005.
2. P. Fleeger, “Software Engineering”, Prentice Hall, 1999.
3. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli, “Fundamentals Of Software Engineering”, Prentice Hall Of India 1991.
4. I. Sommerville, “Software Engineering” , 5<sup>th</sup> Edition: Addison Wesley, 1996.

## CA1507

## DATABASE MANAGEMENT SYSTEMS

L	T	P	C
3	1	0	4

### AIM:

To provide a strong foundation in database technology and an introduction to the current trends in this field.

### OBJECTIVES:

- To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.
- To make a study of SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To know the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.

## UNIT 1

9

Data and Information, File Systems - disadvantages, Database Management Systems - Introduction, DBMS vs. File Systems, Tiered application architecture - 2 tier & 3 tier, Data Abstraction, Three schema architecture & logical data independence. Evolution of database management systems, Data Models, Types of data models

## UNIT II

9

Data Modeling, Classifications of data modeling techniques, E-R Modeling - definition, database design methodology, Basic components of E-R Models, Cardinality, Constraints, Existence, Entity sub types, Types of attributes, Relationships - types, Degree of a relationship, Recursive and Ternary relationship, Entity sub type partitioning, Aggregation, Types of entity sets, Keys and Identifiers, Discriminators, A real world example.

**Relational algebra:** Introduction, Selection and projection, set operations, renaming, Joins, Division, syntax, semantics. Operators, grouping, ungrouping, relational comparison.

**Calculus:** Tuple relational calculus, Domain relational Calculus, calculus vs algebra, computational capabilities.

### **UNIT III**

**9**

Relational Database Fundamentals - Relational structure, Rows and Columns, Properties of relations, Relationships and keys, Integrity constraints, transform the E-R model into a relational model identifying keys and constraints, Codd's Rules. Normalization - basic definitions, Functional Dependencies, Fundamentals of a good relational database design, Types of normal forms with the E-R Model example.

### **UNIT IV**

**9**

SQL - basics, data types, SQL Parsing, Operators, Types of SQL commands, creating tables & constraints, Where - Group By - Having - Order By, Sub Queries, SQL Functions - single-row and group functions, arithmetic, string, numeric and date functions, Set Operators  
Views - basics, updatable and non-updatable views, With Check option on views, Indexes - Basics, Types of Indexes, Advantages of indexed access methods, B-Tree Indexes - structure and accessing data, Creating indexes on database systems, types of indexes.

### **UNIT V**

**9**

Advanced SQL - Joins - definition, types of joins, Join Views - advantages, Correlated sub queries, Hierarchical queries. PL/SQL - Basics, Architecture, Data types, Operators, %type and row type, PL/SQL control structures, Cursors - types of cursors, PL/SQL Exceptions, Subprograms - Functions, Procedures, Triggers

**L: 45 + T: 15, TOTAL: 60 PERIODS**

### **REFERENCES :**

1. Abraham Silberschatz, Henry F. Korth and S. Sudharssan, "Database System Concepts", 4<sup>th</sup> Edition, Tata McGraw Hill, 2002
2. Raghu Ramakrishnan & Johannesgerhrke, "Data Base Management Systems", Mc Graw Hill International Edition, 2000

**CA1508**

## **ALGORITHM ANALYSIS AND DESIGN**

**L T P C**  
**3 1 0 4**

### **AIM:**

To introduce the classic algorithms in various domain, and techniques for designing efficient algorithms.

### **OBJECTIVES:**

- Apply the algorithms and design techniques to solve problems.
- To have a sense of the complexities of various problems in different domains.

### **UNIT I INTRODUCTION**

**9**

Fundamentals of algorithmic problem solving – Important problem types – Fundamentals of the analysis of algorithm efficiency – analysis frame work – Asymptotic notations – Mathematical analysis for recursive and non-recursive algorithms.

**UNIT II DIVIDE AND CONQUER METHOD AND GREEDY METHOD 9**

Divide and conquer methodology – Merge sort – Quick sort – Binary search – Binary tree traversal – Multiplication of large integers – Strassen’s matrix multiplication – Greedy method – Prim’s algorithm – Kruskal’s algorithm – Dijkstra’s algorithm.

**UNIT III DYNAMIC PROGRAMMING 9**

Computing a binomial coefficient – Warshall’s and Floyd’ algorithm – Optimal binary search tree – Knapsack problem – Memory functions.

**UNIT IV BACKTRACKING AND BRANCH AND BOUND 9**

Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

**UNIT V NP-HARD AND NP-COMPLETE PROBLEMS 9**

P & NP problems – NP-complete problems – Approximation algorithms for NP-hard problems – Traveling salesman problem – Knapsack problem.

**L: 45 + T: 15, TOTAL: 60 PERIODS**

**REFERENCES:**

1. Anany Levitin “Introduction to the Design and Analysis of Algorithms” Pearson Education 2003.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, “Introduction to algorithms” Prentice Hall 1990.

**AIM:** To study the concepts of computer network

**OBJECTIVES:**

- To learn Fundamentals of networking
- To understand network layer
- To Study about transport layer
- To study the applications of networking

**UNIT I - NETWORK FUNDAMENTALS**

**9**

Communication model – Data communications networking – Data transmission concepts and terminology – Transmission media – Data encoding – Data link control. Protocol architecture – OSI – TCP/IP – LAN architecture – Topologies – MAC – Ethernet, Fast Ethernet, Token ring, FDDI, Wireless LANS – Bridges.

**UNIT II - NETWORK LAYER**

**9**

Network layer functions – Switching concepts – Circuit switching networks – Packet switching – Routing – Internetworking concepts – IP – Unreliable connectionless delivery – Datagrams – Routing IP datagrams – ICMP.

**UNIT III - TRANSPORT LAYER**

**9**

Transport layer functions – User Datagram Protocol – Transmission Control Protocol – Reliable Delivery Service – Connection Establishment – Flow Control – Congestion Control – Queueing disciplines – Congestion Avoidance.

**UNIT IV NETWORK SECURITY**

**9**

Security requirements and attacks – Confidentiality with Symmetric Encryption – Message authentication and Hash functions - Public Key encryption – Digital Signature – SSL – Transport layer security – IPV4 and IPV6 security.

**UNIT V APPLICATIONS**

**9**

Domain Name System (DNS) – Telnet – rlogin – FTP – SMTP – MIME – IMAP – HTTP – SNMP – Network Management Security.

**L: 45 + T: 15, TOTAL: 60 PERIODS**

**REFERENCE BOOKS:**

1. Larry L. Peterson & Bruce S. Davie, “Computer Networks: A Systems Approach”, Fourth Edition, Morgan Kaufmann Publishers, 2007.
2. William Stallings, “Data and Computer Communications”, Seventh Edition, PHI, 2004.
3. James F. Kurose, Keith W. Ross, “Computer Networking: A Top-Down Approach”, Fourth Edition, Addison-Wesley, 2008.

**CA1573**

**OBJECT ORIENTED PROGRAMMING LAB**

**L T P C**  
**0 1 2 2**

**AIM:** To understand the Object Oriented Programming concepts and principles in detail

1. Programs using Constructor and Destructor.
2. Creation of classes and use of different types of functions.
3. Count the number of objects created for a class using static member function.
4. Write programs using function overloading and operator overloading.
5. Programs using inheritance.
6. Program using friend functions.
7. Program using virtual function.
8. Write a program using exception handling mechanism.
9. Programs using files.
10. Programs using function templates and class templates.

**TOTAL: 45 PERIODS**

**REFERENCES**

1. Herbert Schildt, "C++ The Complete Reference", Tata McGrawHill Edition, 2003
2. Bjarne Stroustrup, "The C++ Programming Language", 3<sup>rd</sup> Edition, Addison Wesley, 2000
3. Robert Lafore, "Waite Groups OOP in Turbo C++", Galgotia Publications, 2001

**CA1574**

**DBMS LAB**

**L T P C**  
**0 1 2 2**

**AIM:**

To understand basic operations in the database using SQL and PL/SQL

**OBJECTIVES:**

- To know how to insert and retrieve data from the database.
  - To know how to use PL/SQL programs
  - To know the advance concepts of DBMS.
1. SQL Commands using different data types in SQL & Data Definition Language Commands.
  2. SQL commands using Data Manipulation Language and transaction control Commands.
  3. SQL commands using different types of Data Constraints.
  4. SQL commands using Joins (single-table or multi-table)
  5. SQL commands using group-by clause and date arithmetic.
  6. SQL commands using different functions (aggregate, math and string)
  7. SQL commands using different types of sub queries
  8. SQL commands for creating views, inserting, updating and deleting data in views
  9. PL/SQL with Control Structures and Procedures.
  10. PL/SQL using Functions, triggers and cursors



**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Abraham Silberschatz, Henry F.Korth and S.Sudharssan,"Database System Concepts", 4<sup>th</sup> Edition, Tata McGraw Hill, 2002
2. Raghu Ramakrishnan & Johannesgerhrke, "Data Base Management Systems", Mc Graw Hill International Edition, 2000

**CA1575**

**ALGORITHMS LAB**

**L T P C**  
**0 1 2 2**

**AIM:**

To design and implement algorithms for standard problems using general algorithm design techniques

1. Apply the divide and Conquer technique to arrange a set of numbers using merge sort method.
2. Perform Strassen's matrix multiplication using divide and conquer method.
3. Solve the knapsack problem using greedy method.
4. Construct a minimum spanning tree using greedy method.
5. Construct optimal binary search trees using dynamic programming method of problem solving.
6. Find the solution for traveling salesperson problem using dynamic programming approach.
7. Perform graph traversals.
8. Implement the 8 Queens Problem using backtracking.
9. Implement knapsack problem using backtracking.
10. Find the solution of traveling salesperson problem using branch and bound technique.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2003.
2. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to algorithms" Prentice Hall 1990.

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**NOORUL ISLAM UNIVERSITY, KUMARACOIL**

**MASTERS IN COMPUTER APPLICATIONS**

**CURRICULUM AND SYLLABUS**

**SEMESTER - III**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1.	CA1510	Computer Graphics	3	1	0	4
2.	CA1511	Software Project Management	3	1	0	4
3.	CA1512	Object Oriented Analysis and Design	3	0	0	3
4.	CA1513	Internet and Java Programming	3	1	0	4
5.	MA1505	Operations Research	3	1	0	4
<b>PRACTICAL</b>						
6.	CA1576	Graphics Lab	0	1	2	2
7.	CA1577	Java Programming Lab	0	1	2	2
<b>TOTAL</b>			<b>15</b>	<b>6</b>	<b>4</b>	<b>23</b>

**AIM:**

To make students aware of the full range of techniques required to enable implementation of a graphics system capable of generating complex, realistic images.

**OBJECTIVES:**

- To learn fundamental computer graphics techniques;
- To learn image generation techniques

**UNIT I: OVERVIEW OF COMPUTER GRAPHICS SYSTEM 9**

Over View of Computer Graphics System – Video display devices – Refresh Cathode Ray tubes-Raster Scan and random scan system – Input devices – Hard copy devices.

**UNIT II: OUTPUT PRIMITIVES AND ATTRIBUTES 9**

Drawing line, circle and ellipse generating algorithms – Scan line algorithm – Character generation – attributes of lines, curves and characters – Anti aliasing.

**UNIT III: TWO DIMENSIONAL GRAPHICS TRANSFORMATIONS AND VIEWING 9**

Two-dimensional Geometric Transformations – Windowing and Clipping – Clipping of lines and clipping of polygons. Viewing pipeline-viewing co-ordinate reference frame-window to viewport transformation – Curve and Text clipping algorithms.

**UNIT IV : THREE DIMENSIONAL GRAPHICS AND VIEWING 9**

Three-dimensional concepts – Object representations- Polygon table, Quadric surfaces, Splines, Bezier curves and surfaces – Geometric and Modelling transformations – Viewing pipeline-viewing co-ordinates-Parallel and perspective projections.

**UNIT V : ILLUMINATION AND RENDERING METHODS 9**

Light Sources-Basic Illumination models-Displaying light intensities-Halftone patterns and dithering techniques – Polygon rendering methods-ray Tracing Methods – Adding surface details

**T: 15 + L: 45 = TOTAL: 60 PERIODS**

**BOOKS FOR REFERENCES:**

1. Hearn, D. and Pauline Baker,M., Computer Graphics (C-Version),2ndEdition, Pearson Education, Delhi ,2009.
2. Roger, D.F., Procedural elements for Computer Graphics, McGraw Hill Book Co., 2010.
3. Arun D. Udai,Amerandra N. Sinha., Computer Graphics , TMH, NewDelhi,2008
4. Floey, J.D., Van Dam, A, Feiner, S.K. and Hughes, J.F, Computer Graphics, Pearson Education, New Delhi,2011.

**AIM:**

To Study about the Software Project Management.

**OBJECTIVES:**

- To gain knowledge in software development.
- To study about project management.
- To study project planning and control.

**UNIT 1 : INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT 9**

Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

**UNIT II : PROJECT EVALUATION 9**

Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation.

**UNIT III : ACTIVITY PLANNING 9**

Objectives – Project Schedule – Sequencing and Scheduling Activities – Network Planning Models – Forward Pass – Backward Pass – Activity Float – Shortening Project Duration – Activity on Arrow Networks – Risk Management – Nature of Risk – Types of Risk – Managing Risk – Hazard Identification – Hazard Analysis – Risk Planning And Control.

**UNIT IV : MONITORING AND CONTROL 9**

Creating Framework – Collecting the Data – Visualizing Progress – Cost Monitoring – Earned Value – Prioritizing Monitoring – Getting Project Back To Target – Change Control – Managing Contracts – Introduction – Types of Contract – Stages in Contract Placement – Typical Terms of a Contract – Contract Management – Acceptance.

**UNIT V : MANAGING PEOPLE AND ORGANIZING TEAMS 9**

Introduction – Understanding Behavior – Organizational Behavior Background – Selecting the Right Person for the Job – Instruction in the Best Methods – Motivation – The Old man – Hack man Job Characteristics Model – Working In Groups – Becoming a Team – Decision Making – Leadership – Organizational Structures – Stress – Health and Safety – Case Studies.

