BCA

SEMESTER I

SUBJECT CODE	NAME OF SUBJECT	Teaching Period			Credit
		L	T	P	
01BCA-101	Mathematics-I	5	1	0	6
01BCA-102	Discrete Mathematics	5	1	0	6
01BCA-103	Computer Fundamentals & Programming Concept	5	1	0	6
01BCA-104	Principles Of Management	5	1	0	6
01BCA-201	Practical Software Lab Based On 01BCA-103	0	0	6	3
01BCA-301	Discipline And Co-Curricular Activities	0	0	4	1
Total		**20**	**4**	**10**	**28**

SEMESTER II

SUBJECT CODE	NAME OF SUBJECT	Teaching Period			Credit
		L	T	P	
02BCA-101	Mathematics-II	5	1	0	6
02BCA-102	Data Structure And Programming With 'C'	5	1	0	6
02BCA-103	Data Base Management System	5	1	0	6
02BCA-104	Digital Electronics & Comp. Organization	5	1	0	6
02BCA-201	S/w Lab Based On 02BCA102 & 02BCA103	0	0	6	3
02BCA-301	Discipline And Co-Curricular Activities	0	0	4	1
Total		**20**	**4**	**10**	**28**

SEMESTER III

SUBJECT CODE	NAME OF SUBJECT	Teaching Period			Credit
		L	T	P	
03BCA-101	Computer Oriented Statistical & Optimization Methods	5	1	0	6
03BCA-102	Operating Systems	5	1	0	6
03BCA-103	Computer Architecture	5	1	0	6
03BCA-104	Production And Operation Management	5	1	0	6
03BCA-201	Practical Software Lab Based On 03BCA102 & 03BCA-103	0	0	6	3
03BCA-301	Discipline And Co-Curricular Activities	0	0	4	1
Total		**20**	**4**	**10**	**28**

SEMESTER IV

SUBJECT CODE	NAME OF SUBJECT	Teaching Period			Credit
		L	T	P	
04BCA-101	Computer Oriented Financial Management	5	1	0	6
04BCA-102	Computer Communication Networks	5	1	0	6
04BCA-103	Computer Graphics	5	1	0	6
04BCA-104	Object Oriented Programming And C++	5	1	0	6
04BCA-201	S/w Lab Based On 04BCA103 & 04BCA104	0	0	6	3
04BCA-301	Discipline And Co-Curricular Activities	0	0	4	1
Total		**20**	**4**	**10**	**28**

SEMESTER V

SUBJECT CODE	NAME OF SUBJECT	Teaching Period			Credit
		L	T	P	
05BCA-101	Software Engineering	5	1	0	6
05BCA-102	Programming In Visual Basic	5	1	0	6
05BCA-103	Information System: Analysis, Design And Implementation	5	1	0	6
05BCA-104	Technical Documentation, Presentation & Communication	5	1	0	6
05BCA-201	Practical Software Lab Based On 05BCA102 & 05BCA-103	0	0	6	3
05BCA-301	Discipline And Co-Curricular Activities	0	0	4	1
Total		20	4	10	28

SEMESTER VI

SUBJECT CODE	NAME OF SUBJECT	Teaching Period			Credit
		L	T	P	
06BCA-101	Client Server Technology	5	1	0	6
06BCA-102	Multimedia And Its Application	5	1	0	6
06BCA-103	Project Work	5	1	0	6
06BCA-201	S/w Lab Based On 06BCA101 & 06BCA102	0	0	6	3
06BCA-301	Discipline And Co-Curricular Activities	0	0	4	1
Total		**15**	**3**	**10**	**22**

Semester - I

01BCA-101 MATHEMATICS-I

Course/Paper: 01BCA-101
BCA Semester-I

Sets: Sets and subsets, finite and infinite sets. Algebra of sets: Union, Intersection, complementation, Demorgan laws.Common applications of algebra of sets. Functions: Interval and sub-intervals.
Functions: Definition of function and examples, polynomial, rational, exponential, logarithmic and trigonometric functions. Graph of some simple functions like polynomial (unto 3rd deg), rational trigonometric functions, modulus, function, step functions, rational functions, and composite functions.
Sequences: Sequences, subsequences, finite and infinite sequences, limits of sequences, simple cases. Continuous functions at a point and on an interval, graphs of continuous functions, simple cases
Differentiation of function: Derivative of some common function, polynomial, rational exponential; logarithmic and trigonometric functions. Integration as inverse process of differentiation, integration of simple functions, method of change of variable and substitution for integrals, definite integrals, simple problems of line integral.
Vectors and Matrices: Vector, vector algebra Addition, subtraction, scalar multiplication, magnitude, vector multiplication. Simple applications of vectors. Matrices**:** Matrix, sub matrix, types of matrices, such as symmetric, square, diagonal Matrices, singular and nonsingular matrices. Addition, subtraction, multiplication of matrices, Rank of a matrix, Matrix equation, solution by Cramer's rule and Gauss elimination method.

