

**BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI 620 024****M.C.A****REVISED COURSE STRUCTURE PATTERN****(For the candidates admitted from the academic year 2006-2007 onwards)**

Paper and Title	Inst. Hours /Week	Instructi on Practical Hours	Exam Hours	Marks		Total
				Int.	Ext.	
<b>SEMESTER – I</b>						
Paper I – Digital Electronics And Microprocessors	5		3	25	75	100
Paper II – Discrete Mathematics	5		3	25	75	100
Paper III – Data Structures And Computer Algorithms	4		3	25	75	100
Paper IV – Accounting and Financial Management	4		3	25	75	100
Paper V – Advanced C Programming	4		3	25	75	100
Paper VI – Data Structures Lab – I	-	4	3	25	75	100
Paper VII – PC packages Lab II	-	4	3	25	75	100
<b>SEMESTER II</b>						
Paper VIII – Numerical and Statistical Methods	5		3	25	75	100
Paper IX – Computer Networks	5		3	25	75	100
Paper X – Database Systems	4		3	25	75	100
Paper XI – Operating Systems	4		3	25	75	100
Paper XII – Object Oriented Programming	4		3	25	75	100
Paper XIII – Object Oriented Programming using C++ - Lab III	-	4	3	25	75	100
Paper XIV – RDBMS Lab. Lab – IV	-	4	3	25	75	100
<b>SEMESTER III</b>						
Paper – XV - Optimization Techniques	4		3	25	75	100
Paper – XVI - Programming In JAVA	5		3	25	75	100
Paper – XVII - Internet programming	5		3	25	75	100
Paper – XVIII - Graphics and Multimedia	4		3	25	75	100
Paper – XIX - OOAD and UML	4		3	25	75	100
Paper – XX - Java programming Lab - V	-	4	3	25	75	100
Paper – XXI - Internet programming – Lab - VI	-	4	3	25	75	100

<b>SEMESTER IV</b>						
Paper – XXII - Distributed Technologies	5		3	25	75	100
Paper – XXIII - Software Engineering	5		3	25	75	100
Paper – XXIV - System Modeling and Simulation	4		3	25	75	100
Paper – XXV (Elective – I) – Optional 1. Principles of e-Commerce 2. Data Mining	4		3	25	75	100
Paper – XXVI (Elective – II) – Optional 1. Distributed Operating System 2. Mobile Computing	4		3	25	75	100
Paper – XXVII - Distributed Programming Lab	-	4	3	25	75	100
Paper – XXVII - OS Lab with Unix / Linux	-	4	3	25	75	100
<b>SEMESTER V</b>						
Paper –XXIX - Human-Computer Interaction	5		3	25	75	100
Paper – XXX - Compiler Design	5		3	25	75	100
Paper – XXXI - Cyber Security	4		3	25	75	100
Paper – XXXII – (Elective – III) – Optional 1. Software Project Management 2. Software Testing	4		3	25	75	100
Paper – XXXIII (Elective – IV ) – Optional 1. Web Services 2. Grid Computing	4		3	25	75	100
Paper – XXIV - Open Source Lab (lamp)	-	4	3	25	75	100
Paper – XXXV - <b>MINI PROJECT USING SOFTWARE ENGINEERING TOOLS</b>	-	4	3	25	75	100
<b>SEMESTER VI</b>						
PROJECT / DISSERTATION						200

# **REVISED SYLLABUS**

## **SEMESTER – I**

### **PAPER I - DIGITAL ELECTRONICS AND MICROPROCESSORS**

#### **UNIT-I**

Number Systems: Decimal, Binary, Octal and Hexadecimal number systems- Conversion between number systems- Binary arithmetic-BCD codes – BCD addition- Alphanumeric codes. Boolean Algebra and logic gates : AND, OR, NOT, NAND, NOR, XOR and XNOR gates- Truth tables- Basic laws of Boolean Algebra – De-Morgan’s theorems.

#### **UNIT-II**

Simplifications of Boolean expressions- Canonical SOP and POS forms- Karnaugh maps- Implementing Boolean expressions using NAND gates alone- Implementing Boolean expressions using NOR gates alone.

Combinational logic circuits: Half and Full adders- Half and Full subtractors- Parallel binary adder- BCD adder- Encoders- Decoders- Multiplexers- Demultiplexers.

#### **UNIT-III**

Sequential logic circuits: NAND latch – SR flip-flop- JK flip-flop – Edge triggering- PRESET and CLEAR inputs – Shift register- Universal shift register- Asynchronous and Synchronous counters – BCD counter.

#### **UNIT-IV**

Parallel Computer Models: Introduction, Flynn's classification, Parallel & Vector Computers system Attributes to performance, implicit & Explicit parallelism, shared, Memory Multiprocessors. Uniform and Non-uniform Memory Access and Cache only Memory Access Models, distributed Memory Multicomputers Multivector & SIMD Computers, PRAM and VLSI Models

#### **UNIT- V**

Processors and Memory hierarchy: CISC & RISC Architectures, CISC Family, RISC scalar processors, Super Scalar Processors and their features. Very Long Instruction word Architecture vector & Symbolic processors, Memory Hierarchy.

#### **TEXT BOOK(S)**

1. Moris Mano, “ Digital Computer Fundamentals” TMH, III rd Edition
2. Thomas C Bartee “ Computer Architecture and logic Design ” TMH

#### **REFERENCE(S)**

1. Malvino and Leech “ Digital Principles and Applications” , TMH
2. Badri Ram, “Fundamentals of Microprocessor and Microcomputers” Dhanpat Rai and Sons.
3. Liu and Gibson “ Microcomputer Systems” PHI

## **PAPER II - DISCRETE MATHEMATICS**

### **UNIT-I**

Sets, Relations & Functions: Property of binary relations, equivalence, compatibility, partial ordering relations, Hasse diagram, functions, inverse functions, compositions of functions, recursive functions.

### **UNIT-II**

Mathematical logic: Logic operators, Truth tables, Theory of inference and deduction, mathematical calculus, predicate calculus, predicates and qualifiers.

### **UNIT- III**

Groups & Subgroups: Group axioms, permutation groups, subgroups, cosets, normal subgroups, semi groups, free semi-groups, monoids, sequential machines, error correcting codes, modular arithmetic grammars.

### **UNIT –IV**

Lattices & Boolean Algebra: Axiomatic definition of Boolean algebra as algebra as algebraic structures with two operations , basic results truth values and truth tables, the algebra of propositional functions, Boolean algebra of truth tables.

### **UNIT –V**

Combinatorics & Recurrence Relations: Disjunctive and sequential counting, combinations and permutations, enumeration without repetition, recurrence relation, Fibonacci relation, solving recurrence relation by substitution, solving non- recurrence relation by conversion to linear recurrence relation.

### **TEXT BOOK(S)**

1. Trembly. J.P & Manohar. P., “ Discrete Mathematical Structures with Applications to Computer Science” Mc Graw Hill.
2. Kolman ,Busy & Ross “ Discrete Mathematical Structures” PHI
3. K.D Joshi “Foundations of Discrete Mathematics”, Wiley Eastern Limited.

### **REFERENCE(S)**

1. Seymour Lipschutz & March Lipson Tata Mc Graw Hill.
3. C.L.Liu “ Elements of Discrete mathematics “ Tata Mc Graw Hill.

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## **PAPER III - DATA STRUCTURES AND COMPUTER ALGORITHMS**

### **UNIT- I**

Introduction to data structures, Records, Arrays, Stacks, Queues, Recursion, Linked list, Binary tree and traversing.

### **UNIT- II**

Sorting and Searching Techniques: Introduction, Internal and External Sorting, Insertion, Selection, Merging, Radix, Quick sort, Heap sort and Bubble sort. Searching: Introduction, Sequential search, Binary search, Binary Tree search.

### **UNIT- III**

Graphs and Their applications: Introduction, Graph Theory, Terminology, Representation of graphs, Tree & Binary tree, operations on graphs, shortest path Algorithms, Topological sorting.

### **UNIT- IV**

Algorithms, Development of Algorithms, basic concepts, Structured Program Concepts, Top down development of algorithms, Principle of analyzing Algorithms, Algorithms design methods, Sub goals, Hill climbing.

