

SAURASHTRA UNIVERSITY RAJKOT



FOUR STARS
(Accredited by NAAC)

SYLLABUS

For

Master of Computer Applications (MCA)
AICTE approved

Enforce from : June - 2006

SAURASHTRA UNIVERSITY CAMPUS
RAJKOT – 360005 [GUJARAT]
WEBSITE: www.saurashtrauniversity.edu

CURRICULUM FOR MCA DEGREE

Suggested by

All India Board of Computer Science, Engg./Tech. And Applications



SAURASHTRA UNIVERSITY

RAJKOT

(JUNE – 2006)

Master of Computer Applications (M.C.A.)

Ordinance:

- OMCA 1** Candidates for admission to the Master of Computer Applications (M.C.A. 6 semesters) must have a bachelor's degree of minimum three years duration in any discipline with at least second class with minimum 50% and with mathematics or business mathematics as a subject at higher-secondary (10+2) level or as per GCET norms.
- OMCA 2** The duration of the course will be full time three academic years. The examination for the Master of Computer Applications course will be conducted under the semester system. For this purpose the academic year will be divided into two semesters. No candidate will be allowed to join any other full time regular course or service simultaneously.
- OMCA 3** Candidates who have passed an equivalent examination from any other university or examining body and is seeking admission to the MCA course shall not be admitted without producing the eligibility certificate from the Saurashtra University.
- OMCA 4** **A)** This being full time regular course, a candidate will not be allowed to join any other full time regular course or services.
- B)** No candidates will be admitted to any semester examination for Master of Computer Application unless the Head, Department of Computer Science, certifies it. "That he has attended the courses of study to the satisfaction of the Head, Department of Computer Science."
- OMCA 5** Candidates desirous of appearing at any semester examination of the M.C.A. course must forward their application in the university prescribed form to the Registrar/Controller of Examinations, through the Head, Department of Computer Science on or before the date prescribed for the purpose under the relevant ordinances.
- OMCA 6** No candidate will be permitted to reappear at any semester examination, which he has already passed.
- OMCA 7** To pass the whole M.C.A. examination, student should clear all the six semester examinations within a period of six years from the date of his registration. He shall be required to register himself as a fresh candidate and keep the attendance and appear and pass in the six semester examinations as a fresh candidate from first semester onwards in order to obtain the degree of Master of Computer Application.
- OMCA 8** There shall be an examination at the end of each six semesters to be known as first semester examination, second semester examination respectively, at which a student shall appear in that portion of papers

practical and viva - voce if any, for which he has kept the semester in accordance with the regulations in this behalf.

A candidate whose term is not granted for whatsoever reason shall be required to keep attendance for that semester or terms when the relevant papers are actually taught at the department.

OMCA 9

- (i) A candidate who fails in any no. of courses in a particular semester examination will be permitted to continue his studies for the subsequent semesters up to fourth semester.
- (ii) A candidate who fails in not more than two courses will only be allowed to pursue semester 5th while proceeding from 4th semester to 5th semester.
- (iii) A candidate has to complete successfully all the courses up to 5th semester while getting admitted to final semester that is 6th semester. No candidate will be admitted to 6th semester if he fails to complete all the courses from 1st semester to 5th semester.

OMCA 10

No candidates will be allowed to reappear in any paper in which he has already passed. The marks of successfully completed paper will be carry forwarded for the award of class.

RMCA 1

Standard of passing & award of class

- (i) The standard of passing the MCA degree examination will be as under
 - (a) To pass any semester examination for the MCA degree, a candidate must obtain at least 40% marks in the University Examination separately in each paper of theory, practical and project work.
 - (b) Those of the successful candidates who obtain 40% or more marks in the aggregate of all the semesters taken together will be placed in pass class and those who obtain 50% or more marks in the aggregate of all the semester taken together will be placed in the second class and those who obtained 60% or more marks in the aggregate of all semesters taken together will be placed in the first class and those who obtained 70% or more marks in the aggregate of all the semester taken together will be placed in the first class with distinction.

RMCA 2

The following are the courses and the scheme of examination for the M. C. A. degree examination.

