Course	BCA	Part III	Core I	Semester	I
Major	CA	C Programming		Credit	6
				Hours	6

Objective

To impart the features and syntax of the C Programming language and to train the students to write efficient programs.

UNIT I

Structure of C Program – Character Set – Tokens – Keywords and Identifiers – Constants – Variables – Data Types – Declaration of Variables – Assigning Values to Variables – Defining Symbolic Constants – Declaring a Variable as Constant.

UNIT II

Operators: Arithmetic – Relational – Logical – Assignment – Increment and Decrement – Conditional – Bitwise – Special – Precedence of Arithmetic Operators. Arithmetic Expressions – Evaluation of Expressions. Input and Output Operations: Reading and Writing a Character – Formatted Input and Output.

UNIT III

Branching: Simple If Statement – The If…Else Statement – The Else If Ladder – The Switch Statement – The ?: Operator – The Goto Statement. Looping: While – Do – For Statements.

UNIT IV

Arrays: One-Dimensional Arrays – Declaration and Initialization – Two Dimensional Arrays. Strings: Declaration and Initialization – Reading and Writing Strings. User Defined Functions: Defining and Declaring Functions – Return Values and their Types – Function Calls – Recursion.

UNIT V

Structures: Defining a Structure – Declaration and Initialization – Accessing Structure Members – Pointers: Understanding Pointers – Accessing the Address of a Variable – Declaring and Initializing Pointer Variables – Files: Defining, Opening and Closing a File.

Text Book:

1. E. Balagurusamy, Programming in ANSI C, Tata McGraw Hill Fourth Edition.

Reference Book:

1. Programming with C, Ravichandran, New Age International Company, New Delhi.

Course	BCA	Part IV	Skill-Based Elective - I	Semester	I
Major	CA	Fundamentals of Computer Science		Credit	2
				Hours	2

Objective

To impart the introductory concepts of computer and programming concepts.

UNIT I

Introduction to Computers: Evolution of Computers – Generation of Computers – Classification of Computers: Analog, Digital and Hybrid Computers.

UNIT II

Classification of Computers: Super Computers, Main Frame Computers, Personal Computers & Types – Terminals & Types – Characteristics of Computers – Block Diagram of a Digital Computer.

UNIT III

Introduction to Number System: Decimal, Binary, and Hexadecimal – Number System Conversion: Decimal to Binary – Binary to Decimal – Binary 1's Complement and 2's Complement – 3 Bit Binary Negative Numbers – Floating Point Numbers: Mantissa and Exponent – ASCII Code.

UNIT IV

Memory: Memory Hierarchy – Primary Memory: Volatile and Non-Volatile Memory – RAM and ROM – Input / Output Devices: Input Devices: Keyboard and Mouse – Output Devices: VDU, Printers.

UNIT V

Introduction to Programming Concepts: Types of Programming Languages – Software – Applications Software and System Software – Structured Programming – Algorithms – Procedures and Flowchart with Simple Examples.

Text Book:
1. Rajaraman V. – Fundamentals of Computers, 2nd Edition, Prentice Hall India Limited.

Course	BCA	Part III	Core II - Practical	Semester	I & II
Major	CA	Data Structures Using C Lab		Credit	4
				Hours	4

1.   Write a program to find whether the given number is odd or even.

2.   Write a program to find the roots of a quadratic equation (Using If).

3.   Write a program to find the biggest of three given numbers.

4.   Write a program to find the sum of the digits of a given number using looping structure.

5.   Write a program to sort the given set of numbers using single dimensional array.

6.   Write a program to perform matrix addition and subtraction.

7.   Write a program to perform string manipulation.

8.   Write a program to find the sum of all elements using pointers.

9.   Write a program to implement the following:

   a) Bubble Sort   b) Selection Sort

   c) Quick Sort   d) Insertion Sort

10. Write a program to implement a) Linear Search   b) Binary Search

11. Write a program to implement a) Stack Operation   b) Queue Operation

12. Write a program to implement the concept of singly-linked list.

Course	BCA	Part III	Core III	Semester	II
Major	CA	Data Structures		Credit	6
				Hours	6

Objective

To understand the concepts of data structures and its operations.

UNIT I

Introduction – Basic Terminology – Data Structures – Data Structure Operations – Arrays: Linear Arrays – Representation of Linear Arrays in Memory – Traversing Linear Arrays – Inserting and Deleting.

UNIT II

Linked Lists – Representation of Linked Lists in Memory – Traversing a Linked List – Searching a Linked List – Garbage Collection – Insertion into a Linked List – Deletion from a Linked List – Header Linked Lists – Two-way Lists.

UNIT III

Stacks – Array Representation of Stacks – Linked Representation of Stacks – Arithmetic Expressions – Traversal Algorithms using Stacks – Queues – Linked Representation of Queues – Deques – Priority Queues.

