

## ANNEXURE – I

**B.S.ABDUR RAHMAN UNIVERSITY**  
**SCHOOL OF COMPUTER, INFORMATION AND MATHEMATICAL SCIENCES**  
**MASTER OF COMPUTER APPLICATIONS (MCA)**  
**(Six Semesters / Full Time)**

**(Updated Curriculum and Syllabi as on June 2013)**

### CURRICULAM

Sl. No.	Code	Subject	L	T	P	TC
<b>SEMESTER I</b>						
<b>Theory</b>						
1.	MA617	<a href="#">Mathematical Foundations for Computer Applications</a>	3	1	0	4
2.	CA601	<a href="#">Problem Solving and Programming in C</a>	3	0	0	3
3.	CA602	<a href="#">Computer Architecture</a>	3	0	0	3
4.	CA603	<a href="#">Database Management Systems</a>	3	0	0	3
5.	CA604	<a href="#">Software Engineering</a>	3	0	0	3
6.	CA605	<a href="#">Computer Networks</a>	3	0	0	3
<b>Practical</b>						
1.	CA606	<a href="#">C Programming Lab</a>	0	0	6	2
2.	CA607	<a href="#">DBMS Lab</a>	0	0	6	2
<b>Total</b>						<b>23</b>
<b>SEMESTER II</b>						
<b>Theory</b>						
1.	MS681	<a href="#">Accounting and Financial Management</a>	3	1	0	4
2.	MA618	<a href="#">Resource Management Techniques</a>	3	1	0	4
3.	CA608	<a href="#">Data Structures</a>	3	0	0	3
4.	CA609	<a href="#">Operating Systems</a>	3	0	0	3
5.	CA610	<a href="#">Design and Analysis of Algorithms</a>	3	0	0	3
6.	CA611	<a href="#">Object Oriented Programming using C++</a>	3	0	0	3

**Practical**

1.	CA612	<a href="#">Object Oriented Programming Lab</a>	0	0	6	2
2.	CA613	<a href="#">Algorithms and Data Structures Lab</a>	0	0	6	2
3.	EN611	<a href="#">Communication Skills Laboratory</a>	0	0	2	1
			<b>Total</b>		<b>25</b>	

**SEMESTER III****Theory**

1.	CA701	<a href="#">Internet and Java Programming</a>	3	0	0	3
2.	CA702	<a href="#">Computer Graphics and Multimedia _Systems</a>	3	0	0	3
3.	CA703	<a href="#">Microprocessors and its Applications</a>	3	0	0	3
4.	CA704	<a href="#">Distributed Computing</a>	3	0	0	3
5.		Elective I	3	0	0	3
6.		Elective II	3	0	0	3

**Practical**

1.	CA705	<a href="#">Java Programming and Graphics &amp; Multimedia Lab</a>	0	0	6	2
2.	CA706	<a href="#">Microprocessor Lab</a>	0	0	6	2
3.	CA713	<a href="#">Soft Skills</a>	0	0	2	1
			<b>Total</b>		<b>23</b>	

**Semester IV****Theory**

1.	CA707	<a href="#">Object Oriented Analysis and Design</a>	3	0	0	3
2.	CA708	<a href="#">Web Design and Development</a>	3	0	0	3
3.	CA709	<a href="#">Unix and Network Programming</a>	3	0	0	3
4.	CA710	<a href="#">XML and Web Services</a>	3	0	0	3
5.		Elective III	3	0	0	3
6.		Elective IV	3	0	0	3

**Practical**

1.	CA711	<a href="#">Unix and Network Programming Lab</a>	0	0	6	2
2.	CA712	<a href="#">XML and Web Services Lab</a>	0	0	6	2
<b>Total</b>					<b>22</b>	

**Semester V****Theory**

1.	MS084	<a href="#">Organizational Behaviour</a>	3	0	0	3
2.	CA803	<a href="#">Middleware Technologies</a>	3	0	0	3
3.		Elective V	3	0	0	3
4.		Elective VI	3	0	0	3

**Practical**

1.	CA804	<a href="#">Middleware Lab</a>	0	0	6	2
2.	CA805	Project Phase - I	0	0	12	6*
<b>Total</b>					<b>14</b>	

**Semester VI****Practical**

1.	CA806	Project Phase - II	0	0	24	12
<b>Total</b>					<b>6 + 12 = 18</b>	

\* Credits for Project Work (Phase I) to be accounted along with Project work (Phase II) in VI Semester

**Total Credits : 125**

## LIST OF ELECTIVES

CAY001	<a href="#">Management Information System</a>	3	0	0	3
CAY002	<a href="#">E-Commerce</a>	3	0	0	3
CAY003	<a href="#">Advanced Databases</a>	3	0	0	3
CAY004	<a href="#">Digital Image Processing</a>	3	0	0	3
CAY005	<a href="#">TCP/IP Protocol Suite</a>	3	0	0	3
CAY006	<a href="#">Visual Programming</a>	3	0	0	3
CAY007	<a href="#">Mobile Computing</a>	3	0	0	3
CAY008	<a href="#">Software Quality Management</a>	3	0	0	3
CAY009	<a href="#">Data Mining and Data Warehousing</a>	3	0	0	3
CAY010	<a href="#">Component Based Technology</a>	3	0	0	3
CAY011	<a href="#">Supply Chain Management</a>	3	0	0	3
CAY012	<a href="#">Business Processes</a>	3	0	0	3
CAY013	<a href="#">Software Project Management</a>	3	0	0	3
CAY014	<a href="#">Enterprise Resource Planning</a>	3	0	0	3
CAY015	<a href="#">Software Agents</a>	3	0	0	3
CAY016	<a href="#">Unix Internals</a>	3	0	0	3
CAY017	<a href="#">Grid Computing</a>	3	0	0	3
CAY018	<a href="#">Network Security</a>	3	0	0	3
CAY019	<a href="#">Embedded Systems</a>	3	0	0	3
CAY020	<a href="#">Software Quality Assurance</a>	3	0	0	3
CAY021	<a href="#">Adhoc Networks</a>	3	0	0	3
CAY022	<a href="#">Special Elective</a>	3	0	0	3
CAY023	<a href="#">Principles of Compiler Design</a>	3	0	0	3
CAY024	<a href="#">Business Intelligence</a>	3	0	0	3
CAY025	<a href="#">Service Oriented Architecture</a>	3	0	0	3
CAY026	<a href="#">Content Management System</a>	3	0	0	3
CAY027	<a href="#">Software Testing</a>	3	0	0	3

# MASTER OF COMPUTER APPLICATIONS (MCA)

(Six Semesters / Full Time)

## SYLLABUS

<b>MA617</b>	<b>MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

[TOP](#)

### Objective of the Course:

To extend student's mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

### **1. MATRIX ALGEBRA 12**

Matrices, Rank of Matrix, Solving System of Equations-Eigen Values and Eigen Vectors-Inverse of a Matrix - Cayley Hamilton Theorem

### **2. BASIC SET THEORY 12**

Basic Definitions - Venn Diagrams and set operations - Laws of set theory - Principle of inclusion and exclusion - partitions- Permutation and Combination - Relations- Properties of relations - Matrices of relations - Closure operations on relations - Functions - injective, surjective and bijective functions.

### **3. MATHEMATICAL LOGIC 12**

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

### **4. FORMAL LANGUAGES 12**

Languages and Grammars-Phrase Structure Grammar-Classification of Grammars-Pumping Lemma For Regular Languages-Context Free Languages.

## **5. FINITE STATE AUTOMATA**

**12**

Finite State Automata-Deterministic Finite State Automata(DFA), Non Deterministic Finite State Automata (NFA)-Equivalence of DFA and NFA-Equivalence of NFA and Regular Languages.

**L : 45, T : 15**  
**Total : 60**

### **TEXT BOOK :**

1. Kenneth H.Rosen, " Discrete Mathematics and Its Applications", Tata McGraw Hill, Fourth Edition, 2002 (Unit 1,2 & 3).

### **REFERENCES :**

1. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2002. ( Unit 4,5)
2. A.Tamilarasi & A.M.Natarajan, "Discrete Mathematics and its Application", Khanna publishers, 2<sup>nd</sup> Edition 2005.
3. M.K.Venkataraman "Engineering Mathematics", Volume II, National Publishing Company, 2<sup>nd</sup> Edition,1989.

### **Outcomes of the Course:**

At the end of the course students would

- have gained knowledge which has application in expert system, in database and a basic for the prolog language.
- have an understanding in identifying patterns on many levels.
- be aware of a class of functions which transform a finite set into another finite set which relates to input and output function in computer applications.

**Objective of the Course:**

The aim of the course is

- to introduce students to the foundations of computing, programming and problem-solving.
- to develop basic programming skills necessary for engineering education.
- to develop the programming ability in students, and to improve their proficiency in applying the computing fundamentals to their field of study.

**1. 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

**2. FUNDAMENTAL ALGORITHMS 9**

Introduction – Exchanging the values – Counting – Factorial Computation – SINE computation – Base Conversion – Factoring Methods – Array Techniques.

**3. INTRODUCTION TO C LANGUAGE 9**

Overview of C – Constants, Variables and Data Types – Operators and Expressions – Managing Input/Output Operations – Formatted I/O – Decision Making - Branching -- IF, Nested IF – Switch – goto - Looping- While, do, for statements.

**4. ARRAYS, FUNCTIONS, STRUCTURES AND UNIONS 9**

Arrays – dynamic and multi-dimensional arrays - Character arrays and Strings – String handling Functions - User defined Functions – Categories of Functions – Recursion - Structures and Unions – Array of Structures – Structures and Functions

## **5. POINTERS AND FILE MANAGEMENT**

**9**

Pointers – Declaration, Accessing a variable, character strings, pointers to functions and structures - File Management in C – Dynamic Memory allocation – Linked Lists – Preprocessors.

**Total: 45**

### **TEXT BOOKS :**

1. R.G.Dromey " How to Solve it by Computer ", PHI , 1998
2. E.Balagurusamy " Programming in ANSI C " , Tata McGraw Hill, 2004

### **REFERENCES :**

1. Deitel and Deitel " C How to Program ", Addison Wesley , 2001
2. Brian W.Kernighan & Dennis Ritchie "C Programming Language", PHI, 1990
3. Byron.S.Gottfried "Schaum's Outline of Programming with C ", 2<sup>nd</sup> Edition,1996

### **Outcomes of the Course:**

At the end of the course the student will have strong fundamentals in C.



[TOP](#)**Objective of the Course:**

The aim of the course is to

- understand the digital logic fundamentals
- know about the digital components
- understand the computer organization and Programming concepts
- know in detail I-O organization
- describe about the memory organization and CPU

**1. INTRODUCTION TO DIGITAL DESIGN****9**

Data Representation – Data Types – Complements – Arithmetic Operations – Representations – Fixed –Point, Floating – Point , Decimal Fixed – Point – Binary Codes- Logic Gates, Boolean Algebra, Map Simplification – Combinational Circuits: Half-Adder, Full Adder- Flip Flops - Sequential Circuits

**2. DIGITAL COMPONENTS REGISTER TRANSFER & MICRO OPERATIONS****9**

ICs – Decoders – Multiplexers – Registers – Shift Registers – Binary Counters – Memory Unit – Register Transfer Language – Register Transfer – Bus And Memory Transfers – Arithmetic , Logic And Shift Micro Operations , Arithmetic Logic Shift Unit.

**3. COMPUTER ARCHITECTURE AND PROGRAMMING****9**

Instruction Codes – Computer Registers – Computer Instructions – Timing And Control – Instruction Cycle – Memory Reference Instructions – I/O And Interrupt – Machine Language – Assembly Language – Assembler - Program Loops – Programming Arithmetic And Logic Operations – Subroutines – I/O Programming.

**4. INPUT – OUTPUT ARCHITECTURE****9**

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

## **5. MEMORY ARCHITECTURE AND CPU**

**9**

Memory Hierarchy – Main Memory – Auxiliary Memory – Associative Memory – Cache Memory – Virtual Memory – Memory Management Hardware – CPU: General Register Organization – Control Word – Stack Organization – Instruction Format – Addressing Modes – Data Transfer And Manipulation – Program Control.

**Total : 45**

### **TEXTBOOK :**

1. M.Morris Mano, "Computer System Architecture", Prentice Hall of India, 2001.

### **REFERNCES :**

1. John .p.Hayes, "Computer Architecture and Organization", Tata McGraw Hill, 1996.
2. V.C.Hamatcher, et al "Computer Organization", Tata Mcgraw Hill, 1996

### **Outcomes of the Course:**

At the end of the course, the students will be able to

- understand the major components of a computer including CPU, memory, I/O and storage.
- understand the role of the operating system in interfacing with the computer hardware.
- understand the basic components of the CPU including the ALU and control unit.

[TOP](#)

### Objective of the Course:

The course, Database Management Systems, provides an introduction to the management of database systems. The course emphasizes the understanding of the fundamentals of relational systems including data models, database architectures, and database manipulations. The course uses a problem-based approach to learning.

### 1. INTRODUCTION 9

Database Systems vs. File Systems-View of Data- Data Models-Database Languages-Transaction Management-Database Systems Structure-History of Database Systems-Database Systems Applications-Entity Relationship Model

### 2. RELATIONAL DATABASES 9

SQL-Basic Structure-Set Operations-Complex Queries-Joined Queries-DDL-Embedded SQL-Dynamic SQL-Other SQL Functions-Query by Example-Integrity and Security of searching-Relational Database Design

### 3. DATA STORAGE AND INDEXING 9

Storage & File Structure-Disks-RAID-File Organization-Indexing & Hashing-B+ TREE-B Tree-Static Hashing-Dynamic Hashing-Multiple Key Access

### 4. QUERY EVALUATION & OPTIMIZATION 9

Query Processing-Selection Operation-Sorting-Join Operation-Evaluation of Expressions-Query Optimization

### 5. TRANSACTION MANAGEMENT 9

Transaction Concept-Static Implementation-Concurrency Control-Protocols-Deadlock Handling-Recovery Systems-Recovery with Concurrent Transactions-Shadow Paging-Buffer Management-Case Studies-Oracle-Microsoft SQL Server

**Total: 45**

### TEXT BOOK:

1. Abraham Silberschatz, Henry F.Korth and S.Sudharssan, "Database System Concepts", 4<sup>th</sup> Edition, Tata McGraw Hill, 2002

**REFERENCE :**

1. Raghu Ramakrishnan & Johannesgerhrke, "Data Base Management Systems", Mc Graw Hill International Edition, 2000

**Outcomes of the Course:**

At the conclusion of the course, the student will be able to:

- understand terms related to database design and management
- understand the objectives of data and information management
- develop physical data models for relational database management systems
- implement relational databases using a RDBMS retrieve data using SQL

**Objective of the Course:**

The aims of the course are as follows

- to define software engineering and explain its importance
- to discuss the concepts of software products and software processes
- to solve problems in a team environment through effective use of written and oral communication skills.
- to practice the lifelong learning needed in order to keep current as new issues emerge.
- to develop software in at least one application domain.

**1. 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.

**2. 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

**3. 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

**4. 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

## 5. 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**

### **TEXT BOOK :**

1. Roger Pressman.S., "Software Engineering: A Practitioner's Approach", 6<sup>th</sup> Edition, Mcgraw Hill, 2005.

### **REFERENCES :**

1. P. Fleeger, "Software Engineering", Prentice Hall, 1999.
2. Carlo Ghezzi, Mehdi Jazayari, Dino Mandrioli, "Fundamentals Of Software Engineering", Prentice Hall Of India 1991.
3. I. Sommerville, "Software Engineering" , 5<sup>th</sup> Edition: Addison Wesley, 1996.