**T: 15 + L: 45 = TOTAL: 60 PERIODS**

**BOOKS FOR REFERENCES:**

1. Bob Hughes, Mikecotterell, “Software Project Management”, Third Edition, Tata McGraw Hill, 2004.
2. Ramesh, Gopaldaswamy, "Managing Global Projects", Tata McGraw Hill, 2001.
3. Royce, “Software Project Management”, Pearson Education, 1999.
4. Jalote, “Software Project Manangement in Practive”, Pearson Education, 2002.

**AIM:** To study the concepts of Object Oriented Analysis and Design concepts.

**OBJECTIVES:**

- To learn about objects
- To learn Object methodology and UML
- To Study about object oriented analysis
- To study about object oriented design
- To learn about the quality of software.

**UNIT 1 : INTRODUCTION**

**9**

An overview – Object basics – Object state and properties – Behavior – Methods – Messages – Information hiding – Class hierarchy – Relationships – Associations – Aggregations- Identity – Dynamic binding – Persistence – Metaclasses – Object oriented system development life cycle.

**UNIT II : METHODOLOGY AND UML**

**9**

Introduction – Survey – Rumbaugh, Booch, Jacobson methods – Patterns – Frameworks – Unified approach – Unified modeling language – Static and Dynamic models – UML diagrams – Class diagram – Usecase diagrams – Dynamic modeling – Model organization – Extensibility.

**UNIT III : OBJECT ORIENTED ANALYSIS**

**9**

Identifying Usecase – Business object analysis – Usecase driven object oriented analysis – Usecase model – Documentation – Classification – Identifying object, relationships, attributes, methods – Super-sub class – A part of relationships Identifying attributes and methods – Object responsibility

**UNIT IV : OBJECT ORIENTED DESIGN**

**9**

Design process – Axioms – Colollaries – Designing classes – Class visibility – Refining attributes – Methods and protocols – Object storage and object interoperability – Databases – Object relational systems – Designing interface objects – Macro and Micro level processes – The purpose of a view layer interface

**UNIT V : SOFTWARE QUALITY**

**9**

Quality assurance – Testing strategies – Object orientation testing – Test cases – Test Plan – Debugging principles – Usability – Satisfaction – Usability testing – Satisfaction testing. Case Study : Developing usability test plan and test cases for Bank ATM System.

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES:**

1. Ali Bahrami, “Object Oriented System Development”, McGraw Hill International Edition, 1999.
2. Craig Larman, Applying UML and Patterns, 2<sup>nd</sup> Edition, Pearson, 2002.
3. Grady Booch, James Rumbaugh, Ivar Jacobson, “The Unified Modeling Language User Guide”, Addison Wesley Long man, 1999.
4. Bernd Bruegge, Allen H. Dutoit, Object Oriented Software Engineering using UML, Patterns and Java, Pearson 2004

**AIM:**

To Study about the Internet and Java Programming.

**OBJECTIVES:**

- To study about Internet concepts and www
- To study about Java Programming in Detail
- To study how Java is suitable for internet Programming

**UNIT I : BASIC INTERNET CONCEPTS****8**

Connecting to the Internet – Domain Name System - Exchanging E-mail – Sending and Receiving Files - Fighting Spam, Sorting Mail and avoiding e-mail viruses – Chatting and Conferencing on the Internet – Online Chatting - Messaging – Usenet Newsgroup – Internet Relay chat (IRC) – Instant Messaging - Voice and Video Conferencing.

**UNIT II : WORLD WIDE WEB****8**

Overview – Web Security, Privacy, and site-blocking – Audio and Video on the web – Creating and Maintaining the Web – Web site creation concepts – Web Page Editors – Optimizing Web Graphics – Web Audio Files – Forms, Interactivity, and Database-Driven Web sites – File Transfer and downloading – FTP – Peer to Peer – Downloading and Installing software.

**UNIT III : JAVA FUNDAMENTALS****8**

Java features – Java Platform – Java Fundamentals – Expressions, Operators, and Control Structures – Classes, Packages and Interfaces – Exception Handling.

**UNIT IV : PACKAGES****12**

AWT package – Layouts – Containers – Event Package – Event Model – Painting –Garbage Collection - Multithreading – Language Packages.

**UNIT V : ADVANCED JAVA PROGRAMMING****9**

Utility Packages – Input Output Packages – Inner Classes – Java Database Connectivity - Servlets - RMI – Java Beans.

**T: 15 + L: 45 = TOTAL: 60 PERIODS****BOOKS FOR REFERENCES:**

1. Margaret Levine Young, "Internet and WWW", 2nd Edition, Tata McGraw Hill, 2002.
2. Herbert Schildt, The Complete Reference – Java 2 , 4th Edition, Tata McGraw Hill, 2001.
3. Keyur shah, "Gateway to Java Programmer Sun Certification", Tata Mc Graw Hill 2002.
4. Deitel & Deitel, Java How to Program, Prentice Hall 1999.

**AIM:**

The probabilistic models are applicable in all areas of computer science. This course provides necessary mathematical support to solve real life problem

**OBJECTIVE:**

To develop mathematical skill to analyze various complex problems and to study the applications of operations research in functional areas of computing like network scheduling, queueing and simulation.

**UNIT I LINEAR PROGRAMMING****9**

Formulation – Graphical solution – Simplex method –Artificial variable technique - Two Phase method - Transportation and Assignment problems.

**UNIT II DYNAMIC PROGRAMMING****9**

Bellman's principle of optimality – Characteristics of the dynamic programming model – The recursive equation - Backward and Forward approach – Applications of Dynamic programming problem in Allocation problems , Shortest route problem and Cargo loading Problem .

**UNIT III QUEUEING MODELS****9**

Birth and Death Process - Poisson Process – Markovian Queues – Single Server Models – Little's formula - Queues in Series – Open Queueing Networks –Closed Queueing networks.

**UNIT IV NETWORK MODEL****9**

Shortest Route, Minimal Spanning tree and Maximal flow models – Critical Path Method – Project Evaluation and Review Technique

**UNIT V SIMULATION****9**

Discrete Event Simulation – Stochastic Simulation - Monte Carlo Simulation – Generation of Random Numbers using Congruent method – Applications to Queueing systems.

**L: 45 + T: 15, TOTAL: 60 PERIODS****REFERENCES:**

1. Taha, H.A. "Operations Research: An Introduction", Ninth Edition, Pearson Education Edition, Asia, New Delhi, 2002.
2. Robertazzi. T.G "Computer Networks and Systems – Queuing Theory and Performance Evaluation", Third Edition, Springer, 2002 Reprint.
3. S.S. Rao "Optimization Techniques "Prentice Hall of India , 2004.
4. J.K Sharma "Operations Research" Macmillan, 2003

**AIM:** Implementing Graphics in C Programs

1. Line drawing using DDA algorithm
2. Line drawing using Bresenham's Line drawing algorithm
3. Circle drawing using Bresenham's Circle drawing algorithm
4. Ellipse drawing using Bresenham's Ellipse drawing algorithm
5. Draw various primitives using functions
6. Program for 2D Transformation
7. Program for Composite 2D Transformation
8. Program for polygon filling
9. Program for Cohen Sutherland Line Clipping
10. Program for windowing to viewport mapping
11. Program for polygon clipping using Sutherland hodgemann polygon clipping algorithm
12. Program for 3D Transformation
13. Program for Composite 3D Transformation
14. Program for 3D object projection

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES:**

1. Hearn, D. and Pauline Baker, M., Computer Graphics (C-Version), 2nd Edition, Pearson Education, Delhi, 2009.
2. Roger, D.F., Procedural elements for Computer Graphics, McGraw Hill Book Co., 2010.

**AIM:** To implement the programs in Java Programming.

**OBJECTIVES:**

- To learn the Internet features of Java.
  - To learn Java language in detail.
1. Writing a program using overloading and overriding
  2. Creation of user specific packages
  3. Writing a program using Interfaces.



4. Generate the program using exception handling mechanisms.
5. Creation of programs using threads.
6. Reading and writing text files.
7. Programs using applets.
8. Programs using Java Database Connectivity (JDBC).
9. Programs using RMI (Remote Method Invocation) to access a remote method.
10. Programs using servlets.
11. Programs using servlets and JDBC.
12. Creation and usage of Java beans.

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES:**

1. Keyur shah, "Gateway to Java Programmer Sun Certification", Tata Mc Graw Hill 2002.
2. Deitel & Deitel, Java How to Program, Prentice Hall 1999.

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**MASTERS IN COMPUTER APPLICATIONS**

**CURRICULUM AND SYLLABUS**

**SEMESTER IV**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>Theory</b>					
1.	CA1514	Advanced database Technology	3	1	0	4
2.	CA1515	Middleware Technologies	3	1	0	4
3.	MS1518	Accounting and Financial Management	3	1	0	4
4.	CA1516	Visual Programming	3	1	0	4
5.	XX15E1	Elective –1	3	0	0	3
6.	XX15E2	Elective –2	3	0	0	3
	<b>Practical</b>					
7.	CA1578	Middleware Lab	0	1	2	2
8.	CA1579	Visual Programming Lab	0	1	2	2
		<b>Total</b>	18	6	4	26

**AIM:** To study in detail about Database management

**OBJECTIVES:**

- To learn database management
- To study about various types of databases
- To understand query and transaction processing
- To study about implementation and isolations
- To understand database design issues.

**UNIT I: DATABASE MANAGEMENT**

**9**

Relational Data Model – SQL - Database Design - Entity-Relationship Model – Relational Normalization – Embedded SQL – Dynamic SQL – JDBC – ODBC.

**UNIT II: ADVANCED DATABASES**

**10**

Object Databases - Conceptual Object Data Model – XML and Web Data – XML Schema – Distributed Data bases – OLAP and Data Mining – ROLAP and MOLAP

**UNIT III: QUERY AND TRANSACTION PROCESSING**

**8**

Query Processing Basics – Heuristic Optimization – Cost, Size Estimation - Models of Transactions – Architecture – Transaction Processing in a Centralized and Distributed System – TP Monitor.

**UNIT IV: IMPLEMENTING AND ISOLATION**

**9**

Schedules – Concurrency Control – Objects and Semantic Commutativity – Locking – Crash, Abort and Media Failure – Recovery – Atomic Termination – Distributed Deadlock – Global Serialization – Replicated Databases – Distributed Transactions in Real World.

**UNIT V: DATABASE DESIGN ISSUES**

**9**

Security – Encryption – Digital Signatures – Authorization – Authenticated RPC - Integrity - Consistency - Database Tuning - Optimization and Research Issues.

**T: 15 + L: 45 = TOTAL: 60 PERIODS**

**BOOKS FOR REFERENCES:**

1. Abraham Silberschatz, Henry. F. Korth, S.Sudharsan, Database System Concepts, 4<sup>TH</sup> Edition., Tata McGraw Hill, 2006
2. Philip M. Lewis, Arthur Bernstein, Michael Kifer, “Databases and Transaction Processing: An Application-Oriented Approach”, Addison-Wesley, 2002
3. R. Elmasri and S.B. Navathe, Fundamentals of Database Systems, 3rd Edition, Addison Wesley, 2004
- 4.. Raghu Ramakrishnan & Johannes Gehrke, “Database Management Systems”, 3<sup>rd</sup> Edition, TMH, 2003

**AIM:**

To implement the concept in EJB and C# programming and .NET systems.

**OBJECTIVES:**

- To Know the basic concepts of EJB and its architecture.
- To Know the structure of Session and Entity Beans.
- To Know the basic concepts of C# Language.
- To know how to Build .NET application.
- To know the basic concept of COM & COM+.

**UNIT I :****9**

EJB – EJB Architecture: Logical Architecture– Overview of EJB software Architecture :EJB Server, EJB Container, Enterprise Bean – View of an EJB Conversation :Finding the Bean, Getting Access to the Bean, Getting Rid of the Bean – Building and Deploying EJBs :Writing, Deploying and Connecting the EJB – Roles in EJB.

**UNIT II :****9**

EJB Session Beans: Stateful Session Bean and Stateless Session Bean – EJB entity beans :Container Managed Persistence and Bean Managed Persistence – EJB clients – EJB Deployment – Deployment Descriptor – Building an application with EJB.

**UNIT III :****9**

Introducing C# and the .NET Platform – Understanding .NET Assemblies; Private Assembly –Shared Assembly – Object-Oriented Programming with c#; Encapsulation Services – Inheritance Support – Callback Interfaces, Delegates, and Events.

**UNIT IV :****9**

Building C# applications: Type Reflection, Late Binding, and Attribute-Based Programming; Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET; ADO.NET Name Spaces; Data Table – Data View and Data Set; XML Web Services.

**UNIT V :****9**

COM – Data types – Interfaces – Proxy and Stub – Marshalling – Implementing Server / Client – Interface Pointers – Object Creation, Invocation , Destruction – Comparison COM and COM+ – Understanding .NET to COM interoperability.

**T: 15 + L: 45 = TOTAL: 60 PERIODS****BOOKS FOR REFERENCES:**

1. Tom Valesky, “Enterprise Java Beans”, Pearson Education, 2002.
2. Jesse Liberty, “Programming C#”, Fourth Edition, O’Reilly,2009.
3. Peter Sestoft and Henrik I. Hansen, “C# Preciesely”, Prentice Hall of India, 2004.
4. Robert J. Oberg, “Introduction to C# Using .NET”, Prentice Hall , 2002.
5. Harvey M. Deitel, “C# How to program”, Prentice Hall , 2002.
6. Andrew Troelsen, “C# and the .NET Platform”, Second Edition, Apress Wiley-dreamtech, India Pvt Ltd, 2003.

**Objectives:**

- To understand key concepts and conventions of accounting for the preparation of basic financial statements.
- To gain exposure in financial and cost analysis to help in making efficient decision
- To gain knowledge on financial management concepts and ensure in deriving effective Financial planning & financial decision making.

**UNIT I : Financial Accounting 9**

Meaning and Scope of Accounting-Principles-Concepts-Conventions-Assumptions-Accounting Standards-Branches of Accounting -Final Accounts-Trial Balance-Trading Account-Profit and Loss Account-Balance Sheet-Adjustment Entries

**UNIT II : Financial analysis 9**

Nature and objectives of financial statement –Types of financial statements-Financial statement analysis-Types of financial statement analysis- Methods- Ratio Analysis-Funds Flow Analysis-Cash Flow Analysis

**UNIT III : Cost analysis and decision 9**

Concept of cost- Classification of cost- Cost sheet- Cost behaviour- Marginal Costing and Break Even Analysis- Cost Volume Profit Analysis and decision making - Budgets and Budgetary Control- Classification and Types of Budgets – Operating Budgets – Financial Budgets -Master Budget-Fixed Budget- Flexible Budget- Zero Base Budgeting.