A model scheme of instruction and examination							
SAURASHTRA UNIVERSITY							
Master of Computer Applications							
Curriculum for MCA Degree							
Sno.	Subjects	Total Marks	Out of Total Marks		Weekly Scheme		
			University Exam (External)	Sessional (Internal)			
SEM-1					Lectures	Visual	LABS
P-101	Programming In C & Data Structure	100	75	25	3	2	
P-102	Information technology	100	75	25	3	2	
P-103	COA & Digital Electronics	100	75	25	5		
P-104	Computational Maths & Statistics	100	75	25	5		
P-105	TWCS & Management Function	100	75	25	4		
Practical Laboratories							
P-106	C Programming & Data Structure Lab	100	100				6
P-107	I.T,D.E & Maths -Stat lab	100	100				6
SEM-2					Lectures	Visual	LABS
P-201	Microprocessor- Micro controller	100	75	25	4		
P-202	Data Communication & Networking	100	75	25	4		
P-203	SAD & DBMS concepts using MS-Access	100	75	25	4	1	
P-204	CONM-Graph Theory	100	75	25	5		
P-205	Build C/S Application Using VB	100	75	25	2	3	
Practical Laboratories							
P-206	DBMS Lab & MP-MC LAB	100	100				5
P-207	VB-Access Lab & CONM -Networking Lab	100	100				7
SEM-3					Lectures	Visual	LABS
P-301	Software Engineering	100	75	25	5		
P-302	OS (Windows & LINUX)	100	75	25	3	2	
P-303	Web Technologies	100	75	25	3	2	
P-304	RDBMS (using Oracle/ MS Sql)	100	75	25	3	2	
P-305	OOP using C++	100	75	25	3	2	
Practical Laboratories							
P-306	RDBMS & Web Technology Lab	100	100				8
P-307	OS & C++ Lab	100	100				4
SEM-4					Lectures	Visual	LABS
P-401	Building Applications Using JAVA Env.	100	75	25	2	3	
P-402	Graphics & Multimedia Systems	100	75	25	3	2	
P-403	Operation Research & Optimization Tech.	100	75	25	4	1	
P-404	Elective-1	100	75	25	4	1	
Practical Laboratories							
P-406	Graphics & OR & Elective-1 Lab	100	100				8
P-405	JAVA-LAB	100	100				8
SEM-5					Lectures	Visual	LABS
P-501	Building Application Using .Net Platform	100	75	25	2	3	
P-502	Advance Networking	100	75	25	2	3	
P-503	AI & Intelligent Systems	100	75	25	3	1	
P-504	Elective-2	100	75	25	3	1	
Practical Laboratories							
P-505	.Net Platform, Advance Networking & AI Lab	100	100				12
P-507	Project-Minor & Elective-2 LAB	100	100				6
SEM-6							
P-601	Industrial PROJECT-Major	300	300				

Elective Subjects. For Sem-4	
1	DDBMS
2	Visual Programming using VC++
3	Data Warehousing & Data Mining
4	Mobile Computing
5	High Performance Networking & Security System
6	E-Commerce
7	E-Governance
Elective Subjects. For Sem-5	
1	Geomatics (GIS, GPS & Remote Sensing)
2	Biometrics Technologies
3	Bio Informatics
4	Embedded Systems
5	High Performance Computing
6	Image Processing
7	Nano Technology (Smart Materials, MEMS & NEMS)
8	Natural Language Processing

Semester 1 Library 5 hr.

Semester 2 Library 6 hr.

Semester 3 Library 3 hr.

Semester 4 Library 3 hr.

Extra skills

Students are advised to develop following skills by way student seminar, self study and invited speaker in respective area.

Semester – I

1. Developing communication skills
2. Developing presentation skills
3. Developing behavioral skills.
4. Developing group working culture skills.
5. Developing managerial skills
6. Developing multidisciplinary skills
(Mathematics, statistics, physics, Electronics, Chemistry, Biology, Material science etc.)

Semester – II

1. Document creation.
2. Content creation
3. Case study documentation creation.

Semester – III

1. Use of SPSS, Mathcad
2. System documentation
3. In depth device handling

Semester – IV

1. Use of MATLAB for varieties of applications
2. Use of Website development tools
3. Group discussion on emerging technologies
4. Elective subjects self study and application

Semester – V

1. Use of LABVIEW or suitable software on instrument
2. Developing multimedia rich interactive application
3. Development of expertise on emerging technologies
4. Project development of industry domain and documentation.
5. Effort to present to a set of industries for project/job placement.

P101-Programming in C & Data Structure

(1) Introduction

Introduction to algorithms, Flowcharts, Tracing Flowcharts, Problem Solving Methods, Need for Computer Languages (Language Classification, Translators, Features Of C), Reading programs written in C language, C Character set, Identifiers & Keywords, Data Types, Declarations, Statements & Symbolic Constants, Expressions, I/O Functions : getchar, putchar, scanf, printf, gets, puts, getch, getche, getch, putch, sprintf, sscanf . Pre-processor command : #include, #define, #ifdef, Preparing & Running a Complete C Program

Operators & Expressions : Arithmetic, Unary, Logical, Bit-wise, Assignment & Conditional Operators, Library Functions, Control Statements : while, do..while, for statements, Nested loops, if..else,switch, break, continue and goto statements, Comma operator.

(2) Functions

Defining & Accessing : Passing arguments, Function Prototype, Recursion, Use of Library Functions, Storage Classes: Automatic, External and Static Variables (Register),Arrays: Defining & Processing, Passing to a function, Multidimensional Arrays,(1-D & 2-D, Sorting: Bubble, Insertion and Selection. Searching: Linear and Binary, mathematics & character type testing functions.).

