THE CURRICULUM

The course structure that guides the teaching, practical and associated assessment of BCA programme is described year-wise in the following tables.

FIRST YEAR

CODE	SUBJECT	MARKS		
		Internal	Main	Total
BC-101	Information Technology and Web Programming	25	75	100
BC-102	Programming in C	25	75	100
BC-103	Data communication and Networks	25	75	100
BC-104	Digital Computer Organization	25	75	100
BC-105	Mathematics	25	75	100
BC-106	Financial Accounting	25	75	100
BC-107	English Language Communication skills	25	75	100
BC-108	Environmental Studies	25	75	100
BC-109	LAB based on 101, 105, 106	25	75	100
BC-110	LAB based on 102	25	75	100
BC-111	LAB based on 103, 104	25	75	100

BC - 101: INFORMATION TECHNOLOGY AND WEB PROGRAMMING

UNIT 1

Characteristics of Computer; Computer Generation; Basic Computer Organization (Input, Output, Storage unit, CPU); Processor (CU, ALU) and Memory (Main memory, Cache memory); Secondary Storage Devices (Sequential and Direct-Access Devices, Magnetic Tape, Magnetic disk, Optical disk, Memory Storage Devices – Flash drive, memory card, Storage hierarchy), Input Devices (Keyboard, Point-and-Draw, Data Scanning, Digitizer, Electronic-card reader, speech recognition, vision input system); Output Devices (Monitors, Printers, Plotters, Screen Image Projector, Voice recognition Systems).

UNIT 2

Operating System – Process Management, Memory Management, File Management, Security, Command Interpretation, OS capability enhancement software, Overview of some popular OS: DOS, Windows, Linux. Application Software Packages: Word Processing Package, Spreadsheet Package, Graphics Package. Classification of Computers: Notebook computers (laptops), Personal Computers (PC), Workstations, Mainframe Systems, Supercomputers, Client and Server Computers, Handheld Computers (Tablet PC, PDA / Pocket PC, Smartphone).

UNIT 3

Internet, Intranet, Internet Services, Prerequisites of Internet, Internet Applications, Web Browsers, Web page, Web Site, Servers, Types of Internet Connectivity, FTP, Telnet, Search Engines, Domain Names, **E-mail**, Advantages of E-mail, E-Mail address, Structure of E-Mail, Junk Mail, Upload & Download, Internet Security, Firewalls

UNIT 4

HTML, History of HTML, Features of HTML, Structure of HTML Document, HTML Tags, Attributes, Inserting Text, Images, Formatting Text, Background, Lists, Tables, Images, Character Entities, Hyperlinks, Frames, Forms, **CSS**, Evolution of CSS, Types of Style Sheets, CSS Syntax, Using CSS for Colour, Text, Font, Background, Boarders, Lists, Tables, Positioning

UNIT 5

JavaScript: Scripts, Types of Scripts, JavaScript Overview, Advantages of JavaScript, where to put JavaScript, Data Types, Variables, Expressions, Operators, Branching & Looping Statements (If .. Else, Switch, For loop, While loop, Do .. While loop, For loop, For .. In), Popup Boxes, Functions- Build in & User defined, , Array, Dialog Boxes, Objects (String, Date, Math), Events – Windows events, Form element events, Keyboard events, Mouse Events, Validating the inputs, Cookies

Text Books :

1. Computer Fundamental — P.K. Sinha, Priti Sinha
2. IT Tools and Applications — Satish Jain, S Jain, M Jain
3. Internet and Web Design — Satish Jain, Shashank Jain

Ref Books :

1. Unix for you — Koparkar

BC - 102: PROGRAMMING IN C

UNIT 1

Computer software - Relationship Between H/W and S/W, Types of S/W, acquiring Software, Software Development Steps, Firmware, Middleware, Purpose of Program Planning, Algorithm, Flowchart, Pseudo code, Machine Language, Assembly Language, High Level Language, Characteristics of Good Programming Language, Testing and Debugging, Documentation, Changeover to the New System, System Evaluation, System Maintenance.

UNIT 2

Basic Structure of C Program : Character Set, C Tokens, Keyword & Identifiers, Constants, Variables, Data Types, Defining Symbolic Constants, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment And Decrement Operators, Arithmetic Expression, Reading And Writing Character, Formatted Input And Output.