### **UNIT- V**

Algorithms Design Techniques: Divide and Conquer algorithms, Dynamic Programming, Greedy algorithms, Backtracking and Branch & bound.

### **TEXT BOOK(S)**

1. Seymour Lipschitz “Data Structures, Tata McGraw-Hill
2. Ellis Horowitz & S. Sahni, Fundamentals of Data Structures, Galgotia Pub.

### **REFERENCE(S)**

1. Data Structures Using C – Langsam, Augenstein, Tenenbaum, PHI
2. Data structures and Algorithms, V.Aho, Hopcroft, Ullman , LPE
3. Introduction to design and Analysis of Algorithms – S.E. Goodman, ST. Hedetniem- TMH , Unit IV

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## **PAPER IV - ACCOUNTING & FINANCIAL MANAGEMENT**

### **UNIT –I**

Accounting Principles and Concepts – Double entry book keeping- Income and expenditure- Accounting record and system- assets and liabilities- Depreciation, Depletion and Amortization- Accounting for depreciation.

### **UNIT- II**

Journal – Ledger- Trial Balance- Trading, Manufacturing and profit and Loss account – Balance sheet.

### **UNIT-III**

Analysis and interpretation of financial statements with ratios

### **UNIT- IV**

Cost Accounting- Methods and Techniques of Cost Accounting- classifications of cost- Material Cost- Labour Cost – Overhead- fixed and variable cost- Cost- volume – profit analysis- marginal costing and decision making- Budgeting and budgetary control – types of budgets- Preparation of various functional budgets- Preparations of cash budgets- flexible budgets- Advantages of Budgeting and Budgetary control.

### **UNIT- V**

Financial Packages and Practical Applications: Tally Package — Fundamentals – Differences Between Computer Accounting and Manual Accounting – Architecture and Customization of Tally – Features of Tally Configuration of Tally – Tally screens and menus – creation of groups – creation of ledgers – deleting and editing ledgers.  
Case Study: Computerized Accounting.

### **TEXT BOOK(S)**

1. T.S.Grewal, “ Double Entry Book Keeping”, All India Sultan Chand ( Recent Edition)
2. S.N. Maheswari “ Principles of Management Accounting “, Sultan Chand, New Delhi ( Recent Edition)
3. Shukla, Grewal & Gupta, “ Advanced Accounts “ Sultan Chand
4. K. K. Nadhani, “Implementing Tally 5.4”

### **REFERENCE(S)**

1. S.K. Gupta & R.K. Sharma- Practical Problems in Management Accounting ( Recent edition)
2. Khan and Jain “ Financial Management” Tata McGraw Hill ( Recent Edition)
3. “Computerized Accounting under Tally Publications”, Deva Publications.

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## **PAPER V - ADVANCED C PROGRAMMING**

### **UNIT-I**

C- Language fundamentals: Program Structure – Identifiers – Data types – Integer – float – double – char – constants – variables – operators and expressions – managing input and output operations.

### **UNIT-II**

C control structures: Decision making with IF statement – IF..... ELSE statement – nested IF....ELSE statement – FOR statement – DO..... WHILE statement – WHILE..... DO statement – GOTO statement – SWITCH statement.

### **UNIT-III**

C Functions: Mathematical functions – sin – cos – tan –asin – acos – atan – sqrt – pow – log – String functions – stripy – stroat – stremp – strelen – strlwr – strupr and user – defined functions.

### **UNIT-IV**

Arrays and structures: Arrays, definitions, declarations, entering values in – manipulating arrays – examining and passing an array. Structure: definitions – assigning structure variable – assigning initial values – using a structures – structure arrays – structures and functions.

### **UNIT-V**

Pointers and File Operations: Understanding pointers – pointers and functions – File Operations: Understanding files – declaring a file – opening a file – closing a file – input and output functions – formatted input and output – working with structures adding data to a file – reading a printing a disk file.

### **TEXT BOOK(S)**

E. Balagurusamy, “Programming in C”, Tata McGraw Hill, 2000.

### **REFERENCE(S)**

R. C. Hutchison & S. B. Just, “Programming Using The C Language” McGraw Hill, 1988.

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## PAPER VI - DATA STRUCTURES LAB – 1

Write C programmes to implement the following:

### 1. SORTING:

- a. Bubble Sort
- b. Insertion Sort
- c. Selection Sort
- d. Heap Sort
- e. Quick Sort

### 2. SEARCHING :

- a. Linear Search
- b. Binary Search

3. Matrix Manipulations
4. Polynomial Addition & Multiplication
5. Operations on Stack and Conversion of expressions
6. Operations on Queue
7. Operations on Linked List
8. Operations on Doubly Linked List
9. Operations on Binary tree and Traversals
10. Dijkstra's Algorithms to find the Shortest Path
11. File Processing

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## **PAPER VII - PC PACKAGES LAB II**

### **WORD PROCESSING**

#### 1. Text manipulation

Change the font size and type  
Aligning and justification of text  
Underlining the Text  
Indenting the Text

- i. Prepare a Bio-Data
- ii. Prepare a letter

#### 2. Usage of Numbering, Bullets, Footers and Headers Usage of Spell checks and Find and Replace

- i. Prepare a document in news paper format
- ii. Prepare a document with bullets and footers and headers.

#### 3. Tables and Manipulations

- i. Creations, Insertion, Deletion (Columns & Rows) and usage of Auto Format
- ii. Create a mark sheet using table and find out the total marks.
- iii. Create a calendar and Auto format it

#### 4. Picture Insertion and alignment

- i. Prepare a greeting card
- ii. Prepare a handout

#### 5. Creation of documents using templates Creation of Templates

- i. Prepare a letter using any template
- ii. Prepare two data using various kinds of templates

#### 6. Mail Merge concepts

- i. Prepare a business letter for more than one company using mail merge
- ii. Prepare an invitation to be sent to specific addresses in the data source.

#### 7. Copying text and pictures from Excel

- i. Draw a chart in Excel and paste it on word
- ii. Import a picture from Excel and edit the picture.

## **ELECTRONIC WORK SHEET**

- i. Usage of Formulae and built in functions
- ii. Describe the types of functions
- iii. File manipulations
- iv. Data sorting – Ascending and descending
- v. Worksheet preparation
- vi. Mark list Preparation for a student
- vii. Individual Pay Bill Preparation
- viii. Electricity Bill preparation
- ix. Inventory Report Preparation
- x. Invoice Report Preparation
- xi. Drawing Graphs
- xii. Usage of Auto formatting

## **PRESENTATION SOFTWARE**

- i. Creating presentation using Blank presentation
- ii. Creating presentation using Auto content Wizard
- iii. Customizing background of slide master
- iv. Working with Graphs and Objects
- v. Exercises on slide transition and animation
- vi. Usage of Design templates.

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**SEMESTER – II**  
**PAPER VIII - NUMERICAL AND STATISTICAL METHODS**

**Objective:** To develop computing and program writing skills.

**UNIT I:** Introduction and Algebraic equations **(12 hours)**

Errors in Numerical approximation: Sources of error, various types of Errors. Chipping and rounding in different number systems. Transcendental and polynomial equation; Iterative methods, - Bisection method, False position Method, Newton Raphson Method Secant Method, Regula-Falsi Method.

**UNIT II:** System of Equations and Interpolation. **(12 hours)**

Solution of system of linear algebraic equations: Gauss elimination, Gauss Jordan, Gauss Jabcobi and Gauss seidal. Interpolation: Polynomial interpolation, Lagrange and Newton Interpolation, Method of least squares.

**UNIT III:** Differential Equations: **(12 hours)**

Euler’s Method and its modified form Runge kutta method IV order, Predictor, Corrector methods, Miline’s and Adams Methods.

**UNIT IV:** Probability distribution and Correlation **(12 hours)**

Binomial poisson and Normal distribution Fitting of probability distributions, Correlation and Regression, Linear Regression, Correlation Coefficient, Multiple linear regression.

**UNIT V:** Tests of Hypothesis **(12 hours)**

Tests of hypothesis-Testing for attributes Mean and Normal Population- one tailed and two tailed tests – Student T-test, F-test, Chi-Square test.