UNIT IV

Trees: Binary Trees – Representing Binary Trees in Memory – Traversing Binary Trees – Binary Search Trees – Searching and Inserting in Binary Search Trees – Deleting in a Binary Search Tree.

UNIT V

Graphs: Sequential and Linked Representation of a Graph – Traversing a Graph – Sorting: Insertion Sort – Selection Sort – Merge Sort – Radix Sort.

Text Book:

Seymour Lipschutz, Data Structures, Tata McGraw – Hill Publishing Company Limited, New Delhi, 2006.

UNIT I: Chapter 1 (Sections 1.1 to 1.4) and Chapter 4 (Sections 4.2 to 4.5)
UNIT II: Chapter 5 (Sections 5.2 to 5.10)
UNIT III: Chapter 6 (Sections 6.2 to 6.5 and 6.10 to 6.13)
UNIT IV: Chapter 7 (Sections 7.2 to 7.5 and 7.7 to 7.9)
UNIT V: Chapter 8 (Sections 8.3, 8.5 and 8.7) and Chapter 9 (Sections 9.3, 9.4, 9.6 and 9.7)

Reference Book:

A. Chitra and P.T. Rajan, Data Structures, Tata McGraw – Hill Publishing Company Limited, New Delhi.

Course	BCA	Part III		Core IV	Semester	III
Major	CA	Database Management Systems			Credit	4
					Hours	4

Objective
To provide the concepts of database management systems and relational database.

UNIT I
Database Management Systems (DBMS): Data and Data Management − File Based Data Management − Functions of DBMS − Components of a DBMS − Database Users. Database Architecture and Design: Data Abstraction − Data Independence − Database Languages − Database Design − Design Constraints. Data Models: Hierarchical − Network − Relational − Object-Oriented − Entity-Relationship (E-R) Modelling: E-R Model − Components − Relationships − Diagrams.

UNIT II
Relational Database Management Systems: Terminology − The Relational Data Structure − Data Normalization: Pitfalls in Relational Database Design − Decomposition − Functional Dependencies − Normalization − Keys − First Normal Form − Second Normal Form − Third Normal Form − Boyce-Codd Normal Form.

UNIT III
Structured Query Language (SQL): Characteristics − Advantages − Types of SQL Commands − SQL Operators − Tables and Views − Queries and Sub Queries − Aggregate Functions − Insert, Update and Delete operations − Joins and Unions.

UNIT IV
Files, File Organization and File Structures: Operations on Files − File Storage Organization − Physical Storage Media − File Structure − Record Types − Indexing and Hashing. − Database Security: Data Security Risks − Data Security Requirements − GRANT command − REVOKE command.

UNIT V
Transaction Management and Concurrency Control: Transactions − ACID Properties − Transaction States − Concurrency Control − Serializability − Recoverability − Concurrency Control Schemes − Transaction Management in SQL − Transactions and Recovery − User-defined Transactions − The COMMIT, ROLLBACK and SAVEPOINT Commands.

Text Book: Alexis Leon & Mathews Leon, Essentials of Database Management Systems, McGraw-Hill Education (India) Pvt. Limited, 2009.
UNIT I: Chapter 1 (Sections 1.2 to 1.3, 1.8 to 1.9, and 1.11), Chapter 2 (Sections 2.3, 2.5 to 2.8), Chapter 3 (Sections 3.4 to 3.6), Chapter 4 (Sections 4.2 to 4.3, 4.5 and 4.8).
UNIT II: Chapter 6 (Sections 6.2–6.3), Chapter 8 (Sections 8.2 to 8.6, 8.8 to 8.11).
UNIT III: Chapter 12 (Sections 12.2 to 12.5), Chapter 13 (Sections 13.1 and 13.2), Chapter 14 (Sections 14.1 to 14.2), Chapters 15, 16 and 17.
UNIT IV: Chapter 20 (Sections 20.2 to 20.4, 20.9 to 20.10), Chapter 21 (Sections 21.2 to 21.3), Chapter 22 (Section22.3, 22.5, and 22.8)
UNIT V: Chapter 23 (Sections 23.2–23.3, 23.5–23.15).
Reference Book: Rajesh Narang, Database Management Systems. PHI Learning (P) Ltd, New Delhi, 4th Printing 2009.

Course	BCA	Part III	Major Elective - I	Semester	III
Major	CA	Computer Organization and Architecture		Credit	4
				Hours	4

Objective

To impart knowledge about the various digital components used in the design of digital computers. To understand the organization and architecture of the central processing unit.

