

BHARATHIAR UNIVERSITY::COIMBATORE-641 046
B.Sc. COMPUTER TECHNOLOGY With
COMPULSORY DIPLOMA IN COMPUTER NETWORKING
(For the students admitted from the academic year 2008-2009 and onwards)

SCHEME OF EXAMINATION - CBCS PATTERN

Part	Study Components	Course title	Ins. hrs/ week	Examinations				Credit
				Dur.Hrs	CIA	Marks	Total Marks	
	Semester I							
I	Language – I		6	3	25	75	100	3
II	English – I		6	3	25	75	100	3
III	Core 1: Data Structures and C Programming		4	3	25	75	100	4
	Core 2: Computer Organisation and Architecture		4	3	25	75	100	5
	Core Lab 1: C Programming Using Data Structures		3	3	40	60	100	3
	Allied 1: Mathematical Structures for Computer Science		5	3	25	75	100	5
IV	Environmental Studies #		2	3	-	50	50	2
	Semester II							
I	Language – II		6	3	25	75	100	3
II	English – II		6	3	25	75	100	3
III	Core 3: Object Oriented Programming with C++		6	3	25	75	100	4
	Core Lab 2: Programming Lab With C++		4	3	40	60	100	3
	Allied 2: Discrete Mathematics		6	3	25	75	100	5
IV	Value Education – Human Rights #		2	3	-	50	50	2
	Semester III							
	Core 4: RDBMS and ORACLE		6	3	25	75	100	5
III	Core 5: Visual Programming (Visual Basic)		6	3	25	75	100	4
III	Core Lab 3: Visual Programming Lab - VB With MS Access		5	3	40	60	100	3
III	Allied 3: Microprocessors and ALP		6	3	25	75	100	5
IV	Skill based Subject I – Diploma Paper - Data Communication and Networks		5	3	25	75	100	3
IV	Tamil @ / Advanced Tamil# (OR) Non-major elective - I (Yoga for Human Excellence)# / Women's Rights#		2	3	75		75	2

	Semester IV						
III	Core 6: Java Programming	6	3	25	75	100	4
	Core 7: Client/Server Computing	6	3	25	75	100	5
	Core Lab 4: Programming Lab - Java	6	3	40	60	100	3
	Allied 4: Computer Installation and Servicing	6	3	25	75	100	5
IV	Skill based Subject 2 – Diploma paper - Network Lab	4	3	40	60	100	3
IV	Tamil @ /Advanced Tamil # (OR) Non-major elective -II (General Awareness #)	2	3	75		75	2
	Semester V						
III	Core 8: Software Engineering	6	3	25	75	100	5
III	Core 9: Operating Systems	6	3	25	75	100	4
III	Core 10: Graphics and Multimedia	6	3	25	75	100	5
	Core Lab 5: Multimedia	4	3	40	60	100	3
	Elective I	5	3	25	75	100	5
IV	Skill based Subject 3 - Diploma Paper - Network Security and Management	3	3	25	75	100	3
	Semester VI						
	Core 11: Computer Aided Design and Manufacturing	5	3	25	75	100	4
	Core 12: Web Technology	6	3	25	75	100	5
	Core Lab 6: Web Technology	6	3	40	60	100	3
	Elective II	5	3	25	75	100	5
	Elective III	5	3	25	75	100	5
IV	Skill Based Subject 4 - Diploma Lab: Network Security Lab	3	3	40	60	100	3
V	Extension Activities @	-	-	50	-	50	1
	Total					3600	140

@ No University Examinations. Only Continuous Internal Assessment (CIA)

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List of Elective papers (Colleges can choose any one of the paper as electives)		
Elective – I	A	Mobile Computing
	B	Distributed Computing
	C	Digital Image Processing
Elective – II	A	Artificial Intelligence and Expert Systems
	B	Animation Techniques
	C	E-Commerce
Elective - III	A	Data Mining
	B	Embedded Systems
	C	Software Testing

CORE 1 : DATA STRUCTURES AND C PROGRAMMING

Subject Description:

This subject deals with the methods of data structures using C programming language.

Goal: To learn about C programming language using data structural concepts.

Objective: On successful completion of this subject the students should have :

- Writing programming ability on data structures dealing with Stacks, Queues, List, Searching and Sorting algorithms etc.,

UNIT – I:

Programming development methodologies – Programming style – Problem solving techniques: Algorithm, Flowchart, Pseudocode - Structure of a C program – C character set – Delimiters – Keywords – Identifiers – Constants – Variables – Rules for defining variables – Data types – Declaring and initializing variables – Type conversion.

Operators and Expressions – Formatted and Unformatted I/O functions – Decision statements – Loop control statements.

UNIT – II:

Arrays – String and its standard functions.

Pointers – Functions – Preprocessor directives: #define, #include, #ifndef, Predefined macros.

UNIT – III:

Structure and Union: Features of structure, Declaration and initialization of structure, Structure within structure, Array of structure, Pointer to structure, Bit fields, Enumerated data types, Union.

Files: Streams and file types, Steps for file operation, File I/O, Structures read and write, other file functions, Command line arguments, I/O redirection.

UNIT – IV:

Linear data structures: Introduction to data structures – List: Implementations, Traversal, Searching and retrieving an element, Predecessor and Successor, Insertion, Deletion, Sorting, Merging lists – Stack: Representation, Terms, Operations on stack, Implementation.

Single linked list, Linked list with and without header, Insertion, Deletion, Double linked list – Queues: Various positions of queue, Representation

UNIT V:

Searching and Sorting – Searching: Linear, Binary.

Sorting – Insertion, Selection, Bubble, Quick, Tree, Heap.

TEXT BOOK:

Ashok N Kamthane, “PROGRAMMING AND DATA STRUCTURES” – Pearson Education, First Indian Print 2004, ISBN 81-297-0327-0.

REFERENCE BOOK:

1. E Balagurusamy: Programming in ANSI C, Tata McGraw-Hill, 1998.
2. Ellis Horowitz and Sartaj Sahni: Fundamentals of Data Structure, Galgotia Book Source, 1999.

CORE 2 : COMPUTER ORGANISATION AND ARCHITECTURE

Subject Description:

This subject deals with fundamentals of digital computers, Microprocessors and system architecture.

Goal:

To learn about computer fundamentals and its organization.

Objective:

On successful completion of this subject the students should have:

- Knowledge on digital circuits
- Interfacing of various components

Unit I

Number System and Binary Codes: Decimal, Binary, Octal, Hexadecimal – Binary addition, Multiplication, Division – Floating point representation, Complements, BCD, Excess3, Gray Code.

Arithmetic Circuits: Half adder, Full adder, Parallel binary adder, BCD adder, Half subtractor, Full subtractor, Parallel binary subtractor - Digital Logic: the Basic Gates – NOR, NAND, XOR Gates.

Unit II

Combinational Logic Circuits: Boolean algebra –Karnaugh map – Canonical form 1 – Construction and properties – Implicants – Don't care combinations - Product of sum, Sum of products, simplifications.

Sequential circuits: Flip-Flops: RS, D, JK, T - Multiplexers – Demultiplexers – Decoder – Encoder - Counters.

Unit III

CENTRAL PROCESSING UNIT: General register organization – control word – examples of Micro operations – Stack organization – Instruction formats – Addressing modes – Data transfer and manipulation control.

Unit IV

Input – Output Organization: Input – output interface – I/O Bus and Interface – I/O Bus Versus Memory Bus – Isolated Versus Memory – Mapped I/O – Example of I/O Interface. Asynchronous data transfer: Strobe Control and Handshaking – Priority Interrupt: Daisy-Chaining Priority, Parallel Priority Interrupt. Direct Memory Access: DMA Controller, DMA Transfer. Input – Output Processor: CPU-IOP Communication.