**UNIT IV : Financial planning and decision 9**

Nature and scope of Financial Management - Time Value of Money Concept -Risk and Return – Financial Planning-Capitalization- Cost of Capital - Factors Affecting Cost of Capital-Computation for Each Source of Finance and Weighted Average Cost of Capital-Capital Structure – Optimal Capital Structure- Risk-Return trade off- Planning the Capital structure- Factors Affecting Capital Structure-Dividend Policy and decision – Valuation of firms – Forms of dividends – Bonus issue – Right issue

**UNIT V : Investment decision 9**

Concepts of Working Capital-Kinds of working capital- Working Capital Policies-Factors affecting Working Capital-Estimation of Working Capital Requirements-Financing of working capital- Concepts of fixed capital- Capital Budgeting –Process –Methods of Appraisal - ARR method – Pay back period method – NPV method – profitability index method – IRR method.

**T:15 + L: 45 = TOTAL: 60 PERIODS**

**BOOKS FOR REFERENCES:**

1. S.N.Maheswari, “Financial and Management Accounting”, Sultan Chand & Sons, 2003
2. I.M.Pandey, ”Financial Management”, Vikas Publications, 4<sup>th</sup> Reprint, 2002
3. S.P.Iyengar, “Cost and Management Accounting”, Sultan Chand & Co,
4. I.M.Pandey, “Elements of Management Accounting” Vikas Publishing House, 1993
5. Shashik.Kupta , Dr. R.k Sharma, Financing management Kalayani publications

**AIM:**

To study about Windows Programming and Visual Programming

**OBJECTIVES:**

- To Study in detail about Windows Programming
- To study about Visual Basic and Visual C++

**UNIT I : WINDOWS PROGRAMMING****8**

The windows programming Model – Event driven programming – GUI concepts – Overview of Windows programming – Creating and displaying the window – Message Loop – windows procedure – WM\_PAINT message – WM\_DESTROY message – Data types – Resources – An Introduction to GDI – Device context – Text output – Scroll Bars – Keyboard – Mouse – Menus.

**UNIT II : VISUAL BASIC PROGRAMMING****10**

Form Design-Overview-programming Fundamentals – Variables and Constants – Variant type – Procedure scope – Main – Control statements – control arrays Responding to mouse events - Responding to keyboard events – keypress, keyup, keydown events- Graphics Controls- File System Controls- Accessing databases with data controls

**UNIT III : VISUAL C++ PROGRAMMING****9**

Visual C++ components – Introduction to Microsoft Foundation Classes Library – Getting started with AppWizard – Class Wizard – Event handling – Keyboard and Mouse events- WM\_SIZE, WM\_CHAR messages - Graphics Device Interface - Pen, Brush, Colors, Fonts - Single and Multiple document interface - Reading and Writing documents -Resources – Bitmaps creation, usage of BMP and displaying a file existing as a BMP.

**UNIT IV : CONTROLS****9**

Dialog Based Applications, controls – Animate control, image list, CRect tracker – Tree control – CtabControl – Dynamic controls – slider control – progress control – Inheriting CTreeView – CRicheditView – Modal Dialog, – Modeless Dialog – CColorDialog –CFileDialog.

**UNIT V : Advanced Concepts****9**

Domain Name System – Email – World Wide Web (HTTP) – Simple Status bars – Splitter windows and multiple views – Dynamic Link Library – Data base Management with ODBC – TCP/IP – Winsock and WinInet, – ActiveX control – creation and usage– Container class.

**T: 15 + L: 45 = TOTAL: 60 PERIODS****BOOKS FOR REFERENCES:**

1. Charles Petzold, “Windows Programming”, Microsoft press.
2. J. David Kruglinski, “Programming Microsoft Visual C++”, Fifth Edition, Microsoft press, 2001.
3. Steve Holzner, “Visual C++ 6 programming”, Wiley Dreamtech India Private Ltd., 2003.
4. Kate Gregory “Using Visual C++”, Prentice Hall of India Pvt., Ltd., 1999.
5. Herbert Sheildt, “MFC from the Ground Up”.
6. Deitel , “ Visual Basic 6.0 How To Program”, Pearson Education, 2002.

**CA1578**

**MIDDLEWARE LAB**

**0 1 2 2**

**AIM:**

To develop various distributed application and component programs.

**OBJECTIVES:**

- To study about the component technology.
  - To implement the distributed application program using RMI
  - To gain knowledge about CORBA distributed environment.
  - To learn to create and deploy Web services.
1. Develop distributed application using RMI.
  2. Develop an application for message communication between client and server.
  3. Develop distributed application file download from a server using RMI.
  4. Develop component program using COM.
  5. Program to develop component for Encryption and decryption using COM.
  6. Develop component program for information retrieval using COM.
  7. Develop a middleware component for message exchanging using CORBA.
  8. Develop a middleware component for computing using CORBA.
  9. Create a web service to display an information using c#
  10. Create a web service to exchange information.

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES:**

1. Tom Valesky, "Enterprise Java Beans", Pearson Education, 2002.
2. Jesse Liberty, "Programming C#", Fourth Edition, O'Reilly, 2009.
3. Robert J. Oberg, "Introduction to C# Using .NET", Prentice Hall , 2002.

**CA1579**

**VISUAL PROGRAMMING LAB**

**0 1 2 2**

**AIM: To learn about Visual C++**

**OBJECTIVES:**

- To implement the programs using Visual Basic.
- To implement the programs using Visual C++.

**VB**

1. Form Design – Keyboard & Mouse events

2. Programs on usage of data types - variant, Control arrays
3. Simple applications using file system controls
4. Database applications using data control.

#### **VC++**

5. Programs using GDI objects.
6. Programs using basic events.
7. Programs using Modal and modeless dialogs.
8. Programs using static and dynamic controls.
9. Programs using toolbars and status bars.
10. Creating DLLs and using them.
11. Data Access through ODBC- CDatabase, CRecordSet

**TOTAL: 45 PERIODS**

#### **BOOKS FOR REFERENCES :**

1. J. David Kruglinski, "Programming Microsoft Visual C++", Fifth Edition, Microsoft press, 2001.
2. Kate Gregory "Using Visual C++", Prentice Hall of India Pvt., Ltd., 1999.
3. Deitel , " Visual Basic 6.0 How To Program", Pearson Education, 2002.



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**MASTER OF COMPUTER APPLICATIONS**

**CURRICULUM AND SYLLABUS**

**SEMESTER - V**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>THEORY</b>						
1.	CA1517	Advanced XML and Web Applications	3	1	0	4
2.	CA1518	Big Data Analytics	3	1	0	4
3.	XX15E3	Elective –3	3	0	0	3
4.	XX15E4	Elective – 4	3	0	0	3
5.	XX15E5	Elective –5 (Open Elective)	3	0	0	3
<b>PRACTICAL</b>						
6.	CA1580	XML and Web Applications Lab	0	1	2	2
7.	CA15P1	Project Work – Phase I	0	0	12	6
<b>TOTAL</b>			15	3	14	25

**Prerequisite:**

Some knowledge about web, database, enterprise computing and web development

**Aim:**

To create enterprise computing knowledge among students.

**Objectives:**

1. Creating knowledge about XML data revolution and web services.
2. Training the students in skills such as XML structuring, presentation and processing.

**UNIT I INTRODUCTION****9**

Role of XML – XML and The Web –SOAP – Web Services – Revolutions Of XML – Service Oriented Architecture (SOA). XML Language Basics – XML validating and non validating parsers, organizing XML data, creating well formed XML, Adding attributes, Namespaces.

**UNIT II XML TECHNOLOGY****9**

Structuring XML documents - DTD, Schema, Presentation and Transformation - CSS, XSL, XSLT, XHTML, XFORMS, Voice XML, XML processing - SAX, DOM.

**UNIT III ADVANCED XML****9**

XML Query- Applications - Advantages, XLINK – Applications - Advantages, using X pointer – Applications – Advantages , Resource Description Framework – Applications- Advantages, XML Child languages- Applications- Advantages SMIL - Applications- Advantages, SVG - Applications- Advantages.

**UNIT IV SOAP AND WEB SERVICES****9**

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

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

**UNIT V XML SECURITY AND APPLICATIONS****9**

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

**L: 45 + T: 15 = TOTAL: 60 PERIODS****REFERENCES:**

1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson Education, 2005.
2. Heather Williamson - "XML The complete reference" - TATA McGRW HILL EDITION - 2008
3. Elliotte Rusty Harold & W. Scottmeans – "XML in a Nutshell" - O'REILLY 2004
4. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services", Pearson Education, 2004.

**Prerequisite:**

Basic knowledge data bases and its analysis

**Aim:**

- Analyze the big data analytic techniques for useful business applications.
- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics
- Explore on Big Data applications Using Pig and Hive
- Understand the fundamentals of various big data analysis techniques

**Objectives:**

- To explore the fundamental concepts of big data analytics
- To learn to analyze the big data using intelligent techniques.
- To understand the various search methods and visualization techniques.
- To learn to use various techniques for mining data stream.
- To understand the applications using Map Reduce Concepts.

**UNIT I INTRODUCTION TO BIG DATA****9**

Introduction to BigData Platform – Challenges of Conventional Systems - Intelligent data analysis –Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re - Sampling - Statistical Inference -Prediction Error.

**UNIT II MINING DATA STREAMS****9**

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream –Filtering Streams –Counting Distinct Elements in a Stream – Estimating Moments –Counting Oneness in a Window –Decaying Window -Real time Analytics Platform(RTAP) Applications -Case Studies -Real Time Sentiment Analysis, Stock Market Predictions.

**UNIT III HADOOP****9**

History of Hadoop -The Hadoop Distributed File System –Components of Hadoop-Analyzing theData with Hadoop-Scaling Out-Hadoop Streaming-Design of HDFS -Java interfaces to HDFSBasics-Developing a Map reduce Application -How Map Reduce Works-Anatomy of a Map ReduceJob runFailures-Job Scheduling-Shuffle and Sort –Task execution -Map Reduce Types andFormats-Map Reduce Features

**UNIT IV HADOOP ENVIRONMENT****9**

Setting up a Hadoop Cluster -Cluster specification -Cluster Setup and Installation –Hadoop Configuration -Security in Hadoop -Administering Hadoop –HDFS -Monitoring-Maintenance-Hadoop benchmarks - Hadoop in the cloud

**UNIT V FRAMEWORKS****9**

Applications on Big Data Using Pig and Hive –Data processing operators in Pig –Hive services –HiveQL –Querying Data in Hive -fundamentals of HBase and ZooKeeper -IBM InfoSphere BigInsights and Streams. Visualizations -Visual data analysis techniques, interaction techniques; Systems and applications

**L: 45 + T: 15 = TOTAL: 60 PERIODS**

**REFERENCES :**

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. Tom White “ Hadoop: The Definitive Guide” Third Edition, O’reilly Media, 2012.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, McGrawHill Publishing, 2012
4. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
5. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, JohnWiley & sons, 2012.
6. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
7. PeteWarden, “Big Data Glossary”, O’Reilly, 2011.
8. Jiawei Han, Micheline Kamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.
9. Da Ruan,Guoqing Chen, Etienne E.Kerre, GeertWets, Intelligent Data Mining, Springer ,2007
10. Paul Zikopoulos ,Dirk deRoos , Krishnan Parasuraman , Thomas Deutsch , James Giles , David Corrigan , Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, 2012
11. Michael Minelli (Author), Michele Chambers (A uthor), Ambiga Dhiraj (Author) , Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses,Wiley Publications,2013
12. Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, 2011

**CA1580**

**XML AND WEB APPLICATIONS LAB**

**L T P C**  
**0 1 2 2**

**Prerequisite:**

Basic knowledge about web development.

**Aim:**

To learn XML structuring, presentation, transformation and developing web services.

**Objectives:**

- To learn structuring XML using DTD and
- Schema
- To learn the techniques to process XML.
- To learn to create and deploy XML web services

1. Create an XML document to store information and create the DTD files.
2. Create an XML schema for a XML document.
3. Create an XML document to store information related to a web site and create the DTD file.
4. Present a XML document using cascading style sheets (CSS).
5. Write an XSLT program to extract elements from a XML document and use formatting.
6. Use Microsoft DOM to navigate and extract information from a XML document.

7. Navigate and extract information from a XML document using SAX.
8. Use Microsoft DSO to connect HTML or VB with XML document and display the information in HTML or VB.
9. Create web service for performing some mathematical calculation with appropriate client program.
10. Create Web service for performing Conversion with appropriate client program.

**CA15P1**

**PROJECT WORK – PHASE I**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>12</b>	<b>6</b>

The Mini Project is not only a part of the coursework, but also a mechanism to demonstrate the abilities and specialization. It provides the opportunity for the student to demonstrate originality, teamwork, inspiration, planning and organization in a software project, and to put into practice some of the techniques that have been taught throughout the previous courses. The Mini Project is important for a number of reasons. It provides students with:

- Opportunity to specialize in specific areas of computer science;
- Future employers will most likely ask about the project at interview;
- Opportunity to demonstrate a wide range of skills and knowledge learned, and
- Encourages integration of knowledge gained in the previous course units.

Mini Project work shall be carried out by a student under the guidance of a faculty. It is mandatory that a Student should submit the document of the completed work in the mid-semester and presentation before the project course committee during the semester in which the mini project work is undertaken. . The student should demonstrate that he/she has acquired both analytical and practical skills in the field specialization. The student should submit the mini project report at the end of the semester.

The project report should be documented with an engineering approach to the solution of the problem . The project report should be prepared in order to solve the problem in a methodical and professional manner, making due references to appropriate techniques, technologies and professional standards.

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**NOORUL ISLAM UNIVERSITY, KUMARACOIL**

**MASTER OF COMPUTER APPLICATIONS**

**CURRICULUM AND SYLLABUS**

**SEMESTER VI**

<b>Sl.No</b>	<b>Course Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
1.	CA15P5	Project Work – Phase II	0	0	36	18
<b>Total</b>			0	0	36	<b>18</b>

Project work is an inclusive component of a Program. Project work shall be carried out by a student under the guidance of a faculty either within the University department(s) or in external organizations like Industries, Research Institutes/ Centers or other Academic Institutions recognized by the appropriate statutory bodies and approved by the Board of Management. In case of external organizations, a co-guide from such institutions is essential. The guide/co-guide may be from other related departments of the University also. Guide/co-guide is normally fixed by mutual consent but recommended by the HOD and approved by the Dean. This choice is open to a student from the first semester onwards.

