THIRUVALLUVAR UNIVERSITY
M.Sc.INFORMATION TECHNOLOGY
SYLLABUS
(With effect from 2022 – 2023)

The Course of Study and the Scheme of Examination

Sl. No.	*Study Components* / *Course Title*		*ins. hrs / week*	*Credit*	*Title of the Paper*	*Maximum Marks*		
						CIA	*Uni. Exam*	*Total*
SEMESTER I								
	Core Practical		4	4	Operating System	25	75	100
			4	4	Object Oriented Analysis & Design	25	75	100
			4	4	DBMS	25	75	100
			5	0	Object Oriented Programming Lab	0	-	-
			5	0	RDBMS-Lab	0	-	-
			5	0	Visual Programming-Lab	0	-	-
Internal Elective for same major students (Choose any one)								
	@ Core Elective	**Paper-1**	3	3	A. Computer Architecture B. Discrete Mathematics C. Principles of Communication System	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
	@ Open Elective	**Paper-1**		3	Digital data handling	25	75	100
			30	**18**		**100**	**300**	**400**
SEMESTER II						*CIA*	*Uni. Exam*	*Total*
	Core Practical		4	4	Visual Programming	25	75	100
			4	4	Computer Networks	25	75	100
			4	4	Software Engineering	25	75	100
			5		Object Oriented Programming Lab	25	75	100
			5		RDBMS- Lab	25	75	100
			5		Visual Programming -Lab	25	75	100
Internal Elective for same major students (Choose any one)								
	@ Core Elective	**Paper-2**	3	3	A. Introduction to Computation with PYTHON B. E-Commerce C. Microprocessor & Micro Controller	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
	@ Open Elective	**Paper-1**		3	A. HTML Programming	25	75	100

	Field Study			2				100
	@Compulsory Paper			2	Human Rights & Duties	25	75	100
			30	**22**		**175**	**525**	**700**

S. No.	***Study Components*** / ***Course Title***		***ins. hrs / week***	***Credit***	***Title of the Paper***	***Maximum Marks***		
						CIA	***Uni. Exam***	***Total***
SEMESTER III								
	Core Practical		4	4	Internet Programming	25	75	100
			4	4	Mobile Computing	25	75	100
			4	4	Computer Graphics and Multimedia	25	75	100
			5		Network -Lab	25	0	0
			5		Internet Programming Lab	25	0	0
			5		Graphics and Multimedia Lab	25	0	0
Internal Elective for same major students (Choose any one)								
	@Core Elective	**Paper-3**	3	3	A. JSP and EJB B. Big Data Analytics C. Image Processing	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								
	@ Open Elective	**Paper-1**	**3**	3	A. Data Analysis using SPSS.	25	75	100
	MOOC			2				100
			30	**20**		**100**	**300**	**400**
SEMESTER IV						***CIA***	***Uni. Exam***	***Total***
	Core Practical		4	4	A. Data Mining and Warehousing	25	75	100
			4	4	B. Network Security	25	75	100
			5	5	C. Network LAB	25	75	100
			5	5	D. Internet Programming Lab	25	75	100
			5	5	E. Graphics and Multimedia Lab	25	75	100
			4	4	F. Project Work/ Dissertation and viva voce	25	75	100
Internal Elective for same major students (Choose any one)								
	@Core Elective	Paper-4	3	3	A. Open Source Software	25	75	100
					B. Machine Learning Techniques	25	75	100
					C. Component Technology	25	75	100
External Elective for other major students (Inter/multi disciplinary papers)								

	@ Open Elective (Non-Major)	**Paper-1**		3	A. Content Design using Latex	25	75	100
			30	**33**		**175**	**525**	**700**

Subject	**Papers**	**Credit**	**Total Credits**	**Marks**	**Total marks**
MAIN	10	4-5	46	100	1000
MAIN PRACTICAL	6	4-5	30	100	600
MAIN PROJECT	1	4	4	100	100
ELECTIVE	4	3	12	100	400
COMPULSORY PAPER	1	2	2	100	100
Field Study		2	2	100	100
Mooc		2	2	100	100
Total	**23**	**-**	**92**	**-**	**2400**

@ Compulsory Courses don't change this category. Number of core papers & Practical may be changed

SEMESTER I

OPERATING SYSTEM

Objectives:

To learn what an operating system is, what its role in a computing system is, how operating systems have evolved over time, and what the various components of an operating system are and how they work. Several real operating system case studies help to understand how the principles studied are used in practice. The role of an operating system in a distributed system is also to be studied.

UNIT-I

Introduction: Main frame Systems, Desktop Systems - Multiprocessor Systems - Distributed Systems - Clustered Systems - Real Time systems - Hand held Systems, Operating Systems Structures: System Components - Operating System Services - System calls - System Programs - System Design and Implementation - CPU scheduling: Basic Concepts - Scheduling Algorithms.

UNIT-II

Process Management: Process Concepts - Process Scheduling - Operation on Process - Co-Operating process - Inter Process Communication - Threads: Multithreading Models - Process Synchronization: The Critical Section Problem - Synchronization Hardware - Semaphores - classical problem of Synchronization - Monitors - Deadlock: Deadlock Characterization - Methods for handling Deadlocks - Deadlock Prevention - Deadlock Avoidance - Deadlock Detection - Recovery from Deadlock.

UNIT-III

Memory Management: Background - Swapping - Contiguous Memory Allocation - Paging - Segmentation - Segmentation with paging - Virtual Memory: Demand paging - Page Replacement - Thrashing.

UNIT-IV

File Systems: File Concepts - Access methods - Directory Structure - File Protection - File System Implementation: File System Structure and Implementation - Directory Implementation - Allocation methods Free Space Management - Recovery - Disk Structure - Disk Scheduling.

UNIT-V

Distributed Operating System : Design issues in distributed operating system -Distributed file systems - Naming and Transparency-Remote File Access -Stateful versus Stateless service - Distributed Coordination-Event Ordering -Mutual Exclusion - Atomicity - Concurrency Control - Deadlock Handling -Election Algorithms-Case Study-Linux and Windows.

Text Books:

Silberschatz, Galvin, Gagne, Operating System Concepts, 6th Edition, 2003.

Pradeep K.Sinha, Distributed OS concepts and Design, IEEE computer Society Press, PHI 1998.

References Books:

Dhamdhere - Operating System a Concept Based Approach, 2nd Edition, 2006, TMH, New Delhi.

Harris - Schaums Outlines of Operating Systems, 2005, TMH, New Delhi.

Andrew S. Tanenbaum, Modern Operating Systems, Prentice Hall of India, 2nd Edition 2001.

Achut S. Godbole and Kahate Atul, Operating Systems & Systems Programming, Tata Mcgraw Hill, 2003.

Charles Crowley, Operating systems: A Design Oriented Approach, Tata McGraw Hill, 1999.

OBJECT ORIENTED ANALYSIS AND DESIGN

UNIT I: Object oriented concepts and principles – Object oriented concepts – Identifying the elements of an object model – Management of object oriented software projects –Object oriented Analysis- Domain analysis – OOA Process – Object relationship model – Object behavior model.

UNIT II : Object oriented Design- design for object oriented systems – the system design process – object design process – design patterns – Object oriented programming.

UNIT III: Object oriented Testing – Testing OOA and OOD models – Testing strategies – Test case design for OO software – Testing methods – Interclass test case design

UNIT IV : Technical Metrics for Object oriented system – Object oriented metrics – Metrics for OOD – Class oriented metrics - System concept for Object modeling - Abstraction, Inheritance, Polymorphism, Encapsulation, Message Sending, Association, Aggregation.

UNIT V: Use-Case Modeling – Actors, Use Cases, Use Case Relationships. The Process of Requirements Use-Case - Identify Business Actors, Identify Business Requirements Use Cases, Construct Use Case Model Diagram-Class Diagrams and Object Diagrams-Package Diagrams-Sequence and Collaboration diagrams, State chart diagram.

TEXT BOOKS

1. **Roger Pressman**,‖ *Software Engineering*‖, 6th Edition, TMH, 2010.
2. **Bahrami**, **—***Object Oriented Systems Development*‖ , 7th Edition, TMH ,1999.

REFERENCE BOOKS

1. **Stephan R. Schach**, **—***Object oriented software*
2. **Timothy C. Lethbridge, Robert Laganiere** , ‖*Object-Oriented Software Engineering* –
3. *A practical software development using UML and Java*‖, 2nd Edition, TMH , 2008.

E- R EFERENCES

http://www.freetechbooks.com/object-oriented-analysis-and-design-course- notes-t577.html

www.engin.umd.umich.edu/CIS/course.des/cis200/.../tutorial/one.doc

DATA BASE MANAGEMENT SYSTEM

Objectives:

The primary goal of this subject is to provide the complete knowledge on the object-oriented approach of databases. This serves the skill on Functional Dependencies, Normalization and data base design. It provides the complete set of administration tools on databases.