Unit V

Memory Organization: Memory Hierarchy – Main Memory- Associative memory: Hardware Organization, Match Logic, Read Operation, Write Operation. Cache Memory: Associative, Direct, Set-associative Mapping – Writing Into Cache Initialization. Virtual Memory: Address Space and Memory Space, Address Mapping Using Pages, Associative Memory Page Table, Page Replacement.

Text Books:

1. Digital Electronics Circuits and Systems, V.K. PURI, TATA McGRAW-HILL Pub. Company
2. Computer System Architecture, M. MORRIS MANO, Pearson Education Pub, III Edition.

Reference Books:

ISRD group - TATA McGRAW-HILL

CORE LAB 1 : C PROGRAMMING LAB USING DATA STRUCTURES

1. Write a C program to create two array list of integers. Sort and store the elements of both of them in the third list.
2. Write a C program to experiment the operation of STACK using array implementation.
3. Write a C program to create menu drive program to implement QUEUE to perform the following:
 - I. Insertion
 - II. Deletion
 - III. Modification
 - IV. Listing of elements using pointers
4. Write a C program to create LINKED LIST representation of employee records and do the following operations using pointers:
 - I. To add a new record
 - II. To delete an existing record
 - III. To print the information about an employee
 - IV. To find the number of employees in the structure
5. Write a C program to count the total nodes of the linked list.
6. Write a C program to insert an element at the end of the linked list.
7. Write a C program to insert an element at the begining of the Double linked list.
8. Write a C program to display the hash. table, which is to be prepared by using the Mid-square method.
9. Write a C program to demonstrate Binary search.
10. Write a C program to insert nodes into a Binary tree and to transverse in pre-order.
11. Write a C program to arrange a set of numbers in ascending order using QUICK-SORT.
12. Write a C program to arrange a set of numbers in descending order using EXCHANGE-SORT.

Allied Paper 1: MATHEMATICAL STRUCTURES FOR COMPUTER SCIENCE

Subject Description:

This subject deals with mathematical concepts like Matrices, Numerical analysis and Statistical methods for computer science and applications.

Goal: To learn about the mathematical structures for computer based applications.

Objective: On successful completion of this subject the students should have:

- Understanding the concepts of mathematics
- Learning applications of statistical and numerical methods for Computer Science.

Unit I

Matrices – Introduction – Determination – Inverse of a matrix – Rank of a Matrix - Eigen value Problems

Unit II

System of Simultaneous Linear algebraic Equation – Gauss elimination, Gauss Jordan, Gauss Seidal methods. The solution of Numerical Algebraic & Transcendental equation – Bisection method – Newton – Raphson method – false position method.

Unit III

Numerical Difference ion – Newton’s forward Difference - Backward Difference – Startling formula Numerical Integration – Trapezoidal Rule & Simpson’s rule Numerical solutions of ordering differential Equations – Taylor series & Runge kutta method

Unit IV

Measures of central tendency – Mean Media and Mode – Relationship among mean media and mode. Measures of dispersion – Range, quartile deviation, mean deviation and Standard deviation

Unit V

Regression and Correlation – Types of relationship – Linear regression – Correlation – Coefficient of correlation – Regression equation of variables – Discrete Probability distribution – Uniform, Binomial & poisson Distribution

Text Book:

1. Engineering Mathematics Volume II – Dr M.K. Venkataraman - NPC (Unit I)
2. Numerical Methods in science & Engineering - M.K. Venkataraman – NPC , Revised Edition -2005 (Unit II & III)
3. Business Statistics - S.P. Gupta & M.P. Gupta **Sultan Chand and Sons** (Unit IV & V)

Reference Book:

1. Numerical methods – E. Balagurusamy Tata MC Graw Hill.
2. Fundamental of Mathematical statistics S C Gupta, V. K. Kapoor **Sultan Chand and Sons**

CORE 3 : OBJECT ORIENTED PROGRAMMING WITH C++
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Subject Description:

This subject deals with Object-oriented programming concepts using C++.

Goal: To learn about on Object-oriented Programming concept.

Objective:

On successful completion of this subject the students should have:

- Writing programming ability on OPDS concepts like Encapsulation, Abstraction, Inheritance, Polymorphism and Exception handling ect.,

UNIT-I

Introduction to C++ - key concepts of Object-Oriented Programming –Advantages – Object Oriented Languages – I/O in C++ - C++ Declarations. Control Structures : - Decision Making and Statements : If .. else ,jump, goto, break, continue, Switch case statements - Loops in C++ : For,While, Do - Functions in C++ - Inline functions – Function Overloading.

UNIT-II

Class and Objects: Declaring objects – Defining member functions – Static member variables and functions – Array of objects – Friend functions – Overloading member functions – Bit fields and Class – Constructor and Destructors – Characteristics – Calling constructor and Destructors – Constructor and Destructor with static member.

UNIT-III

Operator Overloading: Overloading unary, binary operators – Overloading Friend functions – type conversion – Inheritance: Types of Inheritance – Single, Multilevel, Multiple, Hierarchal, Hybrid, Multi path inheritance – Virtual base Classes – Abstract Classes.

UNIT-IV

Pointers: Declaration – Pointer to Class , Object – this pointer – Pointers to derived classes and Base classes – Arrays – Characteristics – array of classes – Memory models – new and delete operators – dynamic object – Binding , Polymorphism and Virtual Functions.

UNIT-V

Files: File stream classes – file modes – Sequential Read / Write operations – Binary and ASCII Files – Random Access Operation – Templates – Exception Handling - String – Declaring and Initializing string objects – String Attributes – Miscellaneous functions .

TEXT BOOKS :

Ashok N Kamthane: Object-Oriented Programming with ANSI and Turbo C++, Pearson Education publication. 2003.

REFERENCE BOOKS:

1. E. Balagurusamy: Object Oriented Programming with C++, TMH Pub., 1998.
2. Maria Litvin and Gary Litvin: C++ for you++, Vikas Publ, 2002.
3. John R Hubbard: Programming with C++, TMH Publ. II Edition, 2002.
4. Bhushan Trivedi , “ Programming with Ansi C++ “, Oxford university Press. 2007.

CORE LAB 2 : PROGRAMMING IN C++ USING DATA STRUCTURES

1. Create a class to implement the data structure STACK. Write a constructor to initialize the TOP of the stack to 0. Write a member function POP() to delete an element. Check for overflow and underflow conditions.
2. Create a class ARITH which consists of a FLOAT and an integer Variable. Write member ADD(), SUB (), MUL (), DIV (), MOD () to perform addition, multiplication ,division and modulus Respectively. Write member functions to get and display values.
3. Create a class MAT has a 2-d matrix and R&C represents the rows and columns of the matrix. Overload the operators + ,-, * to add subtract and multiply two matrices. Write member functions to get and display MAT object values.
4. Create a class STRING. Write member function to initialize, get and display strings .Overload the operator + to concatenate two strings, = = to compare two strings and a member function to find the length of the string.
5. Create a class which consists of EMPLOYEE detail like eno, ename, dept, basic-salary, and grade. Write member functions to get and display them. Derive a class PAY from the above class and write a member function to calculate da , hra , pf depending on the grade and Display the Payslip in a neat format using console I/O.
6. Create a class SHAPE which consist of two VIRTUAL FUNCTIONS Cal_Area() and Cal_PERI to calculate AREA and PERIMETER of various figures. Derive three classes SQUARE,RECTANGLE and TRIANGLE from the class SHAPE and calculate AREA and PERIMETER of each class separately and Display the result. .
7. Create two classes which consists of two private variables, one float And one integer variables in each class. Write member functions to get and display them. Write FRIEND function common to arguments And the integer and float values of both the objects separately and Display the result.
8. Write a user defined function USERFUN() which has the formatting commands like setw() , showpoint , showpos precision(). Write a program which prints an multiplication table and uses USERFUN() for formatting.
9. Write a program to perform Insertion, Deletion and Updation using files.
10. Write a program which takes a file as argument and copies in to another file with line numbers using Command Line Arguments.