In the Project Work, Student is expected to do an in depth study in his/her specialized area by doing a detailed literature survey, understanding different aspects of the problem, arriving at the status report in the area, carry out developmental and/or experimental Work, analyze and interpret the results to arrive at the conclusions. Project presentations are inclusive components of a program. These presentations are based on learnt investigation methodologies, concepts and techniques from the available relevant research literature, etc, critical correlation of work of various authors/ researchers and results pertaining to the project work and their analysis. The student should demonstrate that he/she has acquired both analytical and practical skills in the field specialization. Interdisciplinary projects are also encouraged. Project may be applied research or industry oriented or a combination of both.

Project work may be allotted to a single student not to a group of students. Minimum duration of project work is 16 weeks, during the final semester with adequate preliminary preparations in the pre-final semester, if not, in earlier semesters, preferably from the third semester onwards.

It is mandatory that a Student gives three presentations before the project course committee for the project during the semester in which the project work is undertaken.

Due to unavoidable circumstances, if a student is unable to complete the project or submit the project report on or before the specified date, he/she may be permitted by the concerned HOD to submit the same in the subsequent semester.

HOD shall constitute a project Course committee to review and evaluate project work done by the students in a program. There shall be three assessments for 100 marks each. Each student shall make presentation on the progress and work made by him/her before the committee. Marks will be awarded based on the work done by the student, Presentation before the Committee, and a Viva voce by the committee. The total marks obtained in the three assessments out of 300 marks shall be reduced to 30 marks and rounded to the nearest integer.

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**MASTERS IN COMPUTER APPLICATIONS**  
**CURRICULUM AND SYLLABUS**  
**LIST OF ELECTIVES**

Sl.No	Course Code	Elective Title	L	T	P	C
<b>ODD SEMESTER ELECTIVES</b>						
1.	CA15A1	Software reuse	3	0	0	3
2.	CA15A2	Software Reliability and Metrics	3	0	0	3
3.	CA15A3	Embedded System and Interfacing	3	0	0	3
4.	CA15A4	Advanced Soft Computing	3	0	0	3
5.	CA15A5	Knowledge Engineering	3	0	0	3
6.	CA15A6	Digital Image Processing Techniques	3	0	0	3
7.	CA15A7	XML and Web Applications	3	0	0	3
8.	CA15A8	User Interface Design	3	0	0	3
9.	CA15A9	Service Oriented Architecture	3	0	0	3
10.	CA15B1	UNIX Internals	3	0	0	3
11.	CA15B2	System Software Internals	3	0	0	3
12.	CA15B3	Bio Informatics	3	0	0	3
13.	CA15B4	Management Information System	3	0	0	3
14.	CA15B5	Software Quality Assurance	3	0	0	3
15.	CA15B6	Wireless technology	3	0	0	3
16.	CA15B7	Computer Aided Drug Design	3	0	0	3
17.	CA15B8	Virtualization Techniques	3	0	0	3
18.	CA15B9	Cloud Computing	3	0	0	3
<b>EVEN SEMESTER ELECTIVES</b>						
19.	CA15C1	Ad Hoc Networks	3	0	0	3
20.	CA15C2	Distributed Operating System	3	0	0	3
21.	CA15C3	Multimedia Databases	3	0	0	3
22.	CA15C4	Artificial Intelligence	3	0	0	3
23.	CA15C5	Software Requirements Management	3	0	0	3
24.	CA15C6	Cyber Forensics	3	0	0	3
25.	CA15C7	Mobile Communication Techniques	3	0	0	3
26.	CA15C8	Principles of Compiler Design	3	0	0	3
27.	CA15C9	Information System Security	3	0	0	3
28.	CA15D1	Modeling and Simulation	3	0	0	3
29.	CA15D2	Cryptography And Network Security	3	0	0	3
30.	CA15D3	Data Mining and Data Warehousing	3	0	0	3



**Prerequisite:** None

**Aim:** This course explains the various methods and metrics used in development of software reusable components.

**Objectives:**

- Metrics used in software reusable components
- Development of reusable components
- Reuse in business

### **UNIT I INTRODUCTION**

**9**

Software Reuse success Factors- Change in process - Change in Organization-set of Principles- Reuse Cost effective-software Engineering Processes- Establishing & Managing a Reuse business.

### **UNIT II OBJECT-ORIENTED SOFTWARE ENGINEERING**

**9**

Transform requirement into code- Use Case model-Analysis model-Design model Implementation Model-Test Model-Application and Component Systems- Layered Architecture.

### **UNIT III COMPONENTS**

**9**

Use case Components-Structure the use case model to ensure component reuse- Reusing Component to build the use case model-Design the use case components for effective reuse Expressing use case Variability- Packaging & Documenting use case components objects Components.

### **UNIT IV REUSE PROCESSES**

**9**

Object-oriented Business Engineering-Applying Business Engineering-Applying Business engineering to Define process & organization- Application family Engineering.

### **UNIT V REUSE IN BUSINESS**

**9**

Organizing a Reuse Business- Transition to a Reuse Business- Managing the reuse business – Making the reuse Business work. Applications of reuse in business. A case study of reuse in business.

**TOTAL: 45 PERIODS**

### **REFERENCES:**

1. Ivar Jacobson, Martin Gres, Patrick Johnson, "Software Reuse", Pearson Education, 2004.
2. Even-Andre Karisson, " Software Reuse - A Holistic Approach ", John Wiley and Sons, 1996.
3. Karma McClure, " Software Reuse Techniques - Additional reuse to the systems development process ", Prentice Hall, 1997.

**Prerequisite:** None

**Aim:** To study the concepts of software reliability

**Objectives:**

- To learn Fundamentals of software reliability
- To understand software reliability modeling
- To Study the fundamentals of measurement
- To study about product metrics

### **UNIT I INTRODUCTION TO SOFTWARE RELIABILITY**

**7**

Basic Concepts – Failure and Faults – Environment – Software reliability; Availability – Modeling –uses; Failure definition – Classification, Counting - System Configuration – test run selection – Selection Strategy, Equivalence Partitioning.

### **UNIT II SOFTWARE RELIABILITY MODELING**

**12**

Concepts – General Model Characteristic – Historical Development of models – Model Classification scheme; Markovian models – General concepts – General Poisson Type Models – Binomial Type Models – Poisson Type models – Fault reduction factor for Poisson Type models.

### **UNIT III COMPARISON OF SOFTWARE RELIABILITY MODELS**

**10**

Comparison Criteria – Failure Data – Comparison of Predictive Validity of Model Groups– Recommended Models – Comparison of Time Domains; Calendar Time Modeling – Limiting Resource Concept – Resource Usage model – Resource Utilization – Calendar Time Estimation and confidence Intervals.

### **UNIT IV FUNDAMENTALS OF MEASUREMENT**

**8**

Measurements in Software Engineering – Scope of Software metrics –Representational Theory of Measurement – Measurement and Models – Measurement Scales and Scale Types – Goal based Framework – Software Measurement Validation.

### **UNIT V PRODUCT METRICS**

**8**

Measurement of Internet Product Attributes – Size and Structure – External Product Attributes – Measurement of Quality – Software reliability: measurement and prediction - Basics of reliability theory, The software reliability problem, Parametric reliability growth models – Model Evaluation.

**TOTAL: 45 PERIODS**

### **REFERENCES:**

1. John D. Musa, Anthony Iannino, Kazuhira Okumoto, “Software Reliability – Measurement, Prediction, Application, Series in Software Engineering and Technology”, McGraw Hill, 1987.
2. John D. Musa, “Software Reliability Engineering”, Tata McGraw Hill, 1999.
3. Norman E . Fenton, Shari Lawrence Pfleeger, "Software metrics", Second Edition, International Student Edition, 2003.

**Pre-requisite :** None

**Aim :** To identify the primary external influences affecting HRM.

**Objectives:**

- To understand the importance of human resources.
- To describe the steps involved in the human resource planning process
- To understand the stages of employee socialization and training needs.
- To know about the purposes of performance management systems and appraisal.
- To know the list of occupational safety and health administration enforcement priorities.

**UNIT I FUNDAMENTALS OF HRM**

**9**

Introduction- importance of HRM – functions- qualities of HR manager – evolution and growth of HRM – trends and opportunities - HRM in global environment – legal and ethical context – laws for discriminatory practices – equal opportunity employment.

**UNIT II STAFFING, RECRUITMENT AND SELECTION**

**9**

HR policies - need, type and scope – human resource planning – job analysis – recruiting goals – recruiting sources – global perspective – selection process – pre-employment testing–Interviews – job offers – hiring mistakes - key element for successful predictors.

**UNIT III TRAINING AND DEVELOPMENT**

**9**

Socialization – new employee orientation, training, development – organizational development –methods – evaluating training – international training and development issues – career development - value for organization and individual – mentoring and coaching – traditional career stages

**UNIT IV PERFORMANCE EVALUATION, REWARDS AND BENEFITS**

**9**

Appraisal process – methods – factors distort appraisal – team appraisal – international appraisal –rewards – Theories of motivation - compensation administration – job evaluation and pay structure –special cases of compensation – executive compensation programs – employee benefits.

**UNIT V SAFE AND HEALTHY WORK ENVIRONMENT**

**9**

Occupational safety and health act - issues – stress – assistance program – labor management - employee unions – labor legislation. Promotion, demotion, transfer and separation – employee grievances - redressal methods.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Decenzo and Robbins, Human Resource Management, Wilsey, 10th edition, 2012.
2. Mamoria C.B. and Mamoria. S., Personnel Management, Himalaya Publishing Company, 1997.
3. Mirza S. Saiyadain Human Resource Management , Tata McGraw Hill , 4th edition 2009
4. Eugence Mckenna and Nic Beach Human Resource Management, , Pearson Education Limited, 2002.

5. Dessler, Human Resource Management, Pearson Education Limited, 2002. Decenzo and Robbins, Human Resource Management, Wiley, 6th edition, 2001.
6. Wayne Cascio, Managing Human Resource, McGraw Hill, 1998.
7. Ivancevich, Human Resource Management, McGraw Hill 2002.
8. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 3rd edition 2005.

**CA15A4**

**ADVANCED SOFT COMPUTING**

**L T P C**  
**3 0 0 3**

**Aim:** To study the concepts of soft computing

**Objectives:**

- To learn Fundamentals of soft computing
- To understand soft computing techniques
- To Study the fundamentals of fuzzy systems
- To study about fuzzy algorithms

**UNIT I INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS 9**

Evolution of Computing - Soft Computing Constituents – From Conventional AI to Computational Intelligence – Neural Networks – Fuzzy Set Theory – Evolutionary Computation – Neuro Fuzzy and Soft Computing Characteristics - Machine Learning Basics.

**UNIT II NEURAL NETWORKS 9**

Machine Learning Using Neural Network, Adaptive Networks – Feed forward Networks – Supervised Learning Neural Networks – Radial Basis Function Networks - Reinforcement Learning – Unsupervised Learning Neural Networks – Adaptive Resonance architectures – Advances in Neural networks.

**UNIT III FUZZY LOGIC 9**

Fuzzy Sets – Operations on Fuzzy Sets – Fuzzy Relations – Membership Functions-Fuzzy Rules and Fuzzy Reasoning – Fuzzy Inference Systems – Fuzzy Expert Systems – Fuzzy Decision Making.

**UNIT IV NEURO-FUZZY MODELING 9**

Adaptive Neuro-Fuzzy Inference Systems – Coactive Neuro-Fuzzy Modeling – Classification and Regression Trees – Data Clustering Algorithms – Rulebase Structure Identification – Neuro-Fuzzy Control – Case studies.

**UNIT V GENETIC ALGORITHMS 9**

Introduction to Genetic Algorithms (GA) - Advanced Operators and Techniques in Genetic Search – Applications of GA in Machine Learning - The Rise of GBML, Development of CS-1, Smith's Poker Player, A Potpourri of Current Applications - Machine Learning Approach to Knowledge Acquisition.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, Prentice-Hall of India, 2003.

2. George J. Klir and Bo Yuan, "Fuzzy Sets and Fuzzy Logic-Theory and Applications", Prentice Hall, 1995.
3. James A. Freeman and David M. Skapura, "Neural Networks Algorithms, Applications, and Programming Techniques", Pearson Edn., 2003.
4. Mitchell Melanie, "An Introduction to Genetic Algorithm", Prentice Hall, 1998.
5. David E. Goldberg, "Genetic Algorithms in Search, Optimization and Machine Learning", Addison Wesley, 1997.
6. S. N. Sivanandam, S. Sumathi and S. N. Deepa, "Introduction to Fuzzy Logic using MATLAB", Springer, 2007.
7. S.N.Sivanandam · S.N.Deepa, " Introduction to Genetic Algorithms", Springer, 2007.
8. Jacek M. Zurada, "Introduction to Artificial Neural Systems", PWS Publishers, 1992.

**CA15A5**

**KNOWLEDGE ENGINEERING**

**L T P C**

**3 0 0 3**

**Prerequisite:** None

**Aim:** To study the concepts of knowledge engineering

**Objectives:**

- To learn Fundamentals knowledge engineering
- To understand resolution and reasoning
- To Study about representation
- To study about actions and planning

**UNIT I INTRODUCTION**

**9**

Key concepts – Why knowledge Representation and Reasoning – Language of first order Logic – Syntax, Semantics Pragmatics – Expressing Knowledge – Levels of Representation – Knowledge Acquisition and Sharing – Sharing Ontologies – Language Ontologies –Language Patterns – Tools for Knowledge Acquisition

**UNIT II RESOLUTION AND REASONING**

**9**

Proportional Case – Handling Variables and Qualifies – Dealing with Intractability – Reasoning with Horn Clauses - Procedural Control of Reasoning – Rules in Production – Description Logic - Vivid Knowledge – Beyond Vivid.

**UNIT III REPRESENTATION**

**9**

Object Oriented Representations – Frame Formalism – Structured Descriptions – Meaning and Entailment - Taxonomies and Classification – Inheritance – Networks – Strategies for Defeasible Inheritance – Formal Account of Inheritance Networks.