### **Outcomes of the Course:**

At the completion of this course, students will be able to,

- understand and apply foundations of software engineering practice and process within production constraints
- get an awareness of current industry standards and practices
- understand and apply principles of project management for single, paired, and team processes
- have strong oral and written communication skills to help students in preparing good quality documentation

**Objective of the Course:**

The intent of this course is to provide students with enough knowledge in networking, various types of networks and to analyze different network applications. It discusses the Network Architecture and defines the quantitative performance metrics that often drive network design. This course explains the overall end-to-end behavior of networks. It introduces internetworking and describes the key elements of the Internet Protocol. It describes many of the issues that all data link protocols must address, including encoding, framing, and error detection. It defines how networks are scaled to the size of the Internet and are able to route packets. It includes core concepts, existing protocol specifications, real protocols which are used to illustrate most of the important ideas.

**1. INTRODUCTION****9**

Building a network – Requirements – Network Architecture – OSI – Internet – Direct Link Networks – Hardware building blocks – Framing – Error detection – Reliable transmission.

**2. NETWORK FUNDAMENTALS****9**

LAN Technology – LAN Architecture – BUS/Tree – Ring – Star – Ethernet – Token Rings – Wireless.

**3. NETWORK LAYER****9**

Packet Switching – Switching and Forwarding – Bridges and LAN switches – Internetworking – Simple Internetworking – Routing.

**4. TRANSPORT LAYER****9**

Reliable Byte Stream (TCP) – Simple Demultiplexer (UDP) – TCP Congestion Control – Congestion Avoidance Mechanisms.

**5. PRESENTATION LAYER and APPLICATIONS****9**

Presentation formatting – Data compression – Cryptographic Algorithms: RSA - DES -- Applications – Domain Name Service – Email - SMTP – MIME – HTTP – SNMP.

**Total: 45**

**TEXT BOOK :**

1. Larry L. Peterson & Bruce S. Davie, "Computer Networks - A systems Approach", 2nd Edition, Harcourt Asia/Morgan Kaufmann, 2000.

**REFERENCES :**

1. James F. Kurose and Keith W. Ross, "Computer Networking - A Top Down Approach featuring the Internet", 1<sup>st</sup> Edition, Addison Wesley Publishing Company, 2001.
2. William Stallings, "Data and Computer Communications", 5<sup>th</sup> Edition, PHI, 1997.
3. Andrew S. Tanenbaum, "Computer Networks", Tata Mcgraw Hill, 3<sup>rd</sup> Edition, 2001

**Outcomes of the Course:**

At the end of the course, the students will be able to

- identify and describe the layers of the OSI and TCP/IP
- illustrate how networks work in practice
- analyze the applications of network
- make effective use of networking topologies



[TOP](#)**Objective of the Course:**

The aim of the course is

- to impart knowledge on the fundamentals of C Programming
- to brief on Data Types, Operators, Statements, Loops, Functions, Array, Pointers, Structures

**Outcomes of the Course:**

At the end of the course, the students will learn the fundamentals of C Programming

1. Display the following:  
(i) Floyd's triangle (ii) Pascal Triangle
2. Generate the following series of numbers:  
Armstrong numbers between 1 to 100  
Prime numbers between 1 to 50  
Fibonacci series up to N numbers
3. Manipulate the strings with following operations.  
(i) Concatenating two strings (ii) Reversing the string (iii) Finding the substring  
(iv) Replacing a string (v) Finding length of the string
4. Find the summation of the following series:  
(i) Sine (ii) Cosine (iii) Exponential
5. Create the sales report for M sales person and N products using two dimensional array.
6. Simulate following Banking operations using functions.  
(i) Deposit (ii) Withdrawal (iii) Balance Enquiry
7. Implement using recursion  
I, Find the solution of Towers of Hanoi problem using recursion.  
II, Fibonacci number generation.  
III, Factorial
8. Generate Student mark sheets using structures.
9. Create a collection of books using arrays of structures and do the following:  
(i) Search a book with title and author name (ii) Sorts the books on title.

**Objective of the Course:**

The aim of the course is

- to learn SQL (Structured Query Language) which would provide functionality to:
  - learn how to create tables which are fundamental storage blocks of data.
  - learn how to place constraints on data that is entered on tables to ensure data integrity.
  - learn how to add, change and remove data from tables.
  - learn how to select a subset of the data you want to see from the collection of tables and data.
  - learn how to combine table and group multiple rows of data in table.
- to learn PL/SQL which would provide the ability to do iterative programming at database level to:
  - write programming blocks with conditional structure, assignment structure, loop structure, etc.
  - use exception Handling, Transaction oriented programs, Stored procedures, functions, packages, etc.
  - use cursors which would allow row wise access of data.
  - use triggers which would allow you define pre and post actions when something changes in the database tables.

**Outcomes of the Course:**

At the end of this course, a student will be able to

- get an idea about database and how this is widely used in real time business activities.
  - create and do manipulation on table.
  - work with table by using PL/SQL Program.
  - get a clear idea about database transaction activities.
1. Execute a single line and group functions for a table.
  2. Execute DCL and TCL Commands.
  3. Create and manipulate various DB objects for a table.
  4. Create views, partitions and locks for a particular DB.
  5. Write PL/SQL procedure for an application using exception handling.

6. Write PL/SQL procedure for an application using cursors.
7. Write a DBMS program to prepare reports for an application using functions.
8. Write a PL/SQL block for transaction operations of a typical application using triggers.
9. Write a PL/SQL block for transaction operations of a typical application using package.
10. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).

Typical Applications – Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory, etc.



**TEXTBOOKS :**

1. S.N.Maheswari, "Financial and Management Accounting", Sultan Chand & Sons, 2003
2. I.M.Pandey, "Financial Management", Vikas Publications, 4th Reprint, 2002

**REFERENCES :**

1. S.P.Iyengar, "Cost and Management Accounting", Sultan Chand & Co.
2. I.M.Pandey, "Elements of Management Accounting" Vikas Publishing House, 1999

**Outcomes of the Course:**

At the end of this course, a student will be able to

- prepare final accounts of a concern to find out the profit or loss
- analyze the firm by applying various ratios.
- analyze the factors affecting a capital structure, working capital and dividends.

[TOP](#)**Objective of the Course:**

To teach students how to solve a real world problem by

- constructing a model representation of the problem under study.
- deriving a solution from the model.
- testing the model and solution
- implementing the solution.

**1. LINEAR PROGRAMMING MODELS****12**

Mathematical Formulation - Graphical Solution of linear programming models - Simplex method - Artificial variable Techniques- Variants of Simplex method

**2. TRANSPORTATION AND ASSIGNMENT MODELS****12**

Mathematical formulation of transportation problem- Methods for finding initial basic feasible solution - optimum solution - degeneracy - Mathematical formulation of assignment models - Hungarian Algorithm - Variants of the Assignment problem

**3. INTEGER PROGRAMMING MODELS****12**

Formulation - Gomory's IPP method - Gomory's mixed integer method - Branch and bound technique.

**4. SCHEDULING BY PERT AND CPM****12**

Network Construction - Critical Path Method - Project Evaluation and Review Technique - Resource Analysis in Network Scheduling

**5. QUEUEING MODELS****12**

Characteristics of Queuing Models - Poisson Queues -  $(M / M / 1) : (FIFO / \infty / \infty)$ ,  $(M / M / 1) : (FIFO / N / \infty)$ ,  $(M / M / C) : (FIFO / \infty / \infty)$ ,  $(M / M / C) : (FIFO / N / \infty)$  models.

**L : 45, T : 15**  
**Total : 60**

**TEXT BOOK :**

1. Taha H.A., "Operations Research : An Introduction " 7<sup>th</sup> Edition, Pearson Education, 2004.

**REFERENCES :**

1. A.M.Natarajan, P.Balasubramani, A.Tamilarasi, "Operations Research", Pearson Education, Asia, 2005.
2. Prem Kumar Gupta, D.S. Hira, "Operations Research", S.Chand & Company Ltd, New Delhi, 3<sup>rd</sup> Edition , 2003.

**Outcomes of the Course:**

Resource Management Techniques gives students the power to make more effective decisions and build more productive systems based on:

- data
- careful predictions of outcomes and estimates of risk
- the latest decision tools and techniques

[TOP](#)**Objective of the Course:**

Data structure is a particular way of storing and organizing data in a computer so that it can be used efficiently. Different kinds of data structures are suited to different kinds of applications and some are highly specialized to specific tasks. For example, B-trees are particularly well-suited for implementation of databases, while compiler implementations usually use hash tables to look up identifiers. Data structures are used in almost every program or software system. Data structures provide a means to manage huge amounts of data efficiently, such as large databases and internet indexing services. Usually, efficient data structures are a key to designing efficient algorithms. Some formal design methods and programming languages emphasize data structures rather than algorithms as the key organizing factor in software design.

**1. DATA STRUCTURES 9**

Introduction – Arrays – Structures – Stack: Definition and examples, Representing Stacks - Queues and lists: Queue and its Representation, lists – Applications of Stack, Queue and Linked Lists.

**2. TREES 9**

Binary Trees – Operations on binary trees - Binary Tree Representations – node representation, internal and external nodes, implicit array representation – Binary tree Traversals - Huffman Algorithm – Representing Lists as Binary Trees

**3. SORTING AND SEARCHING 9**

General Background – Exchange sorts – Selection and Tree Sorting – Insertion Sorts – Merge and Radix Sorts – Basic Search Techniques – Tree Searching – General Search Trees – Hashing.

**4. GRAPHS AND THEIR APPLICATIONS 9**

Graphs – An application of graphs – Representation – transitive closure - Warshall's algorithm – Shortest path algorithm - a flow Problem – Dijkstra's algorithm – An application of scheduling - Linked representation of Graphs – Graph Traversals

**5. 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

**Total: 45**

**TEXT BOOK :**

1..Tanaenbaum A.S.,Langram Y. Augestein M.J " Data Structures using C"  
Pearson Education , 2004

**REFERENCES:**

1. Robert Kruse & Clovis L. Tondo " Data Structures and Program Design in C",Prentice Hall , 2nd edition.,1991.
2. Weiss "Data Structures and Algorithm Analysis in C " ,Addison Wesley , Second Edition, 1997.

**Outcomes of the Course:**

At the completion of this course, the student will able to

- understand the properties of various data structures;
- identify the strengths and weaknesses of different data structures concepts;
- possess the knowledge of various existing algorithms;
- analyze and compare the efficiency of algorithms;

**CA609**

**OPERATING SYSTEMS**

**L T P C**

[TOP](#)

**3 0 0 3**

**Objective of the Course:**

This course provides an overview of computer system and operating system, concepts of process management, memory management, storage management, protection and security issues, and distributed systems

**1. INTRODUCTION**

**7**

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

**2. PROCESS MANAGEMENT**

**8**

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

**3. PROCESS SYNCHRONIZATION**

**10**

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

**4. MEMORY MANAGEMENT**

**10**

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

**5. I/O AND FILE SYSTEMS**

**10**

Disk Scheduling-File Concepts-File System Structure-Access Methods-Directory Structure-Protection-Directory Implementation-Allocation Methods-Free Space Management-Case Study: Linux System

**Total: 45**

**TEXT BOOK :**

1. Silberschatz and Galvin, Operating System Concepts, 6<sup>th</sup> Edition, John Wiley & Sons, Inc., 2004

**REFERENCES :**

1. Milankovic M., Operating System Concepts and Design, 2<sup>nd</sup> Edition, McGraw Hill, 1992
2. P.C.Bhatt, An Introduction to Operating Systems-Concepts and Practice, Prentice Hall Of India, 2004
3. H.M.Deitel, An Introduction to Operating Systems, 2<sup>nd</sup> Edition, Pearson Education, 2002

**Outcomes of the Course:**

At the completion of this course, students will be able to

- master understanding of design issues associated with operating systems
- master various process management concepts including scheduling, synchronization, deadlocks and multithreading
- master concepts of memory management including virtual memory also the master issues related to file system interface and implementation, disk management

[TOP](#)**Objective of the Course:**

The aim of the course is to

- introduce basic concepts of algorithms
- introduce mathematical aspects and analysis of algorithms
- introduce sorting and searching algorithms
- introduce various algorithmic techniques
- introduce algorithm design methods
- teach how to apply the algorithms and design techniques to solve problems;
- devise correct and efficient algorithms for solving a given problem
- validate/verify algorithms
- learn whether efficient algorithm exists for solving a given problem
- write clear algorithms.
- explain NP-Completeness and deal with NP-complete problems

**1. INTRODUCTION****8**

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.

**2. DIVIDE AND CONQUER METHOD AND GREEDY METHOD****7**

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.

**3. DYNAMIC PROGRAMMING****10**

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

**4. BACKTRACKING AND BRANCH AND BOUND****10**

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

## **5. NP-HARD AND NP-COMPLETE PROBLEMS**

**10**

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

**Total: 45**

### **TEXT BOOK:**

1. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education 2003.

### **REFERENCE:**

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, "Introduction to algorithms" Prentice Hall 1990.

### **Outcomes of the Course:**

At the completion of this course, students will be able to

- understand, explain, model and analyze a given software problem as a solution.
- understand various design methods and analyzing techniques will be learnt by the students
- understand NP-Completeness and deal with NP-complete problems

**Objective of the Course:**

The aim of the course is to

- identify and practice the object-oriented programming concepts and techniques
- practice the use of C++ classes and class libraries
- get a clear understanding of object-oriented concepts.
- understand object oriented programming through C++.
- gain the basic knowledge on Object Oriented concepts.
- develop applications using Object Oriented Programming Concepts.
- implement features of object oriented programming to solve real world problems.

**1. OOP PARADIGAM****8**

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

**2. INTRODUCTION TO C++****11**

Overview of C++-Classes and Objects-Friend Functions-Friend Classes-Inline Function-Static Members-Arrays-Pointers-References-Dynamic Allocation

**3. OVERLOADING****7**

Function Overloading-Overloading Constructor Functions-Copy Constructors-Default Argument-Operator Overloading-Member Operator Overloading-Overloading new and delete

**4. ADDITIONAL FEATURES****10**

Inheritance-Base Class-Access Control-Virtual Functions-Pure Virtual Functions-Templates-Generic Functions-Appling 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

## 5. 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

**Total: 45**

### TEXT BOOKS :

1. Herbert Schildt, "C++ The Complete Reference", Tata McGrawHill Edition, 2003 (unit 2, 3, 4)
2. Bjanne Stroustrup, "The C++ Programming Language", 3<sup>rd</sup> Edition, Addison Wesley, 2000 (Unit 1 & 5)

### REFERENCES

1. Robert Lafore. "Waite Groups OOP in Turbo C++", Galgotia Publications, 2001
2. Stanley, B. Lippman, Jove Lagrie, "C++ Primer", 3<sup>rd</sup> Edition, Addison Wesley, 1998

### Outcomes of the Course:

At the completion of this course, students will be able to

- understand object-oriented programming features in C++
- gain some practical experience of C++
- understand implementation issues related to object-oriented techniques
- further develop skills in software development using a procedural language.

**Objective of the Course:**

The aim of the course is to

- understand and solve logical & mathematical problems through C++ language
- strengthen knowledge of a procedural programming language.
- design and develop solutions to intermediate level problems
- develop their skills in software development using a procedural language
- get programming in skill the object oriented technology with the usage of C++.