Suggested readings –

1.	Engineering mathematics II	Gokhroo
2.	Engineering mathematics Vol II	Hari Singh Parihar

01BCA-102:

DISCRETE MATHEMATICS

Course/Paper: 01BCA-102
BCA Semester-I

Mathematical Logic Statements, Negation operation, Logic connectives and compound statements, conjunction, disjunction, Truth table, Duality, Conditional and in-conditional statements, valid arguments, Laws of detachments and syllogism, tautologies and fallacies.
Boolean Algebra: Development of Boolean Algebra, Truth functions, AND, OR, NOT operators Laws of Boolean Algebra, Reducing Boolean expressions, Boolean expressions and logic diagrams, Universal laws, Building blocks, Negative logic Minterms, Truth table and maps, Reduction of maps, Hybrid functions.
Graph Theory Definition of a graph, finite and infinite graphs, Incidence and degree, null graph Sub graphs, walks, Paths and circuits in a graph, connected graphs, Trees, Properties of Trees, cut sets and cut vertices, Planner graphs, Incidence Matrix, Directed graphs, Fundamental Circuits in Diagraphs, Adjacency matrices of a diagraph.

Suggested readings –

1.	Discrete Mathematical Structures	Kolman, Busby, Ross	PHI
2.	Discrete Mathematical Structures	Chourasiya, Srivastava	Genius Publication, Jaipur
3.	Discrete Mathematics	Olympia Nicodemi	CBS, Delhi
4.	Discrete Mathematics	Akerkar	Pearson/PHI

01BCA-103:

COMPUTER FUNDAMENTALS &PROGRAMMING CONCEPTS

Course/Paper: 01BCA-103
BCA Semester-I

Computer Fundamentals: Number system: decimal, octal. Binary and hexadecimal, Representation of integers, fixed and floating points, character representation: ASCII, EBCDIC, Functional units of computer, I/O devices, primary and secondary memories.
Programming Fundamentals: Algorithm development, Techniques of problem solving, Flowcharting, stepwise refinement, Algorithms for searching, Sorting (exchange and insertion), Merging of order lists.
Programming in C: Representation of integers, Character, real. Data types: constants and variables; Arithmetic Expression, Assignment statement, Logical expression, Sequencing, Alteration and iteration; Arrays, String processing; sub programmers, Recursion, files and Pointers structured programming concepts; Top down design, Development of efficient programs, Program Correctness; Debugging and testing of Programs.

Suggested readings –

1.	Fundamentals of Computers	Sinha, Sinha	BPB
2.	Computer Fundamentals	B. Ram	New Age Int. Pub. Delhi
3.	Let us C	Y. Kanitkar	BPB
4.	Programming with C	B. Gottfried	Schaum's Outline, TMH
5.	Computer Programming in	CRajaraman	PHI

01BCA-104:

PRINCIPLES OF MANAGEMENT

Course/Paper: 01BCA-104
BCA Semester-I

Conceptual Framework of Management - Evolution and Foundation of Management Theories - Study of Management Processes, Planning, Organizing, Directing, Staffing, Communicating, Controlling, Coordinating - Types of Organizational Structures & Designs. - Relevance of Computer Applications in Different Functional Areas of Management Viz: Financial Management, Materials Managements, Production Management, Human Resources Management and Marketing Management.

Suggested readings –

1.	Principles of Management	R.L. Nolakha	RBD,Jaipur
2.	Management	G. S. Sudha	RBSA, Jaipur
3.	Principles of Mabnagement	Cotler	Pearson/PHI
5.	Computer Programming in	CRajaraman	PHI

01BCA- 201

PRACTICAL SOFTWARE LAB BASED ON 01BCA- 103

Course/Paper: 01BCA-201
BCASemester-I

SEMESTER II

Course/Paper: 02BCA-101
BCASemester-II

MATHEMATICS-II

The real number system as a complete ordered field, neighborhood, open and closed sets, limit points of sets. Limits, continuity, sequential Continuity, algebra of Continuous functions, Continuity of composite functions, Continuity on (a,b) implying roundedness. Sequence, convergent sequence, Cauchy Sequence, monotonic sequence, Sub-sequence, Limit superior and limit inferior of sequences. Infinite series, convergence of series, series of positive terms, comparison tests, Cauchy's nth root test,D'Almberts ratio test, Raabe's test.Alternating series and Maclaurin's series for sin x, cos x, log (1+x), (1+x)n . Applications of mean value theorem to monotonic functions and inequalities. Maxima and minima; Indeterminate forms (applications of Maxima and Minima to simple Problems).