(3) String

Operations of Strings (String handling through built-in & UDF: Length, Compare Concatenate, Reverse, Copy, Character Search using array)

(4) Pointers

Declarations, Passing to a function, Operations on Pointers, Pointers & Arrays, Array Of Pointer, (Pointer Arithmetic, Array accessing through pointers, Pointer to structure, Pointer to functions, Function returning pointers, Dynamic Memory Allocations)

(5) Structures

Defining & Processing, Passing to a function, Unions (Array within structure, Array of structure, Nesting of structure, Passing structure and its pointer to UDF, Introduction to Unions and it's Utilities)

(6) Data Files

Open, Close, Create, Process Unformatted Data Files. (Formatted Console I/O functions, Unformatted Console I/O functions, Modes Of Files, Use Of fopen(), fclose(), fgetc(), fputc(), fgets(), fprintf(), fscanf(), fread(),fwrite(), Command Line Arguments)

(7) DATA STRUCTURES

Recursion and its applications,

Linear Data structure and its storage representation

Stack – Concept, operations and applications

Queue – Concept, operations and applications

Sorting

Internal sort and external sort

Sorting methods: Selection, Sequential, Bubble,
Merge, Insertion, Shell, Quick

Searching

Internal and external search

Searching methods: Linear search, Binary search

Non-Linear Data structure and its representation

Link List

Introductions, Node representation,

Singly Link list – Concept, operations and applications

Doubly link list – Concept, operations and applications

Stack and Queue implementation using singly link list

Multi-linked node structure presentation

Tree Structure

Tree representation using Link-list

Binary Tree – Creation, operations, Traversal techniques

Threaded binary tree, Heterogeneous binary tree

Hashing

File structure

Definitions, Data, Records etc, Sequential, Index sequential, Direct files, Multi-Key Access.

Reference Books:

- (1) Programming In C (Hutchison R-MGH)
- (2) Application Programming In C (Johnsonbaugh R & Kalin M – PHI)
- (3) Computer Programming In C (V Rajaraman – PHI)
- (4) Data Structure C (Samiran Chatopadhyay, Debabrata Ghosh- BPB)
- (5) Data Structure Through C (Mlugin Chatopadhyay- BPB)
- (6) Data Structure Using C and C++ (Y kanitkar- PHI)
- (7) An Introduction to Data structure with applications (Trembly and Sorenson)
- (8) Data & File Structure by Merry E.S. Loomies

P102-Information Technology

Computer Fundamentals:

- **Basics of computer:** Block structure of a computer, characteristics of computers, generation of computers, classification of computers.
- **Types of Computers:** Mainframe computer, Mini and Desktop computers, Laptop, Personal Digital Assistant, Networked computers in terms of capacity, speed, cost and end user's utility.
- **Computer performance:** Parameters that affect computer's performance - CPU execution speed, Clock speed, RAM size, Cache, Disc capacity etc.
- **Character codes:** ASCII, EBCDIC, UNICODE, Excess-3, Grey code, Error checking codes etc. with their needs and utilities.

Elements of a computer processing system:

- **Processor:** Understanding some of the functions of the CPU in terms of calculations, logical control and immediate access memory.
- **Storage devices and media:** Compare the main types of memory storage devices in terms of speed, cost and capacity such as: diskette, zip disk, data cartridge, CD Rom, internal – external hard disk, Magnetic Tape, Magnetic Disk.
- **Input- devices:** Various input devices: Mouse, Keyboard, Trackball, Scanner, touch pad, light pen, Joy stick, Digital Camera and Micro phone, Scanner etc.
- **Output – devices:** Printers, Plotter and speaker, VDU etc.
- **Input – Output devices:** Touch screens.
- **Memory:** Understand different type of memory (RAM, ROM, EPROM, EEPROM, Flash RAM etc.), Measuring computer memory (Bit, Byte, KB etc.).

Software

- **Types of software:** System software, Application software.
- **Operating system software:** Functions of OS and brief introduction of some OS. Batch, multi-programming, time sharing, multiprocessing, PC operating system, network operating system, on-line and real time operating system.
- **Application software:** Common Application software such as: Word processing, spreadsheet, database, Web browsing, desktop publishing, accounting, Computer aided designing and drafting (CADD), MATLAB, LAB VIEW & simulation software
- **Programming paradigms and languages:** classification, machine code, assembly language, Programming paradigms and higher level languages.

Information Network & Security

- **Network:** LAN, WAN, WLAN, VPN ,Client / server environment. Sharing printers, files and applications across network for group working.
- **Intranet, Extranet:** Understanding concept of Intranet, Extranet and distinguishing between them.
- **Internet:** Understanding concept of Internet & WWW (World Wide Web), Applications of Internet: E-mail, TELNET, FTP, TCP/IP, Internet chatting, Internet Kiosk.
- **Security:** Understanding security policy such as Authentication and authorization, Encryption, Digital signature etc., Computer viruses

Utility of Application softwares

Ø Use of MS – Office or OpenOffice for data analysis.

