

NETAJI SUBHAS UNIVERSITY, JAMSHEDPUR

Course of Study (2018-2021)

Syllabus for Scheme for Bachelor of Computer Application (BCA)

Note: Each paper in each semester is 30 marks for internal Exam and 70 marks for external Exam.

Total marks 100 for each paper.

1 st SEM		2 nd SEM	
Paper-Code	Paper Name	Paper-code	Paper Name
BCA - 101	BusinessCommunication	BCA –201	Data Structure using C
BCA - 102	Introduction to C Programming	BCA–202	Logic Design
BCA – 103	Computer Fundamentals	BCA–203	Operating System
BCA – 104	Mathematics	BCA – 204	Probability & Statistics
LAB – 105	C & IT LAB	LAB -- 205	DS & OS LAB
3 rd SEM		4 th SEM	
BCA–301	Software Engineering	BCA–401	Computer Networking
BCA -- 302	OOPS using C++	BCA–402	Introduction to Java
BCA – 303	Database Management System	BCA–403	Computer Graphics & multimedia
BCA -- 304	Environmental Science	BCA-404	Data Mining
		LAB–405	Graphics Lab
LAB – 305	C++ & DBMS Lab	LAB -406	Java Lab
5 th SEM		6 th SEM	
BCA –501	Web Programming	BCA –601	Management Information System
BCA –502	E-commerce	BCA –602	Elective – 1(PYTHON)
BCA -- 503	Visual Basic	BCA – 603	Elective – 2(SPM)
LAB -- 504	Visual Basic Lab	BCA - 604	PYTHON LAB
LAB -- 505	WP Lab	PROJ –101	PROJECT

Elective 001

E1-Microprocessor

E2-Multimedia

E3- Python

Elective 002

E3-Software Project Management and Quality Assurance

E4-Mobile Computing

BCA – 101 BusinessCommunication

Introduction:

Definition, Objectives, Stages of Communication, Essentials of Good/Effective Communication, Benefits of Good Communication, Gaps in Communication, Communication and Information Technology.

Business Correspondence:

Structure of a Letter, Inquiry Letter, Sales Letter, Order Letter, Complaints, Complaint Handling, Telemarketing.

Government Correspondence:

Noting, Routine Letter, Demi-Official Letter Memorandum, Circular, Telegrams, Newsletter.

Writing Skills:

Report Writing, Scientific Paper Writing, Writing Small Paragraphs & Essays, Composition.

Grammar:

Sentence Structure, Idiomatic Usage of Language, Tenses, Direct & Indirect Parts of Speech, Active & Passive Voice, Vocabulary.

Selected Short Stories:

2-3 classic short stories, 2-3 great short stories by Indian writers.

Preparation for Job:

Writing Applications for Jobs, Preparing Curriculum Vitae, Preparing for Interviews, Preparing for Group Discussions.

Text Books:

1. Organizations - Structures, Processes and Outcomes; Richard h Hall; Prentice Hall India.
2. English for the Secretary; Yvonne Hoban; Tata McGraw Hill.
3. Technical Communication: M. Raman & S. Sharma; Oxford University Press.
4. Business Communication Process and Product: M.E. Guffey; Thomson Learning.

Reference Book:

1. Human Behavior at Work; John W Newstorm& Keith Davis; Tata McGraw Hill.
2. The Most Common Mistakes in English Usage; Thomas Elliot Berry, Tata McGraw Hill
3. Business Communication: R.K. Madhukar; Vikas Publication.

BCA – 102: Introduction to C Programming

History and Importance of C, Sample programming, Basic Structure and execution of C Programmes, Constants, Variables, and Data Types and various types of declarations, Different type operators and Expressions, Evaluation of Expressions, Operator Precedence and Associability, Mathematical Functions.

Managing Input and Output operations, Decision Making and Branching Decision Making and Looping.

One – dimensional Arrays and their declaration and Initializations, Two-dimensional Arrays and their initializations, Multidimensional Arrays, Dynamic Arrays, String Variables, Reading and Writing Strings, Arithmetic Operations on characters, Putting Strings together, Comparison of Two Strings, String – handling functions, Table and other features of Strings. Need and Elements for user –defined Functions, Definition of Functions, Return values and their types, Function calls and Declaration, Arguments and corresponding return values, Functions that return multiple values, Nesting o functions, Recursion, Passing arrays and strings to functions, The Scope, Visibility and Life time of variables.

Defining Structure, Declaring Structure Variable and Accessing Structure Members, Initialization of Structure, Comparing Structure Variables, Operation on Individual Members, Arrays of Structures, Structures within structures, Structures and Functions, Unions, Size of Structures, Bit Fields.

Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialization of Pointer Variables, Accessing a Variable through its Pointer, File Management in C.