UNIT-I

Concepts For Object-Oriented Databases : Object Identity, Object Structure, and Type Constructors - Encapsulation of Operations, Methods, and Persistence - Type Hierarchies and Inheritance - Complex Objects - Other Object-Oriented Concepts - Object Databases Standards, Languages and Design - Overview of Object Model of ODMG - The Object Definition Language - The Object Query Language - Overview of C++ Language Binding - Object Database Conceptual Design - Overview of the CORBA standard for Distributed Objects - Object Relational and Extended Relational Database Systems: Evolution and Current Trends of Database Technology - The Informix Universal Server - Object Relational Features of Oracle 8 - An overview of SQL 3 - Implementation - Related Issues for Extended Type Systems - The Nested Relational Data Model.

UNIT-II

Functional Dependencies and Normalization for Relational Database: Informal Design Guidelines for Relational Schemas - Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms - Boyce-Codd Normal Form - Relational Database Design and further Dependencies: Algorithms for Relational Database schema Design – Multi-valued Dependencies and Fourth Normal Form - Join Dependencies and Fifth Normal Form - Inclusion Dependencies - Other Dependencies and Normal Forms - Practical Database Design and Tuning: The Role of Information Systems in Organizations - The Database Design Process - Physical Database Design in Relational Databases - An Overview of Database Tuning in Relational Systems - Automated Design Tools.

UNIT-III

Database System Architecture and The System Catalog: System Architectures For DBMS - Catalogs for Relational DBMS - System Catalog Information in Oracle - Other Catalog Information Accesses by DBMS software Modules - Data Dictionary and Data Repository Systems - Query Processing and Optimization: Translating SQL Queries into Relational Algebra - Basic Algorithms for Executing Query Operations - Using Heuristics in Query Optimization - Using Selectivity and Cost Estimates in Query Optimization - Query Optimization in Oracle - Semantic Query Optimization - Transaction Processing Concepts - Transaction and System Concepts - Desirable Properties of Transactions - Schedules and Recoverability - Serializability of Schedules - Transaction Support in SQL.

UNIT-IV

Concurrency Control Techniques: Locking Techniques for Concurrency Control - Concurrency Control Based on Timestamp Ordering – Multiversion Concurrency Control Techniques - Validation Concurrency Control Techniques - Granularity of Data Items and Multiple Granularity Locking - Using Locks for Concurrency Control in Indexes - Some other Concurrency Control Issues - Database Recovery Techniques: Recovery Concepts - Recovery Techniques Based On Deferred Update - Recovery Techniques Based on Immediate Update - Shadow Paging - The ARIES Recovery Algorithms - Recovery In Multi-database Systems - Database Backup and Recovery From Catastrophic Failures - Database Security and Authorization: Database Security Issues - Discretionary Access Control Based on Granting/Revoking of Privileges - Mandatory Access Control for Multilevel Security - Statistical Database Security.

UNIT-V

Enhanced Data Models for Advanced Applications - Active Database Concepts - Temporal Database Concepts - Spatial and Multimedia Database - Distributed Databases and Client - Server Architecture - Distributed Database Concepts - Data Fragmentation, Replication and Allocation Techniques for Distributed Database Design - Types of Distributed Database Systems - Query Processing in Distributed Databases - Overview of Concurrency Control and Recovery in Distributed Databases - An overview of Client - Server Architecture and its Relationship to distributed Databases - Distributed Databases in Oracle-Future Prospects of Client-Server Technology - Deductive Databases - Introduction to Deductive Databases - Prolog/Datalog Notation - Interpretation of Rules .

Basic interface Mechanisms for Logic Programs - Datalog - Programs and their Evaluation - Deductive Database Systems - Deductive Object - Oriented Databases - Applications of Commercial Deductive Database Systems.

Text Books:

Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Addison - Wesley, 2000.

References Books:

Raghu Ramakrishnan, Johannes Gehrtee, “Database Management System”, Tata McGraw Hill, 2002.

Henry F.Korth & Abraham Silberschatz, “Database System Concepts”, McGraw, 1997.

Jeffrey D.Ullman, “Principles of Database Systems”, Galgotia Publishers, 1998.

CORE PRACTICAL – I

OBJECT ORIENTED PROGRAMMING LAB

Objectives:

The main aim is to familiarize the concepts learned in Object Oriented Programming. To write Programs for various object oriented concepts using C++ and Java.

Programs to implement

Function overloading in C++

Simple class design and objects creations in C++

Constructor and destructor in C++

Operator overloading, friend functions

Overloading assignment operator, type conversions

Inheritance and polymorphism in C++

Input/Output operation

Simple class design and objects creation in Java

String handling in Java

Control Structures in Java

Exceptions handling in Java

Java I/O

Multi-threaded programs in Java

Connecting to Database and accessing databases

CORE PRACTICAL – II

RDBMS LAB

Objectives:

To familiarize the concepts learned in RDBMS and to develop various practical applications using SQL and PL/SQL.

Excercises

Study of various SQL commands

Implementation of the concept of Normalization

Inventory control system with a reorder level

Student Mark sheet processing

Pay roll processing

Electricity bill preparation

Telephone Directory Maintenance

Bank Transactions

Library Information processing

Personal Information system

VISUAL PROGRAMMING LAB

Objectives:

The students will acquire knowledge on software development using the visual programming languages. This course concentrates on the development of software systems in Visual Basic and Visual C++.

Visual Basic

Write a VB project that receives a year number from a text box and month name from list box and displays number of days in the given month. Take care of leap years. Use Lost Focus event for list box.

Write a VB project that stores 10 employee records with fields EMPNO, NAME, AGE, SEX and SALARY, in an array. Display data fields in text boxes and provide command buttons to move to desired record.

Write a VB project that receives a foreign currency value selected from a list box and converts it into equivalent Indian rupees. (e.g. USD 42.45, Sterling 71.30, D.Mark 25.52, SW Franc 31.58, SaudiRiyal 11.40, French Franc 7.60, UAE Dhiram 11.55, Kuwait Dhinar 140.56)
[[
Write a VB project using control array that creates a scientific calculator with appropriate command buttons. Include the following capabilities for the calculator: +, -, *, /, %, power, square root, square and log (base 10).

Write a VB project to create a screen saver that displays a list of pictures with 1 second pause in between succesive pictures.

Write a VB project for commercial bank operations using SB account database, with the following features:

1. ADD NEW ACCOUNT
2. DEPOSIT AMOUNT
3. WITHDRAW AMOUNT (with minimum balance condition)
4. Calculate simple interest and update balance taking average of last 6 month balance in the account.
5. CLOSE ACCOUNT.

Write a VB project using built in Ax control (Rich Text Box), develop the windows NOTEPAD like editor with File and Edit menus and also display the floating menu whenever necessary.

Write a VB project for a Blood Bank that maintains a list of donors with address and their blood group. Provide the following reporting features:
i) Search and display the address of a particular donor, given the name in a text box.
ii) Display all the donors (using data report)
a) in age group 20-30.
b) in particular city.
c) with particular blood group.
d) male donors with particular blood group
e) female donors with particular blood group.

Write a VB project using Ax DLL or EXE add a class module that would perform the following functions:

a) Test whether the given number is perfect or not
b) Whether the gn% number Armstrong or not
c) Find the factorial of the given number
d) sum of digits

Write a VB project using Activex X control to create a Textbox that accepts only numeric value. Provide the following properties for the text box: BackColor, Forecolor and Text.

Visual C++

Write Visual C++ win32 application program using MFC that creates a new font.
Write Visual C++ win32 application program using MFC that displays a message "Hello Good Morning!" wherever the user clicks the mouse button on the client area.
Write Visual C++ win32 application program using MFC that allows the user to draw pictures with the help of mouse as a free hand drawing tool.
Write Visual C++ win32 application program using MFC that creates a list box and displays name of the states in India.
Write Visual C++ win32 application program using MFC that displays line, rectangle, rounded rectangle, ellipse and polygon filled with colors.
Write Visual C++ win32 application program using MFC that fills the background of the client area with a bitmap.
Write Visual C++ win32 application program using MFC that displays a menu. Choose the menu items using keyboard accelerator keys and display appropriate messages for the selected command, in message box.
Write Visual C++ win32 application program using MFC that displays the status of ALT, CTRL, SHIFT, NUM LOCK and SCROLL LOCK keys.
Write Visual C++ win32 application program using MFC that displays current mouse coordinates in status bar.
Write Visual C++ win32 application program using MFC that creates two push buttons OK and CANCEL on the client area. Buttons should respond to user click over them and display appropriate message

COMPUTER ARCHITECTURE

Objectives:

To understand the main components of a computer system and the considerations in their design. To understand performance measures, as well as their impact on system architecture. To Understand the interplay among system components such as design trade-offs.