UNIT 3

Control and Conditional Statements: Simple if Statement, The if else Statement, Nesting of if else Statement, The else if Ladder, The Switch Statement, The? : Operator, The goto Statement, The while Statement, The do Statement, the for Statement, Jumps in Loops.

UNIT 4

Arrays One Dimensional Arrays, Declaration & Initialization of One-Dimensional Arrays, Two-Dimensional Arrays, Multidimensional Arrays, Declaring And Initializing String Variables, Reading & Writing Strings. **Functions:** Need For User Defined Functions, A Multifunction Program, Elements of User Defined Functions, Definition of Function, Return Values And Their Types, Function Calls, Function Declaration, Category of Functions.

UNIT 5

Structure: Defining a structure, declaring structure variables, accessing structure members, arrays of structure, arrays within structures, structures within structures, unions, **Pointers:** introduction to pointers, declaring and initializing pointer variables, pointer and arrays, pointer and character strings, pointer and structures, **File** defining and opening a file, closing a file, input-output operations of file.

Text Books :

1. Programming in ANSI C — E. Balagurusamy

Ref Books :

Let us C — Yashwant Kanetkar

BC – 103: DATA COMMUNICATION AND NETWORKS

UNIT I

Fundamentals of Data Communication: Introduction, Communication Systems, Channel Characteristics, Transmission modes, Synchronous and asynchronous transmission. **Transmission Media -** Guided Media (Twisted pair, Co-axial cable, Optical fiber), Unguided Media (Radio, VHF, microwave, satellite), Infrared Transmission, Fiber Optics Communication: Components (Source, Channels Detector).

UNIT II

Data Modems: Concepts of Modulation, Pulse Code Modulation (PCM), Shift Keying [ASK, FSK, PSK, QPSK, DPSK], Encoding techniques and CODEC, Classification of Modems, Standards and Protocols, Protocols used by Modem to Transfer files, Establishing a connection. **Multichannel Data Communication:** Circuits, channels and multichanneling, Multiplexing [FDM, TDM, CDM, WDM], Access Techniques [FDMA, TDMA, Spread Spectrum Techniques and CDMA], Digital Hierarchies [SONET / SDH]. **Networking Fundamentals:** Switching techniques: Circuit Switching, Packet switching, Datagram, Virtual circuit and Permanent Virtual Circuit, Connectionless and connection oriented communication, Message switching, Cell switching (ATM). Network Topologies: Bus Topologies (e.g. Ethernet, Local Talk), Ring Topologies (e.g. IBM Token ring, FDDI), Star Topologies (e.g. ATM).

UNIT III

OSI Model and TCP/IP Suite: Network architectures, Layering the communication process, The need for layered solutions, Open Systems Interconnection (OSI) model, TCP / IP protocol, Data transmission by TCP and Ethernet, Data Encapsulation, Data routing, An Error Reporting Mechanism-The Internet Control Message Protocol (ICMP), User Datagram Protocol (UDP), TCP/IP services and application protocols (The Client / Server Model, Telnet, File Transfer Protocol (FTP), Trivial File Transfer Protocol (TFTP), Simple Mail Transfer Protocol (SMTP), Network File System (NFS), Simple Network Management Protocol (SNMP), Domain Name System (DNS)), Internet Architecture. **Data Link Protocols :** Protocol, Transmission Control Procedure: Synchronous Protocols, Asynchronous Data Link Control (DLC) Protocols, Character Oriented Protocols (COP), Binary Synchronous Protocol (Bisync or BSC), Bit Oriented Protocols (BOP), Synchronous Data Link Control Protocol (SDLC), High Level Data Control Protocol (HDLC), Transmission Control Procedure Types, Non-procedure, Basic control procedure, HDLC Procedure.

UNIT IV

Local Area Network (LAN) : Baseband versus Broadband, Media access control, LAN hardware, LAN Operating System, Transmission media. Implementing LAN: Implementation of LAN using coaxial cables, Implementation of LAN using twisted pair, Implementation of LAN using fiber optic cables, Implementation of LAN using wireless technology, Fast LAN, Non-standard LANs. Extending LAN - Fiber Optic Extension, Repeaters, Bridges, Router, Gateways, Switching, Hubs, Virtual LANs. **Wide Area Network (WAN) -** Network using WAN and network services, Host to terminal Connection, LAN to LAN Connection, Remote LAN connection. Router concepts: Forwarding Function, Filtering Function, Routing Method (Static and dynamic routing).Local routing ARP (Address Resolution Protocol) Table, Distributed routing, Hierarchical Routing, Distance-Vector Protocol, Link-State protocol, Communication protocols over WAN.