Text Book:

1. E. Balagurusamy – Programming in ANSI C, 3rd Edn. , TMH, New Delhi; 2004

Reference:

1. Programming with C, B.S.Gottfried (TMH)
2. Y. Kanetkar – Let us C, 4th Edition, BPB Publication , New Delhi; 2002
3. Y. Kanetkar Pointer in C

BCA –103:Computer Fundamentals

Introduction to Computers

Introduction, Characteristics of computers, Evolution of computers, Generation of Computers, Classification of Computers, The Computer System, Applications of Computers.

Number Systems And Logic Gates

Introduction, Number Systems, Conversion between Number Bases, Arithmetic System, Signed and Unsigned Numbers, Concept of Overflow, Binary Coding, Logic Gates, Boolean algebra, Combination of Logic Gates.

Computer Architecture

Introduction, Central Processing Unit (CPU) Memory, Communication between Various Units of a Computer System, The Instruction Format, Instruction Set, Processor Speed, Multiprocessor Systems.

Primary Memory & Secondary storage

Introduction, Memory Hierarchy, Random Access Memory (RAM), Types of RAM, Read Only Memory (ROM), Types of ROM. Introduction, Classification of Secondary Storage Devices, Magnetic Tape, Magnetic Disk, Optical Disk, Magneto Optical disk.

Input Devices & Output Devices

Introduction, Keyboard, Pointing Devices, Speech Recognition, Digital Camera, Scanners, Optical Scanners. Introduction, Classification of Output, Hard Copy Output Devices, Printers, Plotters, Computer Output Microfilm (COM), Soft Copy Output Devices, Monitors, Audio Output, Projectors, Terminals.

Computer Program, Computer Languages, Computer Software

Introduction, Developing a Program, Algorithm, Flowchart, and Pseudo code (PCode). Introduction, Evolution of Programming Languages, Classification of Programming Languages, Generations of Programming Languages, Features of a Good Programming Language, Selection of a Programming Language.

Software: Definition, Relationship between Software and Hardware, Software Categories, System Software, Application Software, Software Terminology.

Operating System

Introduction, Operating System, Evolution of Operating System, Types of Operating System, Functions of an Operating System, Modern Operating Systems.

Data Communication and Computer Network, Internet Basics

Introduction, Data Communication, Transmission Media, Multiplexing, Switching, Computer Network, Network Topologies, Communication Protocols, Network devices. Introduction, Evolution of Internet, Basic Internet Terms, Getting Connected to Internet, Internet Applications, Electronic Mail: An Introduction How E-Mail Works, Searching the Web (Search Engines), Languages of Internet, Internet and Viruses.

Text Book:

1. Introduction to computer Science, IITL Education solution Limited, R&D Wing, PEARSON Education, Edition 2004

Reference Book:

1. Rajaraman V. – Fundamental of Computers, Prentice Hall of India Pvt. Ltd., New Delhi – 2nd edition, 1996.

BCA –104: Mathematics

Algebra: Sets, Union, intersection, complement, mapping, notion of group, ring, field with simple examples; Polynomials, division algorithm.

Fundamental theorem of classical algebra (without proof), Descartes rule of sign and their application, relation between roots and coefficients,

Symmetric function of roots, transformation of polynomial equations, Cardan's solution of cubic equation.

Matrices, addition and multiplication of matrices, inverse matrix, solution of linear equations in three variables by Cramer's rule, solution of three line linear equations by matrix inversion method.

Differential calculus: Limits of function and continuity, fundamental properties of continuous functions (without proof), geometric meaning of derivative and differential, rules of differentiation, successive differentiation, Rolle's theorem, mean value theorem, Taylor's and Maclaurin's theorems with Cauchy's and Lagrange's forms of remainder, Taylor's series, function of several variables, partial derivatives, total differential.

Euler's theorem on homogeneous functions of two variables.

Introduction to: Application to plane curves.

Integral calculus: Rules of integration of indefinite integrals, solution of definite integrals and their elementary properties, idea of improper integrals.

Dimensional geometry: Transformation of rectangular axes, invariants, general equation of second degree – reduction to standard forms and classification, plane polar equation of a straight line, circle and conic.

Text book:

- 1.Engineering Mathematics, Vol:1 & Vol:2, Sastry,PHI
- 2.University Algebra through 600 Solved Problems, N. S. Gopalakrishnan, New Age International
- 3.Engineering Mathematics, Arumugam, SCITECH

BCA –201: Data Structure using C

Basic concepts of data representation: abstract and system defined types, primitive data structures

Linear data structures and their sequential representation: array, stack, queue, circular queue, dequeue and their operations and applications

Linear data structures and their linked representation: linear link lists, doubly linked lists, linked stack, linked queue and their operations and applications.

Non Linear Data Structures I: Binary trees, binary search trees, representations and operations, thread representations, sequential Representations, graphs and their representation.

