HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B.C.A. Semester – IV
BCA-401 : Data Structure

Teaching Scheme (Per week)		Teaching Scheme (Per semester)		Examination Scheme					
				INT		EXT		TOTAL	
Th. (hours)	Pr. (hours)	Total Hours	Credit	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)
4	--	40	4	30	--	70	--	100	--

Unit - I [18 Marks]
Introduction to Data Structure.
Data Structure: Primitive and Non-Primitive Data Structure, Linear and Non-Linear Data Structure, Time and Space efficiency of the Algorithm. String Manipulation – String Length, String copy, String Compare, String Concatenation, string find

Unit - II [17 Marks]
Linear Data Structures
Arrays, Stacks, Queue, Singly Linked List, Circular Linked List, Doubly Linked List, Applications of Linked List, Reverse a List, Merge a List, Concept of Multi linked Structure

Unit - III [18 Marks]
Non linear Data Structures
Tree Structure, General Tree, Binary Tree, Tree Traversal Algorithms, Copy, Insert & Delete Algorithms, Threaded Tree (Excluding Algorithms), B-Tree and B+ Tree (Excluding Algorithms), AVL Tree (Excluding Algorithms), Height Balanced Tree (Excluding Algorithms), Weight Balanced Tree (Excluding Algorithms), Graph and Networks : Concept, BFS Algorithm, DFS Algorithm

Unit - IV [17 Marks]
Sorting, Searching and File Structure
Sorting: Selection, Bubble, Insertion, Shell, Quick, and Radix. **Searching:** Sequential and Binary Search. **File Organization**: Introduction, Sequential, Index, Direct, Inverted Organizations and their applications, Hashing Function and Collision Processing

Text Book:

1. **An Introduction to Data Structure with Applications 2nd Edition**,
Tremblay J. and Sorenson P., McGraw-Hill international Edition,
2. **Introduction to Data Structure**, Bhagat singh and Thomas Naps: Tata McGraw-Hill Publishing Co. Ltd., 1985.
3. **Expert Data Structure with C**, R. B. Patel, Khanna books.

Question Paper Scheme:

University Examination Duration: 3 Hours.

Q.1 - Unit-I   (18 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.2 - Unit-II   (17 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.3 - Unit-III   (18 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.4 - Unit-IV   (17 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.

Note: All Objective/ Short Questions are compulsory, no option will be given.

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B.C.A. Semester – IV
BCA-402 : GUI Programming using Visual Basic

Teaching Scheme (Per week)		Teaching Scheme (Per semester)		Examination Scheme					
				INT		EXT		TOTAL	
Th. (hours)	Pr. (hours)	Total Hours	Credit	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)
4	--	40	4	30	--	70	--	100	--

Unit - I [18 Marks]

Client Server Basics: Discover Client-Server And Other Computing Architectures, Understand File Server Versus Client-Server Database Deployment, Learn About the Two Tier Versus Three Tire Client-Server Model, **Visual Basic Building Blocks And Default Controls:** Forms, Using Controls, Exploring Properties, Methods And Events, Introduction To Intrinsic Controls, Working With Text, Working With Choices, Special Purpose Controls, VB Advance Controls: Events, Menu bar, Popup Menus, Tool bar, Message Box, Input Box, Built-in Dialog Boxes, Creating MDI, Working with Menus

Unit - II [17 Marks]

VB Programming Fundamentals And Variables: Introduction to Variables, Variable Declaration, Arrays, Introduction to Constants And Option Explicit Statement, Assignment Statements, Working With Math Operations, Strings, Formatting Functions, **Controlling And Managing Program:** All Control Statements, Loops, Error Trapping, Working With Procedures, Functions, Controlling How Your Program Starts, **Common controls and control arrays:** Introduction to common controls- Tree view, list view, tab strip, Creating and working with control arrays.