ALLIED PAPER 2 : DISCRETE MATHEMATICS

Subject Description:

This subject deals with discrete structures like set theory, mathematical logic, relations, languages, graphs and trees.

Goal: To learn about the discrete structures for computer based applications.

Objective:

On successful completion of this subject the students should have :

- Understanding the concepts of discrete mathematics
- Learning applications of discrete structures in Computer Science.

Unit I

Set theory-Introduction-Set & its Elements-Set Description-Types of sets-Venn-Euler Diagrams- Set operations & Laws of set theory-Fundamental products-partitions of sets-minsets-Algebra of sets and Duality-Inclusion and Exclusion principle

Unit II

Mathematical logic – Introduction- propositional calculus –Basic logical operations-Tautologies-Contradiction-Argument-Method of proof- Predicate calculus.

Unit III

Relations – Binary Relations – Set operation on relations-Types of Relations – Partial order relation – Equivalence relation – Composition of relations – Functions – Types of functions – Invertible functions – Composition of functions.

Unit IV

Languages – Operations on languages – Regular Expressions and regular languages – Grammar – Types of grammars – Finite state machine – Finite – State automata

Unit V

Graph Theory – Basic terminology – paths, cycle & Connectivity – Sub graphs - Types of graphs – Representation of graphs in compute memory - Trees – Properties of trees – Binary trees – traversing Binary trees – Computer Representation of general trees.

Text Books:

1. Discrete Mathematics – J.K. Sharma Second Edition – 2005 , Macmillan India Ltd. (UNIT I TO V)

Reference Books:

1. Discrete Mathematics Structures with Applications to computer science - J. P Tremblay R Manohar – Mc Graw Hill International Edition
2. Discrete Mathematics – Dr M. K. Venketaramen, Dr N.Sridharan, N. Chandarasekaran – The National publishing Company Chennai.

CORE 4 : RDBMS AND ORACLE

UNIT-I: Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. **Database Design: Data Modeling and Normalization:** Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams - Denormalization .

UNIT-II: Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - iSQL *Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

UNIT-III: Working with Table: Data Management and Retrieval: DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. **Functions and Grouping:** Built-in functions –Grouping Data. **Multiple Tables: Joins and Set operations:** Join – Set operations.

UNIT-IV: PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. **Control Structures and Embedded SQL:** Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation – Transaction Control statements. **PL/SQL Cursors and Exceptions:** Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT...FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

UNIT-V: PL/SQL Composite Data Types: Records – Tables – Varrays. **Named Blocks:** Procedures – Functions – Packages –Triggers – Data Dictionary Views.

TEXTBOOKS:

DATABASE SYSTEMS USING ORACLE – Nilesh Shah, 2nd edition, PHI.

(UNIT-I: Chapters 1 & 2 UNIT-II: Chapters 3 & 4 UNIT III: Chapters 5 & 6

UNIT-IV: Chapters 10 & 11 UNIT-V: Chapters 12, 13 & 14)

REFERENCE BOOKS:

1. DATABASE MANAGEMNET SYSTEMS – Arun Majumdar, Pritimoy Bhattacharya, 2007, TMH.

2. DATABASE MANAGEMETN SYSTEMS – Gerald V. Post, 3rd edition, TMH.

CORE 5 : VISUAL PROGRAMMING (VISUAL BASIC)

Subject Description: This Subject deals with the Visual Programming.

Goal: To learn about Visual Programming.

Objective: On Successful Completion of this subject the students should have:

- Writing Programming ability on Visual Basic.

UNIT I:

Getting Started – Visual Basic Environment – Initial VB Screen – Single Document Interface – Tool Bars and System Control & Components – Use of File, Edit , View , Project , Format , Run and Debug , Tools , Window Menu , Properties Window , Procedures , Image Controls , Text Boxes , Labels , Navigating between Controls , Message Controls , Message Boxes and Grids.

UNIT II:

Steps in Programming – The Code Window – Editing Tools – Statements in VB – Assignment – and Property Setting – Variables , Numbers , Constants , Displaying Information – Controlling Program Flow – Repeating Operation – Making Decisions – GOTO – String Function – RND Functions – Data and Time Functions – Financial Functions.

UNIT III:

Control Arrays – Lists : One Dimensional Arrays – Array with More than One Dimension – Using Lists Functions and Procedures – Passing by Reference / Passing by Values – Code Module – Global Procedure and Global Variables – Documents for User Defined Types with Statements – Common Dialog Box – MDI Forms.

UNIT IV:

Fundamentals of Graphics and Files – Screen – The Line and Shapes – Graphics Via Codes , Lines & Boxes , Circle , Ellipse , Pie Charts Curves , Paint Picture Method – Graph Control – File Commands – File System Controls – Sequential Files – Random Access Files – Binary Files.

UNIT V:

Clip Board , DDE , OLE , Data Control – Programming with Data Control – Monitoring Changes to the Databases – SQL – Basics Database Objects.

TEXT BOOK :

Gary Comell – “Visual Basic 6.0 Programming”– Tata McGraw Hill Edition.

CORE LAB 3 :VISUAL PROGRAMMING LAB – VB WITH MS ACCESS

1. Develop a VB Project to Check User Name & Password Given by User.
2. Develop a VB Project to Add & Remove Items From List Box.
3. Develop a VB Project to Copy all Items in a List Box to Combo Box.
4. Develop a VB Project to Enter and Display Student Information.
5. Develop a VB Project to Scroll Text from Left to Right Using Timer.
6. Develop a VB Project to Mini Calculator Functions.
7. Develop a VB Project to Documents typing using MDI Form.

Use Employee Information For the Following Projects.

8. Develop a VB Project to Search a Record in MS-ACCESS database using data control.
9. Develop a VB Project to Delete a Record from MS-ACCESS database using data control.
10. Develop a VB Project to Perform following Operations in MS-ACCESS database using DAO. A). Move First Record. B).Move Next Record C).Move Previous Record. D).Move Last Record.
11. Develop a VB Project to Insert a Record in MS-ACCESS database using ADO.
12. Develop a VB Project to Modify a record in MS-ACCESS database using ADO.

ALLIED PAPER 3 : MICROPROCESSORS AND ALP

UNIT I

Introduction to microprocessors: Evolution of microprocessors -Single-chip Microcomputer - Embedded Microprocessors -Bit- Slice processors -Microprogramming -RISC and CISC Processors - Scalar and Superscalar Processors -Vector Processors -Array Processors - Symbolic Processors –Digital Signal Processors.

Intel 8086 -Pin Description of Intel 8086 -Operating modes of 8086 -Register organization of 8086 -BIU and EU -Interrupts -8086 based computer system -Addressing Modes of 8086.

UNIT II

8086 Instruction Set -Instruction Groups -Addressing Mode Byte -Segment Register Selection - Segment Override -8086 Instructions.

Assembly Language Programs for 8086: Largest Number, Smallest Number in a Data Array - Numbers in Ascending and Descending order -Block Move or Relocation -Block Move using REP instruction -Sum of a series -Multibyte Addition.

UNIT III

Intel 386 and 486 Microprocessors: Intel 386 and 486 Microprocessor -486DX Architecture-Register Organization of 486 Microprocessor -Memory Organization -Operating Modes of Intel 486 -Virtual Memory -Memory Management Unit -Gates -Interrupts and Exceptions -Addressing Modes of 80486 -Pin Configuration.

UNIT IV

Input devices -Output devices -Memory and VO addressing -8086 Addressing and Address Decoding -Programmable VO Ports -DMA Data Transfer.

