

UNIVERSITY OF MADRAS
INSTITUTE OF DISTANCE EDUCATION
B.C.A
Under Choice Based Credits System
(With effect from the academic year 2018-2019)

SCHEME OF EXAMINATION

SEMESTER I		SUBJECTS	CREDIT	Max Marks		TOTAL
COURSE COMPONENT				INT	EXT	
Part I	Paper-I					
Part II	Paper-I	English	3	25	75	100
Part III	Core Paper-I	Fundamentals of Digital Computers	4	25	75	100
	Core Paper-II	Practical – I : PC Software Lab	2	40	60	100
	Allied Paper- I	Mathematics – I	3	25	75	100

SEMESTER II		SUBJECTS	CREDIT	Max Marks		TOTAL
COURSE COMPONENT				INT	EXT	
Part I	Paper-II					
Part II	Paper-II	English	3	25	75	100
Part III	Core Paper-III	Programming in C	4	25	75	100
	Core Paper-IV	Practical – II : Programming in C Lab	2	40	60	100
	Allied Paper-II	Mathematics – II	3	25	75	100

SEMESTER III		SUBJECTS	CREDIT	Max Marks		TOTAL
COURSE COMPONENT				INT	EXT	
Part III	Core Paper-V					
	Core Paper-VI	Microprocessors and its Applications	4	25	75	100
	Core Paper-VII	Numerical and Statistical Methods	4	25	75	100
	Core Paper-VIII	Practical-III : Programming in C++ using Data structures	2	40	60	100
Part IV	NME-I	Financial Accounting	2	25	75	100

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SEMESTER IV		SUBJECTS	CREDIT	Max Marks		TOTAL
COURSE COMPONENT				INT	EXT	
Part I	Core Paper-IX			Programming in Java	4	
Part II	Core Paper-X	Operating System	4	25	75	100
Part III	Core Paper-XI	Computer Graphics	4	25	75	100
	Core Paper-XII	Practical-IV : Java Programming Lab	2	40	60	100
Part IV	NME-II	Cost and Management Accounting	2	25	75	100

SEMESTER V		SUBJECTS	CREDIT	Max Marks		TOTAL
COURSE COMPONENT				INT	EXT	
Part III	Core Paper-XIII			Database Management System	4	
	Core Paper-XIV	Software Engineering	4	25	75	100
	Core Paper-XV	Resource Management Techniques	5	25	75	100
	Core Paper-XVI	Practical-V : RDBMS Lab	2	40	60	100
	Core Elective –I	Visual Programming	3	25	75	100
Part IV		Environmental Studies	2	25	75	100

SEMESTER VI		SUBJECTS	CREDIT	Max Marks		TOTAL
COURSE COMPONENT				INT	EXT	
Part III	Core Paper-XVII			Web Technology	4	
	Core Paper-XVIII	Data Communication and Net Working	4	25	75	100
	Core Paper-XIX	Software Testing	4	25	75	100
	Core Paper-XX	Practical-VI : Web Application Lab	2	40	60	100
	Core Elective- II	Multimedia Systems	3	25	75	100
Part IV		Value Education	2	25	75	100

CREDIT DISTRIBUTION

Course component		No. of paper x Credit(s)	Total	
Part I	Language Paper(2)	2x3	06	
Part II	English(2)	2x3	06	
Part III	Core paper(12)	12x4	48	
	Core paper(2)	2x5	10	
	Core Practical(6)	6x2	12	
	Allied(2)	2x3	06	
Part IV	Elective(2),	2x3	06	
	NME(2),EVS(1),VE(1)	4x2	08	102

**BACHELOR OF COMPUTER APPLICATION(BCA)
Under Choice Based Credits System
(With effect from the academic year 2018-2019)**

SYLLABUS

SEMESTER – I

Core Paper I :Fundamentals of Digital Computers
Objective of the Course: This course introduces the basic concepts of computers and fundamentals of Digital Principles
Unit 1: Fundamentals of computers – Characteristics of computers – Computer Language – Operating Systems – Generation of Computers.
Unit-2: Number systems - Conversion from one number system to another - compliments - Binary codes - Binary logic - Logic gates - Truth tables.
Unit 3: Boolean Algebra - Axioms - Truth table simplification of Boolean function - map method (upto 5 Variables) - Mc-Clausky tabulation method
Unit-4: <i>Sequential logic – RS, JK, D and T Flip flops - Registers –Shift Registers - Counters – Ripple Counters – Synchronous Counter – Design of Counters</i>
Unit-5 : Adders – Subtractors – Decoders – Encoders – Multiplexer - Demultiplexer – Design of Circuits using decoders/Multiplexers – ROM – PLA – Designing circuits using ROM/PLA

1.Recommended Texts:

- i. M.M. Mano, Digital Logic and Computer Design, Pearson Education .
- ii. V.Rajaraman,2002, Fundamentals of Computers, Third Edition, PHI, New Delhi.

1. Reference Books:

- i .T.C.Bartee,1991,Computer Architecture and logical Design, McGraw Hill.

Core Paper II: Practical –I : PC Software Lab

Objective of the Course :This course gives an exposure to Various Software of Office Package

MSWORD

1. Text Manipulations.
2. Usage of Numbering, Bullets, Footer and Headers.
3. Usage of Spell check, and Find & Replace.
4. Text Formatting.
5. Picture insertion and alignment.
6. Creation of documents, using templates.
7. Creation templates
8. Mail Merge Concepts
9. Copying Text & Pictures from Excel

MS-EXCEL

10. Cell Editing
11. Usage of Formulae and Built-in Functions
12. File Manipulations
13. Data Sorting (both number and alphabets)
14. Worksheet Preparation
15. Drawing Graphs
16. Usage of Auto Formatting

POWER POINT

17. Inserting Clip arts and Pictures
18. Frame movements of the above
19. Insertion of new slides
20. Preparation of Organisation Charts
21. Presentation using Wizards
22. Usage of design templates