Suggested readings –

1.	Real analysis	J.N Sharma	Krishna Prakashan

Data Structure And Programming With 'C'

02BCA-102:

Course/Paper: 02BCA-102
BCA Semester-II

SECTION-A
Data types, I/O functions, Logical Operators, Control structures of C, conditional Statements, Switch Statement, Arrays, Pointers, Functions, Recursion, Structures & Unions, Operations on bits, File Handling & C Preprocessor.

SECTION-B
Data Structure:
Introduction to Algorithm Design and Data Structure : Design & analysis of algorithm, Top down and Bottom-up approaches to algorithm design, Analysis of algorithm, Frequency count, Complexity measures in terms of time and space.
Arrays; Stacks and Queues : Representation of array (single & multi dimensional arrays), Address calculation using column & row major ordering, representation of stacks & Queues using arrays and their operations, circular queues, Applications of arrays, stacks & queues, conversions from Infix to postfix & prefix and evolution of prefix expressions using stack.
Linked list: Singly linked list (Operations on list), Linked stacks and queues, polynomial representation and manipulation using linked list. Application: Reading and writing polynomials, polynomial addition. Circular linked list and doubly linked list, generalized list, sparse matrix representation using generalized list structure.
Trees : Logical level of binary search tree, BST transversal methods (Preorder, Postorder and Inorder), Recursive and non-recursive algorithms for traverse method, Insertion into and deletion from a BST and their implementation, preorder and Postorder, traversal, Insertion in Threaded tree, B-tree (Insertion and Deletion algorithms).
Searching and Sorting: Sequential and binary searches, Indexed search, Hashing schemes, Sorting methods (Insertion, Selection,
Bubble, Quick, Merge and Heap Sorts).

Suggested readings –

1.	Data Structures	Lipschutz	Schaum's Outline, TMH
2.	Data Structure & program design	Kruse	Pearson/PHI
3.	Data Structures & Algorithms	Trivedi, Gupta	Ashirwad, Jaipur
4.	Data Structures & Algorithms using C	Khanna, Tulli, Chaturvedi	Genius, Jaipur
5.	Programming & Data Structures	Kamthane	PHI

02BCA-103:

DATABASE MANAGEMENT SYSTEM

Course/Paper: 02BCA-103
BCA Semester-II

Overview of Database Management System: Elements of Database System, DBMS and its architecture, Advantage of DBMS (including Data independence), Types of database users, Role of Database administrator
Data Models: Brief overview of Hierarchical and Network Model, Detailed study of Relational Model (Relations, properties of Relational Model, Key and Integrity rules), Comparison of Hierarchal, Network and Relational Model, CODD's rules for Relational Model, E-R diagram
Normalization: Normalization concepts and update anomalies, Functional dependencies, Multivalued and join dependencies, Normal Forms: (1NF, 2NF, 3NF,BCNF, 4NF, and 5NF)
SQL: SQL Constructs, SQL Join: Multiple table Queries, Build-in functions, Views and their use, Overviews of ORACLE :(Data definition , and manipulation)
Database Securities, Integrity and Control: Security and Integrity threats, Defense mechanism, Integrity, Auditing and Control, Recent trends in DBMS-Distributed and Deductive Database

Suggested readings –

1.	Database System Concepts	Korth, Sudarshan	TMH
2.	Database Concepts	Elmasri, Nawathe	Pearson
3.	Database Management Systems	Raghuramakrishan	
4.	SQL, PL/SQL, The Programming language Oracle	I. Bayross	BPB
5.	Introduction to Database Management Systems	Kahate	Pearson

02BCA-104:

Digital Electronics And Computer Organization

Course/Paper: 02BCA-104
BCA Semester-II

Digital Electronics: Logic gates and circuits: Gates (OR,AND, NOR, NAND, XOR&XNOR); Demorgan's laws; Boolean laws, Circuit designing techniques (SOP, POS, K-Maps). Combinational Building Blocks: Multiplexers; Decoders; Encoders; Adder and substracter. Sequential Building Blocks: Flip-Flops (RS, D, JK, Master-slave & T flip-flops); Registers & Shift registers, Counters: Synchronous and Asynchronous (Designing method). Memories: ROMs, PROMs, EPROMs, RAMs, Hard Disk, Floppy Disk and CD-ROM.
Computer Organization: Central Processing Unit: Introduction, Register Organization; Stack Organization, Instruction format and addressing modes. Control Unit: Control memory; Horizontal and vertical formats; Address sequencer; Multiprogramming Vs Hardwired control; RISC Vs CISC. Arithmetic Algorithms: Integer multiplication using shift and add, Booth's algorithm, Integer division, Floating-point representations and arithmetic algorithms. I/O Organization: Strobe based and handshake base communication; Vector and priority interrupt; DMA based data transfer. Memory Organization: Basic cell of static and dynamic RAM; Building large memories using chips; Associative memory; Cache memory organization and Virtual memory organization.

Suggested readings –

1.	Computer System Architecture	Mano	Pearson
2.	Digital logic & Computer Design	Mano	Pearson

02BCA- 201

PRACTICAL SOFTWARE LAB BASED ON 02BCA- 102 & 02BCA- 103

Course/Paper: 02BCA-201
BCASemester-II

SEMESTER III

03BCA- 101

COMPUTER ORIENTED STATISTICAL & OPTIMIZATION METHODS

Course/Paper: 03BCA-101
BCA Semester-III

Unit 1 Collection of Data, Sampling & sampling designs, Classification and tabulation of Data, Graphical representation of Data, Measure of Central
values, measure of dispersal, Skew, moments and kurtosis correlation and regression
Unit 2 Probability & Probability and distributions (Normal, Poisson's Binomial)

Unit 3 Linear Programming , Graphical Methods, Simplex methods (Simple Applications) Transportation problems, Assignments problems, Game theory

Suggested readings –

1.	Statistics	Pillai	S. Chand
2.	Mathematical Statistics	SP Gupta	Sultan Chand

03BCA- 102

OPERATING SYSTEMS

Course/Paper: 03BCA-102
BCA Semester-III

Operating Systems and Resource Manager, Operating system classifications, simple monitor, multiprogramming, timesharing, real time systems, multiprocessor systems, operating systems services. File System : File supports, access methods, allocation methods-contiguous linked and index allocation; directory systems single level, tree-structure, a cyclic graph and general graph directory, file protection. CPU Scheduling: Basic scheduling concepts, Process overviews, process states, multiprogramming, Schedulers, and Scheduling algorithms, multiple- processor scheduling. Memory Management: Bare machine approach , resident monitor, Partition, Paging and segmentation, virtual memory, demand paging. Deadlocks : Deadlock Characterizations, deadlock prevention, avoidance detection and recovery. Resource Protections : Mechanisms, Policies & domain of protection, Access matrix and its implementation, dynamic protection structures. Case Study of Windows-NT: Design Principle; System components, Environment subsystem; File System, Programmer Interface.

Suggested readings –

1.	Operating System Principles	Galvin,Gagne	John Willey & sons
2.	Modern Operating Systems	Tanenbaum	Pearson
3.	Operating Systems	Dhamdhere	MGH
4.	Operating System concepts	Manish k. Sah	Ashirwad, Jaipur

03BCA- 103

COMPUTER ARCHITECTURE

Course/Paper: 03BCA-103
BCA Semester-III

Basic computer organization and design. Instructions and instruction codes. Timing and control/ instruction cycle. Register/ types of register/ general purpose & special purpose registers/ index registers. Register transfer and micro operations/ register transfer instructions. Memory and memory function. Bus/ Data transfer instructions. Arithmetic logic micro-operations/ shift micro-operations. Input/ Output and interrupts. Memory reference instructions. Memory interfacing memory/ cache memory & cache controllers. Central Processing Unit : General Register Organization/ stacks organizations, instruction formats, addressing modes, Data transfer and manipulation. Program control. Reduced computer, pipeline/RISC pipeline vector processing/array processing. Computer Arithmetic : Addition, subtraction and multiplication algorithms, division algorithms. Floating point arithmetic operations, decimal arithmetic operations, decimal arithmetic operations. Input- Output Organization: Peripheral devices. Input/Output interface, ALU Asynchronous Data transfer, mode of transfer, priority interrupts, Direct memory Address (DMA). Input/ Output processor (IOP), serial communication. Evaluation of Microprocessor: Overview of intel 8085 to Intel Pentium processors. Basic microprocessor, architecture and interface, internal architecture, external architecture, memory and input/ output interface.