**Outcomes of the Course:**

On completion of this course the students will be able to

- describe the syntax and semantics of the C++ programming language
  - explain the use of class and object.
  - work in a team to analyze engineering problems and develop C++ programs for solving these problems.
  - use the basic utilities and facilities for software development.
  - debug and test software
  - develop a minor software in C++ language
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.



**Objective of the Course:**

The aim of the course is to

- introduce the concept of efficiency of an algorithm
- study run-time efficiency of an algorithm
- introduce Big-O notation
- determine the Big-O of an algorithm

**Outcomes of the Course:**

On completion of this course the students will be able to:

- analyze the complexity of a given algorithm.
- apply classical sorting, searching, optimization and graph algorithms.
- compare, contrast, and choose appropriate algorithmic design techniques to present an algorithm that solves a given problem.
- develop program that implements Kruskal's algorithm, Binary Search, all types of sorting, Prim's algorithm, greedy algorithm, optimal binary search tree, Dijkstra's Algorithm, solution for n-queens problem, and program to implement traveling salesperson problem using dynamic programming.

**ALGORITHMS:**

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.

## **DATA STRUCTURES:**

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

**Objective of the Course:**

The aim of the course is to

- enable the students to speak English with correct accent and pronunciation.
- interact effectively in real life situations and in workplace.
- develop the writing ability of students by providing them the required practice.
- improve the written communication skill so as to write reports, letters etc.

**Outcomes of the Course:**

This lab course will enable students to use 'good' English and perform the following

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- Take part in social and professional communication.

**UNIT I LANGUAGE FUNDAMENTALS****3**

Tenses, Subject – Verb Agreement, Correction of Errors.

**UNIT II ORAL COMMUNICATION****10**

Oral practice – Introducing oneself, Conversations, Role-play - Activities based on real life situations and professional situations such as marketing, advertising, etc. Debating on a topic, Group Discussion, Oral Presentation, Non-verbal communication, Mock Interviews, Conducting meetings, Participating in meetings- Phonetics- Correct Pronunciation.

### **UNIT III WRITTEN COMMUNICATION**

**6**

Writing a letter of application with resume- practical training- calling for quotations – placing an order – letter of complaint, Memoranda, Writing an email, Minutes - Report Writing - Project report - Writing a proposal.

### **UNIT IV LANGUAGE LABORATORY**

**6**

Language fundamental practices - Listening Comprehension, Reading Comprehension, Listening to correct pronunciation , Accent, Viewing models of Presentations, Interviews, Group Discussions in the language lab and practice in the class room.

**Total : 25**

### **REFERENCES :**

1. A.J.Thomson & A.V. Martinet, "A Practical English Grammar" Oxford University Press, 1999.
2. Andrea J. Rutherford, "Basic Communication Skills for Technology", second edition, Pearson Education, 2007.
3. P.K.Dutt, G. Rajeevan and C. L. N. Prakash, " A Course in Communication Skills", Cambridge University Press, India 2007.
4. Krishna Mohan and Meera Banerjee, " Developing Communication Skills " Macmillan India Ltd. (reprinted 1994-2007.)
5. Riordan, Pauley, "Report Writing Today" , AIT B.S. Publisher, New Delhi(2000)
6. Gerson, Sharon, Steve m. Gerson, "Technical Writing: Process and Product", Pearson Education, New Delhi(2004).
7. R.K. Bansal, J.P. Harrison, "Spoken English", Orient Longman , Mumbai(1999)
8. Grant Taylor, "English Conversation Practice"Tata MCGraw Hill, New Delhi(1997).

## SEMESTER – III

CA701

### INTERNET AND JAVA PROGRAMMING

L T P C  
3 0 0 3

[TOP](#)

#### Objective of the Course:

The aims of this course are to

- learn basic internet concepts, fighting against spam, conferencing on the internet, planning and creating website.
- learn the fundamentals of the capabilities of Java and to introduce encapsulation, polymorphism, and the Java language mechanism (classes and objects) to implement it.
- make a study on graphics programming.
- learn about event handling and exception handlings.
- develop Java computer programs that performs various problem-solving algorithms.
- apply the theory and professional knowledge of Java Programming to practice during hands-on laboratories.
- develop the programming skills to use the Java object oriented programming methodology to produce quality computer based solutions to real problems.
- work with collection of API and develop fast programs.
- develop good multithreaded programs.

#### 1. 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.

#### 2. 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.

#### 3. JAVA FUNDAMENTALS

8

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

#### **4. PACKAGES**

**12**

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

#### **5. ADVANCED JAVA PROGRAMMING**

**9**

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

**Total : 45**

#### **TEXT BOOKS :**

1. Margaret Levine Young, "Internet and WWW", 2<sup>nd</sup> Edition, Tata McGraw Hill, 2002. (Unit 1 & 2)
2. Herbert Schildt, The Complete Reference – Java 2 , 4<sup>th</sup> Edition, Tata McGraw Hill, 2001. (Unit 3, 4 & 5)

#### **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.

#### **Outcomes of the Course:**

On completion of this course the students will be able to

- develop Java computer programs that perform various problem-solving algorithms.
- improve the programming skills in Object Oriented language.
- graphics programming and Internet Programming skills are developed.

[TOP](#)**Objective of the Course:**

The goal of this course is to provide complete guidelines for theoretical and practical usage of computer graphics and multimedia, to provide students with an overview of the key concepts of digital production of animation and visual effects with reference to workflow, people and technology. Real time design can be performed for a several problems effectively. It will also enable students to be practically sound in area of 2D, 3D and animation.

**1. INTRODUCTION 9**

Overview of Graphics System - Bresenham technique - Line Drawing and Circle Drawing Algorithms - DDA - Line Clipping - Text Clipping.

**2. 2D TRANSFORMATIONS 9**

Two dimensional transformations - Scaling and Rotations - Interactive Input methods - Polygons - Splines - Bezier Curves - Window view port mapping transformation.

**3. 3D TRANSFORMATIONS 9**

3D Concepts - Projections - Parallel Projection - Perspective Projection - Visible Surface Detection Methods - Visualization and polygon rendering - Color models - XYZ-RGB-YIQ-CMY-HSV Models - animation - Key Frame systems - General animation functions - morphing.

**4. OVERVIEW OF MULTIMEDIA 9**

Multimedia hardware & software - Components of multimedia - Text, Image - Graphics - Audio - Video - Animation - Authoring.

**5. MULTIMEDIA SYSTEMS AND APPLICATIONS 9**

Multimedia communication systems - Data base systems - Synchronization Issues - Presentation requirements - Applications - Video conferencing - Virtual reality - Interactive video - video on demand

**TEXT BOOKS :**

- 1.Hearn D and Baker M.P, "Computer graphics – C Version", 2<sup>nd</sup> Edition, Pearson Education, 2004(unit 1, 2 &3)
- 2.Ralf Steinmetz, Klara steinmetz, "Multimedia Computing, Communications and Applications", Pearson education, 2004(unit 4 & 5)

**REFERENCES :**

1. Siamon J. Gibbs and Dionysios C. Tsihritzis, "Multimedia programming", Addison Wesley, 1995.
2. John Villamil, Casanova and Leony Fernanadez, Eliar, "Multimedia Graphics", PHI, 1998.

**Outcomes of the Course:**

On completion of this course,

- the students will attain the complete knowledge in graphics & multimedia domain.
- students can show their proficiency while working with Graphics and multimedia software's and tools.



[TOP](#)**Objective of the Course:**

To introduce features and technology of microprocessor based systems, gain assembly language programming, interfacing of memory and peripheral devices and gain knowledge about the architecture, instruction set, programming, addressing mode interfacing and applications of INTEL 8085, INTEL 8086 and INTEL 80386.

**1. INTRODUCTION TO 8085 MICRO PROCESSOR 9**

Evolution of the Microprocessor - INTEL 8085- Introduction- Register Architecture - Memory Addressing - 8085 Addressing Modes -8085 Instruction Set -Timing Methods 8085 Pins and Signals -8085 Instruction Timing and Execution - Interrupts-DMA- Serial port-8085 Based System Design

**2. INTRODUCTION TO 8086 MICROPROCESSOR 9**

Introduction -8086 Architecture -8086 Addressing Modes -8086 Instruction Set - Data Movement Instructions Arithmetic and Logic Instructions - Program Control Instructions

**3. 8086 MICROPROCESSOR INTERFACING 9**

System Design Using 8086- Basic System concepts-Bus Cycle - Address and data bus concepts- interfacing with memories-RAM - EPROM - DRAMs - Programmed I/O : 8086-Based Microcomputer.

**4. 80386 AND PENTIUM MICRO PROCESSORS 9**

Introduction to Intel 80386- Basic Programming model - Memory Organisation - I/O Space - 80386 pins and signals- Bus transfer techniques - 80386 Modes - Introduction to Intel Pentium Microprocessor: Block diagram and Registers.

**5. PERIPHERAL INTERFACING 9**

Keyboard Display Interface-Hex key and display interface to 8085, 8279 Keyboard display controller chip- Printer Interface: LR 7040 Printer interface using 8295 printer controller-CRT controller interface: CRT Fundamentals, 8275 CRT Controller- Coprocessors.

**TEXT BOOK :**

1. Mohamed Rafiquzzaman "Introduction to Microprocessors and Microcomputer-Based System Design" 2<sup>nd</sup> edition, CRC Press,1995.

**REFERENCES :**

1. Walter A.Triebel, Avtar Singh, "the 8088and8086 Microprocessors Programming, Interfacing, Software, Hardware and Applications", Prentice Hall of India Pvt. Ltd., 2002.
2. Barry B.Brey,"The INTEL microprocessors 8086/8088, 80186, 80286, 80386 and 80486 Architecture, Programming and Interfacing," Prentice Hall of India, 2001.

**Outcomes of the Course:**

Upon completion of this course the student shall be able to understand and do the following

- Develop a program in assembly language for the INTEL 8085 and INTEL 8086.
- Design interfacing logic to connect external devices to microprocessor.
- Design and develop a microprocessor based system for specific applications.

[TOP](#)**Objective:**

The students will be able to learn

- Architecture Models of Distributed Computing
- Communication among various protocols
- Distributed File Systems
- Basics of Cloud Computing

**UNIT-1 : Introduction****9**

Introduction to distributed systems-examples of distributed systems-Characteristics-goals-Hardware and Software concepts-Design Issues-Resource Sharing and the web-Challenges: System Models: Introduction, Architectural Model, Fundamental Models and Client Server Models

**UNIT-II : Interprocess Communication****9**

Interprocess Communication: Message oriented communication, Stream oriented communication: Layered Protocols: Lower-level, Transport Level and Higher Level protocols-Distributed Objects: RPC and LRPC, RMI, Events and Notifications

**UNIT -III : Distributed File Systems****9**

Distributed File Systems-CODA,SUN NFS :Naming Services: Name entities, Locating Mobile Entities, Removing unreferenced entities: Case Studies: DNS Directory, Global Name Service,X.500 DS Synchronization-Clock Synchronization, Logical clocks, global state.

**UNIT-IV : Fault Tolerance****9**

Fault Tolerance: Process resilience, Reliable Client Server Communication, Reliable group Communication, Distributed Commit and Recovery.

**UNIT -V : Cloud Computing****9**

Cloud computing - Introduction - Cloud Architecture - Cloud storage - Advantages & disadvantages-Cloud services.

**References:**

1. Shehal Kamalapur, Mrs.Neeta Deshpand Distributed Systems, Technical Publication,2009
2. Michael Miller,"Cloud Computing: Web – Based Applications that change the way you look and Collaborate Online",Que publishing,2008.

**Outcome:**

The student will have

- Knowledge about the various protocols and communication in distributed systems
- Distributed File systems.

**[TOP](#)**

**Objective of the Course:**

The aims of the course are

- to develop Java computer programs that performs various problem-solving algorithms.
- to apply the theory and professional knowledge of Java Programming to practice during hands-on laboratories.
- to develop the programming skills using the object oriented programming methodology to produce quality computer based solutions to real problems.
- to utilize the advance features of Java technology.
- to Work with collection API and develop fast programs.
- to develop good multithreaded programs

**Outcomes of the Course:**

On completion of this course,

- the programming skill of students in object oriented language especially in java gets improved and they become a good internet programmer.
- they will be able to utilize the advance features of Java technology.
- they will be able to work with collection of API and develop fast programs.
- they will be able to develop good multithreaded programs

**JAVA PROGRAMMING:**

1. Program to illustrate the use of overloading and overriding.
2. Program to implement the concept of inheritance
3. Program to illustrate the use of multi threading
4. Program to implement the concept of Interfaces and packages.
5. Generate the program using exceptions handling mechanism..
6. Implement the file operations.
7. Program using Applets.
8. Program using JDBC.

**GRAPHICS AND MULTIMEDIA:**

1. Write a Java program for Line drawing using Bresenham, DDA Line Drawing Algorithms.

2. Write a Java program for Circle Drawing using Bresenham Circle Drawing Algorithms.
3. Write a Java program for Line Clipping using Cohen-Sutherland Line clipping algorithm.
4. Write a Java program for 2D and 3D Transformations like Translations and Scaling and Rotations.
5. Create Frame by Frame Animations using multimedia authoring tools.
  
6. Develop a presentation for a product using techniques like Guide Layer, masking and onion Skin using authoring tools.
  
7. Create a JPEG image which demonstrates the various features of an image editing tool.

[TOP](#)**Objective of the Course:**

This course has been designed to provide students with enough knowledge in the fundamentals of Microprocessors, to learn programming in assembly language and to use Interfaces with Microprocessor.

**Outcomes of the Course:**

On completion of the course, students will be able to

- attain knowledge in Microprocessors
  - program in assembly language efficiently
  - make effective use of microprocessors in various applications
  - utilize various Interfaces along with Microprocessor
1. Write an assembly language program to perform arithmetic operations on block of data using Hexadecimal numbers.
  2. Write an assembly language program to perform arithmetic operations on block of data using BCD numbers.
  3. Write an assembly language program to perform byte and string manipulation.
  4. Write an assembly language program to interface Programmable Peripheral Interface.
  5. Write an assembly language program to interface Programmable Timer.
  6. Write an assembly language program to interface Programmable Communication Interface.
  7. Write an assembly language program to interface Keyboard/Display Controller.
  8. Write a program to Perform Power on Self Test.
  9. Write a program for floppy disk trouble shooting.
  10. Write a program for printer trouble shooting.

[TOP](#)**Objective of the Course:**

This course is intended to provide

- attitude Control and Quick Personal Self Esteem Improvement
- interview Motivation and Developing Personal Confidence using NLP
- effective Answering and Maintaining Fluent Communication
- positive Body Language
- effective Resume Creation
- leadership Skills, Team Player Skills and Career Plan to HR

**UNIT 1 : MOTIVATION****5**

Awareness of Real World Industry and Situations - Conscious Self-Awareness - Practical Visualizations - Neuro- Linguistic Programming Basics - Developing Self Esteem and Self Motivation - Confident Goal Setting - Positive Attitude Development and Positive Thinking - Developing Inner Achievement Mindset.

**UNIT 2 : LEADERSHIP SKILLS****4**

Types of Leadership - Leadership Process and Thinking - Innovative Thinking - Role of Competency, Discipline, Planning and Ethics - Creating Cooperation and Trust in Team Building Process – Mentoring.