UNIT I

Digital Logic: The Basis Gates – NOT, OR, AND – Universal Logic Gates – NOR, NAND - Combinational Logic Circuits: Boolean Laws and Theorems – Sum of Products Method – Product of Sums Method - Truth Table to Karnaugh Map – Pairs, Quads and Octets – Karnaugh Simplification.

UNIT II

Data Processing Circuits: Multiplexers – Demultiplexers – Decoders – Encoders – Arithmetic Circuits: Arithmetic Building Blocks – Half Adder and Full Adder - The Adder Subtract or – Fast Adder (Parallel Adder).

UNIT III

Flip-Flops: SR Flip-Flop – D Flip-Flop – JK Flip-Flop – T Flip-Flop – Shift Registers – Binary Counters – Asynchronous and Synchronous Counters.

UNIT IV

Register Transfer and Micro Operations: Register Transfer Language – Register Transfer – Logic Micro Operations – Shift Micro Operations – Arithmetic Logic Shift Unit.

UNIT V

Central Processing Unit: General Register Organization – Stack Organization – Instruction Formats – Addressing Modes.

Text Book:

1. Donald P. Leach and Albert Paul Malvino, Goutam Saha, Digital Principles and Applications, TMH, Sixth Edition, 2006.

UNIT I: Chapter 2 (Sections 2.1and 2.2) and Chapter 3 (Sections 3.1 to 3.5 and 3.7)
UNIT II: Chapter 4 (Sections 4.1 to 4.3 and 4.6) and Chapter 6 (Sections 6.7 to 6.9).

2. Morris Mano M, Computer System Architecture, Third Edition, 2011.

UNIT III: Chapter 1 (Section 1.6) and Chapter 2 (Sections 2.5 and 2.6)
UNIT IV: Chapter 4 (Sections 4.1, 4.2 and 4.5 to 4.7)
UNIT V: Chapter 8 (Sections 8.2 to 8.5)

Reference Book:

Thomas C. Bartee, Digital Computer Fundamentals, Tata McGraw Hill, 6th Edition, 25th Reprint, 2006.

Course	BCA	Part IV	Skill-Based Elective – II	Semester	III
Major	CA	Office Automation		Credit	2
				Hours	2

Objective
To impart the basic concepts of office packages.

UNIT I
MS-Word: Word Basics – Starting Word – Creating Documents – Parts of the Word Window – Mouse Operations – Keyboard Operations – The Most Important Keys.

UNIT II
Formatting Features – Menus – Toolbars and their Icons – Word Formatting Toolbar – Creating Tables – Insert Picture.

UNIT III
MS-Excel: Excel Basics – Menus, Commands, Toolbars and their Icons – Entering Text in Cells – Columns Width – Series Fill – Entering Formulas – Formatting Cells – Formatting Date Range – Creating a Chart – Functions.

UNIT IV
MS-Power Point: Menus – Toolbar – Creating a New Presentation and a New Slide – Deleting and Copying a Slide – Slide Numbering – Inserting Picture and Text – Organization Chart.

UNIT V
MS-Access: Creating a New Database – Creating a Database through Table Wizard – Creating a New Table – Rename Columns – Saving the Database.

Text Book:
Sanjay Saxena, MS Office 2000 for Everyone, Vikas Publishing, 2007.

Reference Book:
Archana Kumar, Computer Basics with Office Automation, First Edition, 2010.

Course	BCA	Part III	Core V - Practical	Semester	III & IV
Major	CA	Java with SQL Lab		Credit	4
				Hours	4

SQL: Data Definition Languages

Table Creation - Primary Key, Candidate key
Table Alteration - Rename table and Column name, Add Column, Drop column, Modify Column size and Data type
Drop Table

SQL: Data Manipulation Languages

Insertion
Updates
Deletion
String Operations
Set Operations
Tuple Variables
Aggregate Functions with Grouping and Having Clause
Ordering Tuples
Nested Sub queries
Join Operations
Views

Java Programs
1.   Write a program to demonstrate while and do while loop.

2.   Write a program to demonstrate for loop.

3.   Write a program to find area of rectangle using class and object.

4.   Write a program to illustrate the method overloading.

5.   Write a program to demonstrate the various methods in string and string buffer class.

6.   Write a program to find area and volume of rectangle using inheritance.

7.   Write a program to implement the concept of packages.

8.   Write a program to create multiple threads using thread class.

9.   Write a program to implement the concept of exception handling.

10. Write a program to copy a files one into another.

11. Write a program to display a text in the applet window using Applet.

12. Write a program to display geometrical objects using Applet.

Course	BCA	Part III	Core VI	Semester	IV
Major	CA	Java Programming		Credit	6
				Hours	6

Objective

To understand the basic concepts of object oriented programming with Java language.