Range of applications:

- Scientific, Business, educational, weather forecasting and remote sensing, planning, multilingual applications, management information system, decision support system, inventory control, medical, industrial control, banking system, railway reservation system etc.

Reference Books:

1. Rajaraman V – Fundamental of Computers 2nd Edition, PHI
2. Foundation of Information Technology – D. S. Yadav, New Age
3. Foundation of Computing – P. K. Sinha, BPB
4. Sanders, D.H. – Computer Today – McGraw Hill

P103-Computer Organization & Architecture and Digital Electronics

Digital Electronics

Digital Logic Operations, Fundamentals of Boolean Algebra, Minimization Techniques for Logic Operations, Using Boolean Mathematics, Using Karnaugh Map Technique

Combinational & Sequential Logic Circuit-Synchronous & Asynchronous : Flip-flops , Registers, Counters

Computer Organization & Architecture

Computer Instructions, Timing and Control, Instruction Cycle, Memory Reference Instructions, Register Reference Instructions, Input Output Instructions, ALU Design, Data Path and Control Path Design,

Central Processing Unit, Introduction, General Register Organization, Computer Registers, Stack Organization, Instruction Formats, Addressing Modes, Instruction Codes, Data Transfer and Manipulation, Instructions, Program Control Instructions, RISC Vs. CISC (Characteristics),

Control Memory, Address Sequencing, Design of Control Unit.

Memory Organization

Memory Hierarchy, Main Memory, Auxiliary Memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware, Structure of 2D Memory.

I/O Organization

I/O interface, Asynchronous Data Transfer, Modes of Transfer Priority Interrupt, Direct Memory Access, I/O Processors, Serial Communication.

Pipelining in CPU Design & Super scalar Processors

Design Principles for Modern Computers, Parallel Processing, Pipelining, Arithmetic Pipelining, Instruction Pipelining.

Reference Books:

- (1) "Digital Computer Design", V. Rajaraman, T. Radhakrishnan, PHI.
- (2) "Computer System Architecture", M. Morris Mano, PHI.
- (3) "Structured Computer Organization", A. S. Tanenbaum, PHI.

104-Computational Mathematics and Statistics

- **Number system and operations:**
 - Number system (Binary, Octal and Hexadecimal)
 - Conversion from one number system to another including decimal.
 - Operations on binary number system (Addition, subtraction, multiplication, complementation etc.)
 - Integer and floating point representation.

- **Connectives:**
 - Negation, Conjunction, Disjunction, Conditional and Bi-conditional, Statement Formulas and Truth Tables, Other Connectives – XOR, NAND & NOR.

- **Boolean algebra:**
 - Introduction, Basic theorems, Sum of Product and Product of Sum.

- **Theory of Sets, Group, Rings, Field, Relations**
 - Sets : representation, types, Notations, Subsets, Supersets, Operations on set – intersection, union, complement, symmetric difference, Venn Diagrams, Basic Set Identities, Cartesian Products
 - Properties of Group, Rings and Field.
 - Relations, Properties of Binary Relations in a Set, Relation Matrix and the Graph of a Relation.

- **Vectors and Matrices**
 - Matrices- representations and types, operations on matrices, Scalar multiplication, matrix multiplication, transpose of matrix, adjoint of a matrix, inverse of a matrix, determinants of a matrix, Simple applications of Vectors & Matrices.

- **Mathematical concepts:**
 - Coordinate systems, simple concept of coordinate geometry, trigonometry, differentiation, integration, interpolation, extrapolation, curve fitting and their utilities.

- **Statistics**
 - Graphical representation
 - Frequency distributions
 - Measures of central tendency
 - Measures of dispersions
 - Correlation
 - Regression

- Probability and expected value.

Reference books:

- (1) Essential Computer Mathematics - by Seymour Lipschutz (Schaum series)
- (2) Statistics (Schaum series)
- (3) Fundamentals of mathematical statistics - by SC Gupta & VK Kapoor (S. Chand & sons)
- (4) Statistics – by V.K.Kapoor.
- (5) Mathematics – by V.K.Kapoor.
- (6) Computer Oriented Numerical Method – by CK Kumbharana & Dr NN Jani
- (7) Mathematical Fundamentals and Graph Theory – By CK Kumbharana & Dr NN Jani

P-105 TECHNICAL WRITING, COMMUNICATION SKILLS & Introduction to Management Functions

Part-I- TWCS

1. **Technical writing – an Introduction:**
Structure & Sample Contents of technical writing
2. **Correspondence:**
Types: Memos, letters, and e-mail
Standards, Objectives, Components & Structures
Building Effective Resumes, Development of sample resumes,
Job search: Techniques & Related Correspondence
3. **Visual Objects:**
Document design strategies
Embedment of graphics, animation in e-document
4. **Electronic communication:**
Effective E-mail content generation and management of incoming & outgoing emails.
5. **Report strategies:**
Objectives, structure, criteria & sample content for development of research proposals
Objectives, structure, criteria & sample content for development of reports like annual reports, progress reports, data analysis, planning & monitoring reports
Objectives, criteria & sample content for development of project proposals
6. **Oral presentations:**
objectives , types of oral presentations , criteria for effective oral presentations and process , post – speech activities etc.