Other Microprocessors -PowerPC Microprocessors -Pentium Microprocessors -Pentium Pro microprocessor -Alpha Microprocessor -Cyrix Microprocessor -MIPS Microprocessor – AMD Microprocessor .

UNIT V

MOTOROLA 68000, MOTOROLA 68020, MOTOROLA 68030, MOTOROLA 68040
Interfacing of AID Converter and Applications: Introduction -Interfacing of ADC 0808 or ADC 0809 to Intel 8086 -Bipolar to Unipolar Converter -Sample and Hold Circuit, LF 398 - Microprocessor based Measurement and Control of Physical Quantities.

TEXT BOOK

Badri Ram, “Advanced Microprocessors and Interfacing”, Tata McGraw-Hill Publishing Company Limited, Fourteenth reprint, 2007.

DIPLOMA PAPER 1 : DATA COMMUNICATION AND NETWORKS
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UNIT- I

Introduction to communications and Networking : Introduction – Fundamental concepts - Data communications – Protocols- standards - Standards organizations - Signal propagations- Analog and Digital signals- Bandwidth of a signal and a medium - Fourier analysis and the concept of bandwidth of a signal - The data transmission rate and the bandwidth.

Information encoding: Introduction – Representing different symbols- Minimizing errors- Multimedia – Multimedia and Data compression.

UNIT- II

Analog and digital transmission methods: Introduction - Analog signal, Analog transmission - Digital signal, Digital transmission - Digital signal , Analog transmission - Baud rate and bits per second - Analog signal, Digital (Storage and) transmission - Nyquist Theorem.

Modes of data transmission and Multiplexing: Introduction – Parallel and Serial communication - Asynchronous, Synchronous and Isochronous communication - Simplex, Half-duplex and Full-duplex communication – Multiplexing - Types of Multiplexing - FDM versus TDM.

Transmission Errors: Detection and correction : Introduction – Error classification – Types of Errors – Error detection.

UNIT- III

Transmission media: Introduction - Guided media - Un Guided media - Shannon capacity.

Network topologies, switching and routing algorithms: Introduction - Mesh topology - Star topology - Tree topology - Ring topology - Bus topology - Hybrid topology - Switching basics- Circuit switching – Packet switching - Message switching - Router and Routing – Factors affecting routing algorithms - Routing algorithm -Approaches to routing.

UNIT- IV

Networking protocols and OSI model: Introduction – Protocols in computer communications - The OSI model - OSI layer functions.

Integrated services digital networking (ISDN): Introduction – Background of ISDN - ISDN architecture – ISDN interfaces - Functional grouping – Reference points - ISDN protocol architecture - Broadband ISDN (B-ISDN).

UNIT- V

Asynchronous transfer mode (ATM): Introduction- Overview of ATM – Packet size – Virtual circuits in ATM – ATM cells – Switching – ATM layers – Miscellaneous Topics.

Text book:

Data Communications and Networks, ACHYUT. S. GODBOLE, Tata McGraw-Hill Publishing Company, 2007.

CORE 6: JAVA PROGRAMMING

Subject Description:

This Subject deals with the JAVA Programming.

Goal: To learn about Java.

Objective:

On Successful Completion of this subject the students should have:

- Writing Programming ability on Java like Encapsulation, Data Abstraction, Inheritance, Polymorphism and Exception handling, Applet etc.

UNIT I:

Basic Concepts of Object –Oriented Programming: Objects and Classes – Data Abstraction and Encapsulation – Inheritance – Polymorphism – Dynamic Binding – Message Communication – Benefits of Oops – History of Java.

UNIT II:

Features of Java – Differences between C , C++ and Java – Data Types of Java – Variables – Declaration of Variables – Operators in Java – Decision Making and Branching – Decision Making and Looping –Methods.

UNIT III:

Class Defining – Creating Objects – Constructors – Method Overloading – Method Overriding – Final Classes – Abstract Method and Classes. Arrays - Creating any array – Declaration of Array – Creation of Array – Initialization of Arrays – Array Length – 2 Dimensional Arrays – Strings – String Arrays – String Methods – String Buffer Class.

UNIT IV:

Creating Threads – Extending the Thread class – Lifecycle of thread – Exception – Exception Handling – Multiple Catch Statements Throwing our own exceptions – Using Exceptions for Debugging.

UNIT V:

Introduction to Applets : How to Write Applets – Building Applet Code – Applet Life Cycle – Applet Tag – Running the Applet – Concepts of Streams – Stream Classes – Byte Stream class – Character Stream Class – Using Streams.

TEXT BOOK:

E. BALAGURUSAMY – “Programming With JAVA a Primer”, 3rd Edition TMH.

CORE 7: CLIENT / SERVER COMPUTING
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Subject Description:

This Subject deals with the C/S Computing

Goal: To learn about C/S Computing

Objective:

On Successful Completion of this subject the students should have:

- C/S Applications , GUI ETC.,

UNIT I:

Introduction to Client/Server Computing – What is Client/Server Computing – Benefits of Client/Server Computing – Evolution of C/S Computing – Hardware Trends – Software Trends-Evolution of Operating Systems – N/w Trends – Business Considerations..

UNIT II:

Overview of C/S Applications: Components of C/S Applications – Classes of C/S Applications – Categories of C/S Applications . Understanding C/S Computing : Dispelling the Myths – Obstacles – Upfront & Hidden – Open Systems & Standards – Standards – Setting Organizations – Factors of Success .

UNIT III:

The Client Hardware & Software : Client Component – Client Operating Systems – What is GUI – Database Access – Client Software Products : GUI Environments – Converting 3270/5250 Screens – Database Tools – Client Requirements : GUI Design Standards – Open GUI Standards – Interface Independence – Testing Interfaces .

UNIT IV:

The Server : Categories of Servers – Features of Server Machines – Classes of Server Machines – Server Environment : N/W Management Environment – N/W Computing Environment – Extensions – Network Operating System – Loadable Module..

UNIT V:

Server Operating System : OS/2 2.0 – Windows New Technology – Unix Based OS – Server Requirements : Platform Independence – Transaction Processing – Connectivity – Intelligent Database – Stored Procedure – Triggers – Load Leveling – Optimizer – Testing and Diagnostic Tools – Backup & Recovery Mechanisms..

TEXT BOOK:

Dawna Travis Dewire –“Client / Server Computing “ – Tata McGraw Hill.

CORE LAB 4: PROGRAMMING LAB - JAVA

- 1.** Create an Employee Package to Maintain the Information about the Employee. Use Constructors to Initialize the Employee Number and Use Overloading Method to set the Basic Pay of the Employee. By Using this Package Create a Java Program.
- 2.** Program to Implement Polymorphism, Inheritance and Inner Classes.
- 3.** Java Program to Handle Different Mouse Events.
- 4.** Create an Applet for a Calculator Application.
- 5.** Java Program to Maintain the Student Information
- 6.** Animate Images at Different Intervals by using Multithreading Concepts.
- 7.** Program to send a text message to another System and receive the text message from the System.
- 8.** Java Program by using JDBC Concepts to Access a Database.
- 9.** Java Program to Implement RMI.
- 10.** Java Program by using to implement the Tree Viewer.
- 11.** Java Bean Program to view an Image.

ALLIED PAPER 4: COMPUTER INSTALLATION AND SERVICING
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Unit – I

PC SYSTEM

Personal Computer System - Functional Blocks - System Unit - Display Unit - Keyboard.

INSIDE PC

Motherboard - BIOS - CMOS-RAM - Motherboard types – Processors – Chipsets – USB.

ON-BOARD MEMORY

PC's Memory Organization - Memory packaging - I/O Ports - USB Port.

Unit – II

Floppy Disk Drive and Controller - Hard Disk Drive and Controller, MMX – Multimedia Extensions.