UNIT I

Java Evolution: Java Features – Java Support Systems – Java Environment – Overview of Java Language: Simple Java Program – Java Program Structure – Java Tokens – Implementing a Java Program – Java Virtual Machine – Command Line Arguments – Constants, Variables and Data types – Operators and Expressions – Branching and Looping.

UNIT II

Classes, Objects and Methods: Defining a Class – Creating Objects – Accessing Class Members – Constructors – Method Overloading – Static Members – Inheritance: Extending a Class – Overriding Methods – Arrays, Strings and Vectors: One-dimensional Arrays – Creating an Array – Two-dimensional Arrays – Strings.

UNIT III

Interfaces: Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables – Packages: Java API Packages – Creating and Accessing a Package – Using a Package – Adding a Class to a Package – Multithreaded Programming: Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread.

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UNIT IV

Managing Errors and Exceptions: Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Managing Input / Output Files in Java: Stream Classes – Byte and Character Stream Classes – Creation of Files – Reading / Writing Characters.

UNIT V

Applet Programming: How Applets differ from Applications – Building Applet Code – Applet Life Cycle – Creating an Executable Applet – Applet Tag – Adding Applet to HTML File – Running the Applet – Graphics Programming: The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons.

Text Book: E. Balagurusamy, Programming With Java a Primer, TMH, Fourth Edition, 2010.

UNIT I: Chapter 2 (Sections 2.2, 2.8 & 2.9), Chapter 3 (Sections 3.2, 3.5, 3.6, 3.9 to 3.11), Chapter 4 (Sections 4.2 to 4.10), Chapter 5 (Sections 5.2 to 5.11) and Chapters 6 & 7.
UNIT II: Chapter 8 (Sections 8.2, 8.5 to 8.9, 8.11to 8.12) and Chapter 9 (Sections 9.2 to 9.5).
UNIT III: Chapter 10, Chapter 11 (Sections 11.2, 11.5 to 11.8) and Chapter 12 (Sections 12.2 to 12.5)
UNIT IV: Chapter 13 (Sections 13.2 to 13.6), Chapter 16 (Sections 16.3 to 16.5, 16.10 & 16.11)
UNIT V: Chapter 14 (Sections 14.2, 14.4 to 14.6, 14.8 to 14.10) and Chapter 15 (Sections 15.2 to 15.6).
Reference Book: P. Radha Krishna, Object Oriented Programming through Java, University Press (India) Private Ltd., 2007.

Course	BCA	Part IV	Non-Major Elective - I	Semester	IV
Major	CA	HTML Basics		Credit	2
				Hours	2

Objective
To provide programming skills using HTML.

UNIT I
Introduction to HTML: HTML Documents – Anchor Tag – Hyper Links.

UNIT II
Header Section – Title – Prologue – Link – Colorful Web Page – Comment Lines.

UNIT III
Body Section: Heading Printing – Aligning the Headings – Horizontal Rule – Paragraph – Tab Settings – Images and pictures.

UNIT IV
Lists: Unordered Lists – Ordered Lists.

UNIT V
Table Handling: Tables- Tables Creation in HTML – Width of the table and cell – Table width and Alignment of Cell elements – Colouring Cells – Column Specification.

Text Book:
1. C. Xavier, World Wide Web Design with HTML, Tata McGraw-Hill Publishing Company Limited, 2007.

Reference Book:
1. N.P. Gopalan, J. Akilandeswari, Web Technology – A Developer's Perspective, Prentice Hall of India Private Ltd, New Delhi, 2007.

Course	BCA	Part III	Core VII	Semester	V
Major	CA	Operating Systems		Credit	5
				Hours	6

Objective

To understand the fundamentals concepts of operating systems.

UNIT I

Basic Concepts and Terminologies – Operating System as Resource Manager – Process View Point – Hierarchical and Extended Machine View – I/O Programming – Interrupt Structure and Processing.

UNIT II

Memory Management – Single Contiguous Allocation – Example of Multiprogramming – Partitioned Allocation – Relocatable Partitioned Memory Management – Paged Memory Management – Demand Paged Memory Management – Segmented Memory Management

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UNIT III

Process Management – Process State Model – Job Scheduling – Process Scheduling – Process Synchronization.

UNIT IV

Device Management – Techniques – Device Characteristics – I/O Traffic Controller – I/O Scheduler and Device Handlers – Virtual Devices – Spooling.

UNIT V

Information Management – File System Model – Symbolic, Basic File System – Access Control Verification – Logical, Physical File System – Allocation Strategy, Device Strategy Modules.

Text Book: Stuart E. Madnick & John J. Donovan, Operating Systems, McGraw Hill International Book Co, New Delhi, 2016.

Reference Books:
1. Harvey M. Deitel, An Introduction to Operating Systems, Addison-Wesley Publishing Co., New York, 1984.
2. James L. Peterson & Abraham Silbertschatz, An Introduction to Operating Systems, Addison-Wesley Publishing Co., New York, 1987.