Unit - III [18 Marks]

Visual Basic and databases: Understanding the Data Controls And Bound Controls, Introduction to Data Form Wizard, Introduce DAO, Working With Record sets, Record Pointer, Filters, Indexes, Sorts And Manipulation of Records. **Remote And ActiveX Data Objects**: Working With ODBC, Remote Data Objects And Remote data Control, Introducing ADO, ADO Data Control, Using Data Grid Control And ActiveX Data Objects. **ActiveX Controls, Extending ActiveX Controls And Classes:** Creating, Testing, Compiling, Enhancing And User Drawn ActiveX Controls, Using ActiveX Control Interface Wizard And Property Pages Wizard, Introducing Ambient, Extender Objects, Creating Property Pages, Building Class Modules, ActiveX DLL.

Unit - IV [17 Marks]

Client-Server Development Tools: COM, Services Models, Development Tools Included with VB 6, Working With SourceSafe Projects. **Reports and Packaging:** Data Reports and Crystal Reports, Packaging A Standard EXE Project

Text Book:

1. **Visual Basic 6 Client/Server How-To**, JARKE (TACHMEDIA)
2. **Using Visual Basic 6,** SILER (TMH)

Question Paper Scheme:

University Examination Duration: 3 Hours.

Q.1 - Unit-I   (18 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.2 - Unit-II   (17 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.3 - Unit-III   (18 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.4 - Unit-IV   (17 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.

Note: All Objective/ Short Questions are compulsory, no option will be given.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B.C.A. Semester – IV
BCA-403 : System Analysis and Design

Teaching Scheme (Per week)		Teaching Scheme (Per semester)		Examination Scheme					
				INT		EXT		TOTAL	
Th. (hours)	Pr. (hours)	Total Hours	Credit	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)
4	--	40	4	30	--	70	--	100	--

Unit - I   **[18 Marks]**

System definition: Need for system development, Types of system, Types of user ,System development strategies. **SDLC, Structured Analysis Development Strategy:** Physical and Logical DFD, Data Dictionary. **System Prototype Method:** Role of system analyst, System investigation:- Fact Finding Techniques, Tools for Documenting Procedures & Decision. **Decision Tree, Decision Table, Structured English**

Unit - II   **[17 Marks]**
   Code design,
   Form design,
   Input design,
   Output design,
   Computer Aided system tools

Unit - III   **[18 Marks]**

   System Engineering and Quality Assurance: Design of software, Software design and documentation tools: Structure Flowchart, HIPO, Warier /Orr Diagrams. Testing, Documentation, **Managing System Implementation**

Unit - IV   **[17 Marks]**
   Case Studies
   Financial Accounting System,
   Payroll System,
   Library System,
   Inventory / Stock System,
   Billing System,
   Online Banking System,
   Railway Reservation System,
   (Input, Output, DFD)

Text Book:

1. **Analysis & Design of Information Systems,** James A. Senn
2. **System Analysis & Design, 1st Edition,** S.Parthasarthy & B.W.Khalkar
3. **Introduction to S.A.D,** LEE VOL. 1 & 2

Question Paper Scheme:

University Examination Duration: 3 Hours.

Q.1 - Unit-I   (18 Marks)
      A. Objective/ Short Questions.
      B. Descriptive/ Long questions.
Q.2 - Unit-II   (17 Marks)
      A. Objective/ Short Questions.
      B. Descriptive/ Long questions.
Q.3 - Unit-III   (18 Marks)
      A. Objective/ Short Questions.
      B. Descriptive/ Long questions.
Q.4 - Unit-IV   (17 Marks)
      A. Objective/ Short Questions.
      B. Descriptive/ Long questions.

Note: All Objective/ Short Questions are compulsory, no option will be given.

HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B.C.A. Semester – IV
Elective-II : BCA-404 : Operating System

Teaching Scheme (Per week)		Teaching Scheme (Per semester)		Examination Scheme					
				INT		EXT		TOTAL	
Th. (hours)	Pr. (hours)	Total Hours	Credit	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)
4	--	40	4	30	--	70	--	100	--

Unit - I [18 Marks]

Operating System: Definition and Meaning of Operating System, Functions of Operating System, User interface(CUI,GUI), classifying operating systems, **Operating System Structure :** Monolithic Systems, Layered Systems, Kernel, Client-Server Model. **Additional Concept**: Buffering, Spooling (simultaneous Peripheral Operation Online).