**UNIT 3 : EFFECTIVE COMMUNICATION I****4**

Eliminating Stage Fright - Increasing Fluency - Increasing Focus while Listening - How to communicate as a Follower - How to communicate as a Leader - Assertive and Polite Communication.

**UNIT 4 : EFFECTIVE COMMUNICATION II****5**

Fluency with increased vocabulary - Group Discussion Etiquette - Advanced Group Discussions - Giving a positive Body Language - Interviews: Clear Speaking - Interviews: Handling Pressure .

**Total : 18****REFERENCES :**

1. Charles Faulkner and Steve Andreas, "NLP: The New Technology of Achievement", Harper Paperbacks publishers, 1996.
2. Sarvesh Gulati, "Corporate Soft Skills" , Rupa and Co publishers.



3. P.K.Dutt, G. Rajeevan and C. L. N. Prakash, " A Course in Communication Skills", Cambridge University Press, India 2007.

**Outcomes of the Course:**

By the end of this course students will be able to develop the following:

- Awareness of Real World Industry and Situations
- Role of Competency, Discipline, Planning and Ethics
- Advanced Group Discussions
- Giving a positive Body Language
- Interviews: Clear Speaking
- Interviews: Handling Pressure

## SEMESTER – IV

CA707

OBJECT ORIENTED ANALYSIS AND DESIGN

L T P C  
3 0 0 3

[TOP](#)

### Objective of the Course:

The objective of this course is to enhance correct way to do object-orientation. It also explores the basic code qualities of cohesion, coupling, redundancy, testability, readability, encapsulation and dispersion. While not a course on patterns, object-orientation is taught in a way consistent with how design patterns suggest identifying and defining objects.

### 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.

### 2. 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.

### 3. 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

### 4. 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

## **5. SOFTWARE QUALITY**

**9**

Quality assurance – Testing strategies – Object orientation testing – Test cases – Test Plan – Debugging principles – Usability – Satisfaction – Usability testing – Satisfaction testing

**Total : 45**

### **TEXT BOOK :**

1. Ali Bahrami, "Object Oriented System Development", McGraw Hill International Edition, 1999.

### **REFERENCES :**

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

### **Outcomes of the Course:**

By the end of this course students will be able to

- analyze software requirements and document those using Use Cases.
- perform software analysis and record the results using UML notation.
- perform software design and record the results using UML notation.
- apply object-oriented patterns.
- discuss how object-oriented software development affects testing and quality.

**[TOP](#)****AIM**

To highlight the features of different technologies involved in Web Technology and various Scripting Languages.

**OBJECTIVES**

- Students will get an introduction about various Scripting Languages. Students will be provided with an up-to-date survey of developments in Web Technologies.
- Enable the students to know techniques involved to support real-time Software development.
- To make the students to create interactive animations using Flash.
- Students will attain knowledge in HTML5 and CSS3.

**1. INTRODUCTION****9**

History of the Internet and World Wide Web-Web essentials-clients-servers-communications-markup languages-web pages types and issues- Web page design and site building – Client Side Scripting and Server Side Scripting-Domains and Hosting- Static Website Designing, Dynamic Websites and WebApps- Web Standards and W3C recommendations

**2. CASCADING STYLE SHEET 3****9**

The need of dynamic web pages; an overview of DHTML, cascading style sheet (css), comparative studies of different technologies of dynamic page creation – Understanding CSS Transitions -colors and backgrounds-Fonts-text-Links-gradients- transforming the messages-enriching forms-creating different css3 Box shadows effects.

**3. HTML 5****9**

A brief history of markup-Design of HTML5-Rich media-attributes-events-Web Forms 2.0-Semantics-HTML5 for web designers- HTML5 web storage-HTML5 web SQL-HTML5 canvas-audio-video-Geolocation.

## 4. MULTIMEDIA

9

Bitmaps- vector graphics-Creating clippings –frame rate-resolution- Animations with sound effects – Adding audio or Video – Windows Media Player ActiveX Control – Agent control – Real Player ActiveX control-creating website with particular theme using all the utilities-animations and interaction.

## 5. JavaScript and JQuery

9

Introduction to java script-variables-functions-if conditions-loops-element selector-events-Java Script design patterns-Using jQuery UI-jQuery fundamentals-Design patterns in jQuery-Ajax,JSON and API essentials-jQuery mobile essentials.

**Total: 45**

### TEXT BOOKS :

1. Aferganatel, "Web Programming: Desktop Management", PHI, 2004
2. Dan Cederholm, "CSS3 for Web Designers",2010.
3. Jeremy Keith, "HTML5 for Web Designers" ,2010.
4. James L. Mohles, Flash 5.0 Graphics, Animation & Interaction, Macromedia 2000.
5. Robert Reinhardt, Jon Warren Lentz , "Flash 5 Bible", Hungry Minds Inc, 2001.
6. Addy Osmani, "Essential JavaScript & JQuery Design Patterns"
7. *Murach's , "JavaScript and jQuery", 2012.*

### REFERENCE BOOKS:

1. Web Technologies - Godbole A. S. & Kahate A., TMH.
2. Professional Java Server Programming --- Allamaraju et al WROX

### OUTCOMES

After learning this course, students are able to

- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Styles sheets.
- Build dynamic web pages using JavaScript (client side programming).
- Build interactive web applications using flash.

[TOP](#)**Objective of the Course:**

The main objective of this course is to learn and get familiar with the UNIX operating system and UNIX process environment. The creation, communication and execution of process are studied with well defined examples through this course. Understanding of the term socket and socket programming is pursued efficiently.

**1. INTRODUCTION & FILE SYSTEM 9**

Overview of UNIX OS - File I/O - File Descriptors - File sharing - Files and directories - File types - File access permissions - File systems - Symbolic links - Standard I/O library - Streams and file objects - Buffering - System data files and information - Password file - Group file - Login accounting - system identification.

**2. PROCESSES 9**

Environment of a UNIX process - Process termination - command line arguments - Process control - Process identifiers - Process relationships terminal logins - Signals -threads.

**3. INTERPROCESS COMMUNICATION 9**

Introduction - Message passing (SVR4)- pipes - FIFO - message queues - Synchronization (SVR4) - Mutexes - condition variables - read - write locks - file locking - record locking - semaphores -Shared memory(SVR4).

**4. SOCKETS 9**

Introduction - transport layer - socket introduction - TCP sockets - UDP sockets - raw sockets - Socket options - I/O multiplexing - Name and address conversions.

**5. APPLICATIONS 9**

Debugging techniques - TCP echo client server - UDP echo client server - Ping - Trace route - Client server applications like file transfer and chat.

**Total: 45****TEXT BOOKS :**

- 1.W.Richard Stevens, Advanced programming in the UNIX environment, Addison Wesley, 1999.(Unit 1,2 &3)
- 2.W. Stevens, Bill Fenner, Andrew Rudoff, "Unix Network Programming", Volume 1,The Sockets Networking API,3<sup>rd</sup> Edition, Pearson education, Nov 2003.(unit 4 & 5)

### **REFERENCE BOOK :**

- 1.Meeta Gandhi,Tilak Shetty and Rajiv Shah – The 'C' Odyssey Unix –The open Boundless C ,1<sup>st</sup> Edition ,BPB Publications1992.

### **Outcomes of the Course:**

On completion of this course,

- the students will attain the complete knowledge in network communication in UNIX platform.
- different types of networking and their functionality will be understood by the students.
- students get the broad knowledge on network details of a system which is configured as UNIX supported components.

[TOP](#)**Objective of the Course:**

The aim of this course is to

- describe how web services are used and the technologies used to develop them.
- describe the role of SOAP in building web services, the basics of the SOAP protocol, and the structure of a SOAP document.
- explain the role of WSDL and UDDI in building web services and be familiar with their usage.
- design a web service, taking different design considerations into account.
- design a .NET web service, taking advanced design considerations into account.
- define and address the various security aspects of building and accessing web services.
- design and deploy .NET web services.
- explain the use of UDDI registries and WSDL in creating web-services clients.
- describe the data types, access methods, and protocols used when accessing web services.
- design a web service using Microsoft .NET.
- evaluate and analyze web-service parameters and make relevant design decisions about web-service clients.

**1. INTRODUCTION****9**

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

**2. XML TECHNOLOGY****9**

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

**3. SOAP****9**

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

**4. WEB SERVICES****9**



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

## **5. XML SECURITY**

**9**

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

**Total: 45**

### **TEXT BOOK:**

1. Frank. P. Coyle, XML, Web Services And The Data Revolution, Pearson  
Education, 2002.

### **REFERENCES:**

1. Ramesh Nagappan , Robert Skoczylas and Rima Patel Sriganesh, “ Developing  
Java Web Services”, Wiley Publishing Inc., 2004.
2. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services”,  
Pearson Education, 2004.
3. McGovern, et al., “Java Web Services Architecture”, Morgan Kaufmann  
Publishers,2005.

### **Outcomes of the Course:**

Students will learn:

- the role of web services in commercial applications
- the principles of web service provision
- use of Java for implementing web services
- use of BPEL (Business Process Execution Logic) and WSDL (Web Service  
Description Language) for implementing web services

[TOP](#)**Objective of the Course:**

The main objective of this course is to learn and get familiar with the Unix operating system through Red hat Linux. UNIX basic commands working and their purpose will be defined .The communication system across the network will be discussed and represented practically. The interprocess communication is implemented using pipe, named pipe, message queue, semaphore and shared memory concepts. The socket programming with TCP and UDP protocols are practically implemented.

**Outcomes of the Course:**

On completion of this course,

- basic UNIX commands their syntax and purpose can be well understood by the students.
- the students will attain the hands on experience in working with Red hat Linux.
- the inter-process communication concepts were implemented practically by the students.
- different types of networking and their functionality is understood by the students.
- students get the practical knowledge on network details of a system which is configured as UNIX supported components.

1. Program using basic network commands
2. Program using system calls : create, open, read, write, close, stat, fstat, lseek
3. Program to implement inter process communication using pipes
4. Program to perform inter process communication using message queues
5. Program to perform inter process communication using shared memory
6. Program to perform synchronization using semaphores
7. Program to capture packets : sniffer
8. Program using TCP sockets (Client and Server)
9. Program using UDP sockets (Client and Server)
10. Program using URL class to download webpages

[TOP](#)**Objective of the Course:**

The aim of the course is

- to provide the knowledge necessary to build and validate XML.
- to with XML being a core technology in Web Services, this will give students a background in the underlying technologies.
- to cover the basics of XML, Schemas, WSDL, and Web Services concepts.

**Outcomes of the Course:**

On completion of this course, students will be able to

- build effective XML documents
  - build DTD documents to validate XML
  - build Schema documents to validate XML
  - describe services using WSDL
  - build and consume Web services
  - understand the role of web services in commercial applications
  - understand the principles of web service provision
  - understand the use of Java for implementing web services
1. Create an XML document to store an address book.
  2. Create an XML document to store information about books and create the DTD files.
  3. Create an XML schema for the book's XML document from exercise 2.
  4. Create an XML document to store resumes for a job web site and create the DTD file
  5. Present the book's XML document using cascading style sheets (CSS).
  6. Write an XSLT program to extract book titles, authors, publications, book rating from the book's XML document and use formatting.
  7. Use Microsoft DOM to navigate and extract information from the book's XML document.
  8. Use Microsoft DSO to connect HTML form or VB form to the book's XML document and display the information.
  9. Create a web service for temperature conversion with appropriate client program.
  10. Create a web service for currency conversion (at five currencies) with appropriate client program.

## SEMESTER – V

MS084

ORGANIZATIONAL BEHAVIOUR

L T P C  
3 0 0 3

[TOP](#)

### Objective of the Course:

The aim of the course is

- to enable the students to understand the need of Organizational Behaviour in technical environment
- to explain concepts, principles and techniques relating to different functional areas of Organizational Behaviour
- to make the students to understand the need for applying the concepts of Organizational Behaviour to improve the overall performance.

### 1. LEADERSHIP

9

Technical Leadership - Leader's Goal, Conviction, Vision - Transformational and Transactional Leadership - Leader's Vision - Professionalism : Importance, Elements - Managing Awareness - Performance - Manager's Role in Professionalism.

### 2. MANAGING TECHNICAL AND PROFESSIONAL PEOPLE

9

Goals of Engineers and Scientists - Work Assignment - Need for Influence - Professional Career and Goals - Age and Creativity - Performance - Motivation - Employee Partnership - Career Risks - Technical Competence - Professional Discipline - Manager's Role in Professional Discipline - Guidelines.

### 3. IDENTIFICATION AND DEVELOPMENT OF TALENTED PEOPLE

9

Talented Professionals – Importance - Characterization - Identification – Assessment and Recognizing Talent - Development - Development Needs - Counseling.

### 4. INNOVATION

9

The Importance of Innovation - Risk of Failure - Nature of Creativity - Imagination - Managing Innovative Teams - Needs of Creative Teams - Team Dynamics - A Software Development Example - Manager's Responsibility - Team's Personal Needs - Political versus Technical Solutions - Team Synergism.

### 5. TEAM ENVIRONMENT AND RECOGNITION

9

Innovative Team Environment -Award Programs - Recognition Programs - An Example Award Plan - Industry Award Plans - Award Guidelines - Incentive Plans - A Caution on Recognition Programs

**Total: 45**

**TEXT BOOK :**

1.Watts S. Humphrey, "Managing Technical People: Innovation, Teamwork, and the Software Process", Addison-Wesley, 1996.

**REFERENCES :**

1. Saiyadain, M.S. Organizational Behaviour, 2009, Tata McGraw Hill.
2. Prasad C.M, Organizational Behaviour, 2002, Publisher: Sultan Chand and Sons.

**Outcomes of the Course:**

Students would be encouraged to work in team and also to lead and come up with more innovative ideas.

[TOP](#)**Objective of the Course:**

The aim of the course is to learn

- the fundamentals of three tier architecture
- about the Client/Server Architecture
- about the concepts of Enterprise Java Beans
- about the concepts of ASP.Net
- about the concepts of VB.Net

**1. Client / Server Concepts****9**

Client – Server – File Server, Database server, Group server, Object server, Web server. Middleware – General middleware – Service specific middleware. Client / Server Building blocks – RPC – Messaging – Peer – to- Peer.

**2. EJB Architecture****9**

EJB – EJB Architecture – Overview of EJB software architecture – View of EJB – Conversation – Building and Deploying EJBs – Roles in EJB.

**3. EJB Applications****9**

EJB Session Beans – EJB entity beans – EJB clients – EJB Deployment – Building an application with EJB.

**4. ASP.net****9**

Basics of HTML - Introduction to Microsoft Visual Studio 2005 API - Overview of the .NET 2.0 Framework - Language Primer - Understanding Web Form Pages - Form Validation - Building Business Components - Building User Controls - Designing Web Sites with Master Pages - Adding Standard Navigation Elements - Securing ASP.NET 2.0 Web Sites - Building Applications.

**5. VB.net and ADO.net****9**

Overview of VB.Net - Variables, Constants, Operators and Calculations - Conditions, Switches and Loops - Arrays - Structures and Enumerators - Class, Methods, Objects and Namespaces - Method overloading and Object overloading - Delegates - Inheritance - Exception Handling - Multi-Threading - Overview of ADO.NET 2.0 - Displaying and Editing Data - Crystal Report - Building Applications.