Course	BCA	Part III	Core VIII	Semester	V
Major	CA	Data Communications and Networking		Credit	4
				Hours	6

Objective

To understand the basic concepts of data communications. To impart knowledge about the functions of the OSI model.

UNIT I

Basic Concepts: Line Configuration – Topology – Transmission Media – Categories of Networks – Internetworks. The OSI Model: The Model – Functions of the Layers.

UNIT II

Transmission of Digital Data: Digital Data Transmission – DTE-DCE Interface – Modems. Transmission Media: Guided Media. Multiplexing: Frequency Division – Wave Division – Time Division.

UNIT III

Error Detection and Correction: Types of Errors – Detection – Redundancy Check: Vertical – Longitudinal – Cyclic – Checksum – Error Correction. Data Link Control: Line Discipline – Flow Control – Error Control – Data Link Protocols: Asynchronous and Synchronous Protocols – Character and Bit Oriented Protocols.

UNIT IV

Local Area Networks: Ethernet – Token Bus – Token Ring – FDDI – Switching: Circuit Switching – Packet Switching – Message Switching. Networking and Internetworking Devices: Repeaters – Bridges – Routers – Gateways. Routing Algorithms: Distance Vector Routing – Link State Routing.

UNIT V

Transport Layer: Duties of the Transport Layer – Connection – TCP/IP Protocol Suite: Domain Name System – File Transfer Protocol – Hypertext Transfer Protocol.

Text Book:

Behrouz A. Forouzan, Data Communications and Networking, Tata McGraw-Hill, Fourth Edition (2007).

UNIT I: Chapter 2 (Sections 2.1 to 2.5) and Chapter 3 (Sections 3.1 and 3.2)
UNIT II: Chapter 6 (Sections 6.1, 6.2 and 6.4), Chapter 7 (Section 7.1) and Chapter 8 (Sections 8.2 to 8.4)
UNIT III: Chapter 9 (Sections 9.1 to 9.7), Chapter 10 (Sections 10.1 to 10.3) and Chapter 11 (Sections 11.1 to 11.4)
UNIT IV: Chapter 12 (Sections 12.2, 12.4 to 12.6), Chapter 14 (Sections 14.1 to 14.3) and Chapter 21 (Sections 21.1 to 21.4 and 21.6 to 21.8)
UNIT V: Chapter 22 (Sections 22.1 and 22.2) and Chapter 25 (Sections 25.3, 25.5 and 25.9)

Reference Book:

William Stallings, Data and Computer Communication, PHI, Tenth Edition (2013).

Course	BCA	Part III		Core IX	Semester	V
Major	CA	Web Design			Credit	4
					Hours	6

Objective
To provide programming skills in HTML and JavaScript.

UNIT I
Introduction: History – HTML Documents – Anchor Tag – Hyper Links. Head Section: Header Section – Title – Prologue – Link – Colorful Web Page – Comment Lines – Body Section: Heading Printing – Aligning the Headings – Horizontal Rule – Paragraph – Tab Settings – Images and Pictures.

UNIT II
Lists: Unordered Lists – Ordered Lists. Table Handling: Tables – Tables Creation in HTML – Width of the Table and Cell – Table Width and Alignment of Cell Elements – Colouring Cells – Column Specification.

UNIT III
Introduction to Java Script – Placing JavaScript in an Html File: Using Html Script Tags – Creating Your First Script – Using External JavaScript Files – Using JavaScript Comments – Using Variables: Understanding Variables – Why Variables are Useful – Defining Variables for Your Scripts – Understanding Variable Types – Using Variables in Script – Writing a Page of JavaScript.

UNIT IV
Using Functions: What a Function is? – Why Functions are Useful – Structuring Functions – Calling Functions in Your Scripts – Java Script Operators: Understanding Operator Types – Understanding Mathematical Operators – Understanding Assignment Operators – Understanding Comparison Operator – Understanding Logical Operators.

UNIT V
Conditional Statements and Loop: Defining Conditional Statements – Using Conditional Statements – Defining Loops – Using Loops – Event Handlers: What is an Event Handler – Why Event Handlers are Useful – Learning the Event Handlers – Creating Scripts Using Event Handlers – Other Ways to Register Events.

Text Books:
1. C. Xavier, World Wide Web Design with HTML, Tata McGraw-Hill Publishing, New Delhi, 2007.
   UNIT I: Chapter 4, 5, 6   UNIT II: Chapter 7, 8
2. Java Script: A Beginner's Guide 3rd Edition, John Pollock, Tata MC Graw-Hill Edition 2010.
   UNIT III: Chapter 1, 2, 3   UNIT IV: Chapter 4, 5   UNIT V: Chapter 6, 7

Reference Books:
1. N.P. Gopalan, J. Akilandeswari, Web Technology – A Developer's Perspective, Prentice Hall of India Private Ltd, New Delhi, 2007.
2. 2. Ivan Bayross, Web Enabled commercial Application Development using.., 3rd Revised Edition, BPB publications New Delhi.