**TEXT BOOK(S)**

1. S.S.Sastry “Introductory methods of Numerical Analysis”, PHI.
2. S. C Gupta “Introduction to mathematics statistics”, Sultan & Chand

**REFERENCE BOOK(S)**

1. “Computer Oriented Numerical Methods”, V. RajaRaman, PHI.
2. Madin, a Statistical Methods, “An Introductory Text – Wiley Bastern Limited, New Delhi.
3. C. Xavier “ C Language and Numerical Methods” New Age International Publications.

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## **PAPER – IX - COMPUTER NETWORKS**

### **Unit I**

Introduction – Communication Model – Data Communication – Communication Networking- Protocol Architecture: Need for Protocol Architecture – OSI – The TCP/IP Protocol Architecture – Analog/Digital Transmission – Guided and Wireless Transmission

### **Unit II**

Wide Area Networks : Circuit switching & Packet Switching – Circuit switching: networks & concepts – Packet Switching – Principles - X.25 – Frame Relay – Routing in Switched networks – Congestion control in switched networks.

### **Unit III**

Local Area Networks: Topology – Transmission media – Protocol – Architecture – Bridges – Switches – High Speed LANs – Ethernet – Token Ring – Fiber Channel - Wireless LANs – Technology: IEEE 802.11 – Architecture and Services - Medium Access control – Physical layer

### **Unit IV**

Internet work Protocols – Basic Protocol Functions – Principles of Internetworking - Connectionless Internetworking – Internet Protocol – IP V6 – Internetwork Operations: Multicasting – Routing protocols – Integrated service architecture

### **Unit V**

Transport Protocol: Connection oriented transport protocol mechanism – TCP – TCP congestion control – UDP.

Network Security: Security requirements and attacks – Confidentiality with symmetric encryption – Message Authentication and Hash function – Public key encryption and digital signatures

### **Text Book:**

“Data and Computer Communication – William Stallings – 7<sup>th</sup> Edition, Tata Mcgraw Hill, 2004.

### **Reference Books:**

1. “Computer Networks” – III edition – Andrew S.Tanenbaum – Pearson Education, 1998.
2. Computer Networks, Kurose, Pearson Education.
3. Uyless D. Black, Data Communications and Distributed Networks, ed., Pearson Education, 2000.

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## **PAPER – X - DATABASE SYSTEMS**

### **UNIT – I**

Introduction – purpose of database systems – Data Abstraction – Data models – Instances and schemes – Data independence – DDL – DML – Database users – ER model – Entity sets – Keys – ER diagram – relational model – Structure – Relations Algebra – Relational Calculus – Views.

### **UNIT – II**

SQL – QBE – QUEL – Basic structure – various Operations – Relational database design problems in the relational data base design – Normalisation – normalization using functional, Multi value and join dependencies.

### **UNIT – III**

File and system structure – overall system structure – file Organization – data dictionary – Indexing and hashing – basic concept B and B+ tree indices – Static and Dynamic hash functions.

### **UNIT – IV**

Recovery and atomicity – failures classification and types – Transaction model and Log based recovery, schedules – serial and non-serial types – Serialization of schedules and views – testing for seriability – lock based protocols – time based protocols – validation techniques – multiple Granularity – multiversion schemes – insert and delete Operations.

### **UNIT – V**

Distributed data bases – structure of distributed databases – Trade offs in Distributing the database – Transparency and autonomy – distributed query processing – recovery in distributed systems – commit protocols – security and integrity violations – authorization and views – security specification – encryption – Statistical databases.

### **TEXT BOOK(S):**

Henry F.Korth, and Abraham Silberschatz,, Sudarshan “Database system Concepts”, McGraw Hill, 4<sup>th</sup> Edition, 2002

### **REFERENCE BOOK(S):**

1. Pipin C.Desai, “An Introduction to data base systems”, Galgotia Publications Private Limited, 1991.
2. C.J.Date, “An Introduction to Database Systems”, 3<sup>rd</sup> Edition, Addison Wesley 1983.

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## **PAPER – XI - OPERATING SYSTEMS**

Course Objectives: To impart knowledge about Operating Systems, their functional architecture and processes.

### **UNIT – I**

Operating Systems Objectives and functions – Operating System and User /Computer Interface, Operating System as a Resource Manager: Evaluation of Operating Systems – Serial Processing, Sample Batch Systems, Time Sharing Systems.

### **UNIT – II**

Process Description, Process Control –Processes and Threads. Concurrency – Principles of Concurrency, Mutual Exclusion – Software support, Dekker’s Algorithm – Mutual Exclusion – Hardware support, Mutual Messages – Deadlock – Deadlock prevention, Deadlock Detection, Deadlock Avoidance – An Integrated deadlock Strategy.

### **UNIT – III**

Memory Management – Memory Management Requirements – Fixed Partationing, Placement Algorithm, Relocation in a Paging System – Sample Segmentation. Virtual Memory – Paging – Address Translation in a Paging System. Segmentation –Organization, Address Translation in a Segmentation System – Combined Paging and Segmentation – Virtual Memory – Operating System Software – Fetch Policy, Placement Policy and replacement Policy, Page buffering resident set Management.

### **UNIT – IV**

Scheduling – Types of Scheduling, scheduling Algorithms, scheduling criteria, FIFO, Round Robin, Shortest Process next, Shortest Remaining Time, Highest response ratio and Feedback scheduling Performance comparison – Fair – Share Scheduling. I/O Management and disk scheduling – Organization of the I/O function – the Evaluation of the I/O function, Logical structure of the I/O function, I/O Buffering, Disk Cache.

### **UNIT – V**

File Management – Files, File Management Systems, File System Architecture, Functions of File Management File Directories – File Sharing – Secondary Storage Management – File allocation.

### **TEXT BOOKS:**

1. William Stallings, “Operating Systems”, Second edition, Maxwell McMillan, International Editions, 1997.

### **REFERENCES:**

1. Deital H.M. “An Introduction to Operating Systems”, Addison Wesley Publishing Co., 1998.
2. Silberchatz A., Peterson J.L., Galvan P. “Operating System Concepts”, Third Edition, Addison Wesley Publishing Co., 1992.

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## **PAPER – XII -- OBJECT ORIENTED PROGRAMMING**

*Objective:* To impart Object Oriented Programming skills using C++

### **UNIT-I**

What is Object Oriented Programming? – C++ Console I/O- C++ commands- Classes: Some difference between C and C++- Introducing Function Overloading- Constructor and Destructor Functions- Constructors take parameters- Introducing Inheritance – Object Pointers – In line Functions – Automatic in lining.

### **UNIT-II**

Assigning Objects – Passing Object to Functions – Returning Object from Functions- An Introduction to friend functions- Arrays of objects – Using Pointers to Objects – Using new & delete – More about new & delete – references – Passing references to objects- Returning references- Independent References and restrictions.

### **UNIT-III**

Overloading Constructor Functions- Creating and Using a Copy constructor- Using default arguments- Overloading and ambiguity – Finding the address of an overload function- the basics of operator overloading- overloading binary operators-overloading the relational and logical operators- overloading a Unary operator – using friend operator functions- a closer at the assignment operator- overloading the subscript() operator.

### **UNIT-IV**

Base class access control –using protected members- Constructors, destructors and inheritance- multiple inheritance- virtual bas classes- Some C++ I/O basics- formatted I/O using width(), precision () and fill() – using I/O manipulators- Creating your own inserters- creating extractors.

### **UNIT-V**

Creating your own manipulators- File I/O basics- unformatted, binary I/O- more unformatted I/O functions- random access- checking the I/O status- customized I/O and files- Pointers and derived classes- Introduction to virtual functions- more about virtual functions- applying polymorphism- Exception handling.

### **TEXT BOOK(S)**

Herbert Schildt “ Teach Your self C++”, III rd edition, Tata McGraw Hill 5<sup>th</sup> Reprint 2000.