**Total No of periods: 45**

**TEXT BOOKS :**

1. Robert Orfali, Dan Harkey and Jeri Edwards, "The Essential Client/Server Survival Guide", Galgotia Publications Pvt. Ltd., 2002. (Unit 1)
2. Tom Valesky, "Enterprise Java Beans", Pearson Education, 2002. (Unit 2 & 3)
1. DreamTech Software Team, "ASP.Net 2.0 Black Book", DreamTech Press, 2006. (Unit 4)
4. Jeffrey R. Shapiro, "Visual Basic.Net - Complete Reference" (Unit 5)

**REFERENCE:**

1. Greg Buczek, "ASP.Net Developer Guide", Tata McGraw-Hill.

**Outcomes of the Course:**

On completion of the course, the students will understand

- the basics of Client/Server Architecture.
- the role played by EJB in developing different types of applications.
- importance of .Net Framework.
- the basics of ASP.

[TOP](#)**Objective of the Course:**

The aim of the course is

- to explain the main principles of component technology,
- to explain how Object-Oriented middleware can be used for parallel and distributed programming,
- to state and detail how Object-Oriented middleware, together with components turn out to be very effective for the Grid.

**Outcomes of the Course:**

On completion of the course, students will have

- ability to bring together resources across dissimilar networks or computing platforms.
- ability to develop an independent programming interface without Application Programme Interface (API)

1. Create a distributed application to download various files from various servers using RMI
2. Create a Java Bean to draw various graphical shapes and display it using or without using BDK
3. Develop an Enterprise Java Bean for Banking operations
4. Develop an Enterprise Java Bean for Library operations
5. Create an Active-X control for File operations
6. Develop a middleware component for retrieving Stock Market Exchange information using .NET
7. Develop a middleware component for retrieving Weather Forecast information using .NET
8. Develop a component for converting the currency values using VB.NET
9. Develop a component for encryption and decryption using VB.NET
10. Develop a component for retrieving employee information from a Database Table (Oracle or Access) using VB.NET and ADO.NET



**CA805**

**PROJECT 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>

[TOP](#)

## SEMESTER VI

<b>CA806</b>	<b>PROJECT PHASE - II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>24</b>	<b>12</b>

### [TOP](#)

#### **Objective of the Course:**

The objective of the project is to help the student to develop the ability to apply theoretical and practical tools / techniques to solve real life problems related to industry, academic institutions and research laboratories.

#### **Outcomes of the Course:**

After the completion of this project work, the student should be able to

- describe the Systems Development Life Cycle (SDLC).
- evaluate systems requirements.
- complete a problem definition.
- evaluate a problem definition.
- determine how to collect information to determine requirements.
- perform and evaluate feasibility studies like cost-benefit analysis, technical feasibility, time feasibility and Operational feasibility for the project.
- work on data collection methods for fact finding.
- construct and evaluate data flow diagrams.
- construct and evaluate data dictionaries.
- evaluate methods of process description to include structured English, decision tables and decision trees.
- evaluate alternative tools for the analysis process.
- create and evaluate such alternative graphical tools as systems flow charts and state transition diagrams.
- decide the S/W requirement specifications and H/W requirement specifications.
- plan the systems design phase of the SDLC.
- distinguish between logical and physical design requirements.
- design and evaluate system outputs.
- design and evaluate systems inputs.
- design and evaluate validity checks for input data.
- design and evaluate user interfaces for input.
- design and evaluate file structures to include the use of indexes.
- estimate storage requirements.
- explain the various file update processes based on the standard file organizations.
- decide various data structures.

- construct and evaluate entity-relationship (ER) diagrams for RDBMS related projects.
- perform normalization for the normalized tables for RDBMS related projects
- decide the various processing systems to include distributed, client/server, online and others.
- perform project cost estimates using various techniques.
- schedule projects using both GANTT and PERT charts.
- perform coding for the project.
- identify documentation requirements and prepare and evaluate systems documentation.
- perform various systems testing techniques/strategies to include the phases of testing.
- perform systems implementation and identify its key problems.
- generate various reports.
- prepare and evaluate a final report.
- brief the maintenance procedures and the role of configuration management in operations.
- decide the future scope and further enhancement of the system.
- plan for several appendices to be placed in support with the project report documentation.
- work effectively as an individual or as a team member to produce correct, efficient, well-organized and documented programs in a reasonable time .
- recognize problems that are amenable to computer solutions, and knowledge of the tools necessary for solving such problems.
- develop of the ability to assess the implications of work performed.
- get good exposure and command in one or more application areas and on the software
- develop quality software using the software engineering principles

## ELECTIVES

<b>CAY001</b>	<b>MANAGEMENT INFORMATION SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### [TOP](#)

#### **Objective of the Course:**

The aim of the course is

- to understand the basic principles of how the information system support the management in the various arena in the business units. MIS is the basic necessity of organization and encompasses all decisions in life, more particularly, business decisions and implementation.
- to provide an understanding of the Information Systems (IS) management framework of E-business.
- to focus on best practices, tools and models to implement an effective management system
- to provide insights on how to develop and implement enterprise-wide IT strategies, initiatives and programs
- to explore MIS subsystems and technologies including hardware, software and networking.

#### **1. SYSTEM CONCEPTS**

**7**

Definition – Computer based user machine system – Integrated system – Need for a database – Utilization of models – Evolution – Subsystems – Organizational subsystems – Activities subsystems.

#### **2.ORGANIZATIONAL STRUCTURE**

**9**

Basic model – Hierarchical – Specialization – Formalization – Centralization – Modifications of basic organizational structure – Project organization – Lateral relations – Matrix organization – Organizational culture and power organizational change

#### **3. STRUCTURE OF MIS**

**10**

Operating elements – Physical components – Processing functions – Outputs – MIS support for decision making – Structured programmable decisions – Unstructured non-programmable decisions – MIS structure based on management activity and organizational functions – Synthesis of MIS structure

#### **4. SYSTEM SUPPORT**

**10**

Data representation – Communication network – Distributed systems – Logical data concepts – Physical storage devices – File organizations – Data base organization – Transaction processing

#### **5. DEVELOPMENT AND MANAGEMENT**

**9**

A contingency approach to choosing an application – Developing strategy – Lifecycle definition stage – Lifecycle development stage – Lifecycle installation and operation stage – Project management

**Total: 45**

#### **TEXT BOOK :**

1. Gordon B. Davis, Margrethe H. Olson, Management Information Systems: Conceptual foundations, Structure and development –2<sup>nd</sup> Edition – Tata-Mc Graw hill International book company, 2000

#### **REFERENCES :**

- 1.E.Wainright Martin, Carol V. Brown, Danial W. DeHayes, Jeffrey A. Hoffer, William C. Perkins, "Managing Information Technology" 3<sup>rd</sup> Edition, Prentice Hall International edition 1999.
2. Harold Koontz, Heinz Weihrich, "Essentials of Management", 5<sup>th</sup> Edition, Tata McGraw Hill 1998.

#### **Outcomes of the Course:**

At the end of this course, the students will be able to

- become familiar with critical-thinking skills in identifying information systems problems and how to investigate existing literature about hardware and software solutions to problems.
- become familiar with the advances in networking, data communications and the Internet and how they affect the way business is conducted.
- identify which information technology tools are used to solve various business problems.

[TOP](#)**Objective of the Course:**

The aim of this course is to make the students understand

- the scope of E-Commerce in the realm of modern business.
- the technologies used to develop and deliver E-Commerce applications.
- the marketing methods used in E-Commerce
- the legal and regulatory framework in which e-commerce must operate.

**1. INTRODUCTION****6**

Networks and Commercial Transactions - Internet and Other Novelties - Electronic Transactions Today - Commercial Transactions - Establishing Trust - Internet Environment - Internet Advantage - World Wide Web.

**2. SECURITY TECHNOLOGIES****9**

Why Internet Is Insecure - Internet Security Holes - Cryptography : Objective - Codes and Ciphers - Breaking Encryption Schemes - Data Encryption Standard - Trusted Key Distribution and Verification - Cryptographic Applications - Encryption - Digital Signature - Nonrepudiation and Message Integrity.

**3. ELECTRONIC PAYMENT METHODS****9**

Traditional Transactions : Updating - Offline and Online Transactions - Secure Web Servers - Required Facilities - Digital Currencies and Payment Systems - Protocols for the Public Transport - Security Protocols - SET - Credit Card Business Basics.

**4. ELECTRONIC COMMERCE PROVIDERS****9**

Online Commerce Options - Functions and Features - Payment Systems : Electronic, Digital and Virtual Internet Payment System - Account Setup and Costs - Virtual Transaction Process - InfoHaus - Security Considerations - CyberCash: Model - Security - Customer Protection - Client Application - Selling through CyberCash.

## **5. ONLINE COMMERCE ENVIRONMENTS**

**12**

Servers and Commercial Environments - Payment Methods - Server Market Orientation - Netscape Commerce Server - Microsoft Internet Servers - Digital Currencies - DigiCash - Using Ecash - Ecash Client Software and Implementation - Smart Cards - The Chip - Electronic Data Interchange - Internet Strategies, Techniques and Tools.

**Total: 45**

### **TEXT BOOK :**

1. Pete Loshin, "Electronic Commerce", 4<sup>th</sup> Edition, Firewall media, An imprint of laxmi publications Pvt. Ltd., New Delhi, 2004.

### **REFERENCES :**

1. Jeffrey F. Rayport and Bernard J. Jaworski, "Introduction to E-Commerce", 2<sup>nd</sup> Edition, Tata Mc-Graw Hill Pvt., Ltd., 2003.
2. Greenstein, "Electronic Commerce", Tata Mc-Graw Hill Pvt., Ltd., 2000.

### **Outcomes of the Course:**

At the end of the course the student will be able to

- understand E-Commerce concepts and terminology
- process management decisions that are involved in launching, operating and managing business activity on the World Wide Web.
- become familiar with important business, legal issues.

[TOP](#)**Objective of the Course:**

The aim of this course is to make the students to

- use concepts and DBMS features learned previously
- be familiar with data modeling and able to apply the techniques to medium-complexity problems
- be proficient with basic SQL and familiar with advanced usage
- be exposed to database administration
- be familiar with ODBC and Web site use of databases

**1. RELATIONAL DATABASES 9**

Relational Model - Querying - Storage Structures - Query Processing - Normalization.

**2. OBJECT ORIENTED DATABASES 9**

Introduction to Object Oriented Data Bases - Approaches - Modeling and Design - Persistence - Transaction - Concurrency - Recovery - Database Administration.

**3. EMERGING SYSTEMS 9**

Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases - Mobile Databases.

**4. CURRENT ISSUES 9**

Rules - Knowledge Bases - Active and Deductive Databases - Distributed Databases and Parallel databases.

**5. DATABASE DESIGN ISSUES 9**

Security - Integrity - Consistency - Database Tuning - Optimization and Research Issues.

**Total: 45**



**TEXT BOOK :**

1. R. Elmasri and S.B. Navathe, Fundamentals of Database Systems, Addison Wesley, 2000.

**REFERENCES :**

1. Gary W. Hanson and James V. Hanson, Database Management and Design, Prentice Hall of India Pvt Ltd, 1999.
2. Alex Benson, Stephen Smith and Kurt Thearling, Building Data Mining Applications for CRM, Tata McGraw-Hill, 2000.

**Outcomes of the Course:**

On successful completion of this course, students will:

- discuss the concepts of transaction management.
- be able to design high-quality relational databases and database applications.
- have developed skills in advanced visual & conceptual modeling and database design.
- be able to translate complex conceptual data models into logical and physical database designs.

[TOP](#)**Objective of the Course:**

The objectives of this course are to

- cover the basic theory and algorithms that are widely used in digital image processing
- expose students to current technologies and issues that are specific to image processing systems
- develop hands-on experience in using computers to process images
- develop critical thinking about shortcomings of the state of the art in image processing

**1. DIGITAL IMAGE FUNDAMENTALS****9**

Image formation, Image transforms – fourier transforms, Walsh, Hadamard, Discrete cosine, Hotelling transforms.

**2. IMAGE ENHANCEMENT & RESTORATION****9**

Histogram modification techniques - Image smoothening - Image Sharpening - Image Restoration - Degradation Model – Noise models - Spatial filtering – Frequency domain filtering.

**3. IMAGE COMPRESSION & SEGMENTATION****9**

Compression Models - Elements of information theory - Error free Compression - Image segmentation –Detection of discontinuities - Edge linking and boundary detection - Thresholding – Region based segmentation - Morphology.

**4. REPRESENTATION AND DESCRIPTION****9**

Representation schemes- Boundary descriptors- Regional descriptors - Relational Descriptors

**5. OBJECT RECOGNITION AND INTERPRETATION****9**

Patterns and pattern classes - Decision-Theoretic methods - Structural methods.

**Total: 45****TEXT BOOK :**

1. Gonzalez.R.C & Woods. R.E., Digital Image Processing, II Ed., Pearson Education, 2002.

## **REFERENCES :**

1. Anil Jain.K, Fundamentals of Digital image Processing, Prentice Hall of India, 1989.
2. Sid Ahmed, Image Processing, McGraw Hill, New York, 1995.

## **Outcomes of the Course:**

The student will attain the following outcomes:

- understand the frequency domain description of discrete-time image processing
- understand the design & specification of multi-dimensional digital filters for image processing applications
- gain proficiency in using simulation and design software tools, such as those found in Matlab

[TOP](#)**Objective of the Course:**

To provide the skills necessary for the students to design, build and test a small TCP/IP Network, comprising of three subnetworks and two routers. The students will learn how to trace and rectify faults on the network.

**1. INTRODUCTION 10**

Standards – Internet – History- OSI model – Protocol suite – Addressing – Transmission media – Local Area and Wide Area Networks – Switching – Connecting devices – IP addressing

**2. INTERNET PROTOCOL 10**

Subnetting – Supernetting – IP packets – Delivery – Routing – Routing model – Routing table – Datagram – Fragmentation – Checksum – IP Design – ARP – RARP – Internet control message protocol – Internet group management protocol

**3. TRANSMISSION CONTROL PROTOCOL 8**

User Datagram protocol – UDP operation – Use – UDP design – TCP services – Flow control – Error control – TCP operation and design – connection – Transition diagram – Congestion control

**4. APPLICATION LAYER AND CLIENT SERVER MODEL 8**

Concurrency – BOOTP – DHCP – Domain name system – Name space – Distribution – Resolution – Messages – Telnet – Rlogin – Network Virtual Terminal – Character Set – Controlling the server – Remote login

**5. APPLICATION PROTOCOLS 9**

File Transfer Protocol – Connections – Communication – Simple Mail Transfer Protocol – Simple Network Management Protocol – Hyper Text Transfer Protocol – Transaction – Request and Response messages

**Total: 45**

**TEXT BOOK :**

1. Behrouz A. Forouzan, "TCP/IP Protocol Suite", Tata McGraw Hill Edition 2000.

**REFERENCE :**

1. Douglas E. Comer, David L. Stevens, "Internetworking with TCP/IP – Volume I, II and III", Prentice-Hall of India Pvt. Ltd., 2<sup>nd</sup> Edition 1994

**Outcomes of the Course:**

At the end of the course the student will be able to:

- identify the needs and the purpose of each of the protocols at each layer
- use and configure each of the common applications used with TCP/IP
- configure a router using static routing and RIP
- examine a TCP/IP trace at all levels, and diagnose network problems

[TOP](#)**Objective of the Course:**

The aim of the course is

- to introduce the concepts of visual programming.
- to introduce GUI programming using Microsoft foundation classes.
- to enable the students to develop programs and simple application using Visual C++.