Allied Paper – I :Mathematics – I
Objective of the course :This course gives an exposure to fundamental mathematics for logic implementation
<p>UNIT – I ALGEBRA AND NUMERICAL METHODS: Algebra: Summation of series simple problems. Numerical Methods: Operators E, Δ, ∇, difference tables, Newton-Raphson method Newton's forward and backward interpolation formulae for equal intervals, Lagrange's interpolation formula.</p> <p>UNIT- II MATRICES: Symmetric, Skew-Symmetric, Orthogonal, Hermetian, Skew-Hermetian and Unitary matrices. Eigen values and Eigen-vectors, Cayley-Hamilton theorem (without proof) – verification- Computation of inverse matrix using Cayley - Hamilton theorem.</p> <p>UNIT- III THEORY OF EQUATIONS: Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, transformation of equation by increasing or decreasing roots by a constant, reciprocal equation. Newton's method to find a root approximately - simple problems.</p> <p>UNIT IV TRIGONOMETRY: Expansions of $\sin^n\theta$ and $\cos^n\theta$ in a series of powers of $\sin\theta$ and $\cos\theta$ - Expansions of $\sin^n\theta$, $\cos^n\theta$, $\tan^n\theta$ in a series of sines, cosines and tangents of multiples of "θ" - Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in a series of powers of "θ" – Hyperbolic and inverse hyperbolic functions - Logarithms of complex numbers.</p> <p>UNIT V DIFFERENTIAL CALCULUS: Successive differentiation, n^{th} derivatives, Leibnitz theorem (without proof) and applications, Jacobians, Curvature and radius of curvature in Cartesian co-ordinates, maxima and minima of functions of two variables, Lagrange's multipliers - Simple problems</p>

Book for Reference:

1. S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers, 1986, Chennai.
2. P. Duraipandian and S.UdayaBaskaran, Allied Mathematics, Vol. I & II Muhil Publications Chennai

SEMESTER – II

Core Paper –III :Programming in C
Objective of the course :This course introduces the basic concepts of C programming
Unit 1: Fundamental Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions.
Unit-2: Data input output functions - Simple C programs - Flow of control - if, if-else, while, do-while , for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.
Unit 3: Functions –Definition - proto-types - Passing arguments – Recursions- Storage Classes - Automatic, External, Static, Register Variables – Multi-file programs.
Unit-4: Arrays - Defining and Processing - Passing arrays to functions – Multi-dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Self-referential structures – Unions - Bit wise operations.
Unit-5: Pointers-Declarations- Passing pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers – Files- Creating , Processing ,Opening and Closing a data file.

1. Recommended Texts:

i.E.Balaguruswamy, 1995,Programming in ANSI C, TMH Publishing Company Ltd.

2. Reference Books:

- a. H. Schildt, 2004, The Complete Reference, 4th Edition, TMH
- b. Gottfried,B.S, 1996, Programming with C, Second Edition, TMH Pub. Co. Ltd., New Delhi
- c. Kanetkar Y,1999, Let us C, BPB Publications., New Delhi.
- d. Kamthane,2002,Programming with ANSI & Turbo C , First Edition,Pearson Education , New Delhi

Core paper – IV :Practical – II : Programming in C Lab

Objective of the course :This course gives hands on training in C programming

I Summation of Series :

1. Sin(x), 2. Cos(x), 3. Exp(x) (Comparison with built in functions)

II String Manipulation :

1. Counting the no. of vowels, consonants, words, white spaces in a line of text and array of lines
2. Reverse a string & check for palindrome.
3. Substring detection, count and removal
4. Finding and replacing substrings

III Recursion :

1. ${}^n P_r$, ${}^n C_r$
2. GCD of two numbers
3. Fibonacci sequence
4. Maximum & Minimum
5. Towers of Hanoi.

IV Matrix Manipulation :

- 1.Addition & Subtraction
- 2.Multiplication
- 3.Transpose, and trace of a matrix
- 4.Determinant of a Matrix
- 5.Inverse of Matrix

V Sorting and Searching :

- 1.Insertion Sort
- 2.Bubble Sort
- 3.Linear Search
- 4.Binary Search

Allied Paper II :Mathematics - II

Objective of the course :This course gives an exposure to fundamental mathematics for logic implementation

Unit-I INTEGRAL CALCULUS:

Bernoulli's formula. Reduction formulae - $\int_0^{\frac{\pi}{2}} \sin^n x dx$, $\int_0^{\frac{\pi}{2}} \cos^n x dx$, $\int_0^{\frac{\pi}{2}} \sin^m x \cos^n x dx$ (m, n being positive integers), Fourier series for functions in $(\alpha, \alpha+2\pi)$, Half range sine and cosine series

Unit-II DIFFERENTIAL EQUATIONS

Ordinary Differential Equations: second order non- homogeneous differential equations with constant coefficients of the form $ay'' + by' + cy = X$ where X is of the form $e^{\alpha x} \cos \beta x$ and $e^{\alpha x} \sin \beta x$

Partial Differential Equations: Formation, complete integrals and general integrals, four standard types and solving Lagrange's linear equation $Pp + Qq = R$

Unit-III LAPLACE TRANSFORMS:

Laplace transformations of standard functions and simple properties, inverse Laplace transforms, Application to solution of linear differential equations up to 2nd order- simple problems.

Unit – IV VECTOR DIFFERENTIATION

Introduction, Scalar point functions, Vector point functions, Vector differential operator ∇ , Gradient, Divergence, Curl, Solenoidal, irrotational, identities.

Unit – V VECTOR INTEGRATION

Line, surface and volume integrals, Gauss, Stoke's and Green's theorems (without proofs). Simple problems on these.