Unit – III

Input Devices - Monitors and Display Adapters.

Unit – IV

Output Devices

DOT Matrix Printer - Printer Controller - Laser Printer - Inkjet Printer.

Computer Installation

Power supply - PC Installation.

Unit – V

Trouble shooting and servicing

POST, Trouble shooting the mother board - Trouble shooting the Keyboard - Trouble shooting the disk devices - Trouble shooting the printer.

Maintenance

Diagnostic Software's - Data Security.

Computers and Communication

Networking – Modem - Internet.

Text Book:

Computer Installation and Servicing, Second Edition by D.Balasubramaniam, Tata McGraw-Hill, 2005.

DIPLOMA PAPER 2 (LAB): NETWORK LAB

1. Write a program to Detect Errors using Vertical Redundancy Check (VRC).
2. Write a program to Detect Errors using Longitudinal Redundancy Check (LRC).
3. Write a program to Detect Errors using Cyclic Redundancy Check (CRC).
4. Write a Socket program to implement Asynchronous Communication.
5. Write a Socket program to implement Isochronous Communication.
6. Write a program to implement Stop & Wait Protocol.
7. Write a program to implement Sliding Window Protocol.
8. Write a program to implement the Shortest Path Routing using Dijkstra algorithm.
9. Write a Socket Program to Perform file transfer from Server to the Client.
10. Write a Program to implement Remote Procedure call under Client / Server Environment

CORE 8 : SOFTWARE ENGINEERING

Subject Description:

This Subject deals with the Soft Ware Engineering

Goal:

To learn about Software Engineering

Objective:

On Successful Completion of this subject the students should have:

- Design Process, Analysis Concepts, User Interface Design.

UNIT I:

The Evolving role of software – Software – Software Crises & Myths – Software Engineering : Layered Technology – The Software Process Model – Evaluating Software Process Models – Components Based Development – The Formal Methods Model – 4GT – Software Scope – Resources – Software Project Estimation – Decomposition Techniques – Empirical Estimation Models.

UNIT II:

Analysis Concepts & Principles: Requirement Analysis – Analysis Principles – Software Prototyping – Specification. Analysis Modeling: Data Modeling – Functional Modeling & Information Flow – Behavioral Modeling.

UNIT III:

Design Concepts & Principles: The Design Process – Design Principles – Design Concepts – Effective Modular Design.

UNIT IV:

User Interface Design: The Golden Rules – UID – Task analyzing and modeling – Interface Design Activities – Implementation Tools – Design Evaluation.

UNIT V:

Component Level Design: Structured Programming – Comparison of Design Notations. Object oriented design: Design for Object Oriented Systems – the System design process – The Object Design Process.

TEXT BOOK:

Roger S Pressman – “Software Engineering a Practioner’s Approach” 5th Edition, TMH.

CORE 9 : OPERATING SYSTEMS

Subject Description:

This Subject deals with the Operating System.

Goal:

To learn about Operating System

Objective:

On Successful Completion of this subject the students should have:

- OS Concepts, Process, Files, Dead Lock Etc.,

UNIT I:

History of Operating System - Operating system concepts – Process – Files -System calls
The Shell - Operating System Structure - Monolithic Systems – Virtual Machines-Client Server
model.

UNIT II:

Introduction to Process-Implementation of Process-Process States- Inter Process
Communication- Race Condition - Critical Region - Mutual Exclusion - Sleep & Wakeup -
Process Scheduling - Shortest job First-Two Level Scheduling

UNIT III:

Files – Structures – Type – Operations - Shared Files - Disk Space Management -The
Security Environment - Generic Security Attacks - Design Principles for Security-User
Authentication - Deadlocks - Deadlock Detection & Avoidance - Deadlock Prevention

UNIT IV:

Memory Management: Swapping - Virtual Memory - Memory Management without
Swapping – Segmentation - Using MS DOS - MS DOS shell – MS DOS File System.

UNIT V:

UNIX: UNIX Goals- Interface to Unix-Process in Unix- UNIX files system- Memory
Management System Calls in UNIX.

TEXT BOOK:

Andrew S. Tanenbaum - “Modern Operating System” -Eastern Economy Edition –PHI

REFERENCE BOOK:

1. D.M.Dhamdhare – “Operating Systems–A Concept Based Approach” 2nd edition
TMH.
2. Milan Milenkovic-“Operating System” 2nd edition TMH.

Core 10 : GRAPHICS AND MULTIMEDIA
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(GRAPHICS – UNITS I & II)

UNIT-I: Output Primitives: Points and Lines – Line-Drawing algorithms – Loading frame Buffer – Line function – Circle-Generating algorithms – Ellipse-generating algorithms. **Attributes of Output Primitives:** Line Attributes – Curve attributes – Color and Grayscale Levels – Area-fill attributes – Character Attributes.

UNIT-II: 2D Geometric Transformations: Basic Transformations – Matrix Representations – Composite Transformations – Other Transformations. **2D Viewing:** The Viewing Pipeline – Viewing Co-ordinate Reference Frame – Window-to-Viewport Co-ordinate Transformation - 2D Viewing Functions – Clipping Operations.

(MULTIMEDIA – UNITS III, IV & V)

UNIT-III: Text: Types of Text – Unicode Standard – Font – Insertion of Text – Text compression – File formats. **Image:** Image Types – Seeing Color – Color Models – Basic Steps for Image Processing – Scanner – Digital Camera – Interface Standards – Specification of Digital Images – CMS – Device Independent Color Models – Image Processing software – File Formats – Image Output on Monitor and Printer.

UNIT-IV: Audio: Introduction – Acoustics – Nature of Sound Waves – Fundamental Characteristics of Sound – Microphone – Amplifier – Loudspeaker – Audio Mixer – Digital Audio – Synthesizers – MIDI – Basics of Staff Notation – Sound Card – Audio Transmission – Audio File formats and CODECs – Audio Recording Systems – Audio and Multimedia – Voice Recognition and Response - Audio Processing Software.

UNIT-V: Video: Analog Video Camera – Transmission of Video Signals – Video Signal Formats – Television Broadcasting Standards – PC Video – Video File Formats and CODECs – Video Editing – Video Editing Software. **Animation:** Types of Animation – Computer Assisted Animation – Creating Movement – Principles of Animation – Some Techniques of Animation – Animation on the Web – Special Effects – Rendering Algorithms. **Compression:** MPEG-1 Audio – MPEG-1 Video - MPEG-2Audio – MPEG-2 Video.

TEXTBOOKS:

1. **COMPUTER GRAPHICS – Donald Hearn, M.Pauline Baker**, 2nd edition, PHI.
(UNIT-I: 3.1-3.6,4.1-4.5 & UNIT-II: 5.1-5.4,6.1-6.5)
2. **PRINCIPLES OF MULTIMEDIA – Ranjan Parekh**, 2007, TMH.
(UNIT III: 4.1-4.7,5.1-5.16 UNIT-IV: 7.1-7.3,7.8-7.14,7.18-7.20,7.22,7.24,7.26-28
UNIT-V: 9.5-9.10,9.13,9.15,10.10-10.13)

REFERENCE BOOKS:

1. **COMPUTER GRAPHICS – Amarendra N Sinha, Arun D Udai**, TMH.
2. **MULTIMEDIA: Making it Work – Tay Vaughan**, 7th edition, TMH.

CORE LAB 5: MULTIMEDIA LAB

Using suitable Multimedia software/tool (Flash/Photoshop/Macromedia) do the following

:

1. Create a Sun Flower.
2. Create Water Drops.
3. Animate Plane Flying in the Clouds.
4. Create Plastic Surgery for Nose.
5. Create Mouse.
6. Create See thru text.
7. Create Military Clothe.
8. Create Stone Texture.
9. Create Rollover Buttons.
10. Create Realistic Stone Structure.
11. Create Web Page.
12. Convert Black and White to Color Photo.
13. Create Ice Text.
14. Create Realistic Blood Structure.
15. Create Fog Effects.