**1. INTRODUCTION****8**

GUI Concepts – Overview of Windows programming – Creating the window - Displaying the window - message Loop – windows procedure-WM\_PAINT message - WM\_DESTROY message – An Introduction to GDI – Scroll Bars – Keyboard – Mouse – Menus.

**2.VISUAL BASIC PROGRAMMING****9**

IDE – First Visual Basic Program - Introduction to Forms –Intrinsic Controls – working with Files - Accessing databases with data control - Classes and Objects – ADO Object Model.

**3. VISUAL C++ PROGRAMMING****9**

Windows Programming Model - Visual C++ components – Microsoft foundation classes Library Application Framework – Getting Started with AppWizard – Basic Event handling, Mapping modes, and a Scrolling View – Graphics Device Interface, Colors and fonts – Modal Dialog and Windows Common Dialogs – Modeless Dialog and windows Common dialogs – Using ActiveX controls – Windows Message Processing and Multithreading.

**4. ADVANCED CONCEPTS****9**

Menus – Keyboard Accelerators – Rich Edit Control – Tool bars – Status bars – A reusable Frame Window Base Class - Reading and writing documents - SDI and MDI environments – splitter windows and multiple views.

**5. APPLICATIONS OF WINDOWS PROGRAMMING****10**

Dynamic link library – Component Object Model - Object linking and embedding – Data Base Management With Microsoft ODBC.

**Total: 45**

**TEXT BOOKS :**

1. Charles Petzold, "Windows Programming", Microsoft press, 1996. Chapters: 2,5,6,9,10.
2. Francesco Balena, "Programming Microsoft Visual Basic6.0", Microsoft press, Indian Reprint, 2001. Chapters: 1,2,3,5,6,13.
3. David Kruglirski.J, "Programming Microsoft Visual C++", Fifth Edition, Microsoft press, 1998.  
Chapters: 1,2,3,4,5,6,7,8,12,13,14,15,17,18,20,22,24,31.

**REFERENCES :**

1. G.Cornell, "Visual Basic 6", Tata McGraw Hill, 1998.
2. Deitel & Deitel, T.R.Nieto, "Visual Basic 6, How to program", Prentice Hall of India, 1999.

**Outcomes of the Course:**

The student will

- demonstrate fundamental skills in utilizing the tools of a visual programming studio environment in terms of the set of available command menus and toolbars.
- solve mathematical, scientific, and business problems using visual component based programming.
- use visual programming to create simple computer games.

[TOP](#)**Objective of the Course:**

The aim of the course is to

- understand the basics of wireless and mobile communications.
- realize various wireless telecommunication and satellite system
- know various wireless LAN technologies like ieee 802.11, Bluetooth, etc.,
- study the issues in mobile routing and transport and also to learn the existing solutions.
- study Wireless Application layer Protocol (WAP)

**1. INTRODUCTION****9**

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

**2. WIRELESS NETWORKS****9**

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

**3. MOBILE NETWORK LAYER****9**

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

**4. MOBILE TRANSPORT LAYER****9**

Traditional TCP- Indirect TCP- Snooping TCP- Mobile TCP- Fast retransmit/ Fast Recovery- Transmission/ Timeout Freezing – Selective Retransmission- Transaction Oriented TCP



## **5. WAP**

**9**

Architecture – Datagram Protocol- Transport Layer Security- Transaction Protocol-  
Session Protocol- Application Environment-Wireless Telephony Application

**Total: 45**

### **TEXT BOOK :**

1. J.Schiller, Mobile Communication, Addison Wesley, 2000.

### **REFERENCES :**

1. William C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
2. William Stallings, Wireless Communication and Networks, Pearson Education, 2003.
3. Singhal, WAP-Wireless Application Protocol, Pearson Education, 2003.

### **Outcomes of the Course:**

- This course will provide the basic understanding of wireless and mobile communication.
- It will also provide coverage on wireless telecommunication technologies (GSM, DECT, TETRA, UMTS etc) and satellite systems.
- This course will deal with the basic architecture and the protocols of wireless LAN like IEEE 802.11, Hiperlan, Bluetooth, etc.

[TOP](#)

**Objective of the Course:**

The objective of the course is to make students aware about the importance of the software testing during software development. The course covered to be in line with the development tools and languages taught in this level. The course will prepare the student for software testing and debugging. It will further lay down the foundation for advanced courses in Software quality assurances.

**1. INTRODUCTION 9**

Software Process assessment overview - Assessment phases - Assessment principles - Assessment conduct -Implementation consideration - Quality management - Quality assurance plan - Considerations - Verification and Validation.

**2. CONFIGURATION MANAGEMENT 9**

Need for configuration Management - Software product nomenclature - configuration management functions - Baselines - Responsibilities - Need for automated tools - plan - SCM support functions - The requirement phase Design control - The implementation phase - Test phase - SCM Tools - Configuration accounting and audit.

**3. SOFTWARE STANDARDS AND INSPECTION 9**

Definitions - Reason for software standards - Benefits - Establishing standards - Guidelines - Types of reviews - Inspection of objectives - Basic inspection principles - The conduct of inspection - Inspection training.

**4. TESTING AND MANAGING SOFTWARE QUALITY 9**

Testing: principles - Types - Planning - Development - Execution and reporting - Tools and methods - Real Time testing - quality management paradigm - Quality motivation - Measurement criteria - Establishing a software quality program - Estimating software quality.

**5. DEFECT PREVENTION 9**

Principles of software defect prevention - Process changes for defect prevention - Defect prevention considerations - Managements role - Framework for software process change - Managing resistance to software process change - Case studies.

**TEXT BOOK :**

1. Watts S. Humphrey, Managing the software process, Addison Wesley, 1999.

**REFERENCES :**

1. Tsum S.Chow, Software Quality Assurance a Practical Approach, IEEE Computer Society press, 1985.
2. Richard E. Fairley, Software Engineering - A Practitioner's approach, McGraw Hill, 1982.

**Outcomes of the Course:**

On completion of the course, the student

- able to identify and determine the practices needed to manage a software system configuration
- understands the mission of a quality system and knows the applicable standards and norms
- understands the interrelation between product quality and process quality
- knows and applies product and process quality control techniques

[TOP](#)**Objective of the Course:**

This Course has been designed to provide students with enough knowledge to extract data from large databases. The different algorithms provide knowledge to the student regarding the process of Knowledge discovery & data mining which is one of the emerging fields of Information Technology.

**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.

**2. DATA PREPROCESSING AND ASSOCIATION RULES 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.

**3. 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

**4. 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.

**5. 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**

**TEXT BOOK :**

1. Jiawei Han, Micheline Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufmann Publishers, 2002.

**REFERENCES :**

1. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining, & OLAP", Tata McGraw- Hill, 2004.
2. Usama M. Fayyad, Gregory Piatetsky - Shapiro, Padhraí Smyth And Ramasamy Uthurusamy, "Advances In Knowledge Discovery And Data Mining", The M.I.T Press, 1996.
3. Ralph Kimball, "The Data Warehouse Life Cycle Toolkit", John Wiley & Sons Inc., 1998.
4. Sean Kelly, "Data Warehousing In Action", John Wiley & Sons Inc., 1997.

**Outcomes of the Course:**

On completion of the course, the students will be able to

- make more effective use of data stored in databases
- create a clean, consistent repository of data within a data warehouse
- discover patterns and knowledge that is embedded in the data using several different techniques, such as neural nets, decision trees and statistical techniques.

[TOP](#)**Objective of the Course:**

The aim of the course is

- to introduce the fundamental properties of components, technology and architecture and middleware.
- to give exposure to java based component technologies
- to impart knowledge on component technologies such as CORBA, ORB and application server.
- to introduce COM, DCOM and .NET technologies.
- to impart knowledge in component frameworks and development.

**1. INTRODUCTION****8**

Definition - Industrialization of software development - CBD drivers and benefits - Technology evolution - Components and network computing

**2. FUNDAMENTALS****10**

Basic concepts of CBD - Scenarios for CBD - Evolution or revolution - Build,find and use components and objects.

**3. MODELS****10**

Basic concepts of object models - Components and interfaces - Working with interfaces - Component and interface modeling - Specification models - domain modeling - Describing classes - Patterns and frameworks.

**4. Using CBD****9**

Categorizing & deploying components - CORBA, DCOM.

**5. FRAMEWORKS****8**

Class libraries - Encapsulated components - Software frameworks - Pre - built applications.

**Total: 45****TEXT BOOK :**

- 1.Kuth Short, Component Based Development and Object Modeling, Sterling software,1997.

**REFERENCE :**

1. Clemens Szyperski, Component software - Beyond object - Oriented programming, Addison - Wesley, 2000.

**Outcomes of the Course:**

On completion of the course, students will

- be familiar with the principles of integrating and exchanging data
- master the use of XML/DOM to integrate and exchange data, and XSL/XSLT to transform data
- be familiar with building server applications that consume web services, exchange, and transform web-based data

[TOP](#)**Objective of the Course:**

The objective of this course is to understand the finer aspects of the supply chain management that can turnaround an organization and can take it to the position of a leader. The course also aims to learn from the various successes and failures in making an efficient and effective supply chain and deliver value to the customer.

**1.BASIC CONCEPTS****9**

Introduction to supply chain management (SCM) – concept of SCM – Components of SCM, an overview – features of SCM – strategic issues in SCM – Systems View - SCM current scenario – value chain management and customer relations management.

**2.INTERFACES WITH OTHER DISCIPLINES****10**

Marketing and Supply Chain Interface – Customer focus in SCM – Demand planning Purchase planning – Make or Buy decision – Indigenous and global sourcing – Development and management of suppliers – legal aspects of buying – cost management – negotiating for purchasing/subcontracting – purchase insurance – evaluation of purchase performance (performance indices).Inventory management.- Finance and Supply Chain Interface. Financial impact of inventory.

**3.MANUFACTURING AND WAREHOUSING****9**

Manufacturing scheduling – Manufacturing flow system – work flow automation – Flexibility in manufacturing to achieve dynamic optimization. Material handling system design and decision. Warehousing and store keeping – strategies of warehousing and storekeeping – space management.

**4.LOGISTICS MANAGEMENT****8**

Logistics management – Role of logistics in SCM – Integrated Logistics management – transportation design and decision – multi modalism – third party logistics services and providers – facilities management (port/airport.ICD's) channels of distribution – logistics and customer service.



## **5.INFORMATION TECHNOLOGY AND SCM**

**9**

Information technology and SCM – EDI, ERP, Internet and Intranet, E-Commerce, Bar coding, Telecommunication Network, Advanced planning system, Decision support models for Supply Chain Management, Artificial Intelligence for SCM- Best practice in supply chain management – organizational issues to implement SCM.

**Total: 45**

### **TEXT BOOK :**

1. B.S.Sahay, Supply chain management for global competitiveness, Macmillan India Limited, 2000.

### **REFERENCES :**

1. Donald J.Bowersox & David J.Closs, Logistical Management, Tata McGraw-Hill Editions, New Delhi, 2000.
2. David Simchi-Levi, Designing and managing the supply chain, Tata McGraw-Hill Editions, New Delhi, 2000

### **Outcomes of the Course:**

At the completion of this course,

- the student would be able to examine the design and performance of supply networks and processes in different business contexts.
- Students develop capabilities in logistics, digital coordination for supply chain integration, inventory management; risk pooling, procurement, product and process design, and international supply chain management.

[TOP](#)**Objective of the Course:**

The aim of the course is

- to develop a business process strategy to meet stakeholder needs.
- to analyse, improve, design and develop processes to meet stakeholder needs.
- to align technology, organisation, and facilities with the business process strategy and design
- to apply their knowledge to manage process projects effectively.
- to identify, clarify and manage business benefits arising from process change

**1. ORGANIZATIONAL STRUCTURE 9**

Types of Business Organizations-Organizational Structures-Definition-Complexity-Formalization-Size-Technology-Culture-Forms and Outcomes-Explanations of Structures-IT Industry and Organizational Structures-Case Studies

**2. ORGANIZATIONAL OUTCOMES 9**

Organizational Power and Power Outcomes-Leadership and Decision Making-Communication and Organizational Change-Organizational Environments and Effects-Inter and Intra organizational Relationships-Organizational Effectiveness-Case Studies

**3. BUSINESS PROCESS RE-ENGINEERING 9**

Introduction to Business Process Re-engineering (BPR)-Meaning-Types-Process-Impetorative for Survival-Strategic Approach-Implementing Business Process Re-engineering-Methodology and Steps-Indian Scenario of Implementing BPR-Case Studies

**4. BPR AND IT INDUSTRY 9**

BPR and Information Technology Process-People View and Perspectives-Empowering People through IT-Managing Change in the Global Environment-BPR Rediscovering Indian Paradigm-Need of Reengineering-Case Studies

## **5. E-BUSINESS PROCESS**

**9**

E-Business-Introduction-E-business vs. E-commerce-Execution of E-business-Trends-Design for Execution-Construction-Types-Organizational Frame Work and Implementation-E-business Application Areas(CRM,ERP,SCM and Selling)-E-business and India-Case Studies

**Total: 45**

### **TEXTBOOKS :**

1. Richard H.Hall, "Organizations-Structures, Processes and Outcomes", Pearson Education, 2004
2. M.S.Jayaraman et. Al, "Business Process Reengineering", Tata Mc Graw Hill Publications, 2001
3. Ravi Kalakota and Marcia Robinson, "E-Business; Roadmap for Success; Pearson Education, 2000

### **REFERENCES :**

1. Gareth Jones, "Organizational Theory, Design and Change", Pearson Education, 4<sup>th</sup> Edition, 2004
2. Dave Chaffey, "E-business and E-Commerce" Pearson Education, 2<sup>nd</sup> Edition,2003

### **Outcomes of the Course:**

At the completion of this course,

- the student will be able to form the organizational structure,
- improve leadership quality,
- take steps to improve reengineering of Indian scenario, to form organizational frame work and
- Implementation of e-business application areas.

[TOP](#)**Objective of the Course:**

The aim of the course is

- to understand the concepts of Software project management.
- to know the techniques in developing Quality Software Products
- to Manage the Software Product Development

**1. INTRODUCTION 9**

Introduction to Competencies - Product Development Techniques - Management Skills - Product Development Life Cycle - Software Development Process and models - The SEI CMM - International Organization for Standardization.

**2. DOMAIN PROCESSES 9**

Managing Domain Processes - Project Selection Models - Project Portfolio Management - Financial Processes - Selecting a Project Team - Goal and Scope of the Software Project - Project Planning - Creating the Work Breakdown Structure - Approaches to Building a WBS - Project Milestones - Work Packages - Building a WBS for Software.

**3. SOFTWARE DEVELOPMENT 9**

Tasks and Activities - Software Size and Reuse Estimating - The SEI CMM - Problems and Risks - Cost Estimation - Effort Measures - COCOMO: A Regression Model - COCOMO II - SLIM: A Mathematical Model - Organizational Planning - Project Roles and Skills Needed.

**4. SCHEDULING ACTIVITIES 9**

Project Management Resource Activities - Organizational Form and Structure - Software Development Dependencies - Brainstorming - Scheduling Fundamentals - PERT and CPM - Leveling Resource Assignments - Map the Schedule to a Real Calendar - Critical Chain Scheduling.

**5. QUALITY ASSURANCE 9**

Quality: Requirements - The SEI CMM - Guidelines - Challenges - Quality Function Deployment - Building the Software Quality Assurance - Plan - Software Configuration Management: Principles - Requirements - Planning and Organizing - Tools - Benefits - Legal Issues in Software - Case Study.