Book for Reference:

1. S. Narayanan and T.K. Manickavasagam Pillai – Ancillary Mathematics, S. Viswanathan Printers, 1986, Chennai.
2. P. Duraipandian and S.UdayaBaskaran, Allied Mathematics, Vol. I & II Muhil Publications Chennai

SEMESTER – III

Core Paper-V :PROGRAMMING IN C++ AND DATA STRUCTURES
Objective of the course :This course introduces the basic concepts of programming in C++ and Data Structures
Unit 1: Introduction to C++; Tokens, Keywords, Identifiers, Variables, Operators, Manipulators, Expressions and Control Structures in C++; Pointers - Functions in C++ - Main Function -Function Prototyping - Parameters Passing in Functions - Values Return by Functions - Inline Functions - Friend and Virtual Functions
Unit-2: Classes and Objects; Constructors and Destructors; and Operator Overloading and Type Conversions - Type of Constructors - Function overloading. Inheritance : Single Inheritance - Multilevel Inheritance - Multiple Inheritance - Hierarchical Inheritance - Hybrid Inheritance. Pointers, Virtual Functions and Polymorphism; Managing Console I/O operations.
Unit 3: Working with Files: Classes for File Stream Operations - Opening and Closing a File - End-of-File Deduction - File Pointers - Updating a File - Error Handling during File Operations - Command-line Arguments. Data Structures: Definition of a Data structure - primitive and composite Data Types, Asymptotic notations, Arrays, Operations on Arrays, Order lists.
Unit-4: Stacks - Applications of Stack - Infix to Postfix Conversion, Recursion, Maze Problems - Queues- Operations on Queues, Queue Applications, Circular Queue. Singly Linked List- Operations, Application - Representation of a Polynomial, Polynomial Addition; Doubly Linked List - Operations, Applications.
Unit-5: Trees and Graphs: Binary Trees - Conversion of Forest to Binary Tree, Operations - Tree Traversals; Graph - Definition, Types of Graphs, Hashing Tables and Hashing Functions, Traversal - Shortest Path; Dijkstra's Algorithm.

1. Recommended Texts :

- i) E. Balagurusamy, 1995, Object Oriented Programming with C++, Tata McGraw-Hill Publishing Company Ltd.
- ii).E.Horowitz and S.Shani, 1999, Fundamentals of Data Structures in C++ , Galgotia Pub.

2. Reference Books:

- i.) Robert Lafore, Object Oriented Programming in Microsoft C++, Galgotia publication.
- ii.) H.Schildt, C++, 1998, The Complete Reference-1998-TMH Edition, 1998
- iii) R. Kruse C.L. Tondo and B. Leung , 1997, Data Structures and Program design in C, PHI.
- iv) Cangsam, Augenstein, Tenenbaum, Data Structures using C & C++, PHI
- v) D.Samantha, 2005, Classic Data Structures, PHI, New Delhi.

Core Paper VI :MICROPROCESSORS AND ITS APPLICATIONS

Objective of the course :This course introduces the fundamental concepts of Microprocessors.

Unit 1: Introduction to microcomputers-microprocessor and assembly languages-microprocessor architecture and its operations-8085 MPU-8085 instruction set and classifications

Unit 2: Writing assembly level programs-programming techniques such as looping-counting and indexing addressing modes-data transfer instructions-arithmetic and logic operations-dynamic debugging

Unit 3: Counters and time delays-hexadecimal counter modulo 10 counter-pulse timings for flashing lights-debugging counter and time delay program-stack-subroutine-conditional call and return instructions

Unit 4: BCD to binary and binary to BCD conversions-BCD to HEX and HEX to BCD conversions-ASCII to BCD to ASCII conversions-BCD to seven segment LED code conversions-binary to ASCII and ASCII to binary conversions-multi byte addition-multi byte subtraction-BCD addition-BCD subtraction-multiplication and division

Unit 5: Interrupt-implementing interrupts-multiple interrupt 8085-trap-problems on implementing 8085 interrupt-DMA memory interfaces-RAM & ROM –I/O interface-direct I/O memory mapped I/O.

Recommended Texts:

- i) R.S.Ganokar-1990-Microprocessor architecture-Programming and Application with 8085/ 8080A-Wiley Eastern Limited.
- ii) A.Mathur-1993-Introduction to Microprocessor-3rd Edition-Tata McGraw Hill.

Core Paper VII :NUMERICAL AND STATISTICAL METHODS
Objective of the course :This course introduces the concepts of Numerical Analysis and Statistical Methods
Unit-1: Introduction- Mathematical Preliminaries- Errors: Computations, Formula - Errors in a Series Approximation- Roots of Equations- Linear Equations: Bisection , False Position Methods- Newton-Raphson Method- Secant Method- Muller’s Method- Lin-Bairstow’s Method- Simultaneous Linear Equations: Matrix Inversion Method- Gauss Elimination, Gauss-Jordan, LU Decomposition Methods- Gauss-Seidel Method.
Unit-2: Numerical Differentiation- Errors in Numerical Differentiation- Cubic Spline Method- Numerical Integration- Trapezoidal Rule- Simpson’s 1/3 and 3/8 Rules- Romberg Integration- Ordinary Differential Equations- Taylor’s Series Method- Euler’s Method- Runge-Kutta 2 nd and 4 th Order Methods-Predictor-Corrector Methods.
Unit-3: Sampling- Frequency Distribution- Cumulative Frequency Function- Grouped Sample- Measures of Central Tendency: Mean, Median and Mode- Geometric Mean- Harmonic Mean – Dispersion: Range, Mean Deviation, Variance and Standard Deviation- Moments- Computation of Moments
Unit-4: Probability- Characteristics: Addition, Multiplication and Conditional Probability Laws- Discrete Distributions: Random Variable- Density and Distribution Functions.- Binomial Distribution- Poisson Distribution- Hypergeometric Distribution- Mathematical Expectation.
Unit-5: Correlation and Regression Analysis: Linear Least Squares Fit- Nonlinear Fit- Fitting a Polynomial Function- Coefficient of Correlation- Properties- Multiple Correlation – Partial Correlation- Rank Correlation- Tests of Significance- Chi square Test- Goodness of Fit, Algorithm and Analysis of Contingency Tables- t-Test and F-Test.

1. Recommended Texts:

- i) S.S.Sastry, 2005, Introductory Methods of Numerical Analysis, 4th Edition, Prentice- Hall of India Pvt. Ltd..
- ii).E.Balagurusamy , 2000, Computer Oriented Statistical and Numerical Methods- Macmillan India Ltd.