**UNIT IV DEFAULTS, UNCERTAINTY AND EXPRESSIVENESS**

**9**

Defaults – Introduction – Closed World Reasoning – Circumscription – Default Logic Limitations of Logic – Fuzzy Logic – Nonmontonic Logic – Theories and World – Semiotics – Auto epistemic Logic - Vagueness – Uncertainty and Degrees of Belief – Noncategorical Reasoning – Objective and Subjective Probability.

**UNIT V ACTIONS AND PLANNING**

**9**

Explanation and Diagnosis – Purpose – Syntax, Semantics of Context – First Order

Reasoning – Modal Reasoning in Context – Encapsulating Objects in Context – Agents– Actions – Situational Calculus – Frame Problem – Complex Actions – Planning –Strips – Planning as Reasoning – Hierarchical and Conditional Planning.

**TOTAL: 45 PERIODS**

**REFERENCES :**

1. Ronald Brachman, Hector Levesque “Knowledge Representation and Reasoning “, The Morgan Kaufmann Series in Artificial Intelligence 2004
2. John F. Sowa, “ Knowledge Representation: Logical, Philosophical, an Computational Foundations”, 2000
3. Arthur B. Markman, “Knowledge Representation”, Lawrence Erlbaum Associates, 1998

**CA15A6**

**DIGITAL IMAGE PROCESSING**

**L T P C**  
**3 0 0 3**

**Prerequisite:** Nil

**Aim:**

The purpose of this course is to impart knowledge on various Digital Image Processing Techniques and their Applications

**Objectives:**

1. To learn Image Fundamentals and Processing Techniques
2. To be familiar with Image Transformations in Spatial Domain and Frequency Domain
3. To learn various Filters for Image Restoration
4. To study various Image Compression and Segmentation Techniques

**UNIT I DIGITAL IMAGE FUNDAMENTALS**

**9**

Elements of digital image processing systems, Elements of visual perception, brightness, contrast, hue, saturation, Color image fundamentals - RGB, HSI models, Image sampling, Quantization, Two-dimensional mathematical preliminaries, 2D transforms -DFT, DCT, KLT, SVD.

**UNIT II IMAGE ENHANCEMENT**

**9**

Histogram equalization and specification techniques, Noise distributions, Spatial averaging, Directional Smoothing, Median, Geometric mean, Harmonic mean, Contra harmonic mean filters, Homo morphic filtering, Color image enhancement.

**UNIT III IMAGE RESTORATION**

**9**

Image Restoration - degradation model, unconstrained restoration - Lagrange multiplier and constrained restoration, Inverse filtering-removal of blur caused by uniform linear motion, Wiener filtering, Geometric transformations-spatial transformations.

**UNIT IV IMAGE SEGMENTATION**

**9**

Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and merging – Segmentation by morphological watersheds

– basic concepts – Dam construction – Watershed segmentation algorithm.

## **UNIT V IMAGE COMPRESSION**

**9**

Need for data compression, Huffman coding, Run Length Encoding, Shift codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, MPEG.

**TOTAL: 45 PERIODS**

### **REFERENCES:**

1. Rafael C. Gonzalez, Richard E. Woods, , Digital Image Processing', Pearson ,Second Edition, 2004.
2. Anil K. Jain, Fundamentals of Digital Image Processing', Pearson 2002.
3. Kenneth R. Castleman, Digital Image Processing, Pearson, 2006.
4. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins,' Digital Image Processing using MATLAB', Pearson Education, Inc., 2004.
5. D.E. Dudgeon and RM. Mersereau, , Multidimensional Digital Signal Processing'

**CA15A7**

## **SOFTWARE TESTING**

**L T P C**  
**3 0 0 3**

**Pre-Requisite :** Knowledge in Software Engineering

**Aim :** To become efficient in Software Testing

**Objectives :** To learn Software Quality, Test Case Design, Levels of Testing, Test Management, Controlling and monitoring.

## **UNIT I INTRODUCTION**

**9**

Testing as an Engineering Activity – Role of Process in Software Quality – Testing as a Process – Basic Definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support for Developing a Defect Repository.

## **UNIT II TEST CASE DESIGN**

**9**

Introduction to Testing Design Strategies – The Smarter Tester – Test Case Design Strategies – Using Black Box Approach to Test Case Design Random Testing – Requirements based testing – positive and negative testing — Boundary Value Analysis – decision tables - Equivalence Class Partitioning state-based testing– cause effect graphing – error guessing - compatibility testing – user documentation testing – domain testing -Using White-Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing - Coverage and Control Flow Graphs – Covering Code Logic – Paths – Their Role in White-box Based Test Design – code complexity testing – Evaluating Test Adequacy Criteria.

## **UNIT III LEVELS OF TESTING**

**9**

The Need for Levels of Testing – Unit Test – Unit Test Planning –Designing the Unit Tests- The Test Harness – Running the Unit tests and Recording results – Integration tests –

Designing Integration Tests – Integration Test Planning – scenario testing –defect bash elimination -System Testing – types of system testing - Acceptance testing –performance testing - Regression Testing – internationalization testing – ad-hoc testing -Alpha – Beta Tests – testing OO systems – usability and accessibility testing

#### **UNIT IV TEST MANAGEMENT**

**9**

People and organizational issues in testing – organization structures for testing teams – testing services - Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process - Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

#### **UNIT V CONTROLLING AND MONITORING**

**9**

Software test automation – skills needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation - Test metrics and measurements –project, progress and productivity metrics – Status Meetings – Reports and Control Issues – Criteria for Test Completion – SCM – Types of reviews – Developing a review program – Components of Review Plans– Reporting Review Results. – Evaluating software quality – defect prevention – testing maturity model

**TOTAL: 45 PERIODS**

#### **REFERENCES:**

1. Srinivasan Desikan and Gopalaswamy Ramesh, “ Software Testing – Principles and Practices”, Pearson education, 2006.
2. Ilene Burnstein, “Practical Software Testing”, Springer International Edition, Chennai, 2003
3. Boris Beizer, “Software Testing Techniques”, Second Edition,Dreamtech, 2005
4. Elfriede Dustin, “Effective Software Testing”, First Edition, Pearson Education, 2004
5. Renu Rajani, Pradeep Oak, “Software Testing – Effective Methods, Tools and Techniques”, Tata McGraw Hill, 2004.

**CA15A8**

#### **USER INTERFACE DESIGN**

**L T P C**  
**3 0 0 3**

#### **Aim:**

To study the concepts of user interface design

#### **Objectives:**

- To study concepts of various user interfaces To understand soft computing techniques
- To understand of menus, windows, interfaces and business functions.
- To study characteristics, components & various controls for windows.
- To study the concepts to understand about various problems in windows design with color, text, and graphics.

#### **UNIT I**

Introduction – Importance – Human computer interface – Characteristics of GUI – Direct manipulation graphical system – Web user interface – Popularity – Characteristics & Principles.

#### **UNIT II**

User interface design process – Obstacles – Usability – Human characteristics in design – Human interaction speed – Business functions – Requirements analysis – Direct – Indirect



methods – Basic business functions – Design standards – System Timings – Human consideration in screen design – Structures of menus – Functions of menus – Contents of menu – Formatting – Phrasing the menu – Selecting menu choice – Navigating menus – Graphical Menus.

### **UNIT III**

Windows: Characteristics – Components – Presentation styles – types – Managements – Organizations – Operations – Web systems- device- based controls: Characteristics – Screen-based controls: Operate control – Text boxes – Selection control – Combination control – Custom control – Presentation control.

### **UNIT IV**

Text for web pages – Effective feedback – Guidance & assistance – Internationalization – Accessibility – Icons – Image – Multimedia – Coloring.

### **UNIT V**

Windows layout-test: Prototypes – Kinds of tests – Retest – Information search – Visualization – Hypermedia – WWW –Software tools.

**TOTAL: 45 PERIODS**

### **REFERENCES:**

1. Wilbent. O. Galitz ,“The Essential Guide To User Interface Design”, John Wiley&Sons, 2001.
2. Ben Sheiderman, “Design The User Interface”, Pearson Education, 1998
3. Alan Cooper, “The Essential Of User Interface Design”, Wiley– Dream Tech Ltd.,2002

## **CA15A9**

## **SERVICE ORIENTED ARCHITECTURE**

**L T P C**

**3 0 0 3**

### **Aim:**

The purpose of this course is to impart knowledge on Service Oriented Architecture and various analysis techniques required for service oriented architecture.

### **Objectives:**

- To gain understanding of the basic principles of service orientation
- To learn service oriented analysis techniques
- To learn technology underlying the service design
- To learn advanced concepts such as service composition, orchestration and Choreography
- To know about various WS-\* specification standards

### **UNIT I**

9

Roots of SOA – Characteristics of SOA - Comparing SOA to client-server and distributed internet architectures – Anatomy of SOA- How components in an SOA interrelate -Principles of service orientation

### **UNIT II**

9

Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography -

Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer

**UNIT III**

9

Service oriented analysis – Business-centric SOA – Deriving business services- service modeling - Service Oriented Design – WSDL basics – SOAP basics – SOA composition guidelines – Entity-centric business service design – Application service design – Task-centric business service design

**UNIT IV**

9

SOA platform basics – SOA support in J2EE – Java API for XML-based web services(JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries(JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

**UNIT V**

9

WS-Introduction, WS-Architecture, WS-BPEL basics – WS-Coordination, WS- overview - WS-Choreography, WS-Policy, WS-Security

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Thomas Erl, “Service-Oriented Architecture: Concepts, Technology, and Design”, Pearson Education, 2005.
2. Thomas Erl, “SOA Principles of Service Design “(The Prentice Hall Service-Oriented Computing Series from Thomas Erl), 2005.
3. Newcomer, Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005.
4. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services, An Architect’s Guide”, Pearson Education, 2005.
5. Dan Woods and Thomas Mattern, “Enterprise SOA Designing IT for Business Innovation” O’REILLY, First Edition, 2006

**CA15B1**

**INFORMATION STORAGE MANAGEMENT**

**L T P C**  
**3 0 0 3**

**UNIT I STORAGE SYSTEMS**

9

Introduction to evolution of storage architecture, key data center elements, virtualization and cloud computing, key data center elements – host (or compute), Sconnectivity, storage and application in both classic and virtual environments. RAID on application performance, Components of intelligent storage systems and virtual storage provisioning and intelligent storage system implementations.

**UNIT II STORAGE NETWORKING TECHNOLOGIES**

9

Fibre Channel SAN components, connectivity options, and topologies including access protection mechanism “Zoning”, FC protocol stack, addressing and operations, SAN-based virtualization and VSAN technology, ISCSI and FCIP protocols for storage access over IP network, Converged protocol FCOE and its components, Network Attached Storage(NAS) – components, protocol and operations, File level storage virtualization, object based storage and

unified storage platform.

**UNIT III BACKUP, ARCHIVE AND REPLICATION 9**

Business continuity terminologies, planning and solutions, Clustering and multi pathing architecture to avoid single points of failure, Backup and recovery – methods, targets and topologies, Data reduplication and backup in virtualized environment, Fixed content and data archive, Local replication in classic and virtual environments, Remote replication in classic and virtual environments, Three – site remote replication and continuous data protection.

**UNIT IV CLOUD COMPUTING 9**

Definition of cloud computing, Characteristics of cloud computing, steps involved in transitioning from classic data center to cloud computing environment services and deployment models, cloud infrastructure components, cloud migration considerations.

**UNIT V SECURING AND MANAGING STORAGE INFRASTRUCTURE 9**

Security threats, and counter measures in various domains security solutions for FC-SAN, IP-SAN and NAS environments, Security in virtualized and cloud environments, Monitoring and managing various information infrastructure components in classic and virtual environments, information lifecycle management (ILM) and storage tiering, Cloud service management activities.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Information storage and Management: storing, Managing and Protecting Digital Information in Classic, Virtualized, and cloud Environments, 2<sup>nd</sup> Edition, EMC Education Services, Wiley ISBN:978-1-11780-9483-9
2. Networked Storage Concepts and protocols Techbook (Online Version)
3. Learning Aids on [Https://education.emc.com/ISMbikv2/default.aspx](https://education.emc.com/ISMbikv2/default.aspx).

**CA15B2 SYSTEM SOFTWARE INTERNALS**

**L T P C  
3 0 0 3**

**Prerequisite: None**

**Aim:** To Understand the basic concepts of system software internals

**Objectives:**

1. To study the functions of system software
2. To study the concepts of virtual machine and emulation

**UNIT I REVIEW OF COMPUTER ARCHITECTURE 9**

Machine Instructions and Programs- Machine Code- Interpretation of Machine codes – Assemblers – Assembly languages - Instruction set –Basic Assembler Functions – Assembler Features – Assembler Design Options – Designing an Assembler.

**UNIT II LOADERS AND LINKERS 10**

Basic Loader Functions – Machine-Dependent Loader Features – Machine-Independent Loader Features – Loader Design Options – Architectural Issues– Object Files – Storage Allocation – Symbol Management – Libraries – Relocation –Loading and Overlays – Shared Libraries – Dynamic Linking and Loading – Advanced Techniques

**UNIT III MACROPROCESSORS****8**

Basic Macro Processor Functions – Machine-Independent Macro Processor Features – Macro Processor Design Options – Basic Compiler Functions – Grammars – Lexical Analysis – Syntactic Analysis – Code Generation

**UNIT IV INTRODUCTION TO VIRTUAL MACHINES (VM)****9**

Pascal P-Code VM- Functions - Applications – Object-Oriented VMs – Functions - Applications – Java VM Architecture- Functions - Applications – Common Language Infrastructure – Dynamic Class Loading – Security – Garbage Collection – Optimization

**UNIT V EMULATION****9**

Binary Coding - Interpretation and Binary Translation – Instruction Set Issues – Process Virtual Machines- Introduction – Profiling – Migration – Grids- Applications of Process Virtual Machines – Examples of real world implementations of system software.