Course	BCA	Part III	Core X - Practical	Semester	V
Major	CA	Web Design Lab		Credit	4
				Hours	4

HTML

1. Design a HTML document describing you. Assign a suitable background design, background color and a text color.
2. Design a colourful web page of your home town with images and pictures.
3. Develop a HTML document which displays your country name as <h1> heading and displays its states name as hot text. When you click the states name, it opens another page, which tells about that state.
4. Design a web page of your favourite teacher, explaining his/her academic and personal facets and give suitable headings and horizontal rules. Design it in appropriate color.
5. Develop a HTML program to print the courses offered at your college using ordered and unordered lists.
6. Design a telephone bill using table tag and various font styles.

JAVASCRIPT

1. Write a JavaScript program to display the current day and time in the following format.
   Today is : Monday
   Current Time is : 4.05
2. Write a JavaScript program to find the area of a triangle by getting input from the user.
3. Write a JavaScript program to calculate multiplication and division of two numbers (input from user).
4. Write a JavaScript conditional statement to find the largest of five numbers. Display an alert box to show the result.
5. Write a JavaScript program to find the Armstrong numbers of 3 digits.
6. Write a JavaScript program to sort the items of an array.(any sorting technique)

Course	BCA	Part III	Major Elective – II	Semester	V
Major	CA	Software Engineering		Credit	4
				Hours	4

Objective

To provide the basic concepts and various phases involved in the software development.

UNIT I

Introduction: Definitions – Size, Quality and Productivity Factors – Planning a Software Project: Defining the Problem – The Phased Life-Cycle Model – The Cost Model - The Prototype Life-Cycle model – The Programming Team Structure.

UNIT II

Software Cost Estimation: Software Cost Factors – Software Cost Estimation Techniques – Software Requirements Definition: Software Requirements Specification – Formal Specification Techniques.

UNIT III

Software Design: Fundamental Design Concepts – Coupling and Cohesion – Design Notations – Design Techniques.

UNIT IV

Implementation Issues: Structured Coding Techniques – Coding Style – Standard and Guidelines – Documentation Guidelines.

UNIT V

Verification and Validation Techniques: Quality Assurance – Walkthroughs and Inspections – Unit Testing and Debugging – System Testing – Software Maintenance: Configuration Management – Source-code Metrics.

Text Book:

Richard Fairley, Software Engineering Concepts, Tata McGraw Hill Edition, 1997.

Reference Book:

Roger S. Pressman, Software Engineering-A Practitioner's Approach, Mc-Graw Hill Edition, 2005.

Course	BCA	Part IV	Non-Major Elective – II	Semester	V
Major	CA	PC Packages		Credit	2
				Hours	2

Objective
To impart the basic concepts of MS-Word, MS-Excel, and MS-PowerPoint.

UNIT I
MS-Word: Word Basics – Starting Word – Creating Documents – Parts of the Word Window – Mouse Operations – Keyboard Operations – The Most Important Keys.

UNIT II
Formatting Features – Menus – Toolbars and their Icons – Word Formatting Toolbar – Creating Tables – Insert Picture.

UNIT III
MS-Excel: Excel Basics – Menus, Commands, Toolbars and their Icons – Entering Text in Cells – Columns Width – Series Fill – Entering Formulas – Formatting Cells.

UNIT IV
Formatting Text – Inserting Rows and Columns – Formatting Date Range – Creating a Chart – Functions.

UNIT V
MS-Power Point: Menus – Toolbar – Creating a New Presentation and a New Slide – Deleting and Copying a Slide – Slide Numbering – Inserting Picture and Text – Organization Chart.

Text Book:
Sanjay Saxena, MS Office 2000 for Everyone, Vikas Publishing, 2007.

Reference Book:
Archana Kumar, Computer Basics with Office Automation, First Edition, 2010.

Course	BCA	Part III	Core XI	Semester	VI
Major	CA	Shell Programming		Credit	5
				Hours	6

Objective

To understand the fundamental concepts of Linux Programming.

UNIT I

Linux: Introduction – Linux Commands: Directory Oriented Commands – File Oriented Commands – Process Oriented Commands – Communication Oriented Commands – General Purpose Commands.

UNIT II

Pipes and Filters: Pipe – Redirection – Filters – Vi Editor: Starting Vi Modes – Insert, Delete and Replace Commands – Search Commands – Redo and Undo Commands.