UNIT V

Data Transmission Network: Telephone networks: Dial-up Telephone networks, Leased Line. X.25. The Integrated Services Digital Network (ISDN): Narrow band ISDN, Broadband ISDN Service, Frame Relay, Congestion Control, Cell Relay, ATM Structure. **Wireless Communication** - Cellular Radio, Telephony (GSM), VSAT, **Security and Privacy** - Network Security, firewall, VPN.

Text Book:

1. Data Communication and Computer Networks Dr. Jain, Satish Jain

Reference Books:

1. Computer Communication & Networks Andrew S. Tanenbaum

BC - 104: DIGITAL COMPUTER ORGANISATION

UNIT 1

Digital and Analog Quantities, Binary Digits, Logic Levels and Digital Waveforms, Introduction to Basic Logic Operations, Digital Integrated Circuits. Decimal Numbers, Binary numbers, Binary Arithmetic, 1`s and 2`s Complements of Binary Numbers, Signed Numbers, Arithmetic Operations with Signed Numbers, Hexadecimal Numbers, Octal Numbers, Binary Coded Decimal (BCD). **Logic Gates**: The Inverter, The AND Gate, The OR Gate, The NAND Gate, The NOR Gate, The Exclusive-OR and Exclusive-NOR Gates.

UNIT 2

Boolean Operations and Expressions, Laws and Rules of Boolean Algebra, DeMorgan`s Theorems, Boolean Analysis of logic Circuits, Simplification Using Boolean Algebra, Standard Forms of Boolean Expressions, Boolean Expressions and Truth Tables, The Karnaugh Map, Karnaugh Map SOP Minimization. Basic Combinational Logic Circuits, Implementing Combinational Logic, The Universal Property Of NAND and NOR Gates, Basic Overview of Logic Functions, Basic Adders, Parallel Binary Adders, Comparators, Decoders, Encoders, Code Converters, Multiplexers (Data Selectors), De-multiplexers.

UNIT 3

Latches, Edge-Triggered Flip-Flops, Master-Slave Flip-Flops, Flip-Flop Operating Characteristics, Flip-Flop Applications, Asynchronous Counter Operation, Synchronous Counter Operation, UP/Down Synchronous Counters, Counter Applications, Basic Shift Register Functions, Serial In / Serial Out Shift Registers, Serial In / Parallel Out Shift Registers, Parallel In / Serial Out Shift Registers, Parallel In / Parallel Out Shift Registers, Bidirectional Shift Registers, Shift Register Counters, Shift Register Applications

UNIT 4

Register Transfer Language, Register Transfer, Bus and Memory Transfers, Arithmetic Micro operations, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit, Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, Memory-Reference Instructions, Input-Output and Interrupt, Design of Basic Computer.

UNIT 5

Control Memory, Introduction to CPU, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC), Overview of Parallel Processing, Pipelining.

Text Books :

1. Digital fundamentals	Floyd
2. Computer System Architecture	Morris Mano

Ref Books :

1. Structured Computer Organization	Andrew. S. Tanenbaum
2. Digital Principal and Application	Malvino & Leach
3. Digital Computer Fundamental	Thomas C. Bartee

BC - 105: MATHEMATICS

UNIT I

Logical Statements and Truth Tables: Logical Statements, Truth Tables, Negation, Compounding, Negation of Compound Statements, Tautologies and Fallacies, Propositions, Algebra of Propositions, Conditional Statements, Bi-conditional Statements. **Theory of Sets:** Elements of a Set, Methods of Describing a Set, Types of Sets, Venn diagram, Operations on Sets, Intersection of Sets, Union of Sets, Complement of Sets, De-Morgan Law, Difference of Two Sets, Symmetric Difference, Algebra of Sets, Duality, Partition of a Set, Number of Elements in a Finite Set, Ordered Pair, Cartesian Product, Set Relations, Properties of Relations, Binary Relations, Functions of Mapping, Types of Mapping.

UNIT II

Equations: Identities, Inequalities, Grouping Symbols, general solution, Degree of an Equation, Simultaneous Linear Equations, Quadratic Equations, Solutions of Quadratic Equations, Reciprocal Equations, Nature of roots, Symmetrical Expressions, Formation of an equation, Solutions of Simultaneous Equations. **Circular Functions and Trigonometry:** Measurement of Angles, Trigonometric Ratios, Relations between Trigonometric Functions, Signs of Trigonometric function, Trigonometric Functions of Standard Angles, Use of Printed Tables, T-Ratios of Allied Angles, T-Ratios of Sum and Difference of Angles, T-Ratios of Multiple Angles, Transformation of Products and Sums, Trigonometric Identities, Properties of a Triangle, Solutions for a Triangle.