UNIT-I

Basic structure of computer hardware and software - Addressing methods and machine program sequencing - Computer arithmetic - logic design for fast adders - multiplication - Booth's algorithm - Fast multiplication - integer division - floating point number representation- floating point arithmetic.

UNIT-II

Control unit - instruction execution cycle - sequencing of control signals - hardwired control - PLAs - micro programmed control - control signals - microinstructions - micro program sequencing - Branch address modification - Prefetching of micro instructions - emulation - Bit slices.

UNIT-III

Memory organization-Semiconductor RAM memories- internal organization-Bipolar and MOS devices - Dynamic memories - multiple memory modules and interleaving - cache memories - mapping functions - replacement algorithms - virtual memory - address translations - page tables memory management units - Secondary memory - disk drives - organization and operations - different standards.

UNIT-IV

Input-output organizations - accessing I/ O devices - direct memory access (DMA) - interrupts - interrupt handling - handling multiple devices - device identification - vectored interrupts - interrupt nesting - Daisy chaining - I/ O interfaces - serial and parallel standards - buses - scheduling - bus arbitration - bus standards.

UNIT-V

Introduction to parallel organizations - multiple processor organization - symmetric multiprocessors - cache coherence - non uniform memory access - vector computation - introduction to CISC and RISC - Architectures - Comparison.

Text Books:

Hamacher C V, Computer Organization, 4th Edition, McGraw Hill, 1997.
Stallings William, Computer Organization and Architecture, 6th Edition, Pearson Education, 2003

References Books:

Pal Chaudhary P, Computer Organization and Design, Prentice Hall of India, 2004.
Hayes J P, Computer Organization and Architecture, 2nd Edition, Mc Graw Hill, 1998.
Tanenbaum A S, Structured Computer Organization, 6th Edition, Prentice Hall, 2006.
Kai Hwang and Faye A Briggs, Computer Architecture and Parallel Processing, Mc.Graw Hill, 1985.

DISCRETE MATHEMATICS

Objectives:

To understand the concepts of sets, proposition, permutation and combinations.
To familiarize in relations, digraphs and functions, trees, groups and coding.
To help the students for developing the fundamental mathematical knowledge.

UNIT-I

Fundamentals: Sets and subsets - Operations on Sets - Sequences - Division in the integers - Matrices - Mathematical structures.

Logic: Propositions and Logical operations - Conditional Statements - Methods of Proof - Mathematical Induction.
Counting: Permutations - Combinations - The Pigeonhole Principle - Elements of Probability - Recurrence Relations.

UNIT-II

Relations and Digraphs: Product Sets and Partitions - Relations and Digraphs - Paths in relations and Digraphs - Properties of relations - Equivalence Relations - Computer Representation of relations and Digraphs - Manipulation of Relations - Transitive Closure and Warshall's Algorithm.

UNIT-III

Functions: Functions - Permutation Functions - Growth of Functions Topics in Graph Theory: Graphs - Euler Paths and Circuits - Hamiltonian Paths and Circuits - Coloring Graphs

UNIT-IV

Order Relations and Structures: Partially Ordered Sets - External Elements of Partially Ordered Sets - Lattices - Finite Boolean Algebras - Functions on Boolean Algebras - Boolean Functions as Boolean Polynomials.
Trees: Trees - Labeled trees - Tree Searching - Undirected Trees - Minimal Spanning Trees.

UNIT-V

Semigroups and Groups: Binary Operations Revisited - semigroups - Products and Quotients of Semigroups - Groups - Products and Quotients of Groups. Groups and coding: Coding of Binary Information and Error Detection - Decoding and Error Correction

Text Books

Bernard Kolman.Robert C.Busby and Sharon Ross, " Discrete Mathematical Structures", Prentice Hall of India Pvt. Ltd., 1997.

References Books:

Lipschutz - Schaums Outline Series, "Discrete mathematics ", Special Indian Edition 2nd, 2006, TMH, New Delhi.

Veerarjan, "Discrete mathematics ", 1st Edition, 2006, TMH, New Delhi.

Trembley J.P. and Manohar R.P., "DISCRETE MATHEMATICAL STRUCTURES WITH APPLICATIONS TO COMPUTER SCIENCE", TataMcGraw - Hill, 1975

Korthage R.R., " DISCRETE COMPUTIONAL STRUCTURES", Academic Press, 1974.

Preparata, F.P., Yeh R.T., "INTRODUCTION TO DISCRETE STRUCTURES", Addison - Wesley, 1973.

PRINCIPLES OF COMMUNICATION SYSTEM

Objectives:

The aim of this course is to introduce the principles of communications, digital communications, and data communications.

UNIT-I

Spectral Analysis and Random Variable Process: Spectral characteristics of a periodic signal - Spectra of common signals related to communication - Cross correlation, auto correlation and power/energy density spectra - random signals and process - Modeling noises.

UNIT-II

Analog Modulation Systems: Basic principles of AM, FM, and PM - Spectra, power consideration, receiver's characteristics and deduction of AM, FM and PM systems performance - Threshold effects reduction.

UNIT-III

Base Band Data Communication: Sampling and quantizing - PCM, ADPCM, DM, ADM - Base band pulse shaping - Binary data formats - Base band transmission - ISI, correlative coding, optimum SNR - Matched filter deduction.

UNIT-IV

Digital Modulation: Digital modulation - Coherent binary modulation techniques - Coherent quadrature modulation techniques - Non-coherent binary modulation - M-array modulations - Performance of digital modulation systems based on probability of error, bandwidth, and ISI.

UNIT-V

Spread Spectrum Techniques: Fundamental concepts - Direct sequence spread spectrum - Frequency hopping spread spectrum.

Text Books:

Herbert Taub and Donald L Shilling, Principles of Communications Systems, 2nd edition, McGraw Hill Publishing, 2003

Simon Haykin, Principles of Communication, Prentice Hall of India, 1990.

References Books:

Thomas and Chandrasekar - communication Theory, 1st Edition year 2006, TMH, New Delhi.

Lathi B.P, Analog and Digital Communication Systems, Prentice Hall of India, 1992.

J.G. Proakis, Digital Communication, McGraw Hill, 4th edition, 1995.

Edward. A. Lee and David. G. Messerschmitt, Digital Communication, 3rd edition, 2003, Allied Publishers.

J Marvin.K.Simon, Sami. M. Hinedi and William. C. Lindsey, Digital Communication Techniques: Signal Design and Detection, 1994, Prentice Hall of India.

DIGITAL DATA HANDLING

UNIT I : WORKFLOW

Workflow - types, Automated workflow - components, File Preparation, Preflighting, Digital Imposition – preRIP, postRIP, OPI, Trapping, Postscript, PDF, Metadata – JDF, XML.

UNIT II : NETWORKING

Data transmission fundamentals, Communication media, Data interfaces, Concepts and principles of computer networks, PAN, LAN, WAN, MAN, Network Topologies, Network protocols – FTP, TCP/IP, Network Node components – Hubs, Bridges, Routers, Gateways, Switches, Internet – principles, Client/Server model

UNIT III : FILE FORMATS & COMPRESSION TECHNIQUES

File format – EPS, DCS, JPEG, GIF, TIFF, PNG, Comparison of file formats, Compression techniques, Lossy & lossless compression, RLE, Huffman compression, LZW, DCT, Wavelet, Fractal image encoding, Image quality evaluation, Audio compression, Video Compression.

UNIT IV : DATABASE MANAGEMENT

Database, Types, Database Management, Database Languages, Query processing, Data storage, Backup & recovery, Distributed databases, Data Warehousing, Data Mining

UNIT V : SECURITY

Security in Operating Systems, Principles of Network Security, Cryptography, Fire walls, Intrusion Detection Systems, Secure Email, Digital Rights Management

TEXT BOOK

1. Helmut Kiphhan, “Handbook of Print Media”, Springer Verlag, 2001 2. Phil Green, “Understanding Digital Color”, 2nd edition, GATF Press, 1999.

REFERENCE BOOKS

1. Mani Subramanian, “ Network Management: Principles & Practice”, Addison wesley, 1999
2. Sanjiv Purba, “Handbook of Data Management”, Viva Books Private Ltd., 1999
3. Douglas E. Comer, “Computer Networks & Internets”, 2nd Edition, Pearson Publications, 1999
4. Larry L. Pearson, Bruce S. Davie, “Computer Networks: A Systems Approach”, Third Edition, Morgan Kauffman Publishers Inc., 2003
5. Abraham Silberschatz, Henry F. Korth, S.Sudharshan, “Database System Concepts”

VISUAL PROGRAMMING

Objectives:

To learn and understand Windows, Visual Basic and Visual C++ Programming

UNIT-I

Introduction to windows Programming – Event Driven Programming – Data Types – Resources – windows Message – Device context – Document Interfaces – Dynamic Linking Libraries – Software Development Kit (SDK) tools – Context help

UNIT-II

Visual Basic Program – Form Design – VBX control – Properties – Event procedures – Menus and Toolbars – Using Dialog Boxes – Working with control Arrays – Active X controls – Multiple Document Interface (MDI) – File System Controls – Data Control – Database Applications

UNIT-III

Visual C++ Programming – Frame work classes – VC++ Components - Resources – Event Handling – Message Dispatch system – Model and Modeless Dialogs – Important VBX Controls – Document view architecture – serialization – Multiple Document Interface – splitter windows – Coordination between controls.