Part-II IMF

- (7) **Management**
Introduction, meaning, tools, scope, nature, role of manager, classical management , behavioral and quantitative approaches of management , social responsibilities of management , philosophy of management .
- (8) **Human resources management**
Planning , Organizing and staffing , Decision making -by individuals -by groups, Techniques of decision making .
- (9) **Marketing management**
Meaning , importance , marketing mix –product – price – physical distribution – promotion , product life cycle , marketing segmentation , marketing research – objectives , importance – scopes , techniques of marketing research .
- (10) **Manufacturing management**
Operation planning control - enterprise resource planning - scheduling – project time by PERT/CPM , cost management , tender , different overheads , material management .

(11) Financial management

Functions , financial transactions recording process , financial equation , tools of financial analysis –accounts receivable – payable – cash flow – fund flow , estimations and financial forecasting by ratio analysis – budgeting , working capital analysis .

(12) Management information system

Evaluation of information system, categories , information process components .

Reference Books:

- (1) R.D.Agrawal - "Organization & management " , Tata McGraw Hill
- (2) Joseph L. massie – "Essentials of Management " , Eastern Economy Edition
- (3) Chuniwala patel – "Operating management and manufacturing management" , Himalaya publication
- (4) Philip kotler – "Marketing management " .
- (5) Essential of technical writing by Pal & Suri

P-106 Programming Laboratory

- (1) C Programming 60 Marks
- (2) Data Structure 40 Marks

P-107 Programming Laboratory

- (1) Information Technology Lab 40 Marks
Data analysis
- (2) Digital Electronics Lab 30 Marks
- (3) Mathematics-Statistical Lab 30 Marks
Algorithm / Programming development of mathematical -statistics methods.

Semester - 2

P-201 Microprocessor - Micro controller

√ Microcomputer

- § Introduction
- § Hardware
- § Memory Organization
- § Addressing Modes
- § Methods of data transfer
- § 8085 Microprocessor
- § 8086 Microprocessor
- § Microprocessor project fundamentals

√ Microcontroller

- § Introduction
- § Hardware Architecture
- § 8051 Family
- § Instruction Set
- § I/O Port Programming in C
- § 8051 Timer Programming in C
- § 8051 Serial Port Programming in C
- § 8051 Interrupt Priority in C
- § LCD, Keyboard Interfacing
- § Interfacing to External Memory
- § Application- Stepper Motor Controller etc.
- § Overview and use of ARM7, ARM9 Microcontrollers
- § ARM9 processors and Embedded Systems

Books:-

- 1 Microprocessor Architecture, Programming and applications with the 8085 / 8080A - By R.S. GAONKAR
- 2 The 8051 Microcontroller and Embedded System – By M.Ali Mazidi, J G Mazidi, R D McKinley
- 3 Programming for Embedded system – Wiley Dreantch
- 4 Embedded System – RajKamal (TMH)
- 5 Embedded C programming – Thomson Learning Barneh Cox & Cull

P202- Data Communication & Networking

Introduction of Computer Network

Introduction To Networking, Components Of Networking, Different Computing Models Of Network, Centralized, Distributed, Collaborative, Networking Configuration Client/Server Based, Peer To Peer Networking, Local and Wide Area Network. Intranets and Internets Network Services, Basic Connectivity Services, File Services, File Transfer Services, Printing Services, Application Services, Directory Services, Security Services Wide area and local networks, connection oriented and connectionless networks, classification of communications protocols, The telephone network, switched and non-switched options, fundamentals of communication theory, channel speed and bit rate, voice communication and analog waveforms , bandwidth and the frequency spectrum, connecting the analog and digital worlds, digital world, digital signals, the modem asynchronous and synchronous transmission.

Transmission Media

Introduction to transmission frequencies, Transmission Media, Characteristics, Cost, Installation, Requirements, Bandwidth Band Usage, Attenuation and Electromagnetic Interference, Cable Media Coaxial Cable, Twisted-Pair Cable, Fiber Optic Cable, Summary Of Cable. Wireless Media, Reason for wireless Network, Wireless Communication with LANs, Comparison Of Different Wireless Media, Time Division Multiplexing (TDM), Time Division Multiple Access(TDMA), Carrier Sense(Collision) System, Token Passing, Peer-To-Peer Priority System, Priority Slot, Carrier Sense(Collision Free) Systems, Token Passing(Priority) Systems , Network Adapter card

Connectivity Devices

Introduction to Addressing, Modems Asynchronous Transmission, Synchronous Transmission, Repeaters Hubs Passive, Active, Intelligent, Bridges Routing Routers, Brouters Gateways Dynamic Routing Routing Algorithms Distance Vector Routing, Link State Routing.