### **REFERENCE(S)**

1. Robert Lafore “ Object Oriented Programming in Turbo C++”, Galgotia 2001
2. E. Balagurusamy “ Object Oriented Programming with C++ “, TMH  
New Delhi

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**PAPER – XIII**  
**OBJECT ORIENTED PROGRAMMING LAB USING C++ (LAB -III)**

**I – USING FUNCTIONS.**

- a. Write a function in C++ to generate a Fibonacci series of n numbers
- b. Develop a program in C++ to find the largest of any 3 numbers using Macro definitions
- c. Write a function called zeroSmaller ( ) that passes two int arguments, by reference and then sets the smaller of the two numbers to 0. Write a main ( ) program to exercise this function.

**II – USING CLASSES**

a. Create a class that imitates part of the functionality of the basic data type int. Call the class Int (note different spelling). The only data in this class is an int variable. Include member functions to initialize an int to 0, to initialize it to an int value, to display it ( it looks just like an int), and to add two int values.

Write a program that exercises this class by creating two initialized and one uninitialized int values, adding these two initialized values and placing the response in the uninitialized values, and then displaying this result.

b. Create a class time that has separate int member data for hours, minutes, and seconds. One constructor should initialize data to 0, and another should initialize it to fixed values. A member function should display it, in 11.59.59 format. The final member function should add two objects of type time passed as arguments.

A main ( ) program should create two initialized time objects, and one that isn't initialized time objects, and one that isn't initialized . Then it should add the two initialized values together, leaving the result in the third time variable. Finally it should display the value of this third variable.

c. Develop an object oriented program in C++ to read the following information from the keyboard:

- a. Employee name
- b. Employee code
- c. Designation
- d. Years of experience
- e. Age and

Construct an object oriented data base to carry out the following methods:

- a. build a master table
- b. list a table
- c. insert a new entry
- d. delete old entry
- e. edit an entry
- f. search for a record that to be printed
- g. sort entries

**III – USING POLYMORPHISM**

Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get\_data ( ) to initialize base class

data members and another member function `display – area( )` to compute and display the area of figures. Make `display_area ( )` as a Virtual function and redefine this function in the derived classes to suit their requirements.

Using these three classes design a program that will accept dimensions of a triangle or rectangle interactively and display the area.

#### **IV – USING INHERITANCE**

- a. Develop an object oriented program in C++ to create a data base of the following items of the derived class.
  - a. name of the patient
  - b. sex
  - c. age
  - d. ward number
  - e. bed number
  - f. nature of the illness
  - g. date of admission

Design a base class consisting of the data members namely, name of the patient, sex and age. Another base class consists of ward numbers, bed number and nature of the illness. The derived class consists of the data member date of admission. Design a virtual class for the data member, namely name of the patient, sex and age.

- b. Create a generic base class called building that stores the number of floors a building has, the number of rooms, and its total square footage. Create a derived class called house that inherits building and also stores the number of bedrooms and the number of bathrooms. Next, create a derived class called office that inherits building and also stores the number of fire extinguishers and the number of telephone.

#### **V. USING OVERLOADING**

- a. Write a program in C++ using function overloading to read two matrices of different data types such as integers and floating point numbers. Find out the sum of the above two matrices separately and display the total sum of these arrays individually.
- b. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that operate on the objects of FLOAT.

#### **VI – USING CONSTRUCTORS & DESTRUCTORS**

Write an object oriented program in C++ to read an integer number and find the sum of all the digits until it reduces to a single digit using constructors, destructor, default constructor and inline member functions.

#### **VII - USING POINTERS**

- a. Write a C++ program to find out the number of vowels in each word of a given text using a pointer.
- b. Write a C++ program to check whether the given string is a palindrome or not using the pointer method.

#### **VIII – USING FILES**

- a. Write a C++ program to read a file and display the contents of the file on the screen with line numbers.

- b. Write a C++ program to merge two files into a one file heading,
- c. Case studies:
  - i. Paybill Preparation
  - ii. Marklist Preparation.
  - iii. Student Information System

## **IX – USING EXCEPTION HANDLING**

Create a generic function that returns the mode of an array values.

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### **PAPER – XIV -- RDBMS LAB ( LAB IV)**

1. Creating, updating and inserting into database & simple queries.
2. Uses of Select statement – for queries.
  - a. AND, OR, NOT Operators, WHERE clause.
  - b. UNION, INTERSECTION, MINUS.
  - c. Sorting and grouping.
3. Nested queries using SQL.
  - a. Sub queries.
  - b. Join.
4. Built-in-functions of SQL.
5. Use of indexes, creating views and querying in views.
6. Cursors, triggers and stored procedures and functions.
7. Case studies :
  - a. Student evaluation systems.
  - b. Pay – roll system.
  - c. Personnel Information Systems
  - d. Income tax calculations.
  - e. Seat reservation Problems.
  - f. Mark – sheet Preparation.

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**SEMESTER – III**  
**PAPER XV - OPTIMIZATION TECHNIQUES**

**UNIT – I**

Linear Programming : Introduction – History of OR – Meaning of OR – Principles of Modeling – Linear equation – Gaussian Elimination – Formulation of LP models – Graphical Solution – Algebraic Solutions – Simplex Method – Feasibility – Optimality – Artificial Variables – M – Technique – Duality – Dual simplex Algorithm – Transportation Problem – Assignment Problem – Least Time Transportation Problems.

**UNIT – II**

Queuing Models : Introduction – Deterministic Model – Queue Parameters – M/M/I Queue – Limited queue Capacity – Multiple Servers – Finite Sources – Waiting Times – Queue discipline – Non – Markovian Queues – Probabilistic models.

**UNIT – III**

Inventory Models: Determine Models – EOQ – Finite and Infinite Delivery Rates without Back-Ordering – Finite and Infinite delivery rates with Backordering – Quantity Discounts – EOQ with constraints – Probabilistic model – Single Period Model – Reorder Point Model – Variable Lead Times

**UNIT – IV**

PERT / CPM: Arrow (Network) Diagram Representation – Time estimates – Critical Path – Floats – Construction of Time chart and Resource Leveling – Probability and Cost Consideration in Project Scheduling – Project Control.

**UNIT – V**

Replacement Theory : Introduction – Various replacement situations – Replacement Policy – Variables Maintenance costs and fixed money value – Variable Maintenance Costs and Variable Money Value – Individual Replacement Policy – Group Replacement Policy – Reliability.

**Text Book:**

Kanti Swarup P.K.Gupta and Man Mohan, “Operation Research”, Sultan & Chand Publishers New Delhi, 1992.

**Reference Book:**

1. Hamdy A Taha, Operations Research – An Introduction Macmillan Publishing Company, 1982.
2. Don.T.Philps, A.Ravindran, James.J.Solberg, “Operations Research – Principles and Practice John Wiley & Sons, 1976.

## **PAPER XVI - Programming In JAVA**

### UNIT - I

Introduction- Tokens, Operators & Expressions – Classes & Objects

### UNIT - II

Extending Classes – Interfaces – Nested classes & Interfaces.

### UNIT I- II

Control flow – Exception – Strings - Packages

### UNIT - IV

Threads – Programming with types – I/O Packaging.

### UNIT - V

Collection – Utilities – Standard Packages

### Text Book

Ken Arnold, James Gosling, David Holmes, “The Java Programming Language”, 3<sup>rd</sup> Edition

### Reference Book

1. Patric Naughton and Herbert Schildt “Java 2 Complete Ref”. Tata Mc Graw Hill, 1999.
2. C. Muthu, “ Programming with JAVA”, Thomson, 2005
3. Norton Peter and William STanek “Gude to Java Programming” Sams net 1996.

## **PAPER XVII - INTERNET PROGRAMMING**

### **UNIT - I**

Basics of Internet communication - Hardware elements associated with internet- Internet Services - Internet Protocols – TCP/IP, UDP, HTTP – Other Protocols – Telnet- Gopher- Mail and its types- FTP - Remote access - Web Indices – Search Engines

### **UNIT – II**

Introduction to HTML- Tags and Documents- Link documents using Anchor Tags– Images and Pictures – Tables – HTML Forms- Frames – Framesets.

### **UNIT - III**

Introduction to Scripting – Java Script – Data types – Operators – Variables – Conditional Statements – Functions – Objects – Document object– Window Object – Event Handling – Introduction to VBScript and Perl Script.