UNIT III

Coordinate Geometry: Direct Line, Quadrants and Coordinates, Coordinates of Mid-points, Distance between two points, Section Formula, External Division, Coordinates of Centroid, Area of a Triangle, Collinearity of Three points, Area of a Quadrilateral, Locus of a Point, The Straight Line, Slope or Gradient of a Straight Line, Different forms of Equations of a Straight Line, General Equation of a Straight Line, Intersecting Lines, Concurrent Lines, Angles between two Straight Lines, Tangent and Normal, Circle, Equation of Circle, Different Forms of Circle, General Equation of circle, Equation of Tangent to Circle, Equation of Normal to Circle, Equation of a Tangent to Circle in Slope form.

UNIT IV

Vector Algebra: Vectors, Types of Vectors, Operations on Vectors, Addition, Properties of Operation of Addition, Subtraction, Multiplication by a scalar, Orthonormal Bases, Product of Two Vectors, Scalar Product or Dot Product of Two Vectors, Properties of Scalar Product, Vector Product or Cross Product, Properties of Vector Product.

UNIT V

Matrix Algebra: Definition, Types of Matrices, Scalar Multiplication of a Matrix, Equality of Matrices, Matrix Operations, Addition and Subtraction, Multiplication, Properties, Transpose of a Matrix, Determinants of a Square Matrix, Determinants of Order Two, Determinants of Order Three, Minors of a Matrix, adjoint of a Square Matrix, Inverse of a Matrix, Rank of Matrix.

Text Book :

1. Business Mathematics D. C. Sancheti, V. K. Kapoor

Reference Books :

1. Trembley J. P. and Manohar R. P.: Discrete Mathematical Structures with Applications to Computer Science

BC - 106: FINANCIAL ACCOUNTING

UNIT I

Accounting Information System (AIS), Double Entry System, Advantage and Disadvantages of Double Entry System, Principles of Accounting, GAAP: Concepts and Conventions, Journal, Ledger, Subsidiary Books, Accounting Equations, Trial Balance, Methods of preparation of Trial Balance

UNIT II

Final Accounts with Adjustments

UNIT III

Capital Expenditure Decisions: Features of Capital Budgeting Decisions, Scope, Methods of Capital Budgeting, Pay Back Period Method, Rate of Return Method, Net Present Value Method, BCR Method, IRR Method. **Budgetary control System:** Budgeting, Budgetary Control, Classification of Budgets, Sales Budget, Production Budget, Purchase Budget, Fixed Budged, Flexible Budget, Cash Budget, Master Budget, Zero Base Budgeting (ZBB), Advantages and Limitations of ZBB.

UNIT IV

Cost Concept: Costing, Cost Accounting, Cost Control, Objectives of Cost Accounting, Methods and Techniques of Costing, Elements of Cost, Preparation of Cost Sheet. **Marginal costing**: Meaning, Characteristics, BEP, Contribution, P/V Ratio, Margins of Safety, angle of Incidence, Construction of break Even Chart, Curvilinear Break even Chart, Acceptance and Rejection of an offer of Export

UNIT V

Auditing: Meaning, Objectives and Detection of Frauds and Errors, Internal Control: Internal check, Internal Audit, Meaning, Objectives, Advantages and Disadvantages, **Vouching:** Objectives, Importance of vouching, Vouching of Cash Book, Vouching of Trading Transactions, Rights, Duties and Liabilities of an auditor.

Text Book :

1. Rao, Sarangdevot, Rao — Accounting and Financial Management
2. T.S. Grewal — Double Entry Book Keeping

3. Oswal Maheshwari	Cost Accounting
4. Jain Khandelwal & Pareek	Fundamentals of Accounting
5. Gupta R.L. & Radha Swamy	Advanced Accountancy

BC - 107: ENGLISH LANGUAGE COMMUNICATION SKILLS

UNIT 1

English in Communication: Tenses, subject verb agreement, one word substitution, some foreign words and phrases used in English.

UNIT 2

Synonyms and Antonyms, Précis writing, vocabulary testing (related to business and different profession such as law, engineering, medicine), Punctuation.