DIPLOMA PAPER 3: NETWORK SECURITY AND MANAGEMENT

UNIT I

Introduction: Why Network Security is needed – Management principles – Security principles - Network management - Security attacks – Qualities of a Good Network.

Organizational Policy and Security: Security policies, Standards and Guidelines – Information Policy – Security Policy - Physical Security – Social Engineering – Security Procedures – Building a Security Plan.

Security Infrastructure: Infrastructure Components – Goals of Security Infrastructure – Design Guidelines – Security Models.

UNIT II

Cryptography: Terminology and background – Data Encryption Methods – Cryptographic Algorithms- Secret Key Cryptography - Public key cryptography – Message Digest – Security Mechanisms – Speech Cryptography.

Hardware and Software Security: Hardware security – Smart Card – Biometrics – Virtual Private Networks (VPNs) - Trusted Operating Systems – Pretty Good Privacy (PGP) – Security Protocols.

Database Security: Introduction to Database – Characteristics of a Database Approach – Database Security Issues - Database Security – Vendor-Specific Security – Data Warehouse Control and Security.

UNIT III

Intrusion Detection Systems: What is not an IDS – Infrastructure of IDS – Classification of Intrusion Detection Systems – Host-Based IDS – Network-Based IDS - Anomaly Vs Signature Detection – Manage an IDS – Intrusion Detection Tools – IDS Products and Vendors.

Network Security: Fundamental Concepts – Identification and Authentication – Access Control – A Model for Network Security – Malicious Software – Firewalls.

UNIT IV

Network Management: Goal of Network Management – Network Management Standards – Network Management Model – Infrastructure for Network Management - Simple Network Management Protocol (SNMP).

Security Management: Security Plan - Security Analysis - Change Management - Disaster Recovery - Systems Security Management - Protecting Storage Media- Protection of System Documentation -Exchanges of Information and Software – Security Requirements of Systems.

UNIT V

Electronic Mail Policy: Electronic Mail – What are the E-mail threats that organization's face - Why do you need an E-mail Policy - How do you create an E-mail Policy - Publishing the E-mail Policy - University E-mail Policy.

Security of Internet Banking Systems: Introduction Banking System – Security Problem – Methodology for Security Problem – Schematic flow of Internet Banking – A layered approach to security.

Text Books:

Network Security and Management, Brijendra singh, PHI 2007.

CORE 11: COMPUTER AIDED DESIGN AND MANUFACTURING

UNIT – I:

Introduction: CAD/ CAM Defined – The Product Cycle and CAD/CAM – Automation and CAD/CAM – Organization.

Fundamentals of CAD: Introduction – The Design Process – The Application of Computers for Design – Creating the Manufacturing Data Base – Benefits of Computer-Aided Design.

UNIT –II:

Hardware in Computer-Aided Design: Introduction - The Design Workstation - The Graphics terminal - Operator input Devices- Plotters and Other Output Devices - The Central Processing Unit - Secondary Storage.

Conventional Numerical Control: Introduction – Basic Components of an NC System – The NC Procedure – NC Coordinate System – NC Motion Control Systems – Applications of Numerical Control – Economics of Numerical Control.

UNIT – III:

Robot Technology: Introduction – Robot Physical Configurations – Basic Robot Motions – Other Technical Features – Programming the Robot – Robot Programming Languages – End Effectors – Work Cell Control and Interlocks – Robotic Sensors.

Robot Applications: General Considerations in Robot Applications – Material Transfer – Machine Loading - Welding - Spray Coating - Processing Operations - Assembly - Inspection.

UNIT – IV:

Group Technology: Introduction – Part Families – Part Classification and Coding - Three Parts Classification and Coding Systems – Group Technology Machine Cells – Benefits of group Technology.

Computer-Aided Process Planning: The Planning Function – Retrieval-Type Process Planning Systems – Generative Process Planning Systems – Benefits of CAPP – Machinability Data Systems – Computer-Generated Time Standards.

UNIT – V:

Production Planning and Control:

Introduction – Traditional Production Planning and Control – Problems with Traditional Production Planning and Control – Computer-Integrated Production Management System – Cost Planning and Control.

Inventory Management and MRP: Introduction – Inventory Management – Material Requirements Planning – Basic MRP Concepts – Inputs to MRP – How MRP works – MRP Output Reports – Benefit Of MRP – MRP II:Manufacturing Resource Planning.

Text Books:

CAD/CAM Computer-Aided Design and Manufacturing, Mikell.P.Groover and Emory.W.Zimmers, Jr., Pearson Edition, 2003.

CORE 12: WEB TECHNOLOGY

Unit I

HTML: Introduction – HTML Elements – HTML syntax – Document types – html, head, title and body elements – Block level elements – Text level elements – Links – Images – Fonts – Colors – Style Sheets – Character Entities.

Unit II

Active Server Pages: Introduction – ASP Objects: The Request Object – The Response Object – The Server Object – Using the Request, Response and Server Objects.

Unit III

ASP Objects: global.asa file – The Application Object – The Session Object – Using Application and Session Objects.

Unit IV

ASP Components : The Ad Rotator Component – The Browser Capabilities Component – The Content Linking Component – The Content Rotator Component – The Counters Component – The Page Counter Component –The Permission Checker component.

Unit V

Database Connectivity in ASP: AxtiveX Data Objects – The Connection Object – The Command Object - The Recordset Object – The Record Object – The Stream Object.

Text Books:

1. ASP 3.0: A Beginners Guide, Dave Mercer, Tata McGraw Hill, 2001.
2. HTML Programmer's Reference, Thomas A. Powell, Dan Whitworth, Tata McGraw Hill, 2001.

CORE LAB 6: WEB TECHNOLOGY

1. Design a personal web page using HTML.
2. Design a data entry form in HTML.
3. Write a Program in ASP to get data using a form, validate the data and returns the same data for correction if any using the same form.
4. Write a program in ASP to display the Session properties.
5. Write a program in ASP that makes use of Ad Rotator component.
6. Write a program in ASP that makes use of Browser Capabilities component.
7. Write a program in ASP that makes use of Content Rotator component.
8. Write a program in ASP that makes use of page counter component.
9. Write a program in ASP to get the data of students using forms and stores them in database.
10. Write a program in ASP to perform record navigation using a form.

DIPLOMA PAPER 4 (LAB): NETWORK SECURITY
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1. Write a program to encrypt the data using the encryption methods:
 - (i) Substitution Ciphers
 - (ii) Transposition Ciphers
2. Write a program to implement DES algorithm.
3. Write a program to implement the Public Key Cryptography using Diffie -Hellman Algorithm.
4. Write a program to implement the Public Key Cryptography using RSA algorithm.
5. Write a program to secure the Database using User Authentication Security.
6. Write a server security program for Dynamic Page Generation.

ELECTIVE I – A : MOBILE COMPUTING

UNIT I

INTRODUCTION – Mobility of Bits and Bytes – Wireless-the beginning – Mobile computing – Dialog control – Networks – Middle ware and gateways – Application and Services – Developing Mobile computing applications – Security in Mobile computing – Standards – Why is it necessary? – Standard bodies – Players in the wireless space.

MOBILE COMPUTING ARCHITECTURE – History of computers – History of internet – Internet-the Ubiquitous Network – Architecture for mobile computing – Three-Tire architecture – Design considerations for mobile computing – Mobile computing through Internet – Making Existing applications Mobile-enabled.