2. Reference Books:

- i) V. Rajaraman,2005, Computer Oriented Numerical Methods, 3rd Edition, Prentice- Hall of India Pvt. Ltd..
- ii) K. S. Trivedi,2005,Probability and Statistics with Reliability, Queuing and Computer Science Applications, Prentice-Hall of India Pvt. Ltd.
- iii) E. Balagurusamy,1999, Numerical Methods, Tata McGraw-Hill Publishing Co. Ltd..
- iv) P. Niyogi,2003,Numerical Analysis and Algorithms, Tata McGraw-Hill Publishing Co. Ltd..

Core paper VIII :Practical – III : PROGRAMMING IN C++ USING DATA STRUCTURES

Objective of the course :This course deals with practical implementation of Data Structure using C++.

1. Implement PUSH, POP operations of stack using Arrays.
2. Implement PUSH, POP operations of stack using Pointers.
3. Implement add, delete operations of a queue using Arrays.
4. Implement add, delete operations of a queue using Pointers.
5. Conversion of infix to postfix using stack operations
6. Postfix Expression Evaluation.
7. Addition of two polynomials using Arrays and Pointers.
8. Creation, insertion, and deletion in doubly linked list.
9. Binary tree traversals (in-order, pre-order, and post-order) using linked list.
10. Depth First Search and Breadth first Search for Graphs using Recursion.

NME – I : FINANCIAL ACCOUNTING
Objective of the course :This course introduces the concepts of Financial Accounting.
Unit-1: Meaning and scope of Accounting - Basic Accounting concepts and conversions Objectives of Accounting - Accounting transactions Double entry book keeping Journal, Ledger, preparation of Trial Balance Preparation of Cash Book. Course outline.
Unit-2: Preparation of Final accounts of sole trading Concerns Adjustments to final accounts.
Unit-3: Departmental Accounts: Basis for allocation of expenses - Inter departmental transfer at cost or selling price - Treatment of expenses which cannot be allocated.
Unit-4: Depreciation Meaning, causes, types problems based on straight line and diminishing Balance methods.
Unit-5: Meaning, features, defects, Statement of Affairs method and conversion method. (Problems on Statement of Affairs method only).

1. Recommended Texts & Reference Books:

1. Gupta R.L, Advanced Accountancy, S.Chand, Delhi.
2. Agarwala A.N, Higher Science of Accountancy, KitabMahal,Allahabad.
3. S.P. Jain and K.L. Narang, Financial Accounting
4. M.C.Shukla and T.S.Grawel, Adavnced Accounts(Vol. I)
5. Gillespie Accounting system, Procedure & methods, Prentice Hall India Ltd, New Delhi.

SEMESTER – IV

Core Paper - IX :PROGRAMMING IN JAVA
Objective of the course :This course introduces the basic concepts of programming in JAVA
Unit-1: Introduction to Java-Features of Java-Basic Concepts of Object Oriented Programming-Java Tokens-Java Statements-Constants-Variables-Data Types- Type Casting-Operators-Expressions-Control Statements: Branching and Looping Statements.
Unit-2: Classes, Objects and Methods - Constructors - Methods Overloading-Inheritance-Overriding Methods-Finalizer and Abstract Methods-Visibility Control –Arrays, Strings and Vectors-StringBuffer Class-Wrapper Classes
Unit-3: Interfaces-Packages-Creating Packages-Accessing a Package-Multithreaded Programming-Creating Threads-Stopping and Blocking a Thread-Life Cycle of a Thread-Using Thread Methods-Thread Priority-Synchronization-Implementing the Runnable Interface
Unit-4: Managing Errors and Exceptions-Syntax of Exception Handling Code-Using Finally Statement-Throwing Our Own Exceptions-Applet Programming-Applet Life Cycle-Graphics Programming-Managing Input/Output Files: Concept of Streams-Stream Classes-Byte Stream Classes-Character Stream Classes – Using Streams-Using the File Class-Creation of Files-Random Access Files-Other Stream Classes.
Unit-5 : Network basics –socket programming – proxy servers – TCP/IP – Net Address – URL – Datagrams -Java Utility Classes-Introducing the AWT: Working with Windows, Graphics and Text- AWT Classes- Working with Frames-Working with Graphics-Working with Color-Working with Fonts-Using AWT Controls, Layout Managers and Menus.

1. Recommended Texts

- i. E. Balagurusamy ,2004,Programming with JAVA-2nd Edition, Tata McGraw-Hill Publishing Co.Ltd, New Delhi.
- ii. Herbert Schildt,The Complete Reference JavaTM · 2- 5thEdition,Tata McGraw-Hill Publishing Co. Ltd,New Delhi.

2. Reference Books:

- i. Y. Daniel Liang ,2003, An Introduction to JAVA Programming ,Prentice-Hall of India Pvt. Ltd.
- ii. Cay S. Horstmann and Gary Cornell,2005,Core JavaTM2 Volume I, Fundamental 7thEdition,Pearson Education.

Core Paper - X : OPERATING SYSTEMS
Objective of the course :This course introduces the functions of operating systems.
Unit 1: Introduction: Views –Goals –Types of system – OS Structure –Components – Services - System Structures – Layered Approach -Virtual Machines - System Design and Implementation. Process Management: Process - Process Scheduling – Cooperating Process – Threads - Interprocess Communication. CPU Scheduling : CPU Schedulers – Scheduling criteria – Scheduling Algorithms
Unit-2:- Process Synchronization: Critical-Section problem - Synchronization Hardware – Semaphores – Classic Problems of Synchronization – Critical Region – Monitors. Deadlock : Characterization – Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock - Recovery from deadlock.
Unit 3: Memory Management : Address Binding – Dynamic Loading and Linking – Overlays – Logical and Physical Address Space - Contiguous Allocation – Internal & External Fragmentation . Non Contiguous Allocation: Paging and Segmentation schemes – Implementation – Hardware Protection – Sharing - Fragmentation.
Unit-4: VirtualMemory :: Demand Paging – Page Replacement - Page Replacement Algorithms – Thrashing. – File System: Concepts – Access methods – Directory Structure – Protection Consistency Semantics – File System Structures – Allocation methods – Free Space Management.
Unit-5 : I/O Systems: Overview - I/O Hardware – Application I/O Interface – Kernel I/O subsystem – Transforming I/O Requests to Hardware Operations – Performance. Secondary Storage Structures : Protection – Goals- Domain Access matrix – The security problem – Authentication – Threats – Threat Monitoring – Encryption..