Unit - II [17 Marks]

Process: Introduction, Process States, Process Control Block (PCB), Scheduling Queue.
Schedulers: Long-term schedulers, Medium-term schedulers, Short-term schedulers, Context Switch. **Process Scheduling Algorithms** (non-preemptive: FCFS, SJF and preemptive: SJF, Round-Robin (RR), Priority Based / Event Driven (ED), Multi-Level Queue (MLQ)), **Measuring Performance of Computer System :** Throughput, Turnaround time, Response time, Waiting Time, CPU burst.

Unit - III [18 Marks]

Thread: Introduction, Processes & Threads, Process / Thread Synchronization, Critical Section, Semaphore. **Deadlock:** Definition, Causes for Deadlock, Deadlock situations, **Method for Handling Deadlocks:** Deadlock prevention, Deadlock avoidance, Deadlock Detection, Deadlock Recovery.

Unit - IV [17 Marks]

Memory-Management Unit, Memory Management Schemes: Program Initiation, Contiguous Memory Management, Memory Fragmentation, Memory Placement Policy / free partition allocation techniques, Non-Contiguous Memory Management, Paging: Address Translation Unit (ATU), Segmentation, Demand Paging, Page Fault and its solution,

Text Book:

1. Operation System Principal, Abraham Silberscats, Peterbare Galvin, Greg gagne
2. The Complete Reference, Richard L. Petersen

Question Paper Scheme:

University Examination Duration: 3 Hours.

Q.1 - Unit-I   (18 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.2 - Unit-II   (17 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.3 - Unit-III   (18 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.4 - Unit-IV   (17 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.

Note: All Objective/ Short Questions are compulsory, no option will be given.

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HEMCHANDRACHARYA NORTH GUJARAT UNIVERSITY, PATAN

B.C.A. Semester – IV
Elective-II : BCA-404 : Computer Graphics

Teaching Scheme (Per week)		Teaching Scheme (Per semester)		Examination Scheme					
				INT		EXT		TOTAL	
Th. (hours)	Pr. (hours)	Total Hours	Credit	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)	Th. (marks)	Pr. (marks)
4	--	40	4	30	--	70	--	100	--

Unit - I **[18 Marks]**

Overview of Graphics System : Application of computer graphics ,Video Display Devices, Refresh Cathode-Ray Tubes, Raster-scan Displays, Random-Scan Displays, Color CRT Monitors, Raster-Scan System, Random-Scan System, Graphics Monitors and workstations, Input Devices. Hard Copy Devices, Graphics Software.

Unit - II **[17 Marks]**

Output Primitives and Attributes of Output Primitives: Output Primitives Points and Lines, Line Drawing Algorithms, Circle Generating Algorithms, Scan-Line Polygon Fill Algorithm, Inside-Outside tests, Boundary-Fill Algorithm, Flood Fill Algorithm, Cell Array, Character Generation **Attributes of Output Primitives:** Line attributes ,Color and Grayscale Levels, Area fill Attributes, Character Attributes, Bundled Attributes.Antialiasing

Unit - III **[18 Marks]**

Two-Dimension Geometric Transformation: Basic Transformation, Translation, Rotation, Scaling, Matrix Representation and Homogeneous Coordinates, **Composite transformations**: Translation, Rotation, Scaling. **Other Transformation**: Reflection and shear.

Unit - IV **[17 Marks]**

Two Dimensional Viewing : The Viewing Pipeline, Viewing Coordinate Reference Frame, Window-to-View port Coordinate Transformation, Two-Dimensional Viewing Function, Clipping Operation, Point Clipping, Line Clipping, Polygon Clipping, Curve Clipping, Text Clipping.

Text Book:

1. **Computer Graphics**, Donald Hearn, M. Pauline Baker,

Question Paper Scheme:

University Examination Duration: 3 Hours.

Q.1 - Unit-I   (18 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.2 - Unit-II   (17 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.3 - Unit-III   (18 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.
Q.4 - Unit-IV   (17 Marks)
    A. Objective/ Short Questions.
    B. Descriptive/ Long questions.

Note: All Objective/ Short Questions are compulsory, no option will be given.