Networking Standards

Introduction to Standards, Standard Organization and the OSI rules and the Communication Process. The OSI reference Model, How Peer OSI Layer Communicates, Protocol Stacks, Conceptualizing the layers of the OSI Model, OSI physical layer, OSI Data Link Layer, Concepts Of OSI Network Layer, Transport Layer, Session Layer, Presentation Layer, Application Layer, OSI model in perspective Standards that utilize multiple levels of the IEEE 802 family

Network Topologies and architectures

Introduction to Access Methods, Contention Polling, Token Passing, Comparing Contention and Token Passing, Demand Priority, Network Topologies, Bus Topologies, Ring Topologies and Star Topologies Mesh Topology, Network Architectures Ethernet, Token Ring.

Switching & Routing In Networks

Message Switching, Packet Switching when and when not to use packet switching, packet routing, packet switching support to circuit switching networks.

TCP/IP

TCP/IP and internetworking, example of TCP/IP operations, related protocols, ports and sockets, The IP address structure, major features of IP, IP datagram, Major IP services IP sources, routing values of the transport layers, TCP , Major features of TCP, Passive and Active operations, the transmission control block(TCB) route discovery protocols, Examples of route discovery protocols, application layers protocols

Connection Services

Introduction of Public Telephone Network, ISDN- Overview Introduction to Asynchronous Transfer Mode (ATM).

Network Operating System

Understanding Directory Services

 Creating Users

 Creating Groups

 Assigning Services

Network Operating System Configuration

Reference

Black U “Computer network – protocol standards and interfaces”, PHI

Stallings, W “Computer communication network” 4th edition PHI

 Tannebaum A S “ Computer networks”, PHI

B A forozon “Data communication and networking”, TMH

P203- Information Systems: Analysis, Design and Implementation

- (1) Overview of the System Analysis & Design System**
System, Subsystem, Characteristics of system, Information System, Categories of Information system, System Analysis and Design, Types of User, Functions of System Analysts, System Development Methods, System Prototype Methods
- (2) Project Proposals**
Reasons for Project Proposal, Source of Project Request
- (3) Preliminary investigation and feasibility study, Activities in Requirement**
Determination Fact Finding Techniques, Interview, Questionnaire, Record Review, Observation, Tools for Documenting Procedures and Decisions, Decision Tree, Decision Tables, Structured English
- (4) Structured Analysis**
Method Data Flow Diagram, Physical & Logical Data Flow Diagram Data Dictionary, Graphical Description
- (5) CASE Tools**
Use of CASE Tools, Categories of CASE Tools
- (6) Output Design**
Objective of Output, Types of Output, Types of Presenting Information, Designing Printed Output (Printed Reports, printed output Method, special forms, multiple copies)
- (7) Input Design**
Objective of input design, Data capturing guidelines, Designing of source document, layout, captions, Coding Techniques (Classification Code. Functions code, Sequence code, significant digit subset code, mnemonic code etc.) Input Validations and tests,
- (8) Database- File Design**
Basic Terminology, Types of Files, Methods of Organization of files, Normalization
- (9) Development & Quality Assurance**
Modularity and partitioning, Coupling and Cohesion, Span of control, Size, Shared use. System Documentation and its tools, Structured Charts, HIPO
- (10) Testing Methods**
Unit test, system test, peak load test, storage test, performance time test, recovery test, verification, validations and certifications
- (11) Implementation**

System Implementation methods (Parallel, direct cut-over, Pilot approach, phase in) Training & Training Methods

(12) Introduction to database system

Introduction to database system.
Database & Database Users
Characteristics of the Database, Database systems.
Concepts & Architecture
Data Models
Schemas & Instances
Data Independence
Data modeling using the Entity- Relationship Approach

(13) Relational Model

Languages & Systems
Relational Data model & Relational Algebra
Relational Model concepts
Relational Model constraints, Relational algebra

(14) Relational Data Base Design

Function Dependencies
Normalization for relational Databases
Normal forms based on primary keys (1NF, 2NF, 3NF & BCNF)
Lossless join & Dependency preserving decomposition

(15) Implementation of database concepts with Microsoft Access

Creating Database, Tables, Reports, Queries, Forms.
With Tables – Primary Key, Foreign Key, Unique Key, Constraints
Joining Tables.

References :

Analysis and design of information system – By Jams A Sen (TMH)
Rob Coronel “**Database Systems – Design Implementation, and management**” Thomson Learning
Date. C. J. “**An Introduction to Database Systems**”, Narosa Publishing House, New Delhi
Desai B. “**An Introduction to Database Concepts**”, Galgotia Publication, New Delhi
Elmsari and Navathe. “**Fundamentals of Database systems**”, Addison Wesley, New York
Ullman J.D. “**Principles of Database System**”, Galgotia Publications, New Delhi

Topic	Marks
(1) To (11)	45
(12) To (15)	30

P204- Graph theory and Computer oriented numerical methods

(1) Computer arithmetic

Absolute, relative, percentage, rounding & truncation errors

(2) Solution of non-linear & transcendental equations

Bisection method, method of false position, newton-rapson method, secant method, method of successive approximation, concept oriented theoretical consideration of above methods.