### **UNIT – IV**

Introduction to XML – Well formed XML- CSS- XSL- Valid XML- DTD- XSD- Introduction to DOM and SAX Parsers.

### **UNIT - V**

Introduction to Dynamic Web Applications: Server Side Scripting basics – Server Side Scripting Languages – PHP Scripting - General Syntactic Characteristics – Primitives, operations and expressions – Control Statement – Arrays – Functions – Pattern Matching – Form Handling – Files – Cookies – Session Tracking – Database access with PHP and MYSQL

### **TEXT BOOK(S)**

1. Deitel & Deitel “Internet and WWW – How to program? Pearson Education, 2005 (Units I, II and III)
2. Programming the WWW, Robert W Sebesta, Pearson Education ( Unit V)
3. Beginning XML, David Hunter et al., Wrox publications 2000. ( Unit IV)

### **REFERENCE BOOK(S)**

1. Daniel C. Lynch, Marshall T. Rose. Internet systems Handbook”, Addison Wesley 1993.

## PAPER XVIII - GRAPHICS AND MULTIMEDIA

### UNIT – I

#### **GRAPHICS DEVICES – LINE AND CIRCLE DRAWING ALGORITHMS**

Overview of Graphics Systems- Display Devices – Hard copy Devices- Interactive Input devices – Display processors, graphics Software – Line drawing – various algorithms and comparisons – Circle drawing algorithms.

### UNIT - II

#### **FILLING TRANSFORMATIONS AND SEGMENTS**

Attributes – area filling algorithms – Scan conversion algorithms – Transformations – Two dimensional – Basic Composite and Other transformations – Matrix representations- Windowing and Clipping – View port Transformation – Segments – Introduction to 3D Graphics.

### UNIT - III

#### **USES OF MULTIMEDIA INTRODUCTION**

Introduction – What is Multimedia - Multimedia and Personalized computing – Multimedia on the Map – A tour of emerging applications – Multimedia systems – The challenges

**The Convergence of Computers, Communications and Entertainment products:** Technology trends – Multimedia applications: hybrid devices – A designers view of Multimedia appliances – Industry perspectives for the next decade – A forward view – Key challenges Ahead: Technical, Regulatory and Social

### UNIT - IV

#### **Architectures and Issues for Distributed Multimedia Systems:**

Distributed Multimedia systems – synchronization, orchestration and QOS Architecture – The role of standards – A framework for multimedia systems

#### **Digital Video and Image Compression:**

Evaluating a compression system – redundancy and visibility – video compression techniques - standardization of algorithms – The JPEG image compression standard – ITU –T recommendation H.261 – The Mpeg Motion video compression standard – DVI technology

### UNIT - V

Photoshop – Using the Toolbox – Palettes – Creating a simple image – creating Banners- Creating buttons – Creating Shapes & Logos – Creating Patterns and Creating brush.

Flash – How Flash works – Uses of flash – what can flash do- The Timeline – The stage Tools and toolbars – The menu bar – Properties Inspector – Using Bitmaps – importing bitmaps – bitmaps as fills., using sound – importing & editing sound – adding video – manipulating video – Animation : Frame-by-frame animation – Motion tweening – Motion guides – animating text – movie clips.

### TEXT BOOKS

1. Donald Hearn M. Paulin Baker “ Computer Graphics” 1992 , PHI
2. Willam M. Newman , Robert F. Sproull “ Principles of Interactive Graphics” 1979 McGraw Hill,
3. John.F. Koegel Buford, “Multimedia Systems”, Pearson Education 2005

## REFERENCE BOOKS

1. Jen Dehaan “Macromedia FLASH MX 2004”, Macromedia Press, Techmedia.
2. Adobe Press “Adobe Photoshop CS”, Techmedia.

## PAPER XIX - OOAD and UML

### UNIT – I

Complexity : The inherent complexity of software – The Structure of complex systems – Bringing order to chaos – On designing complex systems. – Categories of analysis and design methods. The Object Model : The evolution of object model – Elements of object model – Applying the object model – Foundations of the object model.

### UNIT – II

Classes and Objects : The nature of an object – Relationship among objects – The nature of a class – Relationship among classes – The interplay of classes and objects - On building quality classes and objects – Invoking a method. Classification : The importance of proper classification – Identifying classes and objects – Key abstraction and mechanisms – A problem of classification.

### UNIT – III

Basic Behavioral Modeling: Interactions – Use Cases – Use Case Diagrams – Interaction Diagrams – Activity Diagrams.

### UNIT – IV

Advanced Behavioral Modeling: Events and Signals – State Machines – Processes and Threads – Time and Space – State chart Diagrams.

UNIT – V : Architectural Modeling: Components – Deployment – Collaborations – Pattern and Frameworks – Component Diagram – Deployment Diagrams – Systems and Models.

### Text Books:

1. Grady Booch, “Object –Oriented analysis and Design with Applications”, Pearson Education– Ninth Indian Reprint 2002.
2. Grady Booch, James Rumbaugh and Ivar Jacobson, “The Unified Modeling Languages User Guide”, Addison Wesley – Fourth Indian Reprinting 2000.

### References

1. Ali Bahrami, “Object Oriented Systems Development” Irwin-McGraw Hill, New Delhi, International editions, 1999.
2. Martin Fowler, Kendall Scott, “UML Distilled-Applying the standard Object Modeling Language”, Addition Wesley 1977.

## PAPER XX - JAVA PROGRAMMING LAB - V

1. Assume that a bank maintains 2 kinds of account for its customers, one called savings account and the other current account, The savings account provides compound interest and withdraw facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account falls below this level a service charge is imposed. Create a class Account that stores customers name, account number and type of account. From this derive the classes curr-acct and sav-acct to make them more specific to their requirements.

Introduce the necessary methods in order to achieve the following tasks:

- a. Accept deposit form a customer and update the balance.
- b. Display any deposit interest
- c. Compute and deposit interest.
- d. Permit withdrawal and update the balance.
- e. Check for the minimum balance, impose penalty, if necessary and update the balance.

Use constructors and methods to initialize the class members.

2. Write a program that accepts a shopping list of five items from the command line and stores them in a vector and accomplish the following:

- a. To delete an item in the list.
- b. To add an item at a specified location in the list.
- c. To add an item at the end of the list.
- d. To print the contents of the vector.

3. Implementation of the concept of multiple inheritance using interfaces and design a package to contain the class students and another package to contain the interfaces sports.

4. Develop a simple real-life application program to illustrate the use of multithreads.

5. Create a try block that is likely to generate three types of exception and then incorporate necessary catch blocks to catch and handle them appropriately.

6. Write a Java applet, which will create the layout below :

FORMAT

Enter your Name :

Enter your Age :

Select City : \*Delhi \*Madras

Select S/W : \*Oracle \*Visual Basic \*Java

OK CANCEL

Handle the following simple validations. The name entered should be less than 25 characters wide. Age entered should be done as the user exits the fields as well as when OK button is pressed. Hint use the Boolean action (Event evt, object arg).

7. Write an Applet which will play two sound notes in a sequence continuously use the play() methods available in the applet class and the methods in the Audio clip interface.

## **PAPER XXI - INTERNET PROGRAMMING – LAB - VI**

1. Create a HTML table with rows and columns and split them using Rowspan and Colspan.
2. Create a web page in the format of front page of a news paper using Text links. Align the text with colors.
3. Write a HTML program for new email account registration. Validate the input using Java Script.
3. Write an XML document to display your bio-data. Write an XSL style sheet and attach that to the XML document. Validate the document using DTD or XSD.
5. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.
6. Write a PHP program to access the data stored in a mysql table.

## **SEMESTER IV**

### **PAPER XXII - DISTRIBUTED TECHNOLOGIES**

#### **Unit I:**

Client server architecture: 2-tier model – 3-tier model – n-tier model – J2EE architecture – DODNET architecture – MVC architecture – struts framework. (12)

#### **Unit II:**

Presentation services: Servlet – JSP – Javamail – Interaction services: RMI – CORBA – XML – JMS (12)

#### **Unit III:**

Component model: EJB : Session Beans : Stateless and State full - Entity Beans – CMP and BMP – Message Driven Beans.

