THIRUVALLUVAR UNIVERSITY
VELLORE
M.Sc.INFORMATION TECHNOLOGY
SYLLABUS
(With effect from 2020 – 2021)

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								
1	Core	Paper 1	5	3	Operating System	25	75	100
2		Paper 2	5	3	Object Oriented Analysis & Design	25	75	100
3		Paper 3	5	3	DBMS	25	75	100
	Practical		3	-	Object Oriented Programming Lab	0	-	-
			3	-	RDBMS-Lab	0	-	-
			3	-	Visual Programming-Lab	0	-	-
Internal Elective for same major students (Choose any one)								
4	**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)								
5	**Open Elective**	**Paper-1**	3	3	Digital data handling	25	75	100
			30	**15**		**125**	**375**	**500**
SEMESTER II						CIA	Uni. Exam	Total
6	Core	Paper 4	4	3	Visual Programming	25	75	100
7		Paper 5	4	3	Computer Networks	25	75	100
8		Paper 6	4	3	Software Engineering	25	75	100
9	Practical	Paper 1	3	4	Object Oriented Programming Lab	25	75	100
10		Paper 2	3	4	RDBMS- Lab	25	75	100
11		Paper 3	3	4	Visual Programming -Lab	25	75	100
Internal Elective for same major students (Choose any one)								
12	**Core Elective**	**Paper-2**	4	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)				
13	**Open Elective**	**Paper-1**	3	3	HTML Programming	25	75	100
14	***Field Study**		-	2		100	-	100
15	**Compulsory Paper**		2	2	Human Rights	25	75	100
			30	**31**		**325**	**675**	**1000**

* Field Study

There will be field study which is compulsory in the first semester of all PG courses with 2 credits. This field study should be related to the subject concerned with social impact. Field and Topic should be registered by the students in the first semester of their study along with the name of a mentor before the end of the month of August. The report with problem identification and proposed solution should be written in not less than 25 pages in a standard format and it should be submitted at the end of second semester. The period for undergoing the field study is 30 hours beyond the instructional hours of the respective programme. Students shall consult their mentors within campus and experts outside the campus for selecting the field and topic of the field study. The following members may be nominated for confirming the topic and evaluating the field study report.

(i). Head of the respective department
(ii). Mentor
(iii). One faculty from other department

THIRUVALLUVAR UNIVERSITY

MASTER OF SCIENCE

M.Sc. INFORMATION TECHNOLOGY

SYLLABUS
UNDER CBCS
(With effect from 2020-2021)

SEMESTER I
CORE PAPER 1
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.

<div align="center">

SEMESTER I

CORE PAPER 2

OBJECT ORIENTED ANALYSIS AND DESIGN

</div>

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

SEMESTER I

CORE PAPER 3

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

CORE ELECTIVE

PAPER 1

(to choose 1 out of 3)

A. 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.

B. 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.

C. 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.

OPEN ELECTIVE
PAPER 1
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"

CORE PAPER 4

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.

CORE 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.

CORE PAPER - 6

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.

<div align="center">

CORE PRACTICAL – I

OBJECT ORIENTED PROGRAMMING LAB

</div>

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.

SEMESTER II
CORE ELECTIVE
PAPER 1
(to choose 1 out of 3)

A. 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.

B. 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.

C. 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

OPEN ELECTIVE
PAPER 2
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.

****