UNIT 3

Communication: Communication, verbal and non verbal communication. Oral, written, visual and Audio-Visual communication, Principles and Barriers of communication.

UNIT 4

Report writing, application, various kinds of letters (sales promotion, complaint letters), memos, circular, notice.

UNIT 5

Dialogue writing, press releases, resume writing, Information Technology of future.

Text Books :

1. Business Communication	Rajendra Pal
2. Business Communication	K.K. Sinha
3. A practical English Grammar	Thomson and Martinet
4. English Grammar	W.S. Allen

BC - 108: ENVIRONMENTAL STUDIES

UNIT 1

Environmental Studies: Definition, importance, scope, multidisciplinary nature of environment. Biodiversity – definition and its types. Need for public awareness

UNIT 2

Natural Recourses: Classification of resources, associated problems, Forest Resources, Water Resources, Energy Resources, Food Resources, Mineral Resources, Land Resources. Role of individual in conservation of natural resources.

UNIT 3

Ecosystems: Concept of Ecosystems, Structure and function of an ecosystem. Energy flow, food webs, ecological pyramids, ecological succession. Introduction, types, characteristics features, structure and function of the following ecosystem: forest ecosystem, desert ecosystem, aquatic ecosystem, grassland ecosystem.

UNIT 4

Environmental Pollution: Definition, causes, effects and control measure of – air pollution, water pollution, noise pollution and soil pollution. Solid waste management, Global warming, acid rain, ozone layer depletion, EL-Nino.

UNIT 5

Human Population and the Environment: Population growth and explosion, environment and human health, Role of information technologies in environment and human health. Value Aided Education.

Text Book :

1. Environmental Studies B.L. Choudhary & J. Pandey

Reference :

1. Environmental Sciences, A New Approach

BC - 109: LAB BASED ON 101, 105, 106

SECTION A

MS-Office

Word Processor: Introduction to word processing, Introduction to MS-Word, Creating, Saving & Opening documents, Toolbars, Ruler, Menus, Keyboard Shortcuts, Editing a Document - Editing Text, Selecting, Inserting, deleting, moving text, Previewing documents, Printing documents, Shrinking a document to fit a page, Formatting Documents : Paragraph formats, Aligning Text and Paragraph, Borders and shading, headers and footers, multiple columns. Advanced Features of MS-Word : Find and Replace, Checking the grammar and spelling, Formatting via find and replace, Using the Thesaurus, Using Auto Correct, Auto Complete and Auto Text, word count, Hyphenating, Mail merge, Handling Graphics, Table and charts, Opening Multi document windows, Converting a word document into various formats like - Text, Rich Text Format, WordPerfect, HTML etc.

Worksheet: MS-Excel : Worksheet basics, Creating worksheet, entering data into worksheet - text, dates, alphanumeric, values, saving & quitting worksheet, Opening and moving around in an existing worksheet, Toolbars and Menus, keyboard Shortcuts, Working with single and multiple workbook - coping, renaming, moving, adding and deleting, coping entries and moving between workbooks. Working with formulas & cell referencing, Autosum, Coping formulas, Working with ranges - creating, editing and selecting ranges, Formatting of worksheet - Auto format, changing - alignment, character styles, column width, date format, borders & colours, currency sign, Previewing & Printing worksheet, Adjusting margins, Page break, headers and footers, Graphs and charts - using wizards, various charts type, formatting grid & legends, Database - creation, sorting, query & filtering a database, Functions - Database, Date and Time, Maths & Statistical, Text and Logical.

Presentation Graphics : MS-Power Point : Features, Creating presentation using Slide master and templates in various colour scheme, Working with different views and menus of power point, Working with slides - Make new slide, move, copy, delete, duplicate, Editing and formatting text, bullets, Printing presentation - Print slides, notes, handouts and outlines.

SECTION B

Overview of MS FrontPage, Macromedia, Dream Weaver and Other popular HTML editors. Use of Frames and Forms in web pages, Image editors, FLASH, Issues in Web site creation & Maintenance.

SECTION C

Tally: Practical based Tally and overview of other accounting software

SECTION B

MATLAB: Practical based on BC-105 using MATLAB Software.

BC - 110: LAB BASED ON 102

SECTION A

Implementation of conditional and control statements

SECTION B

Implementation of Arrays and Functions

SECTION C

Implementation of pointers, structures and files

BC - 111: LAB BASED ON 103, 104