Suggested readings –

1.	Computer System Architecture	Mano	Pearson
2.	Digital logic & Computer Design	Mano	Pearson

03BCA- 104

PRODUCTION AND OPERATIONS MANAGEMENT

Course/Paper: 03BCA-104
BCA Semester-III

1. Introduction to operations systems.
2. Historical Evolution of Operations Management
3. New Product Development
4. Product Design & Service Design
5. Technology Development Process and Technology Selection.
6. Capacity Planning
7. Process Selection, Product- process Strategy.
8. Facilities Location.
9. Layout Design
10. Production Planning and Control
11. Aggregate Planning
12. Introduction to Materials Management, Material Requirement Planning systems.
13. Application of JIT
14. Statistical Quality Control (SQC), Quality Assurance, Acceptance Sampling & Total Quality Management (TQM)
15. Case Studies on Various topics.

Suggested readings –

1.	Production,Operation & Management	Ashwathapa	Himalaya Pub
2.	Production,Operation & Management	Ranjeet Singh	
3.	Operation Research Introduction	Taha Handy	Pearson

03BCA- 201

PRACTICAL SOFTWARE LAB BASED ON 03BCA- 102 & 03BCA- 103

Course/Paper: 03BCA-201
BCA Semester-III

SEMESTER IV

04BCA-101

COMPUTER ORIENTED FINANCIAL MANAGEMENT

Course/Paper: 04BCA-101
BCA Semester-IV

1. Introduction to Accounting
- Meaning of accounting.
- Advantage of accounting.
- Uses of Financial Statements.
- Double entry system of Financial Accounting.
- Generally accepted accounting Principles.
- Concepts underlying profit & loss accounts, balance sheet.

2. Accounting Mechanics
- Cash Book
- Special Journals
- Rules of Debit and Credit
- General Ledger
- Bank Reconciliation Statement

3. Preparation of Financial Statement
- Preparation of Trial Balance
- Reconciliation of Trial Balance
- Preparation of Financial Statements (Including Adjustments)

4. Familiarity with and use of Standard Accounting Package (Ex-Tally)
5. Capital Budgeting : Basic Principles and Techniques.
6. Working capital Management : An over all view.
7. Capital Structure: Planning & Analysis
- Ratio Analysis
- Fund flow statement.
- Cash flow statement

Suggested readings –

1.	Double Entry Book-keeping	TS Garewal	
2.	Financial Management	MR Agarwal	Garima, Jaipur
3.	Management Accounting	MR Agarwal	Garima, Jaipur
4.	Financial management	SN Maheshwari	
5.	Financial Management	Khan, Jain	TMH

04BCA-102

COMPUTER COMMUNICATION NETWORKS

Course/Paper: 04BCA-102
BCA Semester-IV

Introduction: Uses of networks) goals and applications). OSI reference model. Example Network-Novell Netware, ARPNET, NSFNET, The Internet.

The Physical Layer : Transmission media : Twisted pair, Baseband and Broadband coaxial cable, Fiber optics; Wireless Transmission : Radio transmission, Microwave transmission, Infrared and light wave transmission; ISDN services; Virtual Circuits verses circuit Switching. Transmission in ATM Networks, Paging Systems, Cordless Telephones, Cellular telephones; Communication Satellite. The Data Link Layer : Framing, Error control, Flow control; Error detection and Correction; Protocols : Simplex stop and wait protocols, One bit sliding window, Using Go- Back n, Example: The Data Link Layer in the Internet. The Medium Access Sub Layer : Framing Static and Dynamic Channel Allocation in LANS and MANs; IEEE standard 802.3 and Ethernet; IEEE standard 802.4 and Token Bus, IEEE 802.4 and token Ring; Bridges; Bridges from 802 x to 802 y, Transparent Bridges, Source Routing Bridges.

The Network Layer : Network layer design issues, shortest path routing. Flooding, Flow based routine, Broadcast routine, Congestion control and

prevention policies; Internet working; connectionless Internet working, Tunneling Internet work Routing, Fragmentation, Firewalls, IP address, Internet control protocols. The Transportation Layer : The transport service; Transport protocols : Addressing, Establishing and releasing a connection; The internet transport protocols : TCP. The Application Layer : Network Security, Electronic mail.