UNIT-IV

Database Connectivity – Embedding Controls in view – Creating user defined DLL s – Dialog based applications – Dynamic data transfer functions – Database management with ODBC – communicating with other applications – Object linking and embedding.

UNIT-V

Basics of GUI Design – Visual Interface Design – File System – Storage and Retrieval System

Text Books:

Petzold,"Windows Programming", Microsoft Press 1995.
Marion Cottingham,"Visual Basic",Peachpit Press,1999.
Kate Gregory,"Using Visual C++",Prentice Hall of India,1999.

References Books:

Pappar and Murray,"Visual C++: The Complete Reference", Tata McGraw Hill,2000.

PAPER – 5

COMPUTER NETWORKS

Objectives:
Understand the basics of Computer Networks. Understand the operation of the protocols that are used Computer Networks.

UNIT-I
Introduction : Applications of Computer Network - Hardware and Software - Protocol Hierarchies - Design Issues of the layers - Interfaces and services - Service Primitives - Reference Models : The OSI Reference model-The TCP/IP Reference Model -Types of computer Network : LAN,MAN,WAN- Topologies - Transmission Media - Concept of data transmission - Switching Techniques - ISDN and ATM.

UNIT-II

Data Link Layer: Data Link Layer design issues - Framing - Flow control - Error Detection and Correction – Data link protocols: Stop and Wait Protocol - Sliding window protocol - Medium access sub layer: Channel allocation –static and dynamic - Multiple access protocol – FDDI - Data Link Layer in the Internet – SLIP - PPP.

UNIT-III
Network Layer : The Network Layer Design Issues - comparison of virtual circuits and datagram subnets - connectionless internetworking - Internetwork routing - Routing algorithms – Fragmentation - The Network Layer in the Internet – The IP Protocol - IP Address - subnets - Internet control protocols - internet multicasting.

UNIT-IV
Transport Layer : The Transport layer services - The concept of client and server in terms of socket addressing - Quality of service - Transport service primitives and buffering – Multiplexing - Crash Recovery - The Internet Transport Protocols (TCP/IP) – The TCP protocol, The TCP segment header, TCP connection management - TCP transmission policy - TCP congestion control - UDP.

UNIT-V
Presentation and Application Layer : Network Security – Traditional Cryptography - Two fundamental Cryptographic Principles – Symmetric and Asymmetric Key Algorithms - DNS - SNMP -E-mail.

Text Books:
Computer Networks," Andrew .S. Tanenbaum", Prentice Hall of India, 2003

References Books:

Forouzan: Data Communication and Networking, Special Indian Edition 4th Edition 2006, TMH, New Delhi.

Shashi Banzal ,"Data and Computer Network Communication",Firewall Media,2007.

J.F Kurose and K.W. Ross, Computer Networking - A top-down approach featuring the internet, Addison Wesley, 2001.

William Stallings, Data & Computer Communication, 6th Edition, Pearson Education, 2002.

Mani Subramanian, Network Management: Principles and Practice, Addison Wesley, 2000.

SOFTWARE ENGINEERING

Objectives:

The objective of this subject is to make the student familiar with the principles, management and practical methodology followed in any software engineering project development, its implementation and maintenance.

UNIT-I

Software characteristics - Software Engineering Layers - Software Process - Process Models - Linear Sequential, Evolutionary and Formal Methods - Software Measurement Size Oriented, Function Oriented, Extended Function Point Metrics, Metrics for quality.

UNIT-II

Software Project Planning - Software Scope, Resources - Project Estimation - Problem Based, LOC Based, Process Based Estimation - Estimation Models - COCOMO Model - Software Quality - Quality Assurance - Software Reviews - Formal Technical Reviews - Statistical Quality Assurance - Software Reliability - SQA Plan.

UNIT-III

Software Requirement Analysis - Communication Techniques - Analysis Principles - Software Prototyping - Specification - Software Design Concepts - Effective Modular Design - Cohesion - Coupling - Design Documentation - Real Time and Design Methods - Data, Architecture, Transform and Transaction Mapping, Interface and Procedural Design.

UNIT-IV

Object Oriented Software Engineering - Concepts Identifying the Elements of Object Model - Object Oriented Analysis - Domain Analysis - Object Relationship and Behavior Model Design for Object Oriented Systems - System Design Process - Testing Strategies - Test Case Design and Testing Methods - Metrics for Object Oriented Systems - Class Oriented Metrics - Operation Oriented Metrics - Metrics For Object Oriented Testing and Projects.

UNIT-V

Software Testing - Fundamentals White Box, Black Box, Control Structure Testing - Testing on Specialized Environments, Unit, Integration, Validation, System Testing - Art of Debugging - Software Reengineering - Software Maintenance - Process Model - Reverse Engineering - Forward Engineering - CASE - Building Blocks 0 - Taxonomy I - CASE - Integration Architecture - CASE Repository

Text Books:

Rogger S.Pressman, “Software Engineering - A Practioners Approach” McGraw Hill Companies Inc, 1998.

References Books:

Pressman - Software Engineering a Practitioner approach, 6th Edition 2006, TMH, New Delhi.

Ian sommerville, “Software Engineering” Addison Wesley, Fifth Edition, 1986.

Carlo Ghezzi, Mehdi Jazayasi, Dino Mandrioloi, “Fundamentals of Software Engineering” PHI Pvt.Ltd., 1991.

Richard.E.Fairley,”Software Engineering Concepts”, Tata McGraw Hill, First Edition, 1985.

CORE PRACTICAL – I

OBJECT ORIENTED PROGRAMMING LAB

Objectives:

The main aim is to familiarize the concepts learned in Object Oriented Programming. To write Programs for various object oriented concepts using C++ and Java.

Programs to implement

Function overloading in C++

Simple class design and objects creations in C++

Constructor and destructor in C++

Operator overloading, friend functions

Overloading assignment operator, type conversions

Inheritance and polymorphism in C++

Input/output operation

Simple class design and objects creation in Java

String handling in Java

Control Structures in Java

Exceptions handling in Java

Java I/O

Multi-threaded programs in Java

Connecting to Database and accessing databases

CORE PRACTICAL – II

RDBMS LAB

Objectives:
To familiarize the concepts learned in RDBMS and to develop various practical applications using SQL and PL/SQL.

Exercises

Study of various SQL commands

Implementation of the concept of Normalization

Inventory control system with a reorder level

Student Mark sheet processing

Pay roll processing

Electricity bill preparation

Telephone Directory Maintenance

Bank Transactions

Library Information processing

Personal Information system

CORE PRACTICAL – III

VISUAL PROGRAMMING LAB

Objectives:

The students will acquire knowledge on software development using the visual programming languages. This course concentrates on the development of software systems in Visual Basic and Visual C++.

Visual Basic

Write a VB project that receives a year number from a text box and month name from list box and displays number of days in the given month. Take care of leap years. Use Lost Focus event for list box.

Write a VB project that stores 10 employee records with fields EMPNO, NAME, AGE, SEX and SALARY, in an array. Display data fields in text boxes and provide command buttons to move to desired record.

Write a VB project that receives a foreign currency value selected from a list box and converts it into equivalent Indian rupees. (e.g. USD 42.45, Sterling 71.30, D.Mark 25.52, SW Franc 31.58, SaudiRiyal 11.40, French Franc 7.60, UAE Dhiram 11.55, Kuwait Dhinar 140.56)
[[
Write a VB project using control array that creates a scientific calculator with appropriate command buttons. Include the following capabilities for the calculator: +, -, *, /, %, power, square root, square and log (base 10).

Write a VB project to create a screen saver that displays a list of pictures with 1 second pause in between succesive pictures.

Write a VB project for commercial bank operations using SB account database, with the following features:

1. ADD NEW ACCOUNT
2. DEPOSIT AMOUNT
3. WITHDRAW AMOUNT (with minimum balance condition)
4. Calculate simple interest and update balance taking average of last 6 month balance in the account.
5. CLOSE ACCOUNT.

Write a VB project using built in Ax control (Rich Text Box), develop the windows NOTEPAD like editor with File and Edit menus and also display the floating menu whenever necessary.

Write a VB project for a Blood Bank that maintains a list of donors with address and their blood group. Provide the following reporting features:
i) Search and display the address of a particular donor, given the name in a text box.
ii) Display all the donors (using data report)
a) in age group 20-30.
b) in particular city.
c) with particular blood group.
d) male donors with particular blood group
e) female donors with particular blood group.