#### **Unit IV:**

ASP.NET : Introduction – architecture – ASP.NET Runtime – Internet Information Services – Visual Web Developer Web Server – ASP.NET Parser – Assembly – Page class.

Web Server Controls – HTML Controls – AdRotator and Calendar Controls – Validation Controls – Security Management.

#### **Unit V:**

ASP.NET and ADO.NET: System.Data, SqlClient and Xml namespaces – Provider objects and Consumer objects – Disconnected data access – GridView FormView.

#### **Books for Study**

1. Jusin Couch, Daniel H.Steinberg, “J2EE Bibl”, Wiley India(p) Ltd, New Delhi, 2002.
2. Paul Tremblett, “Instant Enterprise Java y – Beans”, Tata McGraw Hill Publishing company, New Delhi, 2001.
3. Platt S David, “Introducing Microsoft.Net”, Prentice hall if India, New Delhi, 2003

## **PAPER XXIII - SOFTWARE ENGINEERING**

**UNIT I :** The evolving role of software : Software - Software myths – software engineering – a layered technology – the software process – the software process models – linear sequential model – prototyping model – RAD model – evolutionary software process model – component base development – Agile Computing- Extreme Programming.

**UNIT II :** Software Project Planning : Observation on estimating – Software scope – resources – Software project estimation – Decomposition techniques – Empirical estimation models – Make buy decision.

**UNIT III :** System Engineering : Computer based systems – The system engineering hierarchy – Business process engineering: overview – product engineering: - Requirement engineering – System modeling. Analysis Modeling : The elements of the Analysis model – Data modeling – Functional modeling and information flow – Behavioral modeling – The mechanics of structured analysis – Data Dictionary.

**UNIT IV :** Design Concepts and Principles : Software design and software engineering – the design process – Design principles – Design concepts – Effective modular design – Design heuristics for effective modularity – Design Model – Design Documentation. Architectural Design : Software Architecture – Data design – Architectural styles – Mapping requirements into software architecture – Transform mapping – Transactional mapping – Refining architectural design. User Interface Design : The Golden rules – User interface design – Task analysis and modeling – Interface design activities – Implementation tools – Design evaluation.

**UNIT V :** Software Testing Techniques : Software testing fundamentals – Test case design – white box testing basis path testing – Control structure testing – Black box testing – Testing for specialized environments, architectures and applications. Software Testing Strategies : A strategic approach to software engineering – Strategic issues – Unit testing – Integration testing – Validation testing – System testing – The Art of debugging.

### **Text Book :**

1. Roger S. Pressman, “Software Engineering. A Practitioner’s Approach”, Sixth Edition.

### **References :**

1. Software Engineering, Somerville, Pearson Education.
2. C. Ghezzi, M. Jazayeri and D. Mandrioli, “Fundamentals of Software Engineering”, Pearson Education.
3. Richard Fairly, “Software Engineering Concepts”, Tata McGraw Hill, 1988.

## **PAPER XXIV - SYSTEM MODELING AND SIMULATION.**

### **UNIT – I**

Principle of Computer Modeling and Simulation – Monte Carlo Simulation – Nature of Computer Modeling and Simulation – Limitation of Simulation – Areas of Application – System and Environment – Components of a system – Discrete and Continuous Systems – Models of a system – A variety of Modeling Approaches.

### **UNIT – II**

Random Number Generation, Technique for Generating Random Numbers – Mid square Method – The Mid Product Method – Constant Multiplier Technique – Additive Congruential Method – Linear Congruential Method – Tauswarthe Method – Tests for Random Numbers – The Kolmogorov Simrnov test – The Chi – square test.

Random Variable Generation – Inverse Transform Technique – Exponential Distribution – Uniform distribution – Wei bull distribution – Empirical Continuous Distribution – Generation approximate Normal Varieties – Erlarg Distribution.

### **UNIT – III**

Empirical Discrete Distribution – Discrete Uniform Distribution – Poisson Distribution – Geometric Distribution – Acceptance – Rejection Technique for Poisson Distribution – Gamma Distribution.

### **UNIT – IV**

Design and evaluation of simulation experiments – Input – Output Analysts – Variance reduction technique – Antithetic Variables – Verification and Validation of Simulation models.

Discrete Event Simulation – Concepts in Discrete – event Simulation, Manual Simulation using event Scheduling, Single Channel Queue, two server queue, Simulation of Inventory Problem.

### **UNIT – V**

Simulations Languages – GPSS – SIMSCRIPT – SIMUKA – SIMPLE 1, Programming for Discrete event systems in GPSS, SIMPLE 1 and C – Case Study.

Simulation of LAN – Manufacturing System – Hospital System.

### **Text Books:**

1. Jerry Banks and John S.Carson, “Discrete Event System Simulation”, Prentice Hall of Inc. 1984.
2. Narsingh Deo, “System Simulation with Digital Computer”, Prentice Hall of India, 1979.

### **Reference Books:**

1. Francies Neelamkovil, “Computer Simulation and Modelling”, John Wiley & Sons, 1987.
1. Roth M.Davis and Robert M.O.Keefe, “Simulation Modelling with Pascal”, Prentice Hall of Inc. 1989.

## **ELECTIVE PAPER 1: - Optional - PAPER XXV**

### **i) PRINCIPLES OF E-COMMERCE**

#### **UNIT 1. INTRODUCTION**

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

#### **UNIT 2. SECURITY TECHNOLOGIES**

Why Internet Is Unsecure - 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.

#### **UNIT 3. ELECTRONIC PAYMENT METHODS**

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.

#### **UNIT 4. ELECTRONIC COMMERCE PROVIDERS**

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.

#### **UNIT 5. ONLINE COMMERCE ENVIRONMENTS**

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.

#### **TEXT BOOKS**

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.

## **ELECTIVE COURSE 1:**

### **ii) DATA MINING**

#### **UNIT I:**

**Introduction:** Data mining-motivation, importance-DM Functionalities, Basic Data Mining Tasks, DM Vs KDD,DM Metrics, DM Applications, Social implications.

#### **UNIT II:**

**Data Warehousing:** Difference between Operational Database and Data warehouse- Multidimensional Data Model: From tables to data Cubes, Schemas, Measures-DW Architecture: Steps for design and construction of DW, 3-tier DW Architecture-DW Implementation: Efficient computation of DATA Cubes, Efficient Processing of OLAP queries, Metadata repository.

#### **UNIT III :**

**Data Preprocessing:** Data Mining Primitives, Languages: Data cleaning, Data Integration and Transformation, Data Reduction. Discretization and concept Hierarchy Generation. Task-relevant data, Background Knowledge, Presentation and Visualization of Discovered Patterns. Data Mining Query Language-other languages for data mining.

#### **UNIT IV:**

**Data Mining Algorithms:** Association Rule Mining: MBA Analysis, The Apriori Algorithm, Improving the efficiency of Apriori. Mining Multidimensional Association rules from RDBMS and DXV. Classification and Predication: Decision Tree, Bayesian Classification back propagation, Cluster Analysis: Partitioning Methods, Hierarchical Method, Grid-based methods, Outlier Analysis.

#### **UNIT V:**

**Web, Temporal And Spatial Data Mining:** Web content Mining, Web Structure Mining, Web usage mining. Spatial Mining: Spatial DM primitives, Generalization and Specialization, Spatial rules, spatial classification and clustering algorithms. Temporal Mining: Modeling Temporal Events, Times series, Pattern Detection, Sequences.

#### **TEXT BOOK:**

1. Jiawei I-lan, & Micheline Kamber, "Data Mining: Concepts and Techniques". Harcourt India Private Limited, First Indian Reprint, 2001

#### **REFERENCE BOOK**

2. Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics". Pearson Education, First Indian Reprint, 2003

3. Arun K. Pujari, "Data Mining Techniques", University Press (India ) Limited, First Edition, 2001

## **ELECTIVE PAPER 2: Optional - PAPER XXVI**

### **i) DISTRIBUTED OPERATING SYSTEM**

#### **UNIT – I**

Distributed Computing Systems: Evolution – Models – Distributed Operating System – Issues in designing DOS – Distributed Computing Environment. Communication in distributed system: Protocols – Features of a Good Message Passing – Synchronization – Buffering – Process addressing – Failure handling – Group Communication.