**TOTAL: 45 PERIODS****REFERENCES:**

1. Leland L. Beck, “System Software”, 3rd ed., Pearson Education, 1997. (Units 1,2,3)
2. John R. Levine, “Linkers & Loaders”, Morgan Kaufman, 2003. (Unit 2)
3. James E Smith and Ravi Nair, “Virtual Machines”, Elsevier, 2005. (Units 4, 5)
4. Alfred V Aho, Ravi Sethi, Jeffrey D Ullman, “Compilers”, Pearson Education, 1986.
5. Robert W. Sebesta, “Concepts of Programming Languages”, 7th ed., Pearson Education, 2006.
6. Terrance W Pratt, Marvin V Zelkowitz, T V Gopal, “Programming Languages”, 4th ed., Pearson Education, 2006.
7. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, “Computer Organization”, 5th ed., McGraw Hill, 2002.
8. Silberschatz, Galvin, Gagne, “Operating System Concepts”, 6th ed., Wiley, 2003.

**CA15B3****BIO INFORMATICS****L T P C  
3 0 0 3****Prerequisite:**

**Aim:** To understand basic concepts of molecular biology and genetics and their application in Computer Science.

**Objectives:**

1. To learn the concepts of computer science that relate to problems in biological sciences
2. To learn to use computer as a tool for biomedical research

**UNIT I INTRODUCTION****9**

Need for Bioinformatics technologies – Overview of Bioinformatics technologies Structural bioinformatics – Data format and processing – Secondary resources and applications – Role of Structural bioinformatics - Biological Data Integration System.

**UNIT II DATAWAREHOUSING AND DATAMINING IN BIOINFORMATICS****9**

Bioinformatics data – Data warehousing architecture – data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics

**UNIT III MODELING FOR BIOINFORMATICS** **9**

Hidden markov modeling for biological data analysis – Sequence identification – Sequence classification – multiple alignment generation – Comparative modeling – Protein modeling– genomic modeling – Probabilistic modeling – Bayesian networks – Boolean networks - Molecular modeling – Computer programs for molecular modeling.

**UNIT IV PATTERN MATCHING AND VISUALIZATION** **9**

Gene regulation – motif recognition – motif detection – strategies for motif detection – Visualization – Fractal analysis – DNA walk models – one dimension – two dimension– higher dimension – Game representation of Biological sequences – DNA, Protein, Amino acid sequences.

**UNIT V MICROARRAY ANALYSIS** **9**

Microarray technology for genome expression study – image analysis for data extraction – preprocessing – segmentation – gridding – spot extraction – normalization, filtering – cluster analysis – gene network analysis – Compared Evaluation of Scientific Data Management Systems – Cost Matrix – Evaluation model - Benchmark – Tradeoffs.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Yi-Ping Phoebe Chen (Ed), “BioInformatics Technologies”, First Indian Reprint, Springer Verlag, 2007.
2. Zoe Iacroux and Terence Critchlow, “BioInformatics – Managing Scientific data”, First Indian Reprint, Elsevier, 2004.
3. Bryan Bergeron, “Bio Informatics Computing”, Second Edition, Pearson Education, 2003.

**CA15B4** **MANAGEMENT INFORMATION SYSTEMS**

**L T P C**  
**3 0 0 3**

**Prerequisite:** Nil

**Aim:**

The purpose of this course is to impart knowledge on Management Information System and its Techniques and their Applications.

**Objectives:**

1. To learn Information system Fundamentals
2. To be familiar with representation of system architecture
3. To learn technology underlying the architecture design
4. To learn advanced concepts of Decision theory
5. To know about development life cycle of Information system

**UNIT I** **INFORMATION SYSTEM AND ORGANIZATION** **9**

Matching the Information System Plan to the Organizational Strategic Plan – Identifying Key Organizational Objective and Processes and Developing an Information System Development – User role in Systems Development Process – Maintainability and Recoverability in System Design.

**UNIT II REPRESENTATION AND ANALYSIS OF SYSTEM STRUCTURE** **9**

Models for Representing Systems: Mathematical, Graphical and Hierarchical (Organization

Chart, Tree Diagram) – Information Flow – Process Flow – Methods and Heuristics – Decomposition and Aggregation – Information Architecture – Application of System Representation to Case Studies.

**UNIT III SYSTEMS, INFORMATION AND DECISION THEORY 9**

Information Theory – Information Content and Redundancy – Classification and Compression – Summarizing and Filtering – Inferences and Uncertainty – Identifying Information needed to Support Decision Making – Human Factors – Problem characteristics and Information System Capabilities in Decision Making.

**UNIT IV INFORMATION SYSTEM APPLICATION 9**

Transaction Processing Applications – Basic Accounting Application – Applications for Budgeting and Planning – Other use of Information Technology: Automation – Word Processing – Electronic Mail – Evaluation Remote Conferencing and Graphics – System and Selection – Cost Benefit – Centralized versus Decentralized Allocation Mechanism.

**UNIT V DEVELOPMENT AND MAINTENANCE OF INFORMATION SYSTEMS 9**

Systems analysis and design – System development life cycle – Limitation – End User Development – Managing End Users – off- the shelf software packages – Outsourcing – Comparison of different methodologies.

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Laudon K.C, Laudon J.P, Brabston M.E, “Management Information Systems - Managing the digital firm”, Pearson Education, 2004.
2. Turban E.F, Potter R.E, “Introduction to Information Technology”; Wiley, 2 004.
3. Jeffrey A.Hoffer, Joey F.George, Joseph S. Valachich, “Modern Systems Analysis and Design”, Third Edition, Prentice Hall, 2002.

**CA15B5 SOFTWARE RISK MANAGEMENT AND MAINTENANCE**

**LT P C  
3 0 0 3**

**Pre-Requisite: Knowledge in Software Engineering**

**Aim :**

To understand the various risk levels in software development

**Objectives:**

- To gain expertise in discovering risk and usage of risk assessment tools
- To understand the risk plan , implementation and tracking risks
- To realize the software maintenance process, measurement and benchmarking
- To expertise in the SQA maintenance tools

**UNIT I RISK CULTURE AND MANAGEMENT PROCESS 9**

Risk- Basic Terms- Risk Vocabulary – Risk- Driven Project Management- Controlling the Process, Environment and Risk- Maturity in Risk Culture – Risk Scale – Preparing for Risk – Risk Management- Paradigms- Five Models of Risk Management – Thinking about Less Risky alternatives – Risk Management at Different Levels – Risk Escalation – Risk Models- Risk Intelligence - Software Risk Management steps.

## **UNIT II DISCOVERING RISK AND ASSESSMENT**

**9**

Identifying software risk- Classification of Risks – Risk Taxonomy – Risk Mapping – Statements – Risk Reviews – Risk Ownership and stakeholder management – Risk Assessment Approach – Risk Assessment tools and techniques – Risk Probability, impact, exposure, matrix and Application Problem- Self- assessment checklist.

## **UNIT III RESPONDING TO RISKS AND TRACKING**

**9**

Special Treatment for Catastrophic risks- Constraint Risks – Risk Mitigation Plan Case Study – Contingency Plans- Implementing Risk Response- Tracking Risk Response and Hazards – Trigger Levels- Tracking Project Risks and Operational Risks- Learning by Tracking and Risk Tracker Tool.

## **UNIT IV MAINTENANCE PROCESS**

**9**

Software Maintenance- Customer's Viewpoint- Economics of Maintenance- Issues in Maintenance- Software Maintenance Standard, Process, Activities and Categories – Maintenance Measurement – Service Measurement and Benchmarking – Problem Resolution- Reporting – Fix Distribution.

## **UNIT V ACTIVITIES FOR MAINTENANCE**

**9**

Role of SQA for Support and Maintenance – SQA tools for Maintenance- Configuration Management and Maintenance – Maintenance of Mission Critical Systems – Global Maintenance Teams – Foundation of S3m Process Model- Exemplary Practices.

**TOTAL: 45 PERIODS**

### **REFERENCES:**

1. C. RavindranathPandian, “Applied Software Risk Management: A guide for Software Project Managers”, Auerbach Publications, 2007.
2. John Mcmanus, “Risk Management in Software Development Projects”, Elsevier Butterworth- Heinemann, First Edition, 2004.
3. Alian April and Alain Abran, “Software Maintenance Management: Evaluation and Continuous Improvement”, John Wiley & Sons Inc, 2008.
4. Gopalaswamy Ramesh and Ramesh Bhattiprolu, “Software Maintenance: Effective Practices for Geographically Distributed Environments”, Second Reprint, Tata McGraw- Hill, 2009

**CA15B6**

## **WIRELESS NETWORKS**

**L T P C**

**3 0 0 3**

**Prerequisite:** Basic Knowledge in Computer Networks

**Aim:** To study the different types of wireless networks

### **Objectives:**

1. To learn the features of different wireless networks
2. To learn the working principles of different wireless networks

## **UNIT I WIRELESS LOCAL AREA NETWORKS**

**9**

Introduction to wireless LANs - IEEE 802.11 WLANs –System Architecture – Protocol Stack - Physical Layer- MAC sublayer- MAC Management Sublayer- Wireless ATM - HIPERLAN- System Architecture – Protocol Stack -HIPERLAN-2, Wi-Max, Wi-Fi.

## **UNIT II 3G OVERVIEW & 2.5G EVOLUTION**

**9**

Migration path to UMTS, UMTS Basics, Air Interface, 3GPP Network Architecture,

CDMA2000 overview- Radio and Network components, Network structure, Radio network, TD-CDMA, TD-SCDMA.

### **UNIT III ADHOC & SENSOR NETWORKS**

**9**

Characteristics of MANETs – Introduction – Routing protocols - Table-driven and Source-initiated On Demand routing protocols, Hybrid protocols, Wireless Sensor networks- Introduction - Classification, MAC and Routing protocols – Applications of Sensor networks.

### **UNIT IV INTERWORKING BETWEEN WLANS AND 3G WWANS**

**9**

Interworking objectives and requirements, Schemes to connect WLANs and 3G Networks, Session Mobility, Interworking Architectures for WLAN and GPRS, System Description, Local Multipoint Distribution Service, Multichannel Multipoint Distribution system.

### **UNIT V 4G & BEYOND**

**9**

4G features and challenges, Technology path, IMS Architecture, Convergent Devices, 4G technologies, Seamless Connectivity, Horizontal and Vertical Handover, Advanced Broadband Wireless Access and Services, Multimedia, MVNO.

**TOTAL: 45 PERIODS**

#### **REFERENCES:**

1. Clint Smith. P.E., and Daniel Collins, “3G Wireless Networks”, 2nd Edition, Tata McGraw Hill, 2007.
2. Vijay. K. Garg, “Wireless Communication and Networking”, Morgan Kaufmann Publishers, <http://books.elsevier.com/9780123735805;>, 2007.
3. Kaveth Pahlavan,. K. Prashanth Krishnamuorthy, "Principles of Wireless Networks", Prentice Hall of India, 2006.
4. William Stallings, "Wireless Communications and networks" Pearson / Prentice Hall of India, 2nd Ed., 2007.
5. Dharma Prakash Agrawal & Qing-An Zeng, “Introduction to Wireless and Mobile Systems”, Thomson India Edition, 2nd Ed., 2007.
6. Gary. S. Rogers & John Edwards, “An Introduction to Wireless Technology”, Pearson Education, 2007.
7. Sumit Kasera and Nishit Narang, “ 3G Networks – Architecture, Protocols and Procedures”, Tata McGraw Hill, 2007.

**CA15B7**

**M - COMMERCE**

**LT P C  
3 0 0 3**

**Prerequisite:** Basic Knowledge in Networking

**Aim:** To be able to apply E – commerce principles in market place.

**Objectives:**

- To understand the E – commerce strategies and value chains
- To understand the M-commerce services
- To understand M – commerce infrastructure and applications.
- To know the availability of latest technology and applications of M- commerce in various domains.



- To apply mobile commerce in business-to-business application.

### **UNIT I ELECTRONIC COMMERCE**

**9**

Introduction -The e-commerce environment - The e-commerce marketplace -Focus on portals, Location of trading in the marketplace - Commercial arrangement for transactions - Focus on auctions - Business models for e-commerce - Revenue models - Focus on internet start-up companies – the dot-com - E-commerce versus E-business.

### **UNIT II MOBILE COMMERCE**

**9**

Introduction – Infrastructure Of M- Commerce – Types Of Mobile Commerce Services – Technologies of Wireless Business – Benefits And Limitations, Support, Mobile Marketing & Advertisement, Non-Internet Applications In M- Commerce –Wireless/Wired Commerce Comparisons

### **UNIT III MOBILE COMMERCE: TECHNOLOGY**

**9**

A Framework For The Study Of Mobile Commerce – NTT Docomo’s I- Mode – Wireless Devices For Mobile Commerce – Towards A Classification Framework For Mobile Location Based Services – Wireless Personal And Local Area Networks –The Impact Of Technology Advances On Strategy Formulation In Mobile Communications Networks

### **UNIT IV MOBILE COMMERCE: THEORY AND APPLICATIONS**

**9**

The Ecology Of Mobile Commerce – The Wireless Application Protocol – Mobile Business Services – Mobile Portal – Factors Influencing The Adoption Of Mobile Gaming Services – Mobile Data Technologies And Small Business Adoption And Diffusion – M-Commerce In The Automotive Industry – Location- Based Services: Criteria For Adoption And Solution Deployment – The Role Of Mobile Advertising In Building A Brand – M- Commerce Business Models

### **UNIT V BUSINESS- TO- BUSINESS MOBILE E-COMMERCE**

**9**

Enterprise Enablement – Email And Messaging – Field Force Automation (Insurance, Real Estate, Maintenance, Healthcare) – Field Sales Support (Content Access, Inventory) – Asset Tracking And Maintenance/Management – Remote IT Support –Customer Retention (B2C Services, Financial, Special Deals) – Warehouse Automation – Security.

**TOTAL: 45 PERIODS**

### **REFERENCES:**

1. Dave Chaffey, “E-Business and E-Commerce Management”, Third Edition, 2009, Pearson Education
2. Brian E. Mennecke, Troy J. Strader, “Mobile Commerce: Technology, Theory and Applications”, Idea Group Inc., IGI press, 2003.
3. P. J. Louis, “ M-Commerce Crash Course”, McGraw- Hill Companies February 2001.
4. Paul May, “Mobile Commerce: Opportunities, Applications, and Technologies of Wireless Business” Cambridge University Press March 2001.
5. Michael P. Papazoglou, Peter M.A. Ribbers, ‘e-business organizational and Technical foundation ‘,Wiley India 2009
6. Dr.Pandey , Saurabh Shukla E-commerce and Mobile commerce Technologies , Sultan chand ,2011

**Prerequisite:** None

**Aim:** To study the concepts of virtualization

**Objectives:**

- To learn Fundamentals of virtualization
- To understand memory management in virtualization
- To Study the fundamentals of I/O virtualization
- To study about virtualized computing and security

### UNIT I

**Overview:** Why server virtualization –History and re-emergence –General structures. Architectures comparison. Commercial solutions –VMWare, Xen. Virtual machines: CPU virtualization -Privileged instructions handling -Hypervisor - Paravirtualization. Hardware-assisted virtualization. Booting up. Time keeping. CPU scheduling. Commercial examples.