Write a VB project using Ax DLL or EXE add a class module that would perform the following functions:

a) Test whether the given number is perfect or not
b) Whether the gn% number Armstrong or not
c) Find the factorial of the given number
d) Sum of digits

Write a VB project using Activex X control to create a Textbox that accepts only numeric value. Provide the following properties for the text box: BackColor, Forecolor and Text.

Visual C++

Write Visual C++ win32 application program using MFC that creates a new font.
Write Visual C++ win32 application program using MFC that displays a message "Hello Good Morning!" wherever the user clicks the mouse button on the client area.
Write Visual C++ win32 application program using MFC that allows the user to draw pictures with the help of mouse as a free hand drawing tool.
Write Visual C++ win32 application program using MFC that creates a list box and displays name of the states in India.
Write Visual C++ win32 application program using MFC that displays line, rectangle, rounded rectangle, ellipse and polygon filled with colors.
Write Visual C++ win32 application program using MFC that fills the background of the client area with a bitmap.
Write Visual C++ win32 application program using MFC that displays a menu. Choose the menu items using keyboard accelerator keys and display appropriate messages for the selected command, in message box.
Write Visual C++ win32 application program using MFC that displays the status of ALT, CTRL, SHIFT, NUM LOCK and SCROLL LOCK keys.
Write Visual C++ win32 application program using MFC that displays current mouse coordinates in status bar.
Write Visual C++ win32 application program using MFC that creates two push buttons OK and CANCEL on the client area. Buttons should respond to user click over them and display appropriate message.

INTRODUCTION TO COMPUTATION WITH PYTHON

UNIT I: INTRODUCTION TO COMPUTERS

Introduction to computers, Computer definition, Block diagram of Computer, Hardware Vs Software, Software development life cycle, Structured programming, Computer languages, Creating and running the programs, Number Systems. Introduction to Computer problem solving: Introduction, The problem solving aspect, Top down design, Bottom-up Approach, Implementation of algorithms, The efficiency of Algorithms, Basic Computing Steps and Flow charting (Assignment, Sequencing, Conditionals, Iterations)Practical: Scratch, Raptor

UNIT II: VARIABLES, EXPRESSIONS AND STATEMENTS

Values and types, keywords, Operators Expressions, Interactive mode and script mode, String operations, Comments. Functions & Modules: Function calls, Type conversion functions, Math functions, Adding new functions, Definitions and uses, Flow of execution, Parameters and arguments, Random numbers, the time module, The math module. Conditionals: Conditional execution, Alternative execution, Chained conditionals, Nested conditionals. Iteration: Multiple assignment, Updating variables, the while statement, break, continue.

UNIT III: STRINGS

A string is a sequence, Traversal with for loop, String slices, Strings are immutable, Searching, Looping and counting, String methods, the in operator, String comparison. Tuples: Tuples are immutable, Tuple assignment, Tuples as return values, Lists and tuples, Dictionaries and tuples, Comparing tuples, Sequences of sequences, Debugging. Lists: Traversing a list, List operations, List slices, List methods. Recursion: Stack diagrams for recursive functions, Infinite. Files: Persistence, Reading and writing, Filenames and paths

UNIT IV: CLASSES AND OBJECTS

User-defined types, Attributes, Instances as return values Methods: The init method, The str method, Operator overloading, Polymorphism. Inheritance: Importance, examples. Event handling: Key press events, Mouse events. Exceptions: Catching exceptions, Raising our own exceptions, the finally clause of the try statement.

UNIT V: DEFINITION AND USE OF STACKS:

Abstract data types, The Stack ADT, Implementing stacks with Python lists, pushing and popping, Using a stack to evaluate postfix, Parsing, Evaluating postfix. Queues: The Queue ADT, Linked Queue, Performance characteristics, Improved Linked Queue, Priority queue.

BOOKS RECOMMENDED

1) Think Python - How to Think Like a Computer Scientist, Green Tea Press, Needham, Massachusetts, Allen Downey, Version 2.0.13, June 2014.
2) How to Think Like a Computer Scientist: Learning with Python 3, Peter Wentworth, Jeffrey Elkner, Allen B. Downey and Chris Meyers, Documentation Release 3rd Edition.

A. E- COMMERCE

Objectives:

By the end of the course the student should have :
A background in electronic commerce as it affects small and medium sized business (SMEs)
An understanding of how you can develop and implement anE-commerce strategy for your business
An E-commerce business plan based on the adoption of a selected E-commerce strategy.

UNIT-I

Introduction: Infrastructure for Electronic Commerce - Networks - Packet Switched Networks - TCP/IP Internet protocol - Domain name Services - Web Service Protocols - Internet applications - Utility programs - Markup Languages - Web Clients and Servers - Intranets and Extranets - Virtual private Network.

UNIT-II

Core Technology: Electronic Commerce Models - Shopping Cart Technology - Data Mining - Intelligent Agents - Internet Marketing - XML and E-Commerce

UNIT-III

Electronic Payment Systems: Real world Payment Systems - Electronic Funds Transfer - Digital Payment - Internet Payment Systems - Micro Payments - Credit Card Transactions - Case Studies.

UNIT-IV

Security: Threats to Network Security - Public Key Cryptography - Secured Sockets Layer - Secure Electronic Transaction - Network Security Solutions - Firewalls.

UNIT-V

Inter/Intra Organizations Electronic Commerce: EDI - EDI application in business - legal, Security and Privacy issues - EDI and Electronic commerce - Standards - Internal Information Systems - Macro forces - Internal commerce - Workflow Automation and Coordination - Customization and Internal commerce - Supply chain Management.

Text Book:

Ravi Kalakota and Andrew B Whinston, Frontiers of Electronic commerce, Addison Wesley, 1996

Reference Books:

Baskar - E-Commerce Framework Technologies and Applications 2nd Edition, 2006, TMH, New Delhi.

Pete Loshin, Paul A Murphy, Electronic Commerce, 2nd Edition, Jaico Publishers1996.

David Whiteley, e - Commerce: Strategy, Technologies and Applications, McGraw Hill, 2000.

MICROPROCESSOR AND ITS APPLICATIONS

UNIT I: THE 8086 MICROPROCESSOR

Introduction to 8086 – Microprocessor architecture – Addressing modes – Instruction set and assembler directives – Assembly language programming – Modular Programming – Linking and Relocation – Stacks – Procedures – Macros – Interrupts and interrupt service routines – Byte and String Manipulation.

UNIT II : 8086 SYSTEM BUS STRUCTURE

8086 signals – Basic configurations – System bus timing –System design using 8086 – IO programming – Introduction to Multiprogramming – System Bus Structure – Multiprocessor configurations – Coprocessor, Closely coupled and loosely Coupled configurations – Introduction to advanced processors.

UNIT III :I/O INTERFACING

Memory Interfacing and I/O interfacing – Parallel communication interface – Serial communication interface – D/A and A/D Interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications Case studies: Traffic Light control, LED display , LCD display, Keyboard display interface and Alarm Controller.

UNIT IV: MICROCONTROLLER

Architecture of 8051 – Special Function Registers(SFRs) – I/O Pins Ports and Circuits – Instruction set – Addressing modes – Assembly language programming.

UNIT V:INTERFACING MICRO CONTROLLER

Programming 8051 Timers – Serial Port Programming – Interrupts Programming – LCD & Keyboard Interfacing – ADC, DAC & Sensor Interfacing – External Memory Interface- Stepper Motor and Waveform generation.

TEXT BOOKS:

1. Yu-Cheng Liu, Glenn A.Gibson, “Microcomputer Systems: The 8086 / 8088 Family – Architecture, Programming and Design”, Second Edition, Prentice Hall of India, 2007.
2. Mohamed Ali Mazidi, Janice Gillispie Mazidi, Rolin McKinlay, “The 8051 Microcontroller and Embedded Systems: Using Assembly and C”, Second Edition, Pearson Education, 2011

REFERENCE BOOK:

1. Doughlas V.Hall, “Microprocessors and Interfacing, Programming and Hardware:,TMH, 2012

EDC I: HTML PROGRAMMING

UNIT I

Web Design Principles: Basic principles involved in developing a web site - Planning process - Five Golden rules of web designing- Designing navigation bar -Page design- Home Page Layout -Design Concept. **Basics in Web Design**: Brief History of Internet- What is World Wide Web -Why create a web site -Web Standards - Audience requirement.

UNIT II

Introduction to HTML :What is HTML -HTML Documents- Basic structure of an HTML document - Creating an HTML document - Mark up Tags - Heading-Paragraphs - Line Breaks - HTML TagsModule.

UNIT III

Elements of HTML: Introduction to elements of HTML -Working with Text - Working with Lists, Tables and Frames- Working with Hyperlinks, Images and Multimedia - Working with Forms and controls.