Suggested readings –

1.	Data Communication & Networking	Foruazan TMH	
2.	Computer Networks	Tanenbaum	Pearson
3.	Data & Computer Communications	Stallings	Pearson
4.	Understanding Data Communications Held		Pearson
5.	Networks for Computers	Zheng, Akhtar	Oxford university Press
6.	Scientist & Engineer		

04BCA-103

COMPUTER GRAPHICS

Course/Paper: 04BCA-103
BCA Semester-IV

Development of computer graphics, basic graphics system and standards. Raster scan and Random scan graphics, continual refresh and storagesdisplays, display processors and character generators. Colour display techniques, frame buffer and Bitbit operations concepts in raster graphics. Points/lines and curves/scan conversion/line drawing algorithms/circle and ellipse generation/polygon filling/conic-section generation, anitiliasing. Two-dimensional viewing, basic transformations, coordinate systems, windowing and clipping, segments, interactive picture construction techniques, interactive input/output devices.Three-dimensional concepts, 3-D representation and transformations, 3-D viewing, algorithms for 3-D volumes, Spline curves and surfaces, Fractals, Quadtree and Octree data structures. Hidden lines and surfaces, Randering and Animation.

Suggested readings –

1.	Computer Graphics	Donald, Bacher	Pearson
2.	Computer Graphics: Principles & Practice in C	Foley	Pearson
3.	Computer Graphics	Prajapati	Pragati Prakashan
4.	Computer Graphics	Pachghare	Laxmi Publication
5.	Computer Graphics	Sinha, Vdai	TMH

04BCA-104

OBJECT ORIENTED PROGRAMMING AND C++

Course/Paper: 04BCA-104
BCA Semester-IV

Object-Oriented Analysis and Data Modeling : Object Oriented Concepts, Object oriented Analysis Modeling, Data Modeling.

Object-Oriented Design : Origins of object-Oriented Design, Object Oriented design concepts, Object Oriented Design methods, class and object definition, Refining Operations, Program Components and Interfaces, Annotation for object-oriented Design, Implementation of Detail Design, An alternative object-oriented Design Strategy Integrating OOD with SA/SD. Introduction to OOP and C++ : Advantages of OOP, Need of object Oriented design concepts, Object Oriented Design methods, class and object definition, Refining Operations, Program Components and Interfaces, Annotation for object-oriented Design, Implementation of Detail Design, An alternative object-oriented Design Strategy, Integrating OOD with SA/SD. Introduction to OOP and C++ : Advantages of OOP, Need of object-oriented programming, characteristics of object-oriented languages, C++ and C. C++ Programming Basics : Basic program construction, input/output using cin/count; Preprocessor Directives; Comments, integer, character, float data types manipulators Arithmetic's operators; Library functions. Loops and Decisions : Relational operators, Loops, Decisions, Logical Operators, Precedence, Control statements. Structure and Functions : Structure, Enumerated Data Types, simple functions, Passing arguments to and returning values from functions, Reference Arguments. Overloaded functions, Inline functions, Default Arguments, Variable and Storage classes, Returning by reference. Objects and classes : Specifying & using class & object, Constructors, objects as function arguments. Arrays and Operator Overloading : Array Fundamentals, Arrays as class member data, Arrays of objects, strings, overloading Unary & Binary operators, Data conversion, Pitfalls of overloading & Conversion. Inheritance : Derived class and their constructs, overriding member functions, class hierarchies Public & Private Inheritance, Inheritance levels. Pointers : Pointers with Arrays, functions, strings, pointer to objects, new-delete, Linked-Lists Virtual Functions, files and Streams : Virtual, friend and static function; the this pointer ; streams; string, character, object I/O; I/O with Multiple objects; File pointers; Disk I/O with member function; Error Handling; Redirection; ;command-line Arguments. Suggested Readings: 1. The Waite's Group Object Oriented : Lafore, Rober S. Programming using C++

(Galgotia Publications) 1994 2. Software Engineering, A Practitioner's : Pressman, Rogers S. pproach, (McGraw Hill book Co.) International Edition

1992. 3. Object Oriented Programming in C++ : Barkakati, Nbajoti (Prentice Hall of India) 1996

Suggested readings –

1.	C++: How to program	Deitel	Pearson
2.	Object Oriented Programming With C++	Balagurusamy	TMH
3.	Let us C++	Y. Kanitkar	BPB
4.	Object Oriented Programming With C++	Vikas, Thada	CBC, Jaipur
5.	Object Oriented Programming With C++	Bhave	Pearson/PHI