### UNIT II

Memory management in virtualization: partitioning –reclamation –ballooning. Memory sharing. OS-level virtualization –VM Ware memory management techniques –Red Hat Enterprise Virtualization.

### UNIT III

I/O virtualization: Virtualizing I/O devices -monolithic model -virtual I/O server. Virtual networking –tunneling –overlay networks. Commercial examples. Virtual storage: Granularity - file system level –blocks level.

### UNIT IV

Virtualized computing: Virtual machine based distributed computing, elastic cloud computing, clustering, cold and hot migration. Emerging Applications. Commercial examples. Challenges and future trends. Case study - Real Machines.

### UNIT V

Virtual Security: Virtualization security overview – Guest OS isolation, Guest OS monitoring, Image and snapshot management; Security recommendations – Hypervisor security, Guest OS security, Virtualized infrastructure security, desktop virtualization security; Secure virtualization planning and deployment.

**TOTAL: 45 PERIODS**

### REFERENCES:

1. Virtual Machines: Versatile Platforms for Systems and Processes (1st Ed): Jim Smith, Ravi Nair; Morgan Kaufmann (2005)
2. Applied Virtualization Technology - Usage models for IT professionals and Software Developers (1st Ed): Sean Campbell Intel Press (2006).
3. Guide to Security for Full Virtualization Technologies (Recommendations of the National Institute of Standards and Technology-US), Karen Scarfone, Murugiah Souppaya & Paul Hoffman, NIST Special Publication (2010).

**Prerequisites:**

- Basic Knowledge in computer networks
- Basic Knowledge in technology on computer science

**Aim:**

The overall aim of this course is to develop students with the skills and knowledge to design, build and extend the internet infrastructure and to design a variety of distributed applications.

**Objectives:**

- To provide students with the fundamentals and essentials of Cloud Computing.
- To provide students a sound foundation of the Cloud Computing so that they are able to start using and adopting Cloud Computing services and tools in their real life scenarios.
- To enable students exploring some important cloud computing driven commercial systems such as GoogleApps, Microsoft Azure and Amazon Web Services and other businesses cloud applications

**UNIT I INTRODUCTION**

9

History of cloud computing - Basics and Definition - Roots of Cloud Computing – Service models and deployment models –Features - Infrastructure Management - IaaS – PaaS – Challenges and Risk – Migrating to cloud – seven step model

**UNIT II VIRTUALIZATION AND SERVICES**

9

Introduction – Benefite \_ Levels of Virtualization \_ Virtualization at OS level – Virtualization structure – mechanisms – open source virtualization technology – Xen virtualization architecture – full virtualization – Para virtualization – virtualization of CPU, Memory and I/O devices – Hardware Support – processor virtualization –IaaS –Paas – SaaS – DbaaS – Special services

**UNIT III CLOUD TYPES MODELS AND IMPLEMENTAION**

9

Private cloud – public cloud – community cloud – hybrid cloud – Eucalyptus cloud architecture – open stack cloud architecture - features – components – modes of operation-traditional Vs cloud applications – recommendations and fundamental requirements for cloud application architecture

**UNIT IV DATA SECURITY AND APPLICATION ARCHITECTURE**

9

Challenges with cloud data – data security – data confidentiality – encryption – data availability – data integrity – cloud data management interface – storage gateways – cloud firewall – virtual firewall – application requirements

**UNIT V CLOUD PROGRAMMING AND ADOPTION**

9

Programming support for Google Apps Engine – Amazon EC2- Adoption of public cloud by SMBS – benefits –phases – Vendors roll and responsibilities – vendor selection – provider liability – provider capabilities – success factors for cloud consumers – issues with SMBS using public cloud services

**TOTAL: 45 PERIODS**

**REFERENCES:**

1. Cloud computing principles and paradigms by RajKumar Buyya, James Broberg, Andrzej Goscinski, Wiley India Pvt Ltd, Delhi 2011
2. Cloud computing Black book by Kailash Jayaswal, Jegannath Kallakurchi, Donald J. Houde, Dr. Devan Shah, Kogent Learnig solutions Inc, 2014
3. Cloud computing Bible by Barries Sosinsky, Wiley India Pvt Ltd, Delhi 2011
4. Cloud computing, A hands on approach by Arshdeep Bahga, Vijay Madiseti, Universities Press (India ) Pvt Ltd, 2014

**AIM:** To learn technologies behind Adhoc Networks

**OBJECTIVES:**

- To learn fundamentals of adhoc networks.
- To learn adhoc routing techniques
- To learn about transmission control and QoS management in adhoc networks

**UNIT I**

**FUNDAMENTALS**

**9**

Introduction – Fundamentals of Wireless Communication Technology– IEEE 802.11a–b Standard – Origin of Ad hoc Packet Radio Networks – Technical Challenges – Architecture of PRNETs – Components of Packet Radios – Ad hoc Wireless Networks – Heterogeneity in Mobile Devices – Wireless Sensor Networks – Traffic Profiles – Types of Ad hoc Mobile Communications – Challenges Facing Ad hoc Mobile Networks – Ad hoc wireless Internet.

**UNIT II**

**AD HOC ROUTING PROTOCOLS**

**9**

Introduction – Issues – Classification - Table–Driven Routing Protocols – Destination Sequenced Distance Vector (DSDV) – Wireless Routing Protocol (WRP) – Cluster Switch Gateway Routing (CSGR) – Source–Initiated On–Demand Approaches – Ad hoc On–Demand Distance Vector Routing (AODV) – Dynamic Source Routing (DSR) – Temporally Ordered Routing Algorithm (TORA) – Signal Stability Routing (SSR) – Location–Aided Routing (LAR) – Power–Aware Routing (PAR) – Zone Routing Protocol (ZRP).

**UNIT III**

**MULTICASTROUTING IN ADHOC NETWORKS**

**9**

Introduction – Issues – Operation –Architecture Reference–Classifications of Multicast Routing Protocols – Tree–Based Multicast Routing Protocols– Mesh–Based Multicast Routing Protocols – Summary of Tree and Mesh based Protocols – Energy–Efficient Multicasting – Multicasting with Quality of Service Guarantees – Application – Dependent Multicast Routing – Comparisons of Multicast Routing Protocols.

**UNIT IV**

**TRANSPORT LAYER– SECURITY PROTOCOLS**

**9**

Introduction – Issues - Design Goals of a Transport Layer Protocol for Ad hoc Wireless Networks –Classification of Transport Layer Solutions – TCP over Ad hoc Wireless Networks – Other Transport Layer Protocols for Ad hoc Wireless Networks – Security in Ad Hoc Wireless Networks – Network Security Requirements –Issues and Challenges – Network Security Attacks – Key Management – Secure Routing in Ad hoc Wireless Networks.

**UNIT V**

**QoS AND ENERGY MANAGEMENT**

**9**

Introduction – Issues and Challenges in Providing QoS – Classifications of QoS Solutions – MAC Layer Solutions – Network Layer Solutions – QoS Frameworks for Ad

hocWireless Networks EnergyManagement – Introduction – Need for Energy Management – Classification of Energy Management Schemes – Battery Management Schemes – Transmission Power Management Schemes – System Power Management Schemes.

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES :**

1. C. Siva Ram Murthy and B. S. Manoj, “Ad Hoc Wireless Networks Architectures and Protocols”, Prentice Hall, PTR, 2004.
2. C. K. Toh, “Ad Hoc Mobile Wireless Networks Protocols and Systems”, Prentice Hall, PTR,001.
3. Charles E. Perkins, “Ad Hoc Networking”, Addison Wesley, 2000

**CA15C2**

**DISTRIBUTED OPERATING SYSTEM**

**3 0 0 3**

**AIM:** To study in detail about Distributed Operating System.

**OBJECTIVES:**

- To provide fundamental concepts and design principles of distributed operating systems.
- To provide an overview of various communication techniques that facilitates to exchange information among distributed computing systems.

**UNIT I**

**9**

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**

**10**

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**

**8**

Synchronization – Introduction – Clock Synchronization – Event ordering – Mutual Exclusion –Deadlocks in Distributed Systems – Election Algorithms-Atomic Transactions.

**UNIT IV**

**9**

Resource Management – Introduction – Features – Task Assignment approach – LoadBalancing Approach - Load -Sharing Approach Process Management – Introduction – ProcessMigration – Threads.

**UNIT V**

**9**

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: 45 PERIODS**

**BOOKS FOR REFERENCES:**

1. Pradeep K. Sinha, "Distributed Operating Systems, Concepts and Design" Prentice Hall of India, New Delhi, 2008.
2. Andrew S. Tanenbaum "Distributed Operating Systems", Pearson Education, New Delhi, 2012
3. Mukesh Singhal and Nirajan G.Shivaratri "Advanced Concepts in Operating Systems", Tata McGraw Hill Publishing Company Ltd., New Delhi, 2001
4. George Coulouris, Jean Dollimore, Tim Kindberg, Distributed Systems: Concepts and Design, Pearson Education Ltd., 2012, ISBN: 81-7808-462-7.
5. Yakup Paker, Jean-Pierre Banatre, Müslim Bozyigit, Distributed operating systems: theory and practice, Springer-Verlag, 1987, ISBN: 3540176993.

**CA15C3**

**MULTIMEDIA DATABASES**

**3 0 0 3**

**AIM:** To learn Multimedia databases

**OBJECTIVES:**

- To learn the basics concepts in Database Management systems.
- To understand multidimensional data structures.
- To learn Text/Document databases.
- To study Audio databases.
- To study design and architecture of Multimedia databases.

**UNIT I**

**9**

Basics of Database Management Systems - Relational Model – SQL, Functional Dependencies - Normal Forms – Multivalued Dependencies, Join Dependencies – Examples - An introduction to Object-oriented Databases.

**UNIT II**

**9**

Multidimensional Data Structures: k-d Trees - Point Quadrees - The MX-Quadtree – R-trees - comparison of Different Data Structures.

**UNIT III**

**9**

Text/Document Databases - Precision and Recall - Stop Lists - Word Stems and Frequency Tables - Latent Semantic Indexing - TV-Trees - Other Retrieval Techniques Image Databases - Raw Images - Compressed Image Representations - Similarity-Based Retrieval - Alternative Image DB Paradigms - Representing Image DBs with Relations - Representing Image DBs with R-Trees - Retrieving Images By Spatial Layout-Implementations.

**UNIT IV**

**9**

Audio Databases - A General Model of Audio Data - Capturing Audio Content through Discrete Transformation - Indexing Audio Data. Video Databases - Organizing Content of a Single Video - Querying Content of Video Libraries - Video Segmentation

**UNIT V**

**9**

Design and Architecture of a Multimedia Database - Organizing Multimedia Data

Based on The Principle of Uniformity - Media Abstractions - Query Languages for Retrieving Multimedia Data.

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES :**

1. V. S. Subramanian, "Principles of Multimedia Database Systems", Elsevier Publishers, 1998.
2. Elmasri and Navathe Fundamentals of Database Systems, 4th Edition, Addison Wesley, 2003. S. Subramanian, "Principles of Multimedia Database Systems", Elsevier, 1998.
3. C. J. Date, "An Introduction to Database Systems", Seventh Edition, Pearson Education, 2000.
4. S. Khoshafian and A. B. Bakor, "Multimedia and Imaging Databases", Elsevier, 1996.
5. Kingsley C. Nwosu, "Multimedia Database Systems: Design and Implementation Strategies", Kluwer Academic Publishers, 1996.
6. Prabhakaran, "Multimedia Database Management Systems", Springer, 1<sup>st</sup> Edition, 1996.
7. Lynne Dunckley, "Multimedia Databases: An Object-Relational Approach", Pearson Education, 2003.

**CA15C4**

**ARTIFICIAL INTELLIGENCE**

**3 0 0 3**

**AIM:** To learn Artificial Intelligence techniques

**OBJECTIVES:**

- To search and discover intelligent characteristics of existing AI projects
- To map a new problem as search and create an animation
- Showing different search strategies for a problem
- Program a new game/ problem in Prolog
- To evaluate different Knowledge Representation schemes for typical AI problems
- To design and implement a typical AI problem to be solved Using Machine Learning Techniques
- To design and implement a futuristic AI application

**UNIT I : INTRODUCTION**

**9**

Introduction – Definition - Future of Artificial Intelligence – Characteristics of Intelligent Agents – Typical Intelligent Agents – Problem Solving Approach to Typical AI problems

**UNIT II :PROBLEM SOLVING METHODS**

**9**

Problem solving Methods - Search Strategies- Uninformed - Informed - Heuristics – Local Search Algorithms and Optimization Problems - Searching with Partial Observations - Constraint Satisfaction Problems – Constraint Propagation - Backtracking Search – Game Playing -Optimal Decisions in Games -Alpha--Beta Pruning -Stochastic Games.