UNIT II

MOBILE COMPUTING THROUGH TELEPHONY – Evolution of telephony – Multiple access procedures – Mobile computing through telephone – Developing an IVR application – Voice XML – Telephony applications programming interface(TAPI)

EMERGING TECHNOLOGIES – Introduction – Bluetooth – Radio Frequency Identification (RFID) – Wireless Broadband (WiMAX) – Mobile IP – Internet Protocol Version 6 (IPv6) – Java card.

UNIT III

GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM) – GSM Architecture – GSM Entities – Call routing in GSM – PLMN Interfaces – GSM Address and Identifiers – Network aspects in GSM – GSM frequency allocation – Authentications and Security.

SHORT MESSAGE SERVICES (SMS) – Mobile computing over SMS – Short Message Services (SMS) – Value added services through SMS – Accessing SMS bearer.

UNIT IV

GENERAL PACKET RADIO SERVICE (GPRS) – GPRS and Packet data network – GPRS Network architecture – GPRS Network operations – Data services in GPRS – Applications for GPRS – Limitations of GPRS – Billing and charging in GPRS.

WIRELESS APPLICATION PROTOCOL (WAP) – WAP – MMS – GPRS applications.

UNIT V

CDMA and 3G – Spread Spectrum technology – Is-95 – CDMA Vs GSM – Wireless data – 3rd Generation networks – Applications on 3G.

WIRELESS LAN – Advantages – IEEE 802.11 Standards – Wireless LAN architecture – Mobility in Wireless LAN – Deploying Wireless LAN – Mobile ADHOC networks and Sensor networks – Wireless LAN Security – WiFi Vs 3G.

TEXT BOOK:

1. “MOBILE COMPUTING” - Ashoke K Talukder, Roopa R Yavagal – TATA McGRAW HILL – 2005 – Fourth Reprint 2007.

ELECTIVE I – B : DISTRIBUTED COMPUTING

Subject Description

This Course presents the distributed computing techniques emphasizing the client server model

Goals

To enable the students to learn the concepts of distributed computing

Objectives

On successful completion of the course the students should have:

- Understood the trends and principles of distributed computing

Contents

UNIT I

Distributed Systems: Fully Distributed Processing systems – Networks and interconnection structures – designing a distributed processing system.

UNIT II

Distributed systems: Pros and Cons of distributed processing – Distributed databases – the challenges of distributed data – loading, factors – managing the distributed resources division of responsibilities.

UNIT III

Design considerations: Communication Line loading – line loading calculations- partitioning and allocation - data flow systems – dimensional analysis- network database design considerations- ration analysis- database decision trees- synchronization of network databases

UNIT IV

Client server network model: Concept – file server – printer server and e-mail server

UNIT V

Distributed databases: An overview, distributed databases- principles of distributed databases – levels of transparency- distributed database design- the R* project techniques problem of heterogeneous distributed databases

Reference:

1. John a. Sharp, “An introduction to distributed and parallel processing g” *Blackwell Scientific Publication(Unit I & III)*
2. Uyles D. Black, “Data communication and distributed networks”(unit II)
3. Joel M.Crichlow “introduction to distributed & parallel computing (Unit IV)
4. Stefans Ceri, Ginseppe Pelagatti “Distributed database Principles and systems” *McGraw Hill*

ELECTIVE I – C : DIGITAL IMAGE PROCESSING

UNIT-1 Digital Image Fundamentals

Image Transforms- Walsh, Hadamard, Discrete cosine, Hotelling Transforms-Image Formation. File Formats.

UNIT-2 Image Enhancement

Histogram Modification Techniques-Image Smoothing-Image Sharpening-Image Restoration-Degradation Model-Diagonalization of Circulant and Black circulant matrices-algebraic approach to restoration.

UNIT-3 Image Compression and Segmentation

Compression Models-Elements of Information Theory-Error free Compression-Image Segmentation- Detection of Discontinuities-Edge Linking and boundary detection-Thresholding-Regions Oriented Segmentations-Morphology.

UNIT-4 Feature Extraction

Image feature descriptions-Interpretations of Line drawings, Image pattern recognition algorithms.

UNIT-5 Knowledge Representation and Use

Knowledge Representation and Use-Image analysis using Knowledge about scenes-Image Understanding using two dimensional methods.

TEXT BOOK:

1. Gonzalez.R.C & Woods. R.E., “Digital Image Processing”, 2nd Edition, Pearson Education, 2002. (Chapters: 1, 2, 3, 4, 5, 8, 9, 10, 11 and 12).
2. Anil Jain.K, “Fundamentals of Digital image processing”, Prentice Hall of India, 1989. (Chapters: 5, 7, 8 and 11).

REFERENCES:

1. Sid Ahmed, “Image Processing”, McGraw Hill, New York, 1995.
2. Milan Sonka, Vaclav Hlavac and Roger Boyle, “Image processing Analysis and Machine vision”, Second Edition, Thomson Brooks/Cole, 1999.

ELECTIVE II –A : ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS
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Subject Description:

This Subject deals with the Artificial Intelligence

Goal:

To learn about AI

Objective:

On Successful Completion of this subject the students should have:

- Heuristic, Hill Climbing, Planning, Expert System etc.,

UNIT I:

The AI Problems – AI technique – Criteria for success – Define the Problem as a state space search – Production System – Characteristics – Problem Characteristics.

UNIT II:

Heuristic Search Techniques: Generate and Test – Hill climbing –Best First Search – Problem Reduction – Constraints Satisfaction – Means End Analysis.

UNIT III:

Knowledge Representation Issues: Approaches to knowledge Representation – The Frame Problem – Computable Functions & Predicates – Resolution – Procedural versus Declarative Knowledge.

UNIT IV:

Logic Programming – Backward Versus Forward Reasoning – Matching – Control Knowledge. Planning: Overview – Components of Planning System – Goal Planning – Hierarchical Planning – Reactive Systems.

UNIT V:

Expert Systems: Representing & Using Domain Knowledge – Expert System Shells - Explanation – Knowledge Requisition .

TEXT BOOK:

Elaine Rich and Kevin Knight – “Artificial Intelligence “ Tata Mcgraw Hill 2nd edition 1991.

ELECTIVE II –B : ANIMATION TECHNIQUES

Modified Syllabus for ANIMATION TECHNIQUES Paper

ANIMATION TECHNIQUES PAPER FOR COMPULSORY DIPLOMA IN MULTIMEDIA AND ANIMATION - FOR B.C.A., B.Sc. SOFTWARE SYSTEM & M.Sc. SOFTWARE SYSTEM DEGREE COURSES WITH EFFECT FROM 2007-08 ONWARDS.

CORE PAPER 8-ANIMATION TECHNIQUES FOR B.Sc. MULTIMEDIA AND WEB TECHNOLOGY DEGREE COURSE WITH EFFECT FROM 2008-09 ONWARDS.

ELECTIVE PAPER - ANIMATION TECHNIQUES FOR B.Sc. COMPUTER TECHNOLOGY DEGREE COURSE WITH EFFECT FROM 2008-09 ONWARDS.

UNIT-I: What is mean by Animation – Why we need Animation – History of Animation – Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects - Creating Animation.

UNIT-II: Creating Animation in Flash: Introduction to Flash Animation – Introduction to Flash – Working with the Timeline and Frame-based Animation - Working with the Timeline and Tween-based Animation – Understanding Layers - Actionscript.

UNIT-III: 3D Animation & its Concepts – Types of 3D Animation – Skeleton & Kinetic 3D Animation – Texturing & Lighting of 3D Animation – 3D Camera Tracking – Applications & Software of 3D Animation.

UNIT-IV: Motion Caption – Formats – Methods – Usages – Expression – Motion Capture Software's – Script Animation Usage – Different Language of Script Animation Among the Software.

UNIT-V: Concept Development –Story Developing –Audio & Video – Color Model – Device Independent Color Model – Gamma and Gamma Correction - Production Budgets - 3D Animated Movies.