1. Recommended Texts:

- i) Silberschatz A., Galvin P.B., Gange,,2002 , Operating System Principles ,Sixth Edition, John Wiley & Sons.

2.Reference Books:

- i) H.M. Deitel ,1990, An Introduction to Operating System,- Second Edition, Addison Wesley.

Core Paper - XI :COMPUTER GRAPHICS

This course introduces the concepts of Computer Graphics.

Unit-1: Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random-Scan Systems – Input Devices – Hard-Copy Devices – Graphics Software.

Unit-2: Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Ellipse-Generating (Midpoint) Algorithms – Area-Filling (Boundary-Fill and Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels – Character Attributes – Inquiry Functions .

Unit-3:Two-Dimensional Transformations and Viewing: Basic Transformations – Matrix Representations and Homogeneous Coordinates – Composite Transformations–Other Transformations Window-to- Viewport Coordinate Transformation – Clipping Algorithms: Cohen-Sutherland Line Clipping and Sutherland – Hodgeman Polygon Clipping – Basic Modeling Concepts – Interactive Input Methods: Logical Classification of input Devices – Interactive Picture-Construction Techniques.

Unit-4:Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Cueing - Visible Line and Surface Identification – Polygon Surfaces: Polygon Tables, Plane Equations and Polygon Meshes - Three-Dimensional Transformations: Basic, Other and Composite Transformations.

Unit-5 : Viewing Pipeline and Coordinates – Transformation from World to Viewing Coordinates – Projection Transformations - Matrices - View Volumes - Hidden Surface and Hidden Line Elimination Methods: Back-Face Detection , Depth-Buffer and A-Buffer Methods – -Wireframe Methods.

1. Recommended Texts:

i) D.Hearn and M.P. Baker, 2005, Computer Graphics , C Version,2nd Edition , Pearson Education , New Delhi.

2. Reference Books:

i) W.M.Newman and R.F.Sproull,1997,2nd Edition ,Principles of Interactive Computer Graphics, Tata McGraw-Hill Publishing Co. Ltd.

ii).D.P.Mukherjee,1999,Fundamentals of Computer Graphics and Multimedia, 1st Edition, Prentice-Hall of India Pvt. Ltd. – 1999.

iii).N. Krishnamurthy ,2002,Introduction to Computer Graphics, 1st Edition, Tata McGraw-Hill Publishing Co. Ltd..

iv)D.F.Rogers , 2001, Procedural Elements for Computer Graphics , 2nd Edition , Tata McGraw-Hill Publishing Co. Ltd..

v) Xiang and R.A. Plastock ,2002 ,Computer Graphics , Schaum's Outline Series, Tata McGraw-Hill Publishing Co.

Core Paper – XII: Practical – IV : JAVA PROGRAMMING LAB

Objective of the course :This course introduces the concepts of Java Programming

APPLICATIONS:

1. Substring Removal from a String. Use String Buffer Class.
2. Determining the Perimeter and Area of a Triangle. Use Stream Class.
3. Determining the Order of Numbers Generated randomly using Random Class.
4. Usage of Calendar Class and Manipulation.
5. Implementation of Point Class for Image Manipulation.
6. String Manipulation Using Char Array.
7. Database Creation for Storing E-mail Addresses and Manipulation.
8. Usage of Vector Classes.
9. Interfaces and Packages
10. Implementing Thread based Applications and Exception Handling.
11. Application using Synchronization such as Thread based, Class based and Synchronized Statements.
12. Textfiles (copy, display, counting characters, words and lines)
13. Data file creating and processing for electricity billing.
14. Data file creating and processing for telephone billing

APPLETS:

15. Working with Frames and Various Controls.
16. Working with Dialog Box and Menus.
17. Working with Colors and Fonts.
18. Drawing various shapes using Graphical statements.
19. Working with panel and all types of Layout.
20. Design a simple calculator with minimal of 10 operations
21. Usage of buttons, labels, text components in suitable application
22. Usage of Radio buttons, check box ,choice list in suitable application

NME – II : COST AND MANAGEMENT ACCOUNTING
Objective of the course :This course introduces the concepts of Cost and Management Accounting
Unit-1: Cost Accounting: Definition, Meaning and objectives - Distinction between Cost and Financial Accounting. Management Accounting – Definition and objectives – Distinction between management and financial accounting.
Unit-2: Stores Records - Inventory Control - ABC Analysis - Economic Ordering Quantity - Maximum, Minimum and Reordering levels - Methods of Pricing Issued. .Labour: Importance of Labour Cost Control - Various Methods of Wage Payment.
Unit-3: Overheads: Factory, Administration, Selling and Distribution of overheads - Classification - Allocation and Apportionment-Redistribution (Secondary Distribution) - Absorption of Over heads including 'Machine Hour Rate
Unit-4: Funds Flow and Cash Flow Analysis: Preparation of 'Statement'-Ratio Analysis : Utility and limitations of Accounting Ratios - calculation of Accounting Ratios - Ratio Analysis for Liquidity, Solvency, Profitability and Leverage.
Unit-5: Marginal Costing: The Concept- Break Even Analysis - Break - Even Chart - Importance and assumptions - Application of Profit Volumes Ratio - Different types of problems (with special emphasis on decision making problems). Budget and Budgetary Control : Procedure and Utility - Preparation of different types of Budget including Flexible Budget

1. Recommended Texts & Reference Books:

1. Wheldon A.J., Cost Accounting and Costing Methods.
2. Iyengar S.P., Cost Accounting : Principles and Practice.
3. Bhar B.K., Cost Accounting : Methods and problems.
4. Bigg W.W., Cost Accounts.
5. Prasad N.K, Cost Accounting : Principles and Problems.
6. Jain S.P. and Narang K.L., Advanced Cost Accounting.
7. Agarwal M., Theory and Practices of Cost Accounting
8. Robert Anthony : Management Accounting : Text and cases.
9. Maheswari S.N., Principles of Management Accounting.