#### **UNIT – II**

Synchronization : Clock Synchronization – Event Ordering – Mutual Exclusion – Deadlock – Selection Algorithms. Process Management: Process Migration – Threats.

#### **UNIT – III**

Security : Potential Attacks to Computer Systems – Cryptography – Authentication – Access Control – Digital Signatures – Design Principles.

#### **UNIT – IV**

File System Structure: History – System structure – User Perspective. Internal Representation of files : Inodes – Structure of a regular file – Directories – Conversion of a path to an inode – Super block – Inode Assignment to a new file – Allocation of Disk blocks. System Calls for the file system: Open – Read – Write – Close – File creation – Creation of special files – Change directory, root, owner and mode –stat and fstat – pipes –dup – mounting and unmounting file systems – link and unlink.

#### **UNIT – V**

Interprocess Communication: Process tracing – System – V IPC – sockets. Multiprocessor systems: Problem of multiprocessor systems – Solution with master and slave processors – solution with semaphores.

#### **Text Books:**

1. For Units I, II & III : Pradeep, K.Sinha, “Distributed Operating Systems Concepts and Design”, Prentice Hall of India Private Limited, 1998.  
(Chapters:1.2,1.3,1.5-1.7,2.5,3.2-3.5,3.8-3.10)  
(Chapters: 6,8,11).
2. For Units IV & V : Maurice J.Bach, “The design of the UNIX Operating System”, Prentice Hall of India Private Limited, 1995.  
(Chapters : 1.1-1.3, 4.1, 5.1-5.1.6,11.1,11.2,11.4,12.1)

#### **Reference Books:**

1. Andrew S.Tanaenbaum, “Modern Operating Systems”, Prentice Hall of India Private Limited, 1997.
2. W.Richard Stevens, “UNIX Network Programming”, Prentice Hall of India Private Limited, 1993.

## **ELECTIVE COURSE 2:**

### **ii) Mobile Computing**

#### **Unit I**

Introduction: Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmission – Multiplexing – Spread Spectrum and cellular systems – Medium Access Control – Comparisons –

#### **Unit II**

Telecommunications System: Telecommunication System – GSM – Architecture – Sessions – Protocols – Hand over and Security – UMTS and IMT 2000 – Satellite System

#### **Unit III**

Wireless LAN : IEEE S02.11 – Hiper LAN – Bluetooth – MAC Layer – Security and Link Management.

#### **Unit IV**

Mobile IP: Goals – Packet Delivery – Strategies – Registration – Tunneling and Reverse Tunneling – Adhoc Networks – Routing Strategies

#### **Unit V**

WIRELESS APPLICATION PROTOCOL: Wireless Application Protocol (WAP) – Architecture – XML – WML Script – Applications

#### **Text Book:**

1. Jochen Schiller, “Mobile Communication”, Pearson Education, Delhi, 2000.

#### **References:**

“The Wireless Application Protocol: Writing Applications for the Mobile Internet”, Sandeep Singhal, et al

## **PAPER XXVII - DISTRIBUTED PROGRAMMING LAB**

1. RMI
2. Servlets (Returning Information)
3. Servlets and JDBC
4. JSP
5. JSP and java class
6. EJB: Session Bean
7. EJB: Entity Bean
8. ASP.NET: Server & Client side controls
9. ASP.NET and ADO.NET
10. DOM usage on the server side
11. AJAX: Client request & Server response

## **PAPER XXVIII - OS LAB WITH UNIX /LINUX**

1. Write a menu driven shell program for the following:
  - i. List of files
  - ii. Processes of Users
  - iii. Today's Date
  - iv. Users of system
  - v. Quit to UNIX.
2. Write a shell program which accepts the name of a file from the standard input and then performs the following tests on it.
  - i. File existence
  - ii. File readable
  - iii. File Writable
  - iv. Both readable and writable.
3. Write a shell program using 3 arguments to take the pattern as well as input and output file names. If the pattern is found display "Pattern found", else display "Error message". Also check if right number of arguments are entered.
4. Write a shell program which accepts the name of a file from the standard input and then perform the following tests on it:
  - i. Enter the 5 names in a file
  - ii. Sort the names in existing file
  - iii. List unsorted and sorted file
  - iv. Quit.

5. Write a menu driven shell program to copy, edit, rename, delete a file.
6. Write a menu driven shell program to perform the following tasks
  - i. Enter the sentences in file
  - ii. Search a given whole word in an existing file
  - iii. Quit.
7. Write a shell program to prepare electric bill for domestic consumers.
 

For first 100 units - Rs.0.75/ unit  
 For next 100 units - Rs.1.50/unit  
 Above 200 units - Rs.3.00/unit.  
 Prepare the bill for the following format:  
 Customer No. -----  
 Customer Name -----  
 Pre.Reading -----  
 Cur.Reading -----  
 Units Consumed -----  
 Charge -----  
 Signature
8. Write a shell program to sum up the series.  
 $1/11 + 1/21 + 1/31 + \dots + 1/101$
9. Write a shell program to display the result PASS or FAIL using the information given below:  
  
 Student Name, Student Reg.No., Mark1, Mark2, Mark3, Mark4 . The minimum pass for each subject is 50.
10. Write a shell program to convert all capital letters in a file to small case letters.
11. Write a shell program for a file contains records with each record containing name of city, name of state and name of country. How would you sort this file with country as the primary sort key and state as the secondary sort key.
12. (i). Merge the contents of the files file1, file2, file3, sort them and display the sorted output on the screen page by page.  
 (ii). Display the list of last 20 files present in the current directory, Also store this list in a file profile.
13. Write a shell script which will receive either the file or the filename with its full path during execution. This script should obtain information about this file as given by `ls -l` and display it in proper format.
14. Write the shell script which gets executed the moment the user logs in. It should display the message "Good Morning" / "Good Afternoon" / "Good Evening" depending upon the time at which the user logs in.
15. Suppose a user has renamed some files in current directory using a command like `mv filename filename.$$`. Write a shell script to search all such files and rename them such that they do not contain the shell PID.

## SEMESTER V

### PAPER XXIX - HUMAN-COMPUTER INTERACTION

#### Unit I :

**The Interaction:** Introduction - Models of interaction – Frameworks and HCI Ergonomics – Interaction styles - Elements of the WIMP interface –Interactivity – The context of the interactions

**Paradigms:** Introduction - Paradigms for interaction.

#### Unit II:

**Interaction, Design basics:** Introduction – What is design? – User focus – Scenarios – Navigation design- Screen design and layout – Interaction and prototyping

**HCI in the software process:** Introduction- The software lifecycle – Usability engineering – Interactive design and prototyping – Design rationale.

#### Unit III:

**Design rules:** Introduction –Principles to support usability – Standards – Guidelines – Golden rules and heuristics – HCI patterns

**Implementation Support:** Introduction – Elements of windowing systems – Programming the application Using toolkits- User interface management systems.

#### Unit IV:

**Evaluation techniques:** What is evaluation- Goals of evaluation- Evaluation through expert analysis- Evaluation through user participation – Choosing an evaluation method.

**Universal Design:** Introduction- Universal design principles – Multi-modal interaction- Designing for diversity- Summary. Introduction – Requirements of user support- Approaches to user support Adaptive help systems – Designing user support systems.

#### Unit V:

**User support:**Introduction- Requirements of user support – Approaches to; user support – Adaptive help systems designing user support systems.

#### Text Book:

1. Human-Computer Interaction, Third Edition, “Alan Dix, Janet Finlay, Gregory D. Abowd and Russell Beale”, Pearson Education,2004.

#### Reference Book:

1. Human-Computer Interaction in the New Millennium, “John C.Carroll”, Pearson Education” 2002.

## **PAPER XXX - COMPILER DESIGN**

### **Unit I:**

Different phases of a compiler – finite state automation and lexical analysis – a simple approach to the design of lexical analyzer – regular expressions NFA-DFA-reduced DFA-implementation of lexical analyzer – a language for specifying lexical analyzers.

### **Unit II:**

Context free grammars – Parsers – derivation and parse trees – shift-reduce parsing – operator-precedence parsing – top-down parsing – predictive parsers.