04BCA-201

PRACTICAL SOFTWARE LAB BASED ON 04BCA-103 & 04BCA-104

Course/Paper: 04BCA-201
BCA Semester-IV

SEMESTER V

05BCA-101

SOFTWARE ENGINEERING

Course/Paper: 05BCA-101
BCA Semester-V

Software Engineering :Definition and paradigms, A generic view of software engineering. Requirements Analysis : Statement of system scope,
isolation of top level processes and entitles and their allocation to physical elements, refinement and review. Analyzing a Problem creating a software specification document, review for correctness, consistency, and completeness. Designing Software Solutions : Refining the software Specification Application of fundamental design concept for data, architectural and procedural designs using software blue print methodology and object oriented design paradigm; creating design document : Review of conformance to software requirements and quality. Software Implementation: Relationship between design and implementation: Implementation issues and programming support environment; Coding the procedural design, Good coding style and review of correctness and readability. Software Maintenance: Maintenance as part of software evaluation, reasons for maintenance, types of maintenance (Perceptive, adoptive, corrective), designing for maintainability, techniques for maintenance.
Comprehensive examples using available software platforms/case tools,
Configuration Management.

Suggested readings –

1.	Software Engineering	Pressman	TMH
2.	Software Engineering	Sommerville	Pearson
3.	Advance Software Engineering	Shalini Puri	Genius, Jaipur

05BCA-102

PROGRAMMING IN VISUAL BASIC

Course/Paper: 05BCA-102

BCA Semester-V

Visual Basic overview and environment. Overview of main screen/Tiltbar/tool bar/tool box. Using menus/customizing a form/building the user
interface/cradling controls/command buttons/Text
boxes/labels/image controls.
Program Elements: Statements in Visual basic/writing codes/dialog box, variables/ types of variables/strings/numbers. Writing procedures. Visual
basic program structure. Project, Forms/modules and frames. Projects with multiple. Forms, Displaying in formation on Forms/picture boxes/Textboxes/Printer objects controlling program flow/built-in functions/user defined functions and procedures. Array, grids and records/sorting and searching of records. Objects/object oriented programming/creating objects/building classes. Simple programmes in visual basic.

Suggested readings –

1.	Visual Basic 6 Black Book	Gurmeet Singh	Laxmi Publication
2.	Mastering Visual Basic 6.0	Erangless BPB	
3.	Visual Basic for Programmers	Deitel	Pearson
4.	Visual Basic 6	Gurmeet Singh (Aman)	Firewall Media
5.	Visual Basic 6.0(The Complete reference)		TMH

05BCA-103

INFORMATION SYSTEMS : ANALYSIS, DESIGN AND IMPLEMENTATION

Course/Paper: 05BCA-103
BCA Semester-V

Overview of System Analysis and Design : Systems Development Life Cycle; concept and Models: requirements determination, logical design,
physical design, test planning, implementation, planning and performance evaluation, communication, interviewing, presentation skills; group dynamics; risk and feasibility analysis; group based approaches ,JAD, structures walkthroughs, and design and code reviews; prototyping; database design software quality metrics; application categories software package evaluation and acquisition. Information Requirement Analysis : Process Modeling with physical logical data flow diagrams, data modeling with logical entity relationship diagrams.
Developing a Proposal : Feasibility study and cost estimation. System Design : Design of input and control, design of output and control, file
design/database design, process, user interface design, prototyping; software constructors; documentation. Application Development Methodologies and CASE tools : Information engineering, structured system analysis and design, and object oriented methodologies for application development data modeling, process modeling, user interface design, and prototyping, use of computer aided software engineering (CASE) tools in the analysis, design and implementation of information systems. Design and Implementation on OO Platform : Object oriented analysis and design through object modeling technique, object modeling, dynamic modeling and functional, object oriented design and object oriented programming systems for implementation, object
oriented data bases. Managerial issues in Software Projects : Introduction to software markets; planning of software projects, size and cost estimates;
project scheduling; measurement of software quality and productivity, ISO and capability maturity models for organizational growth.

Suggested readings –

1.	Management Information Systems	Dharminder Kumar	Excel Books
2.	Management Information System	WS Jawedkar	TMH
3.	Managing with Information	Kanter	PHI
4.	Management Information System	James 'O' Brain	TMH

05BCA-104

TECHNICAL DOCUMENTATION, PRESENTATION & COMMUNICATION SKILLS

Course/Paper: 05BCA-104
BCA Semester-V
TECHNICAL DOCUMENTATION PRESENTATION

- Accuracy & Conciseness in Technical English
- Structure Format etc. for Technical Reports & Thesis
- Comparing & contracting other aspects of short reports & long dissertations.