UNIT IV

Introduction to Cascading Style Sheets: Concept of CSS- Creating Style Sheet- CSS Properties-CSS Styling(Background, Text Format, Controlling Fonts) - Working with block elements and objects - Working with Lists and Tables - CSS Id and Class - Box Model(Introduction, Border properties, Padding Properties, Margin properties) - CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align,Pseudo class, Navigation Bar, Image Sprites, Attribute sector)- CSS Color - Creating page Layout and Site Designs.

UNIT V

Introduction to Web Publishing or Hosting: Creating the Web Site - Saving the site - Working on the web site - Creating web site structure - Creating Titles for web pages - Themes-Publishing web sites.

TEXT BOOK

1. Kogent Learning Solutions Inc. HTML 5 in simple steps, Dreamtech Press
2.A beginner's guide to HTML NCSA,14th May,2003
3.Murray,Tom/Lynchburg Creating a Web Page and Web Site College,2002

REFERENCE BOOKS

1.Steven M. Schafer HTML, XHTML, and CSS Bible, 5ed Wiley India John Duckett
2.Beginning HTML, XHTML, CSS, and JavaScript Wiley India Ian Pouncey, Richard
3.York Beginning CSS: Cascading Style Sheets for Web Design Wiley India Kogent
4.Learning Web Technologies: HTML, Javascript Wiley India.

SEMESTER III

PAPER – 6

INTERNET PROGRAMMING

Objectives:

Upon completion of the course the student will be able to:
Write client-side JavaScript programs for executing in a Web browser.
Do basic HTML design using colors, images, tables, frames, and GUI components such as text boxes, buttons, menus, checkboxes, and radio buttons and develop interactive Web applications that integrate HTML with JavaScript using event handlers.
Explain control structures, functions, and arrays, and illustrate how they are used to create JavaScript programs. Also discuss object-oriented programming and the Document Object Model, built-in and custom objects.
Create JavaScript applications that use cookies to track and save Web preferences.

UNIT-I

Introduction: Introduction to the Internet and World Wide Web - World Wide Web Consortium (W3C) - History of the Internet History of the World Wide Web - History of SGML -XML Introduction to HyperText Markup Language - Editing HTML - Common Elements - Headers - Linking - Images - Unordered Lists - Nested and Ordered Lists - HTML Tables-Basic HTML Forms

UNIT-II

Dynamic HTML: Dynamic HTML Object Model and Collections, Event Model, Filters and Transitions, Data Binding with Tabular Data Control, Dynamic HTML-Structured Graphics ActiveX Controls, Dynamic HTML-Path, Sequencer and Sprite ActiveX Controls.

UNIT-III

JavaScript: JavaScript, Introduction to Scripting, Control Statements, Functions, Arrays, Objects.

UNIT-IV

XML: Creating Markup with XML -Parsers and Well-formed XML Documents -Parsing an XML Document with msxml - Document Type Definition (DTD) - Document Type Declaration - Element Type Declarations - Attribute Declarations - Document Object Model - DOM Implementations - DOM Components - path - XSL: Extensible Stylesheet Language Transformations (XSLT)

UNIT-V

PERL, CGI AND PHP: Perl - String Processing and Regular Expressions - Form Processing and Business Logic - Server-Side Includes - Verifying a Username and Password - Using DBI to Connect to a Database - PHP - Form Processing and Business Logic - Connecting to a Database - Dynamic Content in PHP

Text Books:

Deitel & Deitel, Internet & World Wide Web How to Program, 3rd Edition, Pearson Education India, 2004.

Deitel & Deitel, XML How to Program, Pearson Education, 2001.

References Books:

God bole - Web Technologies, TCP/IP to Internet Application Architectures, 1st Edition - 2005, TMH, New Delhi.

Negrino and Smith, Javascript for the World Wide Web, 5th Edition, Peachpit Press 2003.

Deitel & Deitel, Perl How to Program, Pearson Education, 2001.

Benoit Marchal, XML by Example, 2nd Edition, Que/Sams 2002.

MOBILE COMPUTING

Objectives:

The objective is to provide the concepts of mobile computing including access control, digital mobile phone system, wireless LAN and the necessary protocols.

UNIT-I

INTRODUCTION: Mobile and Wireless Devices – Simplified Reference Model – Need for Mobile Computing – Wireless Transmissions – Multiplexing – Spread Spectrum and Cellular Systems – Medium Access Control – Comparisons.

UNIT-II

TELECOMMUNICATION SYSTEMS: Telecommunication Systems – GSM – Architecture – Sessions – Protocols – Hand Over and Security – UMTS and IMT-2000 – Satellite Systems.

UNIT-III

WIRELESS LAN: IEEE 802.11 – 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:

Jochen Schiller, “Mobile Communications”, Pearson Education, Delhi, 2000.

References Books:

Sandeep Singhal, Thomas Bridgman, Lalitha Suryanarayana, Danil Mouney, Jari Alvinen, David Bevis, Jim Chan and Stetan Hild, “The Wireless Application Protocol : Writing Applications for the Mobile Internet”, Pearson Education Asia, 2001.

PAPER – 8

COMPUTER GRAPHICS AND MULTIMEDIA

Objectives:

The objective is to provide complete understanding of the theoretical aspects of computer graphics and multimedia. To provide the details of algorithms which facilitate implementation of both 2D and 3D graphics. To provide a basic understanding of the fundamental issues and problems in the representation and manipulation of multimedia content such as images, audio and video.

UNIT-I

Introduction and Hardware: Representative uses of computer graphics - vector display and raster display architectures - display processor - interactive input devices - output primitives - software portability and graphics standards - conceptual framework for interactive graphics.

UNIT-II

2D graphics: Basic raster graphic algorithms for 2D primitives - scan converting lines - circles - ellipses - filling rectangle - character generation - 2D transformations - 2D clipping - windowing transformation.

UNIT-III

3D graphics: 3D representation methods - 3D transformations - viewing and projections - parallel and perspective projections - hidden line elimination - hidden surface elimination.

UNIT-IV

Introduction: Elements of multimedia systems - Multimedia Hardware - Storage for Multimedia - Input, Output and Communication devices.

UNIT-V

Multimedia Building Blocks: Text - Images - Animation – Audio – Video – Animation – Image editing tools - Painting and drawing tools - Sound editing programs - Video formats - Presentation tools - Authoring tools.

Text Books:

Foley, Van Dam, Reiner, Aughes, “Computer graphics Principles and Practice”, Addision Wesley, 1997.

Hearn and Baker, “Computer graphics”, PHI, Ltd., 1995.

Tay Vaughan, Multimedia - Making it Works, 2nd Edition, McGraw Hill, 1997.

Judith Jeffcoate, Multimedia In Practice - Technology and Applications, Prentice Hall of India, 1995.

References Books:

Plastock, ” Computer Graphics ”, 2nd Edition , 2006, TMH, New Delhi.

William M.Neuman, Robert Sproull, “Principles of interactive computer graphics”, Second edition, McGraw Hill, 1989

Steven Harrington, “Computer graphics - A Programming Approach”, McGraw Hill, 1987.

Parekh,” Principles of Multimedia”, 2006, TMH, New Delhi.

Tay Vaughan, ”Multimedia making it work ”, 7th Edition , 2007, TMH, New Delhi.

CORE PRACTICAL – IV

NETWORK LAB

Objectives:

To familiarize the concepts learned in Computer Network. Programs for various Network functions can be written using Java.

Network Programming

Retrieving data with URLs

Implementation of Socket Programming

Using TCP/IP

Using UDP

Implementation of FTP

Implementation of ECHO/PING/TALK

Implementation of Remote command Execution

Implementation of ARP

Implementation of RARP

Implementation of RMI / RPC

Implementation of Shortest Path Routing Algorithm

Implementation of Sliding Window Protocol

CORE PRACTICAL

INTERNET PROGRAMMING LAB

Objectives:

To implement the concept learned in internet programming and make familiarize with the creation of web based applications.

Creating a web page with cascading style sheets and Embedded style sheets.

Create a web page with the following.

Order form using HTML form elements

Validate the details in client side by using Java script

Design a web page to perform screen saver animations using Java script

Design a web page to display the text file contents using data binding concepts in DHTML.

Design a HTML Editor using Java applet.

Design a web page for library Management using Java applet and JDBC.

Write a Java RMI program to copy a text file from server to client.

Design a web page to conduct On-line Quiz using Java server pages.

Write a servlet program to do the following.

Set the URL of another server.

Display the header details during request of a page.

Display response header as well as contents during response from the server.

Design a web page to demonstrate session tracking Management using Java servlet.

CORE PRACTICAL

GRAPHICS AND MULTIMEDIA LAB

Objectives:

To make the students to understand practically various concepts learned in Computer graphics and Multimedia.

Program for Line drawing using Bresenham, DDA Line Drawing Algorithms.