UNIT III

Shell Programming: Shell Script – Shell Variables – Escape Mechanisms – Shell Meta Characters – Control Statements – Iterative Statements.

UNIT IV

Some Sample Shell Scripts – System Administration: System Administrator – Booting the System – Shutting Down the system.

UNIT V

Adding and Deleting a User – Managing Devices – Mounting File systems – Compression and Decompression – Backup – Remote System Accessing.

Text Book:

1. Mohamed Ibrahim, Linux – A Practical Approach, By Firewall Media publications, 2005.

Reference Book:

1. Richard Petersen, Linux – The Complete Reference, Sixth Edition, Tata McGraw Hill Publications.

Course	BCA	Part III		Core XII	Semester	VI
Major	CA	E-Commerce			Credit	6
					Hours	6

Objective

To acquire the knowledge in Electronic Commerce, Electronic Payment Systems, and the Corporate Digital Library.

UNIT I

Electronic Commerce: Electronic Commerce Framework – Electronic Commerce and Media Convergence – The Anatomy of E-Commerce Applications – Electronic Commerce Consumer Applications – Electronic Commerce Organization Applications.

UNIT II

The Network Infrastructure for Electronic Commerce: Components of the I-way – Network Access Equipment. The Internet as a Network Infrastructure: NSFNET Architecture and Components – National Research and Education Network.

UNIT III

Electronic Commerce and the World Wide Web: Architectural Framework for Electronic Commerce – World Wide Web as the Architecture – Technology behind the Web – Security and the Web. Consumer-Oriented Electronic Commerce: Consumer-Oriented Applications – Mercantile Process Models.

UNIT IV

Electronic Payment Systems: Types of Electronic Payment Systems – Digital Token-based Electronic Payment Systems – Smart Cards and Electronic Payment Systems – Credit Card-Based Electronic Payment Systems – Risk and Electronic Payment Systems – Designing Electronic Payment Systems.

UNIT V

The Corporate Digital Library: Dimensions of Internal Electronic Commerce Systems – Making a Business Case for a Document Library – Types of Digital Documents – Issues behind Document Infrastructure – Corporate Data Warehouses.

Text Book:
1. Ravi Kalakota & Andrew B. Whinston, Frontiers of Electronic Commerce, Pearson Edition, India, 2009.
UNIT I: Chapter 1 (Sections 1.1 to 1.5)
UNIT II: Chapter 2 (Sections 2.2 to 2.3); Chapter 3 (Sections 3.3 to 3.4)
UNIT III: Chapter 6 (Sections 6.1 - 6.2, 6.4 – 6.5), Chapter 7 (Sections 7.1 to 7.2).
UNIT IV: Chapter 8 (Sections 8.1 to 8.6)
UNIT V: Chapter 12 (Sections 12.1 to 12.5).

Reference Book:
1. Manish Chandra Thrived, Electronic Commerce, Jiao Publishing House, 3rd Edition, 2006.

Course	BCA	Part III		Core XIII	Semester	VI
Major	CA	Dot Net Programming			Credit	4
					Hours	5

Objective
To understand the basic concepts of .Net Programming.

UNIT I
Getting Started With VB 2008: Exploring the Integrated Development Environment – Understanding the IDE Components – Variables and Data Type: Variables – Variables as Objects – Constants – Arrays.

UNIT II
Programming Fundamentals: Flow-Control Statements – Basic Window Controls: The Text Box Control – The Listbox, Checkedlistbox, Combobox Controls – The Scroll Bar and Trackbar Controls.

UNIT III
Working with Forms: The Appearance of Forms – Loading and Showing Forms – Building Dynamic Forms at Runtime – Designing Menus.

UNIT IV
The Treeview and Listview Controls: Understanding the List View, Treeview and Image List Controls – The Tree View Controls – The List View Control. Handling Strings and Characters – Handling Dates and Times – Manipulating Folders and Files – Accessing Files.

UNIT V
Planning Demonstration Site – Building the Style Sheet for Master Page. Master – Creating the Content Master Page – Adding Elements to the Main Master Page – Building the Site Navigation – Adding Authentication – Adding Content Pages.

Textbook:
1. Mastering Microsoft Visual Basic 2008, Evangelos Petroutsos, Wiley Publications.
UNIT I: Chapter 1 (1-25), Chapter 2 (35-81)
UNIT II: Chapter 3 (85-100), Chapter 6 (173-213)
UNIT III: Chapter 7 (217-264)
UNIT IV: Chapter 9 (305-346), Chapter 13(461-492), Chapter 15(546-580)
UNIT V: Chapter 26(937-962)

Reference Book:
1. Steven Holzner, Visual Basic .NET Black Book, 2007.