SEMESTER – V

Core Paper XIII :DATABASE MANAGEMENT SYSTEMS
This course introduces the basic concepts of database management systems
Unit-1: Advantages and Components of a Database Management Systems – Feasibility Study – Class Diagrams – Data Types – Events – Normal Forms – Integrity – Converting Class Diagrams to Normalized Tables – Data Dictionary.
Unit-2: Query Basics – Computation Using Queries – Subtotals and GROUP BY Command – Queries with Multiple Tables – Subqueries – Joins – DDL & DML – Testing Queries
Unit-3: Effective Design of Forms and Reports – Form Layout – Creating Forms – Graphical Objects – Reports – Procedural Languages – Data on Forms – Programs to Retrieve and Save Data – Error Handling.
Unit-4: Power of Application Structure – User Interface Features – Transaction – Forms Events – Custom Reports – Distributing Application – Table Operations – Data Storage Methods – Storing Data Columns – Data Clustering and Partitioning.
Unit-5 : Database Administration – Development Stages – Application Types – Backup and Recovery – Security and Privacy – Distributed Databases – Client/Server Databases – Web as a Client/Server System – Objects – Object Oriented Databases – Integrated Applications.

1. Recommended Texts:

- i). G. V. Post – Database Management Systems Designing and Building Business Application – McGraw Hill International edition – 1999.

2. Reference Books:

- i). Raghu Ramakrishnan – Database Management Systems – WCB/McGraw Hill – 1998.
- ii) C.J. Date – An Introduction to Database Systems – 7th Edition – Addison Wesley - 2000.

Core Paper- XIV :SOFTWARE ENGINEERING
Objective of the course :This course introduces the concepts of Life Cycle of Software
Unit-1: Introduction to Software Engineering Some definition – Some size factors – Quality and productivity factors – Managerial issue. Planning a Software Project: Defining the problem – Developing a solution strategy – planning the development process – planning an organization structure – other planning activities
Unit-2: Software Cost Estimation: Software – Cost factors – Software cost estimation techniques – specification techniques – level estimation – estimating software maintenance costs.
Unit-3: Software requirements definition: The software requirements specification – formal languages and processors for requirements specification.
Unit-4: Software Design: Fundamental Design concepts – Modules and modularizing Criteria – Design Notations – Design Techniques – Detailed Design Consideration – Real time and distributed system design – Test plan – Mile stones walk through and inspection – Design guide lines
Unit-5: Verification and validation techniques: Quality assurance – Static analysis – symbolic exception – Unit testing and Debugging – System testing – Formal verification. Software maintenance: Enhancing maintainability during development – Managua aspects of software maintenance – Configuration management – source code metrics – other maintenance tools and techniques.

1. Recommended Texts:

- i) Richard E.Fairly - Software Engineering Concepts - Tata McGraw-Hill book Company.

2. Reference Books:

- i) R.S.Pressman, 1997, Software Engineering – 1997 - Fourth Ed., McGraw Hill.
- ii) RajibMall ,2004,Fundamentals of Software Engineering,2nd Edition, PHI.

Core Paper - XV :RESOURCE MANAGEMENT TECHNIQUES
Objective of the course :This course introduces the concepts of Resource Management Technique
Unit-1: Basics of Operations Research (OR): Characteristics of O.R - Necessity of O.R in Industry -OR and Decision making - Role of computers in O.R. Linear programming: Formulations and Graphical solution (of 2 variables) canonical & standard terms of Linear programming problem. Algebraic solution: Simplex method.
Unit-2: Algebraic solution: Charnes method of penalties - two phase simplex method - concept of Duality - properties of duality - Dual simplex method.
Unit-3: Transportation model: Definition - formulation and solution of transportation models - the row - minima, column - minima, matrix minima and vogel's approximation methods. Assignment model: Definition of Assignment model - comparison with transportation model - formulation and solution of Assignment model - variations of Assignment problem.
Unit-4: Sequencing problem: Processing each of n jobs through m machines - processing n jobs through 2 machines - processing n jobs through 3 machines - processing 2 jobs through m machines - processing n jobs through m machines - travelling salesman problem. Game Theory: Characteristics of games -Maximin, Maximin criteria of optimality - Dominance property - algebraic and graphical method of solution of solving 2 x 2 games.
Unit-5: Pert - CPM: Networks - Fulkerson's Rule - measure of activity - PERT computation - CPM computation - resource scheduling. Simulation: Various methods of obtaining random numbers for use in computer simulation - Additive, multiplicative and mixed types of congruence random number generators - Monte Carlo method of simulation - its advantages and disadvantages.

1. Recommended Texts:

- i) Hamdy A. Taha: ,1996,Operation Research - An Introduction, 5th edition, Prentice Hall of India, Pvt. Ltd., New Delhi .
- ii.) Ackoff R.L. and Sasieni M. W,1968, Fundamentals of Operations Research, John Wiley and sons, New York.
- iii) Charnes A. Cooper W. and Hendersen A.,1953, Introduction to Linear Programming, Wiley and Sons, New York.
- iv) Srinath L.S,1973, PERT and CPM principles and applications, Affiliated East West Press Pvt. Ltd., New York .

Core Paper - XVI :PRATICAL – V : RDBMS LAB

Objective of the course :This course gives an exposure to visual programming using Visual Basic software.