(3) Solution of linear equations

Meaning, conditions for solutions, solution of equation by direct methods - (Gaussian elimination, Gaussian jordan), iterative methods - (Jacobi method, gaussian seidel), ill-conditional equations and solution.

(4) Interpolation and approximation

Introduction, finite differences, Newton's formulae, Central difference formulae, interpolation with unevenly spaced points, divided difference and their properties, inverse interpolation and double interpolation.

(5) Numerical integration & solution of ordinary differential equations

Concept of numerical integration with geometrical representation, trapezoidal method, simpson - 1/3 rule, simpson - 3/8 rule, veddle's rule, understanding and solution of Ordinary Differential Equation and theoretical consideration, euler method, modified euler's method, R-K 2nd order & 4th order method, predictor corrector methods.

(6) Basic concepts of graph

Definition, graph related terminology, sub graphs, isomorphism, walk, path & circuit, connectivity, Euler graph, operations on graphs, Hamiltonian path & circuits, applications.

(7) Tree

Trees & their properties, rooted and binary tree, spanning tree, applications.

(8) Directed graph

Definition and type of directed graphs, binary relations, connectedness, Euler digraph, directed trees, applications.

(9) Representation of graph and algorithm

Incidence matrix, adjacency matrix, path matrix.

Algorithms - connectedness, shortest distance, spanning tree and other algorithms related to (6), (7) & (8).

Topic	Marks
(1) to (5)	45
(6) to (9)	30

Books :

- (1) Introductory methods of numerical analysis - by SS Shastri (PHI)
- (2) Computer oriented numerical methods - by V Rajaraman (PHI)
- (3) Numerical method –By Dr VN vedamurty & Dr Lyengar
- (4) Computer based numerical algorithms - by Krishnamurthi EV, Sen SK (East-west Press)
- (5) Graph theory with applications to engineering and computer science - by Narsingh Deo
- (6) Graph theory - by Harary F (Addision-Wesley publication)
- (7) Exploring and using MATLAB by Dr NN Jani
- (8) Computer Oriented Numerical Method – by CK Kumbharana & Dr NN Jani
- (9) Mathematical Fundamentals and Graph Theory – By CK Kumbharana & Dr NN Jani

P205- Build C/S Application Using VB

1. Introduction

- Oop Concept
- Getting Acquainted To Vb Environment
- Form (Design And Code Window)
- Controls, Properties, Events And Methods
- Project Explorer, Object Browser, Data View Window

2. Controls

Label, Text Box, Command Button, Option Button, Check Box, Picture Box, Image Box, Combo Box, List Box, Drive, Dir, File List Box, Timer, Shape, Line, OLE

3. Declarations, Procedures, Functions And Arrays

- Different Types Of Declarations
- Dim, Public, Private
- Scope Of Variables With Different Declarations
- Standard Module
- Module Declaration
- Option Explicit
- Constants
- Subroutine And Functions
- Static And Dynamic Array
- Collection

4. Data Types And Control Structures

- Different Data Types
- Decision
- If, If-Else, Nested If-Elses, If-Elseif
- Logical Operators
- Loops
- For –Next
- While – Wend
- Do-While –Loop
- Nesting Of Loops
- Select Case
- Goto

5. Database Controls & Database Connectivity

Data Control (DAO & ADO), Dbcombo, Dblistbox, Data Bound Grid, Hierarchical Flex Grid

6. Functions

Val, Chr, Asc, Cstr, Cdate, Cint, CInG, Isnull, Isnumeric, Isemtyp, Iif, Dateadd, Datediff, Mid, Left, Right, Str, MsgBox, Inputbox

7. Multiple Forms

- Working With MDI Form & Child Forms
 - Menu Editor
- 8. File Handling**
- Opening And Closing Of File
 - Reading And Writing Records Into File
- 9. Advance Controls**
Rich Text Box, Common Dialog Control, VS Flex Grid, DTPicker, SSTab, Tool Bar & Image List, Status Bar, Progress Bar, Tree View, List View, Slider, Winsock
- 10. Error Handling**
Types of Errors, Design Time Error, Compile Time Error, Run Time Error, Err Object, Error Trapping Options in VB
- 11. Report Generation**
Data Report, Crystal Report
- 12. Advance VB**
- Introduction to Server-Client
 - Introduction to N-Tier Architecture
 - Need, Use and Create ActiveX, DLL and API
- 13. Port Programming**
- Parallel port & Serial port introduction
 - Port Programming in VB
- 14. Reference Book**
- Visual Basic Black Book
 - Mastering Visual Basic – BPB