**UNIT III : KNOWLEDGE REPRESENTATION**

**9**

First Order Predicate Logic – Prolog Programming - Unification -Forward Chaining – Backward Chaining - Resolution –Knowledge Representation - Ontological Engineering - Categories and Objects –Events - Mental Events and Mental Objects - Reasoning Systems for Categories - Reasoning with Default Information



**UNIT IV : MACHINE LEARNING****9**

Probability basics - Bayes Rule and its Applications - Bayesian Networks – Exact and Approximate Inference in Bayesian Networks - Hidden Markov Models - Forms of Learning - Supervised Learning - Learning Decision Trees - Regression and Classification with Linear Models - Artificial Neural Networks - Nonparametric Models - Support Vector Machines - Statistical Learning - Learning with Complete Data - Learning with Hidden Variables- The EM Algorithm – Reinforcement Learning

**UNIT V :APPLICATIONS****9**

AI applications – Language Models - Information Retrieval - Information Extraction – Natural Language Processing - Machine Translation – Speech recognition – Robot – Hardware – Perception – Planning – Moving

**TOTAL: 45 PERIODS****BOOKS FOR REFERENCES :**

1. S. Russell and P. Norvig, Artificial Intelligence: A Modern Approach, Prentice Hall, 3<sup>rd</sup> Edition, 2009
2. Bratko, I., Prolog Programming for Artificial Intelligence (International Computer Science Series), Addison-Wesley Educational Publishers Inc; 4th edition, 2011.
3. David L. Poole, Alan K. Mackworth, Artificial Intelligence: Foundations of Computational Agents, Cambridge University Press, 2010.
4. Ethem Alpaydin, Introduction to Machine Learning (Adaptive Computation and Machine Learning series), The MIT Press; second edition, 2009
5. Nils J. Nilsson, the Quest for Artificial Intelligence, Cambridge University Press, 2009.

**CA15C5 SOFTWARE REQUIREMENTS MANAGEMENT****3 0 0 3**

**AIM:** To study the concepts of software requirements and how to manage the requirements.

**OBJECTIVES:**

- To learn the overview of requirement engineering
- To understand requirements elicitation
- To Study about requirements analysis
- To study about requirements development
- To study about requirements management

**UNIT I : REQUIREMENTS ENGINEERING OVERVIEW****9**

Software Requirement Overview – Software Development Roles –Software Development Process Kernels – Commercial Life Cycle Model – Vision Development – Stakeholders Needs & Analysis.

**UNIT II : REQUIREMENTS ELICITATION****9**

The Process of Requirements Elicitation – Requirements Elicitation Problems

Problems of Scope – Problems of Understanding – Problems of Volatility – Current Elicitation Techniques – Information Gathering – Requirements Expression and Analysis – Validation – An Elicitation Methodology Framework – A Requirements Elicitation Process Model – Methodology over Method – Integration of Techniques – Fact-Finding – Requirements Gathering – Evaluation and Rationalization – Prioritization – Integration and Validation.

**UNIT III : REQUIREMENTS ANALYSIS 9**

Identification of Functional and Non Functional Requirements – Identification of Performance Requirements – Identification of safety Requirements – Analysis – Feasibility and Internal Compatibility of System Requirements – Definition of Human Requirements Baseline.

**UNIT IV : REQUIREMENTS DEVELOPMENT 9**

Requirements analysis – Requirements Documentation – Requirements Development Workflow – Fundamentals of Requirements Development – Requirements Attributes Guidelines Document – Supplementary Specification Document – Use Case Specification Document – Methods for Software Prototyping – Evolutionary prototyping – Throwaway prototyping.

**UNIT V : REQUIREMENTS VALIDATION 9**

Validation objectives – Analysis of requirements validation – Activities – Properties – Requirement reviews – Requirements testing – Case tools for requirements engineering.

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES:**

1. Ian Sommerville, Pete Sawyer, “Requirements Engineering: A Good Practice Guide”, Sixth Edition, Pearson Education, 2004.
2. Dean Leffingwell , Don Widrig, “Managing Software Requirements A Use Case Approach”, Second Addition, Addison Wesley , 2003.
3. Karl Eugene Wiegers, “Software Requirements”, Word Power Publishers, 2000.
4. an Graham, “Requirements Engineering and Rapid Development”, Addison Wesley, 1998.

**CA15C6 CYBER FORENSICS 3 0 0 3**

**AIM:** To learn about Cyber Forensics

**OBJECTIVES:**

- To understand Computer Forensics, Computing Investigations, Enforcement Agency Investigations, Corporate Investigations, forensically sound principles and practices related to digital evidence collection, management, and handling.

**UNIT I : TYPES OF COMPUTER FORENSICS 9**

Computer Forensics Fundamentals – Types of Computer Forensics Technology – Types of Vendor and Computer Forensics Services.

**UNIT II : DATA RECOVERY 9**

Data Recovery – Evidence Collection and Data Seizure – Duplication and Preservation of Digital evidence – Computer Image Verification and Authentication.

**UNIT III : ELECTRONIC EVIDENCE** **9**  
Discover of Electronic Evidence – Identification of Data – Reconstructing Past Events – Networks.

**UNIT IV :THREATS** **9**  
Fighting against Macro Threats – Information Warfare Arsenal – Tactics of the Military – Tactics of Terrorist and Rogues – Tactics of Private Companies.

**UNIT V : SURVEILLANCE** **9**  
The Future – Arsenal – Surveillance Tools – Victims and Refugees – Advanced Computer Forensics.

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES :**

1. John R. Vacca, “Computer Forensics”, Firewall Media, 2004.
2. Chad Steel, “Windows Forensics”, Wiley India, 2006.
3. Majid Yar, “Cybercrime and Society”, Sage Publications, 2006.
4. Robert M Slade, “Software Forensics”, Tata McGraw Hill, 2004

**CA15C7** **MOBILE COMMUNICATION TECHNIQUES** **3 0 0 3**

**AIM:**

To Study about the Wireless Communication Techniques.

**OBJECTIVES:**

- To study about Fundamental Concept of Wireless.
- To study about Mobile device Technologies
- To study about Wireless networks.

**UNIT I : WIRELESS COMMUNICATION FUNDAMENTALS** **9**

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 SYSTEMS** **9**

GSM – System Architecture – Protocols – Connection Establishment – Frequency Allocation – Routing – Handover – Security – GPRS

**UNIT III : WIRELESS LAN** **9**

Wireless LAN – IEEE 802.11 Standards – Architecture – services – HIPERLAN – AdHoc Network – Blue Tooth.

**UNIT IV : NETWORK LAYER** **9**

Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV – DSR – Alternative Metrics.

**UNIT V : TRANSPORT AND APPLICATION LAYERS** **9**

TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile TCP – Fast



**BOOKS FOR REFERENCES:**

1. Alferd V.Aho, Jeffery D.Ullman, "Principles of Compiler Design", Pearson Education, New Delhi, 2008.
2. D. Chithra, "Principles of Compiler Design, CBS Publishers,2011
3. Dr. O. G. Kakde., Compiler Design Fourth Edition.,2008

**CA15C9 INFORMATION SYSTEM SECURITY****3 0 0 3****AIM:** To study the concepts of system security**OBJECTIVES:**

- To learn Fundamentals of security
- To understand Secure network
- To Study about network management
- To study about network security

**UNIT I : INTRODUCTION****9**

History of network security, Classical information security, Crypto security, Kerberos for IP Networks, Private and public keys, Nature of network security, Fundamental framework for network security.

**UNIT II : SECURITY MODELS****9**

Analysis and performance impact of network topology, Vulnerabilities and security attack models in ATM, IP and mobile wireless networks; Security services, policies, and models.

**UNIT III : TECHNIQUES OF SECURE NETWORK****9**

Intrusion detection techniques - centralized and distributed; Emulation of attack models and performance assessment through behavior modeling and asynchronous distributed simulation; Principles of secure network design.

**UNIT IV : NETWORK MANAGEMENT****9**

Network Management: Management Standards and Models, configuration management, Cryptography: Plain text, cipher text, encryption algorithm, decryption algorithm, requirements, Principles of Public Key Cryptography, DES, double and triple DES, cryptographic models, key distribution, link encryption, end-end encryption, steganography.

**UNIT V : NETWORK SECURITY****9**

Network security: Overview OSI model, maximum transfer unit, IP, TCP, UDP, ICMP, ARP, RARP and DNS, ping, trace route. Network attacks: Buffer overflow, IP scheduling, TCP, Web Security and Application Security: Web servers and browsers: security features, Firewalls and Intrusion Detection Systems: Firewall characteristics & design principles, types of firewalls, Firewall architectures: dual homed host, screening router, screened host.

**TOTAL: 45 PERIODS****BOOKS FOR REFERENCES:**

1. William Stallings: Network Security Essentials, Pearson Education Asia.
2. Gollman Dieter: Computer Security: John Wiley & Sons Ltd.
3. William Stallings " Cryptography and networks security: Principles and Practice,"

Prentice Hall, New jersey,

4. Johannes A Buchmann, "Introduction to cryptography," Springer-verlag.
- 5 Bruce Schiener, "Applied Cryptography".

**CA15D1**

**MODELING AND SIMULATION**

**3 0 0 3**

**AIM:** To study the concepts of system simulation

**OBJECTIVES:**

- To learn Fundamentals simulation
- To understand continuous system simulation
- To Study about probability concepts
- To study about discrete system simulation

**UNIT I**

**9**

Concepts of system – System Environment – stochastic activities continuous and discrete systems – definition and types of modeling – principles in modeling.

System studies : Subsystems – Types of system study – system analysis – system postulation.

**UNIT II**

**9**

System simulation – Fighter – Bomber system – Inventory system, chemical reactor – Recursive System – Monte – Carlo Method – Progress of a simulation study – lag and Cobweb Models – comparison of simulation and analytical methods.

**UNIT III**

**9**

Continuous system simulation: Continuous system model – analog and hybrid computer – digital analog simulators – CSSLS – Feedback and Autopilot system – interactive and real time simulation.

System dynamics : system dynamic diagrams – world model.

**UNIT IV**

**9**

Probability concepts: Arrival pattern and service times, distributions: Poisson, Uniform And Erlong.

**UNIT V**

**9**

Discrete system simulation: Discrete events – time representation – discrete simulation languages – model of telephone system – study of GPSS, SIMSCRIPT Languages – Model of multitasking computer system – comparison between continuous and discrete simulation languages.

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES:**

1. Geoffrey Gorden : "System Simulation "PHI 2nd Ed. 2007.
2. Narsinghdeo : "System Simulation with digital Computer "PHI 2001.
3. Gery Banks,et al., Discrete event System Simulation, PHI NewDelhi, 2005

**AIM:** To learn network security Concepts

**OBJECTIVES:**

- To learn about wired and wireless network security with various cryptographic techniques.
- To learn about private and public keys algorithms along with attacks types.

**UNIT I :CLASSICAL CRYPTOSYSTEM 9**

Security trends – Security Attacks and services – Symmetric cipher model- Classical Encryption Techniques — LFSR sequences – Basic Number theory – Congruences – Chinese Remainder theorem – Modular exponentiation – Fermat and Euler's theorem – Legendre and Jacobi symbols – Finite Field – Galois Field.

**UNIT II : BLOCK CIPHER 9**

Simple DES – DES – Modes of operation – Triple DES – AES – RC4 – RSA – Attacks – Primality test – factoring.

**UNIT III : MESSAGE AUTHENTICATION 9**

Discrete Logarithms – Computing discrete logs – Diffie-Hellman key exchange – ElGamal Public key cryptosystems – Hash functions – Secure Hash – Birthday attacks - MD5 – Digital signatures – RSA – ElGamal – DSA.

**UNIT IV : NETWORK SECURITY 9**

Kerberos, X.509, PKI – Electronic Mail security – PGP – IP security – Web Security – SSL, TLS, SET.

**UNIT V : WIRELESS NETWORK SECURITY 9**

Wireless Network Security- IEEE 802.11 Wireless LANs - Protocol Overview and Security - Wireless Application Protocol (WAP) - Protocol Overview - Wireless Transport Layer Security (WTLS).

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES:**

1. William Stallings, “Cryptography and Network security Principles and Practices”, Pearson/PHI, 5th ed, 2006. [Unit II, Unit III, Unit IV, Unit V]
2. Wade Trappe, Lawrence C Washington, “Introduction to Cryptography with coding theory”, 2nd ed, Pearson, 2007. [Unit I]
3. W. Mao, “Modern Cryptography – Theory and Practice”, Pearson Education, Second Edition, 2007.

**AIM:**

To study advanced aspects of data warehousing and data mining, encompassing the principles, research results and commercial application of the technologies.

**OBJECTIVES:**

The data warehousing module aims to give students a good overview of the ideas and techniques which are behind recent development in the data warehousing and online analytical processing (OLAP) fields, in terms of data models, query language, conceptual design methodologies, and storage techniques. Data mining module aims to motivate, define and characterize data mining as process; to motivate, define and characterize data mining applications.

**UNIT 1 : INTRODUCTION 9**

Relation To Statistics, Databases- Data Mining Functionalities-Steps In Data Mining Process-Architecture of a typical Data Mining Systems- Classification of Data Mining Systems – Overview of Data Mining Techniques.

**UNIT II: DATA MINING CONCEPTS AND TECHNIQUES 9**

Data Preprocessing-Data Cleaning, Integration, Transformation, Reduction, Discretization- Concept Hierarchies-Concept Description: Data Generalization And Summarization Based Characterization- Mining Association Rules In Large Databases.

**UNIT III: PREDICTIVE MODELING 9**

Classification And Prediction. Issues Regarding Classification and Prediction- Classification By Decision Tree Induction-Bayesian Classification-Other Classification Methods-Prediction-Clusters Analysis: Types of Data in Cluster Analysis-categorization of Major Clustering Methods: Partitioning Methods –Hierarchical Methods.

**UNIT IV: DATA WAREHOUSING 9**

Data Warehousing Components –Multi Dimensional Data Model- Data Warehouse Architecture-Data Warehouse Implementation- -Mapping the Data Warehouse to Multiprocessor Architecture- OLAP.–Need- Categorization of OLAP Tools.

**UNIT V : APPLICATIONS 9**

Applications of Data Mining-Social Impacts of Data Mining-Tools-An Introduction to DB Miner-Case Studies-Mining WWW-Mining Text Database-Mining Spatial Databases.

**TOTAL: 45 PERIODS**

**BOOKS FOR REFERENCES:**

1. Jiawei Han, Micheline Kamber, “Data Mining: Concepts and Techniques”, Morgan Kaufmann Publishers, 2002.
2. Alex Berson, Stephen J. Smith, “Data Warehousing, Data Mining & OLAP”, Tata McGraw- Hill, 2004.
3. Usama M.Fayyad, Gregory Piatetsky – Shapiro, Padhrai Smyth and Ramasamy Uthurusamy, “Advances in Knowledge Discovery And Data Mining”, The M.I.T press, 1996.
4. Ralph Kimball, “The Data Warehouse Life Cycle Toolkit”, John Wiley & Sons Inc., 1998.
5. Sean Kelly, “Data Warehousing In Action”, John Wiley & Sons Inc., 1997.