**Total: 45**

**TEXT BOOK :**

1. Robert T. Futrell, Donald F. Shafer, Linda I. Safer, "Quality Software Project Management", Pearson Education, Asia, 2002.

**REFERENCES :**

1. Pankaj Jalote, "Software Project Management in Practice", Addison Wesley, 2002.
2. Hughes, "Software Project Management, 3/E", Tata McGraw-Hill, 2004.

**Outcomes of the Course:**

On completion of the course, the students will be able to

- gain Knowledge to develop Quality Software Products
- plan, organize and manage the various resources effectively to achieve specific
- Handle Software projects effectively.

[TOP](#)**Objective of the Course:**

The aim of the course is

- to describe the concept of ERP and the ERP model; define key terms; explain the transition from MRP to ERP; identify the levels of ERP maturity.
- to explain how ERP is used to integrate business processes; define and analyze a process; create a process map and improve and/or simplify the process; apply the result to an ERP implementation.
- to describe the elements of a value chain, and explain how core processes relate; identify how the organizational infrastructure supports core business processes; explain the effect of a new product launch on the three core business processes.
- to identify the international issues that impact a worldwide implementation of ERP; identify the key technological considerations and infrastructure concerns in ERP implementation; describe the strategic use of technology for ERP.
- to explain how the key elements of organizational change management apply to an ERP implementation; define change readiness; describe a learning requirements plan; explain the use of assessment tools to identify the readiness of an organization to change; identify the methods of implementing and sustaining the change.
- to describe project organizational considerations; define the project management tools and resources needed to implement an ERP system; describe the roles and responsibilities of the key organization players; describe the tactics, tools, and methodologies available to implement ERP; evaluate the success of the implementation.
- to describe how the knowledge management capability of an ERP system can be used to sustain competitive advantage; describe how to use ERP to communicate effectively with customers and suppliers.

**1.INTRODUCTION TO ERP****9**

Integrated Management Information Seamless Integration – Supply Chain Management – Integrated Data Model – Benefits of ERP – Business Engineering and ERP – Definition of Business Engineering – Principle of Business Engineering – Business Engineering with Information Technology.

**2.BUSINESS MODELLING FOR ERP****9**

Building the Business Model – ERP Implementation – An Overview – Role of Consultant, Vendors and Users, Customisation – Precautions – ERP Post

Implementation Options-ERP Implementation Technology –Guidelines for ERP Implementaion.

**3.ERP AND THE COMPETITIVE ADVANTAGE 9**

ERP domain MPGPRO – IFS/Avalon – Industrial and Financial Systems – Baan IV  
SAP-Market Dynamics and Dynamic Strategy.

**4.COMMERCIAL ERP PACKAGE 9**

Description – Multi-Client Server Solution – Open Technology – User Interface-  
Application Integration.

**5.ARCHITECTURE 9**

Basic Architectural Concepts – The System Control Interfaces – Services –  
Presentation Interface – Database Interface.

**Total: 45**

**TEXT BOOK :**

1. Vinod Kumar Garg and N.K.Venkita Krishnan, "Enterprise Resource Planning – Concepts and Practice", PHI, 1998.

**REFERENCE :**

1. Jose Antonio Fernandz, The SAP R/3 Handbook, TMH, 1998.

**Outcomes of the Course:**

A student completing this course will:

- Understand and gain insight into process views of organizations and tools and techniques used to model both as-is and to-be models.
- Effectively describe problems typical of ERP implementation projects and translate this information and use this information to anticipate and articulate the challenges associated with post-implementation management of ERP systems.
- Be able to evaluate the progress of an ongoing ERP implementation project.

[TOP](#)**Objective of the Course:**

Agent-based systems are software products that not only do things as specified but also have knowledge to do their job and can do it in a cooperative, coordinative and competitive way.

Aim of the course is

- to understand the myths and realities of the agent-based systems?
- to develop an agent-based system for a particular task?
- to evolve from object-oriented development to agent-based systems?
- to incorporate and share knowledge among software agents?

**1. AGENT AND USER EXPERIENCE 9**

Interacting with Agents - Agent From Direct Manipulation to Delegation - Interface Agent Metaphor with Character - Designing Agents - Direct Manipulation versus Agent Path to Predictable

**2. AGENTS FOR LEARNING IN INTELLIGENT ASSISTANCE 9**

Agents for Information Sharing and Coordination - Agents that Reduce Work Information Overhead - Agents without Programming Language - Life like Computer character - S/W Agents for cooperative Learning - Architecture of Intelligent Agents

**3. AGENT COMMUNICATION AND COLLABORATION 9**

Overview of Agent Oriented Programming - Agent Communication Language - Agent Based Framework of Interoperability

**4. AGENT ARCHITECTURE 9**

Agents for Information Gathering - Open Agent Architecture - Communicative Action for Artificial Agent

**5. MOBILE AGENTS 9**

Mobile Agent Paradigm - Mobile Agent Concepts - Mobile Agent Technology - Case Study: Tele Script, Agent Tel



**Total: 45**

**TEXT BOOKS :**

1. Jeffrey M. Bradshaw, " Software Agents ", MIT Press, 2000. (Unit 1,2,3 & 4)
2. William R. Cockayne, Michael Zyda, "Mobile Agents", Prentice Hall, 1998 ( 5<sup>th</sup> Unit)

**REFERENCES :**

1. Russel & Norvig, " Artificial Intelligence: A Modern Approach ", Prentice Hall, 2<sup>nd</sup> Edition, 2002
2. Joseph P. Bigus & Jennifer Bigus, "Constructing Intelligent agents with Java: A Programmer's Guide to Smarter Applications ", Wiley, 1997.

**Outcomes of the Course:**

After taking this course, the students

- Will have an understanding of the agent system terminology and development process of agent-based systems.
- Will have learned techniques to design agent-based system.
- Will know how to modify architecture of the current software systems and re-structure them to be agent-based.

[TOP](#)**Objective of the Course:**

This course provides an in depth knowledge of the UNIX operating system's internal features and their operation. The course describes the data structures, their relationships and the major algorithms used to manage System, processes, system calls, interrupts and exceptions, virtual memory and file systems.

**1. INTRODUCTION TO UNIX 9**

Unix operating system - History - System structure -Users Perspective- OS Services- Hardware-Architecture- System Concepts- Kernel data structures - System Administration - Buffer Cache- Heaters - Structure of the Buffer Pool- Scenarios-Reading and writing Disk Blocks.

**2. FILE SYSTEMS 9**

INODES - Structure of a regular file- Directories - Conversion of a path name to an INODE - Super Block- INODE assignment - Disk Blocks- System calls for the file system

**3. PROCESSES 9**

Process States and Transitions - Layout of System Memory - Context of a Process - Manipulation of the process address space - Sleep - Process Control - Creation - Signals - Awaiting process termination - The Shell - System Boot and Init Process - Process Scheduling and Time - System calls for time - Clock.

**4. MEMORY MANAGEMENT 9**

Swapping - Segmentation - Demand Paging - Driver Interfaces - Disk Drivers - Terminal Drivers - Streams.

**5.INTERPROCESS COMMUNICATION 9**

Process Tracing - System V IPC - Network Communications - Sockets - Problem of Multiprocessor Systems - Solution with Master and Slave Processors - Semaphores - Distributed Unix Systems - Satellite Processors - Newcastle connection - Transparent distributed file systems - System Calls.

**Total: 45****TEXT BOOK :**

1. Bach M.J., The Design of the Unix Operating System, Prentice Hall India, 1986.

## **REFERENCES :**

1. Goodheart B., Cox.J., The Magic Garden Explained, Prentice Hall India, 1994.
2. Leffler S.J., Mckusick M.K., Karels M.J and Quarterman J.S., The Design and Implementation of the 4.3 BSD Unix Operating System. Addison Wesley, 1998.

## **Outcomes of the Course:**

Students who have successfully completed this course will have full understanding of the following concepts:

- Ability to understand the basic functioning of UNIX operating systems and shell programming,
- to analyze the buffers and kernel representation, to understand the UNIX system structure, system calls and
- To understand UNIX segmentation, scheduling, paging.

[TOP](#)**Objective of the Course:**

Aim of the course is

- to provide insight into the architectural implications of Grid Computing
- to provide students with awareness of current issues in
  - skills in utilizing current grid tools and technologies.
  - identifying the weakness of existing tools and technologies and proposing potential areas for improvement.
- Justify the applicability, non-applicability of Grid technologies for a specific application

**1. INTRODUCTION 9**

Grid Computing values and risks – History of Grid computing – Grid computing model and protocols – overview of types of Grids.

**2.TYPES OF GRIDS 9**

Desktop Grids : Background – Definition – Challenges – Technology – Suitability – Grid server and practical uses; Clusters and Cluster Grids; HPC Grids; Scientific in sight – application and Architecture – HPC application development environment and HPC Grids; Data Grids; Alternatives to Data Grid – Data Grid architecture.

**3.ARCHITECTURE AND MANAGEMENT 9**

The open Grid services Architecture – Analogy – Evolution – Overview – Building on the OGSA platform – implementing OGSA based Grids – Creating and Managing services – Services and the Grid – Service Discovery – Tools and Toolkits – Universal Description Discovery and Integration (UDDI)

**4. NATIVE PROGRAMMING AND SOFTWARE APPLICATIONS 9**

Desktop supercomputing – parallel computing – parallel programming paradigms – problems of current parallel programming paradigms – Desktop supercomputing programming paradigms – parallelizing existing applications – Grid enabling software applications – Needs of the Grid users – methods of Grid deployment – Requirements for Grid enabling software – Grid enabling software applications.

## **5. APPLICATIONS,SERVICES AND ENVIRONMENTS 9**

Application integration – application classification – Grid requirements – Integrating Applications with Middleware platforms – Grid enabling Network services – managing Grid environments – Managing Grids – Management reporting – Monitoring – Data catalogs and replica management – portals – Different application areas of Grid computing.

**Total: 45**

### **TEXT BOOK:**

1.Ahmar Abbas, “ Grid Computing , A Practical Guide to Technology and Applications”, Firewall media , 2004.

### **REFERENCES :**

1. Joshy Joseph , Craig Fellenstein , “Grid Computing”, Pearson Education , 2004.  
Foster , “Grid Blue print foe new computing”.

### **Outcomes of the Course:**

On completion of the course,

- the students will attain knowledge in Grid Computing.
- students will understand the applications of Grid Computing

[TOP](#)**Objective of the Course:**

The aim of the course is

- to acquire an understanding of network security and its changing character
- to understand how network security is conceptualized and carried out
- to examine the historical evolution of network security
- to analyze both early and contemporary threats to network security
- to articulate informed opinion about issues related to network security
- to identify and investigate threats to network security
- to appreciate the challenges of network security

<b>1. INTRODUCTION</b>	<b>9</b>
Attacks - Services - Mechanisms - Conventional Encryption - Classical And Modern Techniques – Encryption Algorithms - Confidentiality.	
<b>2. PUBLIC KEY ENCRYPTION</b>	<b>9</b>
RSA - Elliptic Curve Cryptography - Number Theory Concepts	
<b>3. MESSAGE AUTHENTICATION</b>	<b>9</b>
Hash Functions - Digest Functions - Digital Signatures - Authentication Protocols.	
<b>4. NETWORK SECURITY PRACTICE</b>	<b>9</b>
Authentication, Applications - Electronic Mail Security - IP Security - Web Security.	
<b>5. SYSTEM SECURITY</b>	<b>9</b>
Intruders – Viruses – Worms – Firewalls Design Principles – Trusted Systems.	

**Total: 45**

**TEXT BOOK :**

1. Stallings, Cryptography & Network Security - Principles & Practice, Prentice Hall, 3<sup>rd</sup> Edition 2002.

## **REFERENCES:**

1. Bruce, Schneier, Applied Cryptography, 2nd Edition, Toha Wiley & Sons, 1996.
2. Man Young Rhee, "Internet Security", Wiley, 2003.
3. Pfleeger & Pfleeger, "Security in Computing", Pearson Education, 3rd Edition, 2003.

## **Outcomes of the Course:**

Completion of the course will have following outcomes:

- understanding of the scientific method through research requirements and in-depth case studies
- improvement in social interaction skills and understanding human behavior through consideration of the impact legal and social systems have on individuals
- preparation for more advanced study in criminal justice/homeland security

[TOP](#)**Objective of the Course:**

The purpose of the Embedded System course is to provide the students, knowledge and hands-on experience in the embedded computer system technology. The course is intended to students specializing in software and system design, giving most attention to hardware design, as understanding in this area is vital for most embedded software designers. In short, this course is a chance for the very novices in electronics design to create a simple embedded computer based device and to learn the maximum from the experience.

**1. INTRODUCTION TO EMBEDDED SYSTEMS 9**

Definition and Classification – Overview of Processors and hardware units in an embedded system – Software embedded into the system – Exemplary Embedded Systems – Embedded Systems on a Chip (SoC) and the use of VLSI designed circuits

**2. DEVICES AND BUSES FOR DEVICES NETWORK 9**

I/O Devices - Device I/O Types and Examples – Synchronous - Iso-synchronous and Asynchronous Communications from Serial Devices - Examples of Internal Serial-Communication Devices - UART and HDLC - Parallel Port Devices - Sophisticated interfacing features in Devices/Ports- Timer and Counting Devices - '12C', 'USB', 'CAN' and advanced I/O Serial high speed buses- ISA, PCI, PCI-X, cPCI and advanced buses.

**3. EMBEDDED PROGRAMMING 9**

Programming in assembly language (ALP) vs. High Level Language - C Program Elements, Macros and functions -Use of Pointers - NULL Pointers - Use of Function Calls – Multiple function calls in a Cyclic Order in the Main Function Pointers – Function Queues and Interrupt Service Routines Queues Pointers – Concepts of EMBEDDED PROGRAMMING in C++ - Objected Oriented Programming – Embedded Programming in C++, 'C' Program compilers – Cross compiler – Optimization of memory codes.



#### **4.REAL TIME OPERATING SYSTEMS – PART - 1**

**9**

OS Services – Interrupt Routines Handling, Task scheduling models - Handling of task scheduling and latency and deadlines as performance metrics - Inter Process Communication And Synchronisation – Shared data problem – Use of Semaphore(s) – Priority Inversion Problem and Deadlock Situations – Inter Process Communications using Signals – Semaphore Flag or mutex as Resource key – Message Queues – Mailboxes – Pipes – Virtual (Logical) Sockets – RPCs.

#### **5. REAL TIME OPERATING SYSTEMS – PART - 2**

**9**

Study of RTOS, VxWorks - Basic Features - Task Management Library at the System - Library Header File - VxWorks System Functions and System Tasks - Inter Process (Task) Communication Functions - Case Study of Coding for Sending Application Layer Byte Streams on a TCP/IP Network Using RTOS Vxworks

**Total : 45**

#### **TEXT BOOK :**

1. Rajkamal, Embedded Systems Architecture, Programming and Design, TATA McGraw Hill, First reprint 2003

#### **REFERENCE :**

1. David E.Simon, An Embedded Software Primer, Pearson Education Asia, First Indian Reprint 2000.

#### **Outcomes of the Course:**

On completion of the course:

- students get exposure with different families and architectures of Embedded System tools such as Microcontrollers, DSPs, FPGAs etc.
- students shall get the expertise required to design any embedded system (h/w or s/w or both) based on any of the above tools
- students become highly proficient in Embedded Software particularly in real-time programming with Industry standard RTOS such as VxWorks and RTLinux.