COMMUNICATION SKILLS

- Communication Process : Concept & importance
- System of Communication : Format & internal, Barrier to effective communication.
- Principles of business communication : Planning & conduct, conversations, interview & Discussion. The preparation of oral statements, effective listening, telephonic communication.
- Written Communication: guides to effective writing for business correspondence including letters and job application. Memorandum, Office orders, Reports.
- Non-Verbal Communication : Importance and Type-cluster and congruency Kinetics Vocal Cues.
- Modern Forms of Communication : Telex, Fax, Telegram Teleconferencing & Email.
- Practical in Business Communication : Report writing, Public Speaking, Seminars, Presentation, Interview, Group Discussion, Effective Listening.

Suggested readings –

1.	Business Communication	JHA	SBD, Meerut
2.	Essencials of Business Communication	Karlohali	S Chand
3.	Business Communication	Madhukar	Vikas Edu., Delhi
4.	Business Communication	Jha	Savera Pub.

05BCA 201

PRACTICAL SOFTWARE LAB BASED ON 05BCA-102 & 05BCA-103

Course/Paper: 05BCA-201
BCA Semester-V

SEMESTER VI

06BCA-101

CLIENT SERVER TECHNOLOGY

Course/Paper: 06BCA-101

BCA Semester-VI

Client-Server Technology and its uses, historical development, client-server technology and heterogeneous computing, Distributed Computer,

Computing plate forms, Microprocessor integration and client server computing, implementations and scalability. Fundamentals of client server design, division of labour, Transition to client-server programming; Interaction of client and server communication Techniques and protocols, implementing client server

applications, multitasking with process and threads. Scheduling implementations, scheduler internals, preemptive Vs non-preemptive systems;

synchronization-understanding and using semaphore implementation in Novell Netware, windows NT and UNIX, Memory-management, Allocation, sharing and manipulating, Client server computing with ORACLE-Overview of DBMS, client server relationships, ORACLE and client server computing, using SQL with SQL, *DBS, the ORACLE tools and design aids, SQL windows & Power Builder.

Suggested readings –

1.	The Essentials Client/Server Survival Guide	Orfoli, Harkey, Edwards	Galgotia, Delhi

06BCA-102

MULTIMEDIA AND ITS APPLICATIONS

Course/Paper: 06BCA-102
BCA Semester-VI

Introduction and Hardware: Definition of Multimedia, CD-ROMs and Multimedia applications, Multimedia requirements-Hardware, Software,

Creativity and organization, Multimedia skills and training Macintosh verses PC, the Macintosh platform,, PC platform, Connections, Memory and storage devices, input devices, output hardware, Communication devices. Multimedia Software: Basic tools, painting and drawing tools, OCR software, Sound editing programs, Animation devices and digital movies and other accessories, Linking multimedia objects, office suites, word processor, spreadsheets presentation tools, Types of Authoring tools card and page based, icon based and time based authoring tools, object oriented tools. Production Building Blocks: Test-using test in Multimedia, Computers and Text, Font editing and Design tools, Hyper media and Hyper text, Sounds-multimedia system sounds MIDI verses Digital Audio, Audio file formats, Working with sound in Windows, Notation interchange file format (NIFF), Adding sound. Production Tips: Image-creation, making still images, images colors, Image, File format, Animation-principles of animation, making workable animations Video, using video, Broadcast video, Standard, Integrating Computer and TVs, shooting and editing Video, using Recording formats, Video tips, Video Compression. Multimedia Project Development and Case Studies: Project planning, Estimating, RPFs and Bid proposals, Designing, Producing acquiring and using contents, Using Telnet, Testing, Preparing for delivery, CD-ROM Technology and Standards. Designing for the Word Wide, working on the Web, Text for the Web, Images for the Web, Sound for the Web, Animation for the Web.

Suggested readings –

1	Multimedia:	Steinmets, Nahrstedt	Pearson
2	Computing, Communication & Application		
3.	Fundamentals of multimedia	Neeraj Bhargava	Shikshak Prakashan, Jaipur
4.	Multimedia making It work	Vaughan	TMH
5.	Multimedia Systems	Buford	Pearson

06BCA-103

PROJECT WORK

Course/Paper: 06BCA-103
BCA Semester-VI

06BCA-201

PRACTICAL SOFTWARE LAB BASED ON 06BCA-101 & 06BCA-102

Course/Paper: 06BCA-201
BCA Semester-VI