Creation of a Database and performing the operations given below using a Menu Driven Program.

a) Insertion b)Deletion c) Modification d) Generating a Simple report for the following:

1. Payroll
2. Mark sheet Processing
3. Saving Bank account for banking
4. Inventory System
5. Invoice system
6. Library information system
7. Student information system
8. Income tax processing system
9. Electricity bill preparation system
- 10.Telephone directory maintenance

Elective - I :VISUAL PROGRAMMING

Objective of the course :To inculcate knowledge on Visual Basic concepts and Programming.

Unit 1: Customizing a Form - Writing Simple Programs - Toolbox - Creating Controls - Name Property - Command Button - Access Keys - Image Controls - Text Boxes - Labels - Message Boxes - Grid - Editing Tools - Variables - Data Types - String - Numbers.

Unit-2: Displaying Information - Determinate Loops - Indeterminate Loops - Conditionals - Built-in Functions - Functions and Procedures.

Unit 3: Lists - Arrays - Sorting and Searching - Records - Control Arrays - Combo Boxes - Grid Control - Projects with Multiple forms - DoEvents and Sub Main - Error Trapping.

Unit-4:VB Objects - Dialog Boxes - Common Controls - Menus - MDI Forms - Testing, Debugging and Optimization - Working with Graphics.

Unit-5 : Monitoring Mouse activity - File Handling - File System Controls - File System Objects - COM/OLE - automation - DLL Servers - OLE Drag and Drop.

1. Recommended Texts :

1. Gary Cornell - Visual Basic 6 from the Ground up - Tata McGraw Hill - 1999.
2. Noel Jerke - Visual Basic 6 (The Complete Reference) - Tata McGraw Hill – 1999

SEMESTER – VI

Core Paper- XVII :WEB TECHNOLOGY
Objective of the course :This course introduces the concepts of ASP, VB Script, Java Script.
Unit 1: Introduction to VBScript - Adding VBScript Code to an HTML Page - VB Script Basics - VBScript Data Types - VBScript Variables - VBScript Constants - VBScript Operators – mathematical- comparison-logical - Using Conditional Statements - Looping Through Code - VBScript Procedures – type casting variables - math functions –date functions – string functions –other functions - VBScript Coding Conventions - Dictionary Object in VBScript - Err Object
Unit-2: Introduction to Javascript – Advantages of Javascript – Javascript syntax - Data type –Variable - Array – Operator & Expression – Looping – control structures - Constructor Function – user defined function Dialog Box .
Unit 3: Javascript document object model – Introduction – Object in HTML – Event Handling – Window object – Document object – Browser object – Form object – Navigator object – Screen object – Build in object – User defined object – Cookies.
Unit-4: ASP.NET Language Structure – Page Structure – Page event , Properties & Compiler Directives . HTML server controls – Anchor, Tables, Forms, Files . Basic Web server Controls – Label, Text box, Button, Image Links, Check & radio Button, Hyperlink, Data List Web Server Controls – Check box list. Radio button list, Drop down list, List box, Data grid, Repeater.
Unit-5: Request and Response Objects, Cookies, Working with Data – OLEDB connection class, command class, transaction class, data adaptor class, data set class. Advanced issues – email, Application issues, working with IIS and page Directives , error handling. Security – Authentication, IP Address, Secure by SSL & Client Certificates

1.Recommended Texts :

- i.)I.Bayross, 2000, Web Enable Commercial Application Development Using HTML, DHTML, Javascript, Perl CGI, BPB Publications.
- ii.) A.Russell Jones, Mastering Active Server Pages 3, BPB Publications.

2. Reference Books:

- i.) HathleenKalata, Internet Programming with VBScript and JavaScript, Thomson Learning
- ii.) Mike McGrath, XML Harness the Power of XML in easy steps, Dreamtech Publications
- iii) T.A. Powell, 2002,Complete Reference HTML , TMH.
- iv) J.Jaworski, 1999, Mastering Javascript, BPB Publications.
- v) Powell, Thomas; Schneider, Fritz, **JavaScript: The Complete Reference, 2nd edition**2004, TMH

Core Paper - XVIII : DATA COMMUNICATION AND NETWORKING
Objective of the course :This course introduces the concepts of Networking
Unit-1: Introduction to Data Communication, Network, Protocols & standards and standards organizations - Line Configuration - Topology - Transmission mode - Classification of Network - OSI Model - Layers of OSI Model.
Unit-2: Parallel and Serial Transmission - DTE/DCE/such as EIA-449, EIA-530, EIA-202 and x.21 interface - Interface standards - Modems - Guided Media - Unguided Media - Performance - Types of Error - Error Detection - Error Corrections.
Unit-3: Multiplexing - Types of Multiplexing - Multiplexing Application - Telephone system - Project 802 - Ethernet - Token Bus - Token Ring - FDDI - IEEE 802.6 - SMDS - Circuit Switching - Packet Switching - Message switching - Connection Oriented and Connectionless services.
Unit-4: History of Analog and Digital Network - Access to ISDN - ISDN Layers - Broadband ISDN - X.25 Layers - Packet Layer Protocol - ATM - ATM Topology - ATM Protocol.
Unit-5: Repeaters - Bridges - Routers - Gateway - Routing algorithms - TCP/IP Network, Transport and Application Layers of TCP/IP - World Wide Web

1. Recommended Texts :

- i) .Behrouz and Forouzan,2001,Introduction to Data Communication and Networking, 2ndEdition, TMH.

2. Reference Books:

- i.) Jean Walrand 1998,Communication Networks (A first Course),Second Edition, WCB/McGraw Hill.
- ii). Behrouz and Forouzan,2006,Data Communication and Networking,3rd Edition, TMH.

Core Paper – XIX :SOFTWARE TESTING
Objective of the course :This course introduces the basic concepts of software testing
Unit-1: Introduction: Purpose – Productivity and Quality in Software – Testing Vs Debugging – Model for Testing – Bugs – Types of Bugs – Testing and Design Style.
Unit-2: Flow/Graphs and Path Testing – Achievable paths – Path instrumentation – Application – Transaction Flow Testing Techniques
Unit-3: Data Flow Testing Strategies - Domain Testing: Domains and Paths – Domains and Interface Testing .
Unit-4: Linguistic –Metrics – Structural Metric – Path Products and Path Expressions. Syntax Testing – Formats – Test Cases .
Unit-5: Logic Based Testing – Decision Tables – Transition Testing – States, State Graph, State Testing.