Lab Exercise

- | | |
|------------------|--|
| 1. Text Box | Take two text box, display sum, difference, multiplication & division in four different label. |
| 2. Text Box | Simple & Compound interest Calculation |
| 3. Option Button | Take one option button group for class and second option button group for semester. Display message box which options are selected by user. |
| 4. List Box | Keep two list box, having data (value) in one list box. Keep four navigation buttons >, >>, <, <<. User should be able to navigate data from list box to another list box. |
| 5. Scroll Bar | Generate color palate with use of three scroll bar and picture box (RGB Combination for picture box-fill color). |
| 6. Timer & Shape | Screen Sever – Take one shape, start from top-left corner of form. Move shape in cross direction and shape should not be go out side of form. |

7. Picture box Develop picture viewer using drive, dir and file list box. User should be able to view list of file in list box only with extension *.jpg and *.bmp. Picture should be displayed in picture box.
8. File Handling

Small Applications

1. Calculator (Simple & Scientific)
2. Tic Tock Game
3. Paint brush (Line, Circle, fill color, free drawing with different color pane & different size)
4. Note pad (File open, close, save, font, font-style, font-size, find & replace etc...)
5. Excel work sheet (Using flex grid)
6. Use flax grid to represent calendar using two combo for month and year. Consider leap year.
7. Student information system (Add, Delete, Save, Undo)
8. Inventory control system (Purchase, Sales & Stock report) with bill printing facility.
9. Online Exam (User ID, Fixed level exam, multi level exam, single choice question, multiple choice question, result should be store user wise)
10. Chatting Application using Winsock.
11. User management system using WIN APIs

P-206 Programming Laboratory

- | | |
|-----------------|------------|
| (1) DBMS Lab | - 50 marks |
| (2) MP – MC Lab | - 50 marks |

P-207 Programming Laboratory

- | | |
|------------------------------------|----------|
| (1) Programming With VB-Access Lab | 40 Marks |
| (2) CONM-Graph theory Lab | 30 Marks |
| (3) Networking Lab | 30 Marks |

P305 – Object Oriented Analysis and Design

(1) Object Modeling

Object and classes, links and association, Generalization and Inheritance, Grouping constructs.

Concept of aggregation, generalization as extension and restriction, Multiple Inheritance, Meta-data, Candidate keys.

Dynamic Modeling – Events and state, Operations, nested state diagrams, Concurrency.

Functional Modelling – Functional Models, Data Flow Diagrams, Specifying Operations.

(2) Object Oriented Analysis

Overview of Analysis, Object Modeling, Dynamic Modeling, Functional Modeling, Adding Operations, Iteration.

(3) System Design

Overview, Breaking a system into sub-systems, Identifying Concurrency, Allocating subsystems to processors and tasks, Management of data stores, Control Implementation, Handling Boundary Conditions, Common Architectural Frameworks.

Object Design – Object design optimization, Implementation of Control, Adjustment of Inheritance, Design of Associations, Documenting Design Decisions.

Comparison of Methodologies.

(4) Implementation using OOP Language

C++ character set, tokens, structure of C++ programming, data types and its size, variables, constant, characters and character string, operators (arithmetic, relational, logical, bit-wise, compound assignment, increment-decrement, conditional, special operators), expressions, qualifiers, manipulator, type conversions, preprocessor directives, macro functions, operator precedence and associativity.

Loops and decisions -- For loop, while, do ... while, and nesting of each others, if, if ... else, else ... if, nesting of if, switch, break, continue, go to.

Arrays and structure -- Single & multi dimensional arrays, strings, string manipulation, arrays of string, structure declaration, structure definition, nesting of structure, array of structure, structure & encapsulations.

Function -- Function components, passing data to function, function return data type, library functions, parameter passing, return by reference, default arguments, inline function, function overloading, arrays & functions, C++ stack, scope and extent of variables, storage classes, functions with variable number of arguments, recursive function.

Object Oriented programming – Procedural languages Vs Object Oriented approach, characteristics of OOL, classes and objects (i.e.), object initialization and cleanup (i.e.), friend function, static function, assignment and copy initialization, the this pointer, dynamic objects, inheritance & polymorphism.

Operating overloading & data conversion -- Over-loadable operators, unary operator overloading, binary operator overloading, overloading of new and delete operators, subscript operator overloading, assignment operator overloading, conversion between basic data type, conversion between object and basic data types, conversion between objects of different classes.

Books

- (1) Object Oriented Analysis and Design – By Booch G.
- (2) Designing Object Oriented software – By Rebecca Wirfs – Brock (PHI)
- (3) Object Oriented Modeling and Design – James Rumbaugh (PHI)
- (4) Mastering C++ programming – By Venugopal, Rajkumar, Ravishankar (TMH)
- (5) Mastering C+ - By Robert Lafore
- (6) Borland C++ & OOPS – TED Fasion
- (7) C++ Programming language – By Stroustrup

12.