Program for Circle Drawing using Bresenham Circle Drawing Algorithms.

Program for Clipping Algorithm using Line Clipping

Program for 2D Transformations like Translations and Scaling and Rotations.

Program for 3D Transformations like Translations and Scaling and Rotations.

Performing various editing operations on an Image

Creating different Animations.

ELECTIVE

PAPER – 3

A. JSP AND EJB

Objectives:

To provide complete skills on Internet programming paradigm and also programming knowledge about J2EE such as JSP and EJB.

UNIT-I

Introduction: J2EE-JSP Basics-Elements – Directives –Scripting Elements – Web Application Server Architecture – Important Servlet API features –Introduction to JSP and Java Beans – JDBC
JSP session – persistent connections – cookies and Java sessions – HTTPS and SSL

UNIT-II

Error Handling and Debugging: JSP Error Handling – types – JSP specific Exception classes - handling different types of errors – Debugging techniques.
Database connectivity – RDBMS - Driver types – coding with JSP and JDBC

UNIT-III

Tag extensions and libraries –simple tags – implementation of Body tag interface – Dynamic GUI – creation of web sites – co-branded model –web portal

UNIT-IV

Introduction – transaction process – Benefits and models of transaction – 2 tier architecture – 3 tier architecture – server side component architecture- distributed transaction processing – The Java 2 Platform Enterprise Edition – Enterprise Bean – type of bean – Logical architecture – EJB - design and implementation of a bean.

UNIT-V

Session beans – Enterprise Bean class – Life cycle – Stateful Session Bean Example – Stateless Session Bean Example –session context – EJB Security
Entity Beans – Persistence concept - Definition and features of Entity Beans – Developing and using Entity Beans- Entity context – Life cycle of Entity Beans – container – managed persistence Bean – Debugging problems

Text Books:

Karl Avedal, Danny Ayers et. Al.,"Professional JSP ",Wrox Press, May 2000

Simon Brown,Robert Burdick,Danko Coker , Professional JSP ",Wrox Press, May 2001

Richard Monson Haefel, "Enterprise Java Beans ",O'Reilly,Shroff Publishers and Distributers Pvt. Ltd.,January 2001

References Books:

Wrox Author Team,"Professional EJB ",Wrox Press, July 2001

ELECTIVE V: B.BIG DATA ANALYTICS

UNIT – I

UNDERSTANDING BIG DATA: What is big data – why big data, Data Storage and Analysis, Comparison with Other Systems, Rational Database Management System , Grid Computing, Volunteer Computing, convergence of key trends – unstructured data – industry examples of big data – web analytics – big data and marketing – fraud and big data – risk and big data – credit risk management – big data and algorithmic trading – big data and healthcare – big data in medicine – advertising and big data – big data technologies – introduction to Hadoop – open source technologies – cloud and big data – mobile business intelligence – Crowd sourcing analytics – inter and trans firewall analytics

UNIT- II

NOSQL DATA MANAGEMENT: Introduction to NoSQL – aggregate data models – aggregates – key-value and document data models – relationships – graph databases – schema less databases – materialized views – distribution models – sharding — version – Map reduce – partitioning and combining – composing map-reduce calculations

UNIT -III

BASICS OF HADOOP: Data format – analyzing data with Hadoop – scaling out – Hadoop streaming – Hadoop pipes – design of Hadoop distributed file system (HDFS) – HDFS concepts – Java interface – data flow – Hadoop I/O – data integrity – compression – serialization – Avro – file-based data structures

UNIT –IV

MAPREDUCE APPLICATIONS: MapReduce workflows – unit tests with MRUnit – test data and local tests – anatomy of MapReduce job run – classic Map-reduce – YARN – failures in classic Map-reduce and YARN – job scheduling – shuffle and sort – task execution – MapReduce types – input formats – output formats

UNIT- V

HADOOP RELATED TOOLS: Hbase – data model and implementations – Hbase clients – Hbase examples –praxis. Cassandra – Cassandra data model – cassandra examples – cassandra clients –Hadoop integration. Pig – Grunt – pig data model – Pig Latin – developing and testing Pig Latin scripts. Hive – data types and file formats – HiveQL data definition – HiveQL data manipulation – HiveQL queries.

BOOKS RECOMMENDED

1. Tom White, "Hadoop: The Definitive Guide", Third Edition, O'Reilley, 2012.
2 Eric Sammer, "Hadoop Operations", O'Reilley, 2012.
1. Vignesh Prajapati, Big data analytics with R and Hadoop, SPD 2013.
2. E. Capriolo, D. Wampler, and J. Rutherglen, "Programming Hive", O'Reilley, 2012.
3. Lars George, "HBase: The Definitive Guide", O'Reilley, 2011.
4. Alan Gates, "Programming Pig", O'Reilley, 2011.

PAPER – 3

C.IMAGE PROCESSING

Objectives:
To familiarize the concepts of Image Processing and its Applications

UNIT-I

Introduction : Image perception – light, luminance, brightness and contrast – Monochrome vision models – Image fidelity criteria – color representation. Digital image sampling and quantization –Basic relationship between pixels

UNIT-II

Image enhancement : point operations – contrast stretching, clipping and thresholding – Histogram modeling – Spatial operations – averaging and low pass filtering, smoothing filter, sharpening filter and median filtering - Image Enhancement in frequency domain – smoothing and sharpening filters – Homomorphic filter

UNIT-III

Image restoration : Image observation models – Inverse and wiener filtering – Least square filters – Image analysis – Edge detection – Boundary extraction – Boundary representation – Region representation – Image segmentation – Classification techniques – Image understandings.

UNIT-IV

Image data compression : Redundancies – Image compression models – Error free compression – Lossy compression - Entropy coding, Run length, Bit plane – Predictive techniques – Delta modulation - DCPM

UNIT-V

Morphological Image Processing : Introduction – Dilation – Erosion – Opening –Closing – Morphological Algorithm operations on binary and Gray scale images

Image Representation and Description : Representation Schemes – Boundary Descriptors – Regional Descriptors

Text Books:

Gonsalez and Woods, "Digital Image Processing", second Edition, Pearson Education,2002.

Anil K.Jain, "Fundamentals of digital image processing", Prentice Hall information and System Science series, 1989.

References Books:

Pratt W.K. ,"Digital Image Processing", 2nd Edition, John Wiley & Sons, 1991.

Rosenfied A. & Kak, A.C., "Digital Picture Processing", Vol. I & II, Academic press, 1982.

Nick Efford – Digital Image Processing: A Practical introduction using Java – Addison Wesley / Benjamin Cummings, 2000.

DATA ANALYSIS USING SPSS

UNIT – I

Introduction statistics**,** Descriptive vs Inferential Data Analysis, Measuring Variables, validity, reliability, explicability, Types of Variables (nominal, ordinal, interval), Common Terms-dataset, population sample, parameter, statistic, Misuses of Data examples, Univariate Descriptive Statistics, Sample Size , Range , Frequency Distributions, Histograms, Other Charts, Measures of Central Tendency and Dispersion , Means, medians, modes ,Variance, standard deviation.

UNIT – II

Introduction to SPSS for Windows, SPSS versions, Starting an SPSS Session , critical issues - SPSS: general description, functions, menus, commands, SPSS file management, Types of Data, Structuring your data for use in SPSS, Creating a New Dataset , Using an Existing Dataset, Manipulating and Merging Datasets ,Importing and Exporting Data , Printing Datasets , Data manipulation - Data Transformation - Syntax files and scripts - Output management

UNIT- III

Descriptive Statistics in SPSS- More on different types of data -mean, standard deviation, variance, range, frequencies, Manipulating Data in SPSS, Recoding and Transforming Variables ,Graphs and Charts , Scatter plots , Histograms ,Box Plots and Other Charts , Cross-tabulations ,Printing and Saving Output

UNIT – IV

Probabilities and Sampling, Binomial and Normal Random Variables, Z-scores ,Using the Normal Table, Other distributions ,Methods of Sampling ,Systematic Sampling, Random Sampling ,Sampling Error.

UNIT – V

Statistical tests - Means - The Chi-Square Test - Cross-tabulation- T-test - Analysis of Variance - one-way ANOVA, Repeated measures ANOVA - Non parametric tests - Normality tests- Correlation and regression - Linear correlation and regression - Cronbach's Alpha - Multiple regression (linear)- Multivariate analysis - Factor analysis - Cluster analysis.

TEXT BOOKS:

1. Field A., Discovering Statistics Using SPSS, Fourth Edition, SAGE, 2013
2. SPSS: Stats Practically Short and Simple, first edition, Sidney Tyrrell,2009
3. Sabine Landau And Brian S. Everitt., A Handbook of Statistical Analyses using SPSS, Chapman & Hall/CRC Press LLC, 2004.