Course	BCA	Part III	Core XIV - Practical	Semester	VI
Major	CA	Dot Net Programming Lab		Credit	4
				Hours	5

1. Create a window based application to check whether the entered choice is correct or not using combo box control.
2. Create a console based application to display the star pyramid.
3. Create a window based application that will use dialogs controls like openfile, color, font, and print.
4. Create a window based application where one window uses menu strip and second window inherit the form containing menu strip using visual inheritance.
5. Create a window based application that will insert registration details like first name, last name, city, state into database and display.
6. Write a program to increase and decrease font size programmatically.
7. Develop an asp.net code to rotate advertisements with adrotator control.
8. Write asp.net program that will use the session.
9. Write asp.net program that will use the cookies.

Course	BCA	Part III	Major Elective - III	Semester	VI
Major	CA	Multimedia Technology		Credit	4
				Hours	5

Objective

To understand the various concepts of multimedia and its applications.

UNIT I

Multimedia: Definition – Where to Use Multimedia? – Delivering Multimedia – Text: About Fonts and Faces – Using Text in Multimedia.

UNIT II

Images: Making Still Images – Image File Formats – Sound: Digital Audio – MIDI Audio – MIDI vs. Digital Audio – Multimedia System Sounds – Audio File Formats.

UNIT III

Animation: Principles of Animation – Animation by Computer – Video: Using Video – How Video Works and is Displayed – Shooting and Editing Video.

UNIT IV

Making Multimedia: The Stages of a Multimedia \Project – What You Need: The Intangibles – Hardware – Software.

UNIT V

The Internet and Multimedia: Internet History – Internet Working – Multimedia on the Web.

Text Book:

1. TayVaughan, Multimedia: Making it Work, Tata McGraw-Hill Eight Edition.
UNIT I: Chapters 1 & 2
UNIT II: Chapters 3 & 4
UNIT III: Chapters 5 & 6
UNIT IV: Chapter 7
UNIT V: Chapter 12

Reference Book:

1. David Hillman, Multimedia Technology and Applications, Galgotia Publications Pvt. Ltd., Year 1998.

Course	BCA	Part IV	Skill-Based Elective -III	Semester	VI
Major	CA	Python Programming		Credit	2
				Hours	2

Objective

To impart programming skills using Python.

UNIT I

Basics: Character Set – Token – Core Data Type – The print( ) Function – Assigning Value to a Variable – The Input( ) Function – The eval( ) Function – Formatting Numbers and Strings – Inbuilt Functions – Operators and Expressions: Arithmetic Operators – Operator Precedence and Associativity – Bitwise Operator – Compound Assignment Operator.

UNIT II

Decision Statements: Boolean Type – Boolean Operators – Using Numbers and Strings with Boolean Operators – Decision Making Statements – Loop Control Statements: While Loop – Range( ) Function – For Loop – Break and Continue Statement.

UNIT III

Functions: Syntax and Basics of a Function – Use of a Function – Parameters and Arguments in a Function – Local and Global Scope of a Variable – Return Statement – Recursive Functions – Strings: Str Class – Inbuilt Functions – Index[ ] Operator – Immutable Strings – String Operators – String Operations.

UNIT IV

Lists: Creating Lists – Accessing the Elements of a List – Negative List Indices – List Slicing [start : end] – Inbuilt Functions for Lists – List Operator – List Methods.

UNIT V

Tuples: Creating Tuples – Tuple( ) Function – Inbuilt Functions for Tuples – Operations on Tuples – Sets: Creating Sets – Set in and not in Operator – Set Class – Set Operations – Dictionaries: Creating a Dictionary – Adding and Replacing Values – Retrieving Values – Formatting Dictionaries – Deleting Items – Methods of the Dictionary Class.

Text Book:

1. Ashok Namdev Kamthane and Amit Ashok Kamthane, Programming and Problem Solving with Python, McGraw Hill Education, 2018.
UNIT I: Chapter 2 (Sections 2.2 - 2.6, 2.9 - 2.12), Chapter 3 (Sections 3.2 - 3.4, 3.7 & 3.8).
UNIT II: Chapter 4 (Sections 4.2 – 4.5, 4.7), Chapter 5(Sections 5.2 – 5.4, 5.6 & 5.7).
UNIT III: Chapter 6 (Sections 6.2 – 6.7), Chapter 7 (Sections 7.2 – 7.4, 7.7 & 7.8).
UNIT IV: Chapter 8 (Sections 8.2 – 8.5, 8.7, 8.8, 8.10).
UNIT V: Chapter 11(Sections 11.1(11.1.1 – 11.1.3, 11.1.5), 11.2, 11.3(11.3.3 -11.3.7, 11.3.9).

Reference Book:

1. Wesley J. Chun, Core Python Applications Programming, Pearson Third Edition.