1. Recommended Texts

- i. B. Beizer , 2003, Software Testing Techniques, II Edn., DreamTech India, New Delhi.
- ii. K.V.KK. Prasad , 2005, Software Testing Tools, DreamTech. India, New Delhi.

2. Reference Books

- i. Burnstein, 2003, Practical Software Testing, Springer International Edn.
- ii. E. Kit, 1995, Software Testing in the Real World: Improving the Process, Pearson Education, Delhi.
- iii. R.Rajani, and P.P.Oak, 2004, Software Testing, Tata Mcgraw Hill, New Delhi.

Core Paper -XX :Practical – VI : WEB APPLICATIONS LAB

Objective of the course :**This course gives training** in web design and applications.

VB SCRIPT & JAVASCRIPT

1. Write a program outputs the squares, roots, cubes and complements of integers between 1 and 100.
2. Create a calculator.
3. Write a script to Sort numbers and strings
4. Create a program to generate a hit counter
5. Create a program to verify whether email address provided by user is valid or invalid.
6. Write a program to scroll the text on status bar.
7. The form consists of two multiple choice list and one single choice list
 - a. the first multiple choice list display the major dishes available.
 - b. the second Multiple choice list display the stocks available.
 - c. The single choice list display the miscellaneous
(Milkshakes, soft drinks, softy available etc.)
8. Write a script to create a digital clock.
9. Create a web page using two image file which switch black and white one another as the mouse pointer moves over the image. Use the On Mouse over and On Mouse event, on Dblclick handler
10. Build a WWW page with an image and 3 buttons., Pick three favorite graphics, Label the buttons and make each one swap in the graphic you have chosen
11. Create a frameset that has two frames, side by side. Make the left-hand frame contain a form with 3 radio buttons

The buttons should be for three search engines:

- Yahoo (<http://www.yahoo.com>)
- Altavista (<http://www.altavista.com>)
- Infoseek (<http://www.infoseek.com>)

When the user clicks on of the option buttons, the frame on the right hand side should be loaded with the right search engine.

12. Write a program to implement Employee database with all validation

ASP

1. Create a login form, to expire, if the user does not type the password within 100 seconds
2. Create an employee database and manipulate the records using command object in ASP
3. Develop an application to illustrate the usage of Request and Response Objects in ASP.
4. Write an ASP program using Request Object to give the exact list of headers sent by the browser to the Web server.
5. Create an Active Server Page to display the records one by one from a student database. The student database should contain roll no, name, marks & total.
6. Design an ASP application that describes books in the Online Bookshop.(Use AD Rotator Component, Content Rotator Component, Content Linking Component)
7. Create a document and add a link to it. When the user moves the mouse over the link it should load the linked document on its own (User is not required to click on the link).
8. Create a document, which opens a new window without a toolbar, address bar, or a status bar that unloads itself after one minute.
9. Create a document that accepts the user's name in a text field form and displays the same the next time when the user visits the site informing him that he has accessed the site for the second time, and so on.

Elective –II: MULTIMEDIA SYSTEMS

Objective of the course :This course gives an exposure to Multimedia and its applications.

Unit-1:What is Multimedia: Definitions - CD-ROM and the Multimedia Highway - Where to use Multimedia - Introduction to Making Multimedia: The stages of a Project - What You Need – Multimedia Skills and Training: The team - Macintosh and Windows Production Platforms: Macintosh Versus PC - The Macintosh Platform - The Windows Multimedia PC Platform - Networking Macintosh and Windows Computers-Hardware Peripherals: Connection - Memory and Storage Devices - Input Devices - Output Hardware - Communication Devices.

Unit-2:Basic Tools: Text Editing and Word Processing Tools - OCR Software - Painting and Drawing Tools - 3-D Modeling and Animation Tools - Image-Editing Tools - Sound Editing Tools - Animation, Video and Digital Movie Tools - Helpful Accessories - Making Instant Multimedia: Linking Multimedia Objects - Office Suites - Word Processors - Spreadsheets - Databases - Presentation Tools. Multimedia Authoring Tools: Types of Authoring Tools - Card-and-Page-Based Authoring Tools - Icon-Based Authoring Tools - Time-Based Authoring Tools - Object-Oriented Authoring Tools - Cross-Platform Authoring Notes

Unit-3:Text: The Power of Meaning - About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext - Sound: The Power of Sound - Multimedia System Sounds - MIDI Versus Digital Audio - Digital Audio - Making MIDI Audio - Audio File Formats - Working with Sound on the Macintosh - Notation Interchange File Format (NIFF) - Adding Sound to Your Multimedia Project - Toward Professional Sound: The Red Book Standard - Production Tips

Unit-4:Images: Making Still Images -Color - Image File Formats. Animation: The Power of Motion - Principles of Animation - Making Animations That Work -Video: Using Video - How Video works - Broadcast Video Standards - Integrating Computers and Television - Shooting and Editing Video - Video Tips - Recording Formats - Digital Video.

Unit-5:Planning and Costing : Project Planning - Estimating - RFPs and Bid Proposals - Designing and Producing : Designing - Producing - Content and Talent : Acquiring Content - Using Content Created by Others - Using Content Created for a Project - Using Talent - Delivering : Testing - Preparing for Delivery - Delivering on CD-ROM - Compact Disc Technology - Wrapping It Up - Delivering on the World Wide Web.

Recommended Texts:

1. Tay Vaughan - Multimedia: Making it Work. - Fourth Edition - Tata McGraw Hill Edition - 1999.
2. Walterworth John A - Multimedia Technologies and Application - Ellis Horwood Ltd. - London - 1991.
3. John F Koegel Buford - Multimedia Systems - Addison Wesley - First Indian Reprint - 2000.