[TOP](#)**Objective of the Course:**

This course equips the students with a solid understanding of:

- practices that support the production of quality software
- software testing techniques
- life-cycle models for requirements, defects, test cases, and test results
- process models for units, integration, system, and acceptance testing
- quality Models

**1. CONCEPTS****9**

Concepts of Quality Control, Quality Assurance, Quality Management - Total Quality Management; Cost of Quality; QC tools - 7 QC Tools and Modern Tools; Other related topics - Business Process Re-engineering –Zero Defect, Six Sigma, Quality Function Deployment, Benchmarking, Statistical process control.

**2. SOFTWARE ENGINEERING CONCEPTS****9**

Software Engineering Principles, Software Project Management, Software Process, Project and Product Metrics, Risk Management, Software Quality Assurance; Statistical Quality Assurance - Software Reliability, Muse Model; Software Configuration Management; Software Testing; CASE (Computer Aided Software Engineering).

**3. QUALITY ASSURANCE MODELS****9**

Models for Quality Assurance-ISO-9000 - Series, CMM, SPICE, Malcolm Baldrige Award.

**4. SOFTWARE QUALITY ASSURANCE RELATED TOPICS****9**

Software Process - Definition and implementation; internal Auditing and Assessments; Software testing -Concepts, Tools, Reviews, Inspections & Walkthroughs; P-CMM.

**5. FUTURE TRENDS****9**

PSP and TSP, CMMI, OO Methodology, Clean-room software engineering, Defect injection and prevention.

**Total: 45**

**TEXT BOOK :**

1. Watts Humphery, "Managing Software Process ", Addison - Wesley, 1998.

**REFERENCES:**

1. Philip B Crosby, " Quality is Free: The Art of Making Quality Certain ", Mass Market, 1992.
2. Roger Pressman, "Software Engineering ", Sixth Edition, McGraw Hill, 2005.

**Outcomes of the Course:**

At the completion of this course, the student will be able to:

- understand and effectively apply software quality assurance (SQA) methods, tools and techniques
- plan for, implement and manage the integrated software quality assurance function
- evaluate how new technologies impact software quality assurance and the system's development life cycle and understand how to benefit from their application

[TOP](#)**Objective of the Course:**

The course examines wireless cellular, ad hoc and sensor networks, covering topics such as wireless communication fundamentals, medium access control, network and transport protocols, unicast and multicast routing algorithms, mobility and its impact on routing protocols, application performance, quality of service guarantees, and security. Energy efficiency and the role of hardware and software architectures will also be presented for sensor networks.

**1. INTRODUCTION****9**

Introduction-Fundamentals of Wireless Communication Technology - The Electromagnetic Spectrum - Radio Propagation Mechanisms - Characteristics of the Wireless Channel - 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 -What Is an Ad Hoc Network? Heterogeneity in Mobile Devices - Wireless Sensor Networks - Traffic Profiles - Types of Ad hoc Mobile Communications - Types of Mobile Host Movements - Challenges Facing Ad Hoc Mobile Networks-Ad hoc wireless Internet

**2. ADHOC ROUTING PROTOCOLS****9**

Introduction - Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks - Classifications of Routing Protocols -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)

**3. MULTICASTROUTING IN ADHOC NETWORKS****9**

Introduction - Issues in Designing a Multicast Routing Protocol - Operation of Multicast Routing Protocols - An Architecture Reference Model for Multicast Routing Protocols -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

#### **4. TRANSPORT LAYER, SECURITY PROTOCOLS**

**9**

Introduction - Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks - 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 in Security Provisioning - Network Security Attacks - Key Management - Secure Routing in Ad Hoc Wireless Networks

#### **5. QoS AND ENERGY MANAGEMENT**

**9**

Introduction - Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks -Classifications of QoS Solutions - MAC Layer Solutions - Network Layer Solutions - QoS Frameworks for Ad Hoc Wireless Networks Energy Management in Ad Hoc Wireless Networks -Introduction - Need for Energy Management in Ad Hoc Wireless Networks - Classification of Energy Management Schemes - Battery Management Schemes - Transmission Power Management Schemes - System Power Management Schemes

#### **TEXT BOOK :**

1. C. Siva Ram Murthy and B.S. Manoj "Ad Hoc Wireless Networks: Architectures and Protocols", Prentice Hall PTR,2004

#### **REFERENCES:**

- 1 C.K. Toh, Ad Hoc Mobile Wireless Networks: Protocols and Systems, Prentice Hall PTR ,2001
2. Charles E. Perkins, Ad Hoc Networking, Addison Wesley, 2000

#### **Outcomes of the Course:**

At the completion of this course, it is envisaged that the students will be able to:

- explain the constraints of the wireless physical layer that affect the design and performance of ad hoc and sensor networks, protocols, and applications;
- explain the performance of various unicast and multicast routing protocols that have been proposed for ad hoc networks;
- explain the operation of several media access protocols that have been proposed for ad hoc and sensor networks;
- Explain various security threats to ad hoc networks and describe proposed solutions.

**CAY022**

**SPECIAL ELECTIVE**

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[TOP](#)

[TOP](#)**Objective of the Course:**

The aim of the course is

- to introduce the major concept areas of language translation and compiler design
- to develop an awareness of the function and complexity of modern compilers
- to understand the phases of the compilation process and be able to describe the purpose and implementation approach of each phase.
- to give students practical exposure to aspects of theoretical Computer Science including Languages, Grammars, and Machines.
- to exercise and reinforce prior programming knowledge with a non-trivial programming project to construct a compiler.

**1. INTRODUCTION****9**

Basic concepts - Grammar - Language - Parts of a compiler – Grouping of phases - Compiler construction tools.

**2. LEXICAL ANALYZER****9**

Role of a lexical analyzer – Input buffering - Specification and recognition of tokens - Finite automata - Regular expression to finite automation – Optimization of DFA-based pattern matchers-Use of a tool for generating lexical analyzer.

**3. SYNTAX ANALYZER****9**

Role of a parser - Context-free grammars - Top-down parsing - Bottom-up parsing - Use of a tool to generate parsers.

**4. INTERMEDIATE CODE GENERATION****9**

Intermediate languages - Declaration - Assignment statements - Boolean expressions - Flow control statements –Back patching.

**5. CODE GENERATION****9**

Introduction to optimization techniques - Issues in the design of a code generator - Run-time storage management - Design of a simple code generator.

**Total:45****TEXT BOOK :**

1. A.V. Aho, Ravi Sethi, J.D. Ullman, Compilers - Principles, Techniques and Tools, Addison- Wesley, 1988.

## **REFERENCES:**

1. Fischer Leblanc, Crafting Compiler, Benjamin Cummings, Menlo Park, 1988.
2. Kennath C.Louden, Compiler Construction Principles and Practice, Vikas publishing House, 2003.
3. Allen I. Holub, Compiler Design in C, Prentice Hall of India, 2001.

## **Outcomes of the Course:**

On completion of this course, students will be able to

- demonstrate a working understanding of the process of semantic analysis through the construction of semantic records based on parse trees, the construction of symbol tables, the organization of run time memory and the writing of a semantic analyzer for a compiler.
- design, analyze, implement and test a working compiler for a small language
- develop a compiler with all the phases



[TOP](#)**Objective**

- To explain the complexity of Business Intelligence decision support projects
- To present a step-by-step guide for the entire Business Intelligence project life cycle
- To impart knowledge of a complete development lifecycle including activities, deliverables, roles, risks, responsibilities, Do's and Don't's, entry and exit criteria for a successful Business Intelligence (BI) decision-support implementation.

**Unit I****9**

Stages and Steps: Guide to the development steps- Business Intelligence (BI) Definition – BI Decision Support Initiatives – Development Approaches – Engineering Stages and Development Steps – Parallel Development Tracks – BI Project Team Structure – Business Case Assessment: Business Justification – Business Drivers – Business Analyst Issues – Cost-Benefit Analysis – Risk Assessment – Business Case Assessment Activities.

**Unit II****9\**

Enterprise Infrastructure Evaluation: Technical Infrastructure Evaluation – The Hardware Platform – The Middleware Platform – The DBMS Platform – Technical Infrastructure Evaluation Activities – Deliverables Resulting from these Activities - Roles and Risks involved in these activities. Nontechnical Infrastructure Evaluation – The Effects of Stovepipe Development – The need for Nontechnical Infrastructure Evaluation -Enterprise architecture and Enterprise Standards - Nontechnical Infrastructure Evaluation Activities – Deliverables Resulting from these Activities - Roles and Risks involved in these activities.

**Unit III****9**

Project Planning – Managing, Defining, Planning the BI Project - Project Planning Activities – Deliverables Roles and Risks - Project Requirements Definition – General Business and Project-Specific Requirements – The Interviewing Process – Project Requirements and Deliverables – Roles and Risks involved - Data Analysis – Business-Focused Data Analysis – Top-Down Logical Data Modeling – Bottom-Up Source Data Analysis - Data Cleansing, Activities, Deliverables, Roles

and Risks - Application Prototyping – Purposes, Best Practices, Types – Building Successful Prototypes – Applications, Deliverables, Roles and Risks – Meta Data Repository Analysis.

#### **Unit IV**

**9**

Database Design – Differences, Logical and Physical Database Design and Activities – Deliverables, Roles and Risks - Extract/Transform/Load (ETL) Design – Implementation Strategies – Preparing for the ETL Process – Designing the Extract, Transformation, Load Programs and ETL Process Flow – Evaluating ETL Tools -ETL Design Activities – Deliverables, Roles and Risks – Meta Data Repository Design – Extract/Transform/Load Development.

#### **Unit V**

**9**

Application Development – Online analytical Processing Tools – Multidimensional Analysis Factors – Online Analytical Processing Architecture – Development Environments – Application Development Activities – Deliverables, Roles and Risks - Data Mining – Meta Data Repository Development.

**Total : 45**

#### **Text Book:**

1. Business Intelligence Roadmap: The Complete Project Lifecycle for Decision Support Applications, Larissa T. Moss, Shaku Atre, Addison Wesley Publications, 2003.

#### **Reference Book:**

1. Business Intelligence Strategy – A practical Guide for Achieving BI Excellence, John Boyer, Bill Frank, Brian Green Tracy Harris and Kay Van De Vanter, First Edition, IBM Corporation, 2010.

#### **Outcome**

- Students can understand the infrastructure components of BI decision-support application and the available tools.
- Students can able to determine number of resources required, type of resources in terms of both technical and human and could able to recognize the components that impairs the success of BI decision-support application.

[TOP](#)**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 - INTRODUCTION****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 - SERVICE LAYER****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 - SERVICE ORIENTED ANALYSIS AND DESIGN****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 - TECHNOLOGIES AND DESIGN FOR SOA****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 - SERVICE DESIGN AND SECURITY****9**

Service design-guidelines- WS-BPEL language basics – WS-Coordination overview  
- WS-Choreography, WS-Policy, WSSecurity-WSOA platform-SOA support in  
J2EEand .NET.

**TOTAL: 45**

**TEXT BOOK:**

1. Thomas Erl, "Service-Oriented Architecture: Concepts, Technology, and Design", Pearson Education, 2005.

**REFERENCES:**

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

**Outcomes of the Course:**

- Discuss about the principles of service orientation
- Explain service composition, orchestration and Choreography
- Provide ASP.NET web services.
- Analyse and design web service

## CAY026 CONTENT MANAGEMENT SYSTEMS

L T P C  
3 0 0 3

[TOP](#)

### Objective

- To impart knowledge in installing CMSmade simple, using the core modules, using Smarty to build templates and it to tell what you are about to do, how to do it.
- To train the students in using an open source content management (CMS) tool – Joomla!, A powerful and robust tool.

### Unit I 9

Content Management System (CMS) – Introduction - Getting Started - CMS versus website builder – Creating Pages and Navigation.

### Unit II 9

Design and Layout - Using Core modules – Users and Permissions – Using Third-party Modules – Creating Own Functionality

### Unit III 9

E-commerce workshop - Advanced Use of CMS - Administration and Trouble Shooting.

### Unit IV 9

Introduction to dynamic web pages and development tools for dynamic content – Downloading tools for dynamic content – Downloading and Installing a content Management System (Joomla!) – Administration elements of a Content Management System – Organizing Content.

### Unit V 9

Basic elements: pages, menus and navigation – incorporate components, modules, plug-ins and languages – Case Studies: Marketing strategies and planning for websites – Design and create a school website, restaurant website, blog site, Securing Content Management System.

**Total : 45**

**Text Books:**

1. CMS Made simple 1.5, Sofia Hauschildt, 2010
2. Joomla! 1.5: A User's Guide – Barrie M. North Second Edition, Prentice Hall.

**Outcome**

- Students will be in a position to install CMSmadesimple (CMSMS), Converting other website templates to work with CMSMS
- Students will be able to add a e-commerce functionality and a discussion of users and permissions.
- Students will be able to develop a successful website powered by Joomla!
- Students can understand the key concepts regarding content organization, editing and templates.

[TOP](#)**Objectives**

The students will be able to learn

- Fundamentals of testing
- Role of Testing in Software Development Lifecycle
- Various techniques of testing
- Tools for testing.

**UNIT-1 : Fundamentals of Testing****9**

Human and errors, Testing and Debugging, Software Quality, Requirement Behavior and Correctness, Fundamentals of Test Process, Psychology of Testing, General Principles of Testing, Test Metrics.

**UNIT-II : Role of Testing in SDLC****9**

Review of software development models (Waterfall Models, Spiral Model, W Model, V Model) Agile Methodology and Its Impact on testing, Test Levels (Unit, Component, Module, Integration, System, Acceptance, Generic)

**UNIT-III - Approaches to Testing****9**

Black Box Testing- Equivalence Class Partitioning, Boundary Value Analysis, State Transition Test, Cause Effect Graphing and Decision Table Technique and Used Case Testing and Advanced black box techniques: White Box Testing- Statement Coverage, Branch Coverage, Test of Conditions, Path Coverage, Advanced White Box Techniques, Instrumentation and Tool Support Gray Box Testing, Intuitive and Experience Based Testing

**UNIT-IV - Test Organization****9**

Test Organization: Test teams, tasks and Qualifications: Test Planning : Quality Assurance Plan, Test Plan, Prioritization Plan, Test Exit Criteria: Cost and economy Aspects: Test Strategies: Preventive versus Reactive Approach, Analytical versus heuristic Approach Test Activity Management, Incident Management, Configuration Management Test Progress Monitoring and Control: Specialized Testing: Performance, Load, Stress & Security Testing

## **UNIT-V : Testing Tools**

**9**

Automation of Test Execution, Requirement tracker, High Level Review Types of test Tools: Tools for test management and Control, Test Specification, Static Testing, Dynamic Testing, Non functional testing.

**Total : 45**

### **References:**

1. Software Testing Foundations, Andreas Spillner, Tilo Linz, Hans Schaefer, Shoff Publishers and Distributors
2. Software Testing: Principles and Practices by Srinivasan D and Gopalswamy R, PearsonEd, 2006
3. Foundations of Software Testing by Aditya P. Mathur – Pearson Education custom edition 2000
4. Testing Object Oriented Systems: models, patterns and tools, Robert V Binder, Addison Wesley, 1996
5. Software Engineering – A practitioner’s approach by Roger S. Pressman, 5th Edition, McGraw Hill
6. The art of software testing by GJ Myers, Wiley

### **Outcome**

The student will have

- Strong fundamentals in various software testing strategies
- Basic Knowledge of testing tools available