TEXT BOOK:

- 1. PRINCIPLES OF MULTIMEDIA – Ranjan Parekh, 2007, TMH. (Unit I, Unit V)**
- 2. Multimedia Technologies – Ashok Banerji, Ananda Mohan Ghosh – McGraw Hill Publication. (Unit II: Chapter 10)**

Text for Unit III, IV & V is appended.

ELECTIVE II –C : E-COMMERCE

Subject Description: This subject deals with E-commerce concepts like E-Commerce, M-Commerce, E-Security and E-payment.

Goal: Knowledge on E-commerce and Real World and Cyberspace problem awareness.

Objective: To inculcate knowledge on E-Commerce concepts in the present IT world.

UNIT-I: What is e-commerce? – E-Commerce is not E-Business – the drivers – Myths You should know – Advantages and Issues in E-Commerce – Benefits and Limitations of the Internet – Role of E-Strategy – Integrating E-commerce – E-Commerce Business Models – Management Implications.

UNIT-II: Mobile-Commerce-The Business of Time: What is M-Commerce? – Why wireless? – How wireless Technology is employed? – Wireless LAN – Wireless application Protocol - Implications for Management.

UNIT-III: Business-to-Business E-Commerce: What is B2B E-Commerce? – Supply chain Management and B2B – B2B Models – B2B Tools-EDI.

UNIT-IV: E-Security: Security in Cyberspace – Designing for Security – How much risk you afford? – The VIRUS – Security Protection and Recovery – Role of Biometrics - How to secure your system? – Security and Terrorism.

UNIT-V: Getting the money: Real World Cash – Electronic Money – Requirements for Internet-Based Payments – How would you like to pay? – B2B and E-Payment – M-Commerce and M-Payment – General Guide to E-Payment.

TEXTBOOK:

1. **ELECTRONIC COMMERCE from Vision to Fulfillment** – Elias M. Awad, 3rd edition, PHI.

(Chapters: 1, 6, 11, 13 &15)

REFERENCE BOOKS:

1. **E-COMMERCE Strategy, Technologies and Applications** – David Whiteley, 2001, TMH.

2. **INTRODUCTION TO E-COMMERCE** – Jeffrey F. Rayport, Bernard J. Jaworski, TMH.

ELECTIVE III-A : DATA MINING

Subject Description:

This Subject deals with the Data Mining

Goal: To learn about Data Mining

Objective:

On Successful Completion of this subject the students should have:

- Matrices, Decision tree, Neural Network, Algorithms etc.,

UNIT I:

Basic Data Mining Tasks – Data Mining Versus Knowledge Discovery in Data Bases – Data Mining Issues – Data Mining Matrices – Social Implications of Data Mining – Data Mining from Data Base Perspective.

UNIT II:

Data Mining Techniques – a Statistical Perspective on data mining – Similarity Measures – Decision Trees – Neural Networks – Genetic Algorithms.

UNIT III:

Classification: Introduction – Statistical – Based Algorithms – Distance Based Algorithms – Decision Tree – Based Algorithms – Neural Network Based Algorithms – Rule Based Algorithms – Combining Techniques.

UNIT IV:

Clustering: Introduction – Similarity and Distance Measures – Outliers – Hierarchical Algorithms. Partitional Algorithms.

UNIT V:

Association Rules: Introduction - Large Item Sets – Basic Algorithms – Parallel & Distributed Algorithms – Comparing Approaches – Incremental Rules – Advanced Association Rules Techniques – Measuring the Quality of Rules.

TEXT BOOK:

Margaret H.Dunbam – “Data Mining Introductory and Advanced Topics” Pearson Education – 2003.

REFERENCE BOOK:

Jiawei Han & Micheline Kamber – “Data Mining Concepts & Techniques” 2001 Academic Press.

ELECTIVE III-B : EMBEDDED SYSTEMS

UNIT I	Introduction to Embedded System: An Embedded System – Processor in the System – Other Hardware units – Software embedded into a system – Exemplary embedded system – Embedded system on chip and in VLSI circuit. Processor and Memory organization: Structural units in a processor – Processor selection – Memory devices – Memory selection - Allocation of memory – DMA – Interfacing processor, memories and I/O devices
UNIT II	Devices and buses for device networks: I/O devices – Timer and counting devices – Serial communication – Host system. Device drivers and Interrupts servicing mechanism: Device drivers – Parallel port device drivers – Serial port device drivers – Device drivers for IPTD – Interrupt servicing mechanism – Context and the periods for context-switching, dead-line and interrupt latency
UNIT III	Programming concepts and embedded programming in C and C++: Software programming in ALP and C – C program elements – Header and source files and processor directives – Macros and functions – Data types – Data structures – Modifiers – Statements – Loops and pointers – Queues – Stacks – Lists and ordered lists – Embedded programming in C++ - Java – C program compiler and cross compiler – Source code for engineering tools for embedded C / C++ - Optimization of memory needs
UNIT IV	Program modeling concepts in single and multi processor systems: Modeling process for software analysis before software implementation – Programming models for event controlled or response time constrained real time programs – Modeling of multiprocessor systems. Software engineering practices: Software algorithm complexity – Software development process life cycle and its models – Software analysis – Software design – Implementation – Testing, Validation and debugging – Software maintenance
UNIT V	Inter-process communication and synchronization of processes, tasks and threads: Multiple processor – Problem of sharing data by multiple tasks and routines – Inter process communication. Real time operating systems: Operating system services – I/O subsystem – Network operating systems – Real time and embedded operating systems – Interrupt routine in RTOS environment – RTOS task scheduling – Performance metric in scheduling
Text Book(s)	Raj Kamal, “ Embedded Systems – Architecture, Programming and Design”, TMH, 2007

ELECTIVE III-C : SOFTWARE TESTING

Subject Description: This subject deals software testing concepts like unit-wise testing, integration testing and acceptance testing.

Goal: Knowledge on software testing and how to test the software at various levels.

Objective: To inculcate knowledge on Software testing concepts.

UNIT-I: Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. **White-Box Testing:** Static Testing – Structural Testing –Challenges in White-Box Testing.

UNIT-II: Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black-Box Testing? – Challenges in White Box Testing - **Integration Testing:** Integration Testing as Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing – Defect Bash.

UNIT-III: System and Acceptance Testing: system Testing Overview – Why System testing is done? – Functional versus Non-functional Testing - Functional testing - Non-functional Testing – Acceptance Testing – Summary of Testing Phases.

UNIT-IV: Performance Testing: Factors governing Performance Testing – Methodology of Performance Testing – tools for Performance Testing – Process for Performance Testing – Challenges. **Regression Testing:** What is Regression Testing? – Types of Regression Testing – When to do Regression Testing – How to do Regression Testing – Best Practices in Regression Testing.

UNIT-V: Test Planning, Management, Execution and Reporting: Test Planning – Test Management – Test Process – Test Reporting –Best Practices. **Test Metrics and Measurements:** Project Metrics – Progress Metrics – Productivity Metrics – Release Metrics.

TEXTBOOKS:

1. **SOFTWARE TESTING Principles and Practices – Srinivasan Desikan & Gopalswamy Ramesh**, 2006, Pearson Education.

(UNIT-I: 2.1-2.5, 3.1-3.4 UNIT-II: 4.1-4.4, 5.1-5.5 UNIT III: 6.1-6.7

(UNIT IV: 7.1-7.6, 8.1-8.5 UNIT-V: 15.1-15.6, 17.4-17.7)

REFERENCE BOOKS:

1. **EFFECTIVE METHODS OF SOFTWARE TESTING–William E.Perry**, 3rd ed, Wiley India.

2. **SOFTWARE TESTING – Renu Rajani, Pradeep Oak**, 2007, TMH.