### **Unit III:**

Intermediate code generation – translation – implementation of syntax – directed translators – intermediate code – postfix notation – parse trees and syntax trees – three-address codes, quadruples and triples – translation of assignment statements.

### **Unit IV:**

Symbol tables – data structures for symbol tables – implementation of a simple stack allocation scheme – implementation of block structured languages – errors – lexical phase error.

### **Unit V:**

Code optimization and code generation: Elementary code optimization technique – loop optimization – DAG representation of basic blocks – value numbers and algebraic laws – object programs in code generation – A machine model – A simple code Generation.

### **Text Book**

1. Alferd V.Aho, Jeffery D.Ullman, “Principles of Compiler Design”, Pearson Education, New Delhi, 2002.

### **Reference Books**

2. William A.Barrett, Rodney M.Bates, David A.Gustafson and John D.Couch – “Compiler Construction Theory and Practice”, Galgotia Publication Co.,1990.
3. Jean-Paul Trembley and Paul G. Soreson,- “The Theory and Practice of Compiler Writing”, McGraw Hill, 1985.

## **PAPER XXXI - CYBER SECURITY**

### **UNIT I:**

Overview – Symmetric Ciphers : Classical Encryption Techniques

### **UNIT II :**

Symmetric Ciphers : Block ciphers and the Data Encryption Standards Public-key Encryption and Hash Functions: Public-Key Cryptography and RSA

### **UNIT III:**

Network Security Practices : Authentication applications – Electronic Mail Security

### **UNIT IV:**

Network Security Practices : IP Security – Web Security

### **UNIT V:**

System Security : Intruders – Malicious Software – Firewalls

### **Text Book:**

1. William Stallings, "Cryptography and Network Security – Principles and Practices", Prentice-Hall, Third edition, 2003

### **References:**

1. Johannes A. Buchanan , "Introduction to cryptography", Springer-Verlag.
2. Atul kahate , "Cryptography and Network Security", TMH

## **ELECTIVE COURSE 3 – Optional - PAPER XXXII**

### **i) . SOFTWARE PROJECT MANAGEMENT**

#### **Unit 1. INTRODUCTION**

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

#### **Unit 2. DOMAIN PROCESSES**

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.

#### **Unit 3. SOFTWARE DEVELOPMENT**

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.

#### **Unit 4. SCHEDULING ACTIVITIES**

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.

#### **Unit 5. QUALITY ASSURANCE**

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.

### **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.
1. Hughes, “Software Project Management, 3/E”, Tata McGraw-Hill, 2004.

## **ELECTIVE COURSE 3**

### **ii) SOFTWARE TESTING**

#### **Unit I: Software Quality**

Quality Concepts - Quality Movement – Software Quality Assurance – Software Reviews – Formal Technical Reviews – Formal Approaches to SQA – Statistical Software Quality Assurance - Software Reliability – The ISO 9000 Quality Standards – The SQA Plan

#### **Unit II: Testing Fundamentals**

Testing Fundamentals – Types of Testing – White box testing – Black box testing - Integration testing – System and acceptance testing – Performance testing – Regression testing

#### **Unit III: Specialized Testing**

Testing of Object Oriented Systems – Usability and Accessibility testing – Testing Web applications

#### **Unit IV:**

Testing Web applications - Testing the Documentation – Test Planning, Management, Execution and Reporting

#### **Unit V:**

Software Test Automation - Test Metrics and Measurements

#### **Text Books:**

1. Software Engineering Concepts and Practices - Roger S Pressman, TMG, Sixth Edition ( For Unit I and Testing Web Apps)
2. Software Testing (Units II, III, IV, V) – Srinivasan Desikan, Gopaldaswamy Ramesh - Pearson Education 2006

#### **Reference Books:**

1. Introducing Software Testing – Louis Tamres, Addison Wesley Publications, First Edition.
2. Software Testing, Ron Patton, SAMS Techmedia, Indian Edition 2001
3. Software Quality – Producing Practical, Consistent Software – Mordechai Ben – Menachem, Gary s. Marliss, Thomson Learning, 2003.

## **ELECTIVE COURSE 4 – Optional – PAPER XXXIII**

### **i) Web Services**

#### **Unit I: Introduction**

What are web services? SOAP WSDL UDDI-Why Web Services are important ? - The evolution of web applications Not just another distributed computing platform – Web services and enterprises.

#### **Unit II:**

**XML Fundamentals:** The Lingua Franca of web services- XML Documents-XML namespaces Explicit and Default namespaces, Inheriting namespaces, And not inheriting namespaces, Attributes and namespaces -XML Schema XML schema and namespaces, A first schema, Implementing XML schema types, The any Element, Inheritance, Substitution groups, Global and local type declarations, Managing Schemas, Schemas and instance documents, XML schema best practices

#### **Unit III : SOAP**

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

#### **Unit IV: UDDI**

UDDI at a glance- The UDDI Business registry- UDDI under the covers – Accessing UDDI-How UDDI is playing out

#### **Unit V:**

**Conversations:** Overview – Web Services – Web services Conversation Language – WSCL Interface components – The Bar scenario conversations – Relationship between WSCL and WSDL

#### **Text Book:**

1. Sandeep Chatterjee, James Webber, “Developing Enterprise Web Services”, Pearson Education, 2004.

#### **Reference Book:**

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

## **ELECTIVE COURSE 4**

### **ii) GRID COMPUTING**

#### **Unit I**

Introduction: Early and Current Grid Activities – An Overview of Grid Business Areas – Applications – Infrastructure. Grid Computing Organization and their Roles: Standards and Guidelines – Tool Kits and Framework – Grid-Based Solution to Solve Computing, Data and Network Requirements.

#### **Unit II**

The Grid Computing Anatomy: The Grid Problem – Concept of Virtual Organizations – Architecture. The Grid Computing Road Map: Autonomic Computing – Business on Demand and Infrastructure Virtualization – Service-oriented Architecture and Grid – Semantic Grid.

#### **Unit III**

Merging Grid Services Architecture with the Web Services Architecture: Service-Oriented Architecture – Web Service Architecture – XML, Related Technologies – XML Messages and Enveloping – Service Message Description Mechanisms – Relationship between Web Service and Grid Service – Open Grid Services Architecture (OGSA): Architecture.

#### **Unit IV**

OGSA Use Cases: Commercial Data Center – National Fusion Collaboratory – Online Media and Entertainment - OGSA Platform Components – OGSI: Grid Services – Specification – Service Data Concepts – Naming and Change Management Recommendations.

#### **Unit V**

OGSA Basic Services: Common Management Model – Service Domains – Policy Architecture – Security Architecture – Metering and Accounting – Common Distributed Logging – Distributed Data Access and Replication.

Case Study: GLOBUS – The Grid Computing Toolkit.

#### **Text Book:**

“ Grid Computing “ , Joshy Joseph and Craig Fellenstein, Pearson Education, 2005

#### **References:**

“ Grid Computing “ S. Jaya Krishna , ICFAI University Press, 2006.

## **PAPER XXXIV - OPEN SOURCE LAB (LAMP)**

1. Write a server side PHP program that displays marks, total, grade of a student in tabular format by accepting user inputs for name, number and marks from a HTML form.
2. Write a PHP program that adds products that are selected from a web page to a shopping cart.
3. Write a PHP program to access the data stored in a mysql table.
4. Write a PHP program interface to create a database and to insert a table into it.
5. Write a PHP program using classes to create a table.
6. Write a PHP program to upload a file to the server.
7. Write a PHP program to create a directory, and to read contents from the directory.
8. Write a shell program to find the details of an user session.
9. Write a shell program to change the extension of a given file.
10. Create a mysql table and execute queries to read, add, remove and modify a record from that table.

## **PAPER XXXV - MINI PROJECT USING SOFTWARE ENGINEERING TOOLS**

### **Preferred Domains:**

Gather , Design , Develop, Test and Deploy using CASE tools

1. Health care
2. Insurance
3. e-Governance
4. Banking
5. on-line reservation
6. Shopping Cart
7. E-commerce(e-bay)
8. Tourism
9. Share/stock portfolio
10. Logistics Management

## **SEMESTER VI:**

### **1. PROJECT WORK**