REFERENCE BOOKS:

1. Statistical Data Analysis (Oxford Science Publications) by Glen Cowan
2. Applied Statistical Analysis By IBM ICE Publication

DATA WAREHOUSING AND DATA MINING

UNIT – I

Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi-Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Marting.

UNIT -II

Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse.

UNIT – III

Overview, Motivation(for Data Mining),Data Mining-Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data,(Binning, Clustering, Regression, Computer and Human inspection),Inconsistent Data, Data Integration and Transformation. Data Reduction:-Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation.

UNIT– IV

Concept Description:- Definition, Data Generalization, Analytical Characterization, Analysis of attribute relevance, Mining Class comparisions, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases– Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases

UNIT – V

Classification and Predictions: What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods K- nearest neighbor classifiers, Genetic Algorithm. Cluster Analysis: Data types in cluster analysis, Categories of clustering methods, Partitioning methods. Hierarchical Clustering- CURE and Chameleon. Density Based Methods-DBSCAN, OPTICS. Grid Based Methods- STING, CLIQUE. Model Based Method –Statistical Approach, Neural Network approach, Outlier Analysis

REFERENCE BOOKS:

1. M.H.Dunham,"Data Mining:Introductory and Advanced Topics" Pearson Education,2013
2. Jiawei Han, Micheline Kamber, "Data Mining Concepts & Techniques" Elsevier,2013.
3. Sam Anahory, Dennis Murray, "Data Warehousing in the Real World:A Practical Guide for Building Decision Support Systems, 1/e", Pearson Education. 2009.
4. Mallach,"Data Warehousing System", McGraw –Hill, 2008.

PAPER – 10

NETWORK SECURITY

Objectives:

The goal of the course is to provide students with a foundation allowing them to identify, analyze, and perhaps solve network-related security problems in computer systems. The course covers fundamentals of number theory, authentication, and encryption technologies, as well as the practical problems that have to be solved in order to make those technologies workable in a networked environment, in particular in the wide-area Internet environment.

UNIT-I

Introduction: Attacks - Services - Mechanisms - Conventional Encryption - Classical and Modern Techniques - Encryption Algorithms - Confidentiality.

UNIT-II

Public Key Encryption: RSA - Elliptic Curve Cryptography - Number Theory Concepts.

UNIT-III

Message Authentication: Hash Functions - Digest Functions - Digital Signatures - Authentication Protocols.

UNIT-IV

Network Security Practice: Authentication, Applications - Electronic Mail Security - IP Security - Web Security.

UNIT-V

System Security: Intruders - Viruses - Worms - Firewalls Design Principles - Trusted Systems.

Text Books:

William Stallings, Cryptography and Network Security: Principles & Practice, Prentice Hall, 3rd Edition, 2002.

References Books:

Kahate - Crytography and Networks Security - 1st Edition 2005, TMH, New Delhi.

Bruce, Schneier, Applied Cryptography, 2nd Edition, Wiley & Sons, 1996.

Man Young Rhee, Internet Security, Wiley, 2003.

Pfleeger and Pfleeger, Security in Computing, Pearson Education, 3rd Edition, 2003.

ELECTIVE III: OPEN SOURCE SOFTWARE

UNIT I : INTRODUCTION

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources– Application of Open Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode – Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux. .

UNIT II :OPEN SOURCE DATABASE

MySQL: Introduction – Setting up account – Starting, terminating and writing your ownSQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary – Working with metadata – Usingsequences – MySQL and Web.

UNIT III OPEN SOURCE PROGRAMMING LANGUAGES

PHP: Introduction – Programming in web environment – variables – constants – data;types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging and error handling – Security – Templates.

UNIT IV PYTHON

Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops – Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.

UNIT V PERL

Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines, Packages, and Modules- Working with Files –Data Manipulation.

TEXT BOOKS

1. Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications, 2003
2. Steve Suchring, “MySQL Bible”, John Wiley, 2002

REFERENCE BOOKS:

1. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O’Reilly, 2002
2. Wesley J. Chun, “Core Phython Programming”, Prentice Hall, 2001
3. Martin C. Brown, “Perl: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
4. Steven Holzner, “PHP: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
5. Vikram Vaswani, “MYSQL: The Complete Reference”, 2nd Edition, Tata McGrawHill Publishing Company Limited, Indian Reprint 2009.

MACHINE LEARNING TECHNIQUES

UNIT I: INTRODUCTION, CONCEPT LEARNING AND DECISION TREES

Learning Problems – Designing Learning systems, Perspectives and Issues – Concept Learning Version Spaces and Candidate Elimination Algorithm – Inductive bias – Decision Tree learning– Representation – Algorithm – Heuristic Space Search.

UNIT II :NETWORKS AND GENETIC ALGORITHMS

Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evolution and Learning.

UNIT III: BAYESIAN AND COMPUTATIONAL LEARNING

Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probably Learning – Sample Complexity for Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV:INSTANT BASED LEARNING AND LEARNING SET OF RULES

K- Nearest Neighbor Learning – Locally Weighted Regression – Radial Basis Functions – Case-Based Reasoning – Sequential Covering Algorithms – Learning Rule Sets – Learning First Order Rules – Learning Sets of First Order Rules – Induction as Inverted Deduction – Inverting Resolution

UNIT V: ANALYTICAL LEARNING AND REINFORCED LEARNING

Perfect Domain Theories – Explanation Based Learning – Inductive-Analytical Approaches FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning.

TEXT BOOK

1.Tom M. Mitchell, “Machine Learning”, McGraw-Hill Education (INDIAN EDITION), 2013

REFERENCE BOOKS

1.Ethem Alpaydin, “Introduction to Machine Learning”, 2nd Ed., PHI Learning Pvt. Ltd., 2013.

2.T. Hastie, R. Tibshirani, J. H. Friedman, “The Elements of Statistical Learning”, Springer; 1st edition, 2001.

COMPONENT TECHNOLOGY

Objectives:
Aim of this course is to provide the concepts of distributed objects and computing methodologies and CORBA

UNIT-I
INTRODUCTION : Objects – distributed objects – Historical perspective on Distributed objects and computing methodologies.

UNIT-II

CORBA : Architecture – Interface Definition Language – Static and dynamic method invocation- Interface Repository – Basic Object adapter – Services.

UNIT-III

DEVELOPMENT OF A CORBA APPLICATION : Client applet – Server – IDL contract – Database interface.

UNIT-IV

DCOM : Model and services – Objects and Object hierarchies – Location transparency – Configuration information – interface definition language (MIDL) – Applications.

UNIT-V
CURRENT ISSUES : Internet Inter Orb Protocol – CORBA – DCOM interoperability issues – CORBA facilities – CORBA domains – CORBA migration process – Other distributed object paradigms.

Text Books:

Mowbray, T.J. and Ruh, W.A., "Inside CORBA", Addition Wesley, 1997.

References Books:

Orfali, R. and Harkey, D. "Client / Server Programming with Java and CORBA", 2nd Edition, John Wiley and Sons, 1999.

Henning, M. and Vnonki, S. "Advanced CORBA Programming with C++", Addison Wesley, 1999.

Slama, Garbis and Russel, "Enterprise CORBA", Addison Wesley, 1999.

Redmond, F.E., "DCOM: Microsoft Distributed Component Object Model", IDG Books Worldwide Inc., 1997.

Sessions, R., "COM and DCOM", John Wiley and Sons, 1998.

Thai, T.I. "Learning DCOM", O'Reilly, 1999.

DATA CONVERSION AND XML

UNIT I: DATA CONVERSION

Conversion of Text to PDF and Conversion of PDF to Word, Data Conversion from Word to HTML format, Data Conversion from Text to HTML, math keying, pre-editing workflow

UNIT II : XML

Introduction to XML - Origins and description of the XML, Differences between XML and HTML, Differences between XML and SGML, Uses of XML, XML Document structure, DTDs, Schemas, validation, character sets and encoding, Namespaces, comments, Processing instruction, CDTA sections, XML Tools

UNIT III : DOCUMENT

Document Type Definitions- Document type declaration, Notations, Entities, XML content models, Element structure, attribute structure, Building document structure.

UNIT IV: CSS

Cascading Style Sheets in browsers and components, The display: block property Fonts, Text Alignment, Borders, Backgrounds, XSL Transformation, Xpath- nodes, syntax, axes and operators

UNIT V: SCHEMA

Basic schema concepts, advanced schema concepts, schema for structures, schema for Data types. DOM-Levels of DOM, XML Tree structure, DOM core, Using DOM interfaces, DOM views, DOM style interfaces, DOM traversal and ranges

BOOKS RECOMMENDED

1. Ed.Tittel, “Schaum’s Outline of Theory and Problems of XML”, Tata McGraw-Hill Edition, 2004.
2. Frank. P. Coyle, “XML, Web Services and the Data Revolution”, Pearson Education, 2002.
3. Aaron Skonnard, Martin Gudgin, “Essential XML Quick Reference”, Addison-Wesley, 2003