Searching Techniques- Linear, Binary

Sorting Techniques-Insertion Sort, Bubble, Selection, Quick, Radix

Introduction of hashing and its different techniques.

Text Books:

- 1.Data Structures in C, Ajay Agarwal, Cyber Tech
- 2.Data Structures Using C, Radhakrishnan&Shrinivasan, ISTE/EXCEL BOOKS
3. C and Data Structure,Radhaganesan,Scitech
- 4.Data Structure Using C & C++, Tannenbaum, PHI
- 5.Mastering Algorithms with C,Loudon,SPD/O'REILLY

BCA – 202 :Logic Design

Binary Systems: Digital Systems, Binary Numbers, Number Base Conversions, Octal and Hexadecimal Numbers, Complements, Signed Binary Numbers, Binary Codes, Binary Storage and Registers, Binary Logic.

Boolean Algebra and Logic Gates: Basic Definitions, Axiomatic Definition of Boolean Algebra, Basic Theorems and Properties of Boolean Algebra, Boolean Functions, Canonical and Standard Forms, Other Logic Operating, Digital Logic Operations, Digital Logic Gates, Integrated Circuits.

Gate - Level Minimization: The Map Method, Four - Variable Map, Five - Variable Map, Product of Sums Simplification, Don't - Care Conditions, NAND and NOR Implementations, Other Two- Level Implements, Exclusive - OR Function.

Combinational Logic: Combinational Circuits? Analysis Procedure, Design Procedure, Binary Adder - Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers

Synchronous Sequential Logic: Sequential Circuits, Latches, Flip-Flops, Analysis of Clocked Sequential Circuits, State Reduction and Assignment, Design Procedure.

Registers and Circuits: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Other Counters.

Memory and Programmable Logic: Introduction, Random-Access Memory, Memory Decoding, Error Detection and Correction, Read-Only Memory, Programmable Logic Array, Programmable Array Logic, Sequential Programmable Devices.

Text Books:

M.Morris Mano- Digital Design, 3rd Edn, Pearson Education, New Delhi - 2005.

Reference Book:

A.B.Marcovitz- Introduction to Logic Design, TMH, New Delhi - 2002.

BCA – 203: Operating System

Introduction: What is an Operating System? Mainframe Systems, Desktop Systems, Multiprocessor Systems, Distributed Systems, Clustered Systems, Real- Time Systems.

Computer-System Structures: Operation, I/O Structure, Storage Structure, Storage Hierarchy.

Operating-System Structures: System Components; Operating-System Services; System Calls; System Programs; System Structure, System Design and Implementation, System Generation.

Processes: Process Concept; Process Scheduling, Operations On Processes.

CPU Scheduling: Basic Concepts; Scheduling Criteria; Scheduling Algorithms.

Storage Management: Memory Management- Backward, Swapping, Contiguous Memory Allocation, Paging, Segmentation, Segmentation with Paging.

File-System Interface: File Concept; Access Methods; Directory Structure; Protection.

Mass-Storage Structure: Disk Structure; Disk Scheduling; Disk Management; Swap-Space Management.

The Linux System: History; Design Principles; Kernel Modules; Process Management; Scheduling; Memory Management; File Systems; Input And Output; Security.

Text book:

1. A. Silberschatz et.al.-Operating System Concepts, 6th Edition, John Wiley Inc., 2003

Reference books:

1. H.M. Deitel -Operating Systems , 6th Edition, Pearson Education, 2006

2. D.M. Dhandhare - Operating Systems, 2nd Edition, Tata McGraw Hill, New Delhi, 2006

3. A. Robbins-Linux Prog.by Examples-Pearson Education, Newdelhi.

BCA – 204:Probability & Statistics

Probability: Introduction, Events & Different Types of Events, Addition & Multiplication Law, Conditional Probability, Bay's Theorem.

Probability Distribution: Random Variables, Probability Function, Binomial Poison & Normal Distribution.

Statistics: Definition, Function & Scope of Statistics.

Measures of Central Tendency: Arithmetic Mean, Weighted A.M., Median, Mode, Geometric & Harmonic Mean and Their Merits & Demerits.

Measures of Variation: Range, The Interquartile Range or Quartile Deviation, Average (Mean), Deviation Standard Deviation, Coefficient of Variation, Skewness, Moments & Kurtosis.

Correlation Analysis: Introduction, Karl Pearson's Coefficient of Correlation, Rank Correlation Coefficient.

Regression Analysis: Difference between Correlation & Regression, Regression Lines, Regression Equations, Regressions Coefficient.

Sampling Distribution: Chi Square (χ^2) Distribution and Its Properties, Chi - Square Test, Application of Chi -Square Distribution: Chi-Square Test for Population Variance, Chi- Square Test of Goodness of Fit.

Text book:

1. S.P. Gupta & M.P. Gupta, "Business Statistics", Sultan Chand & Sons.
2. S.C. Gupta & V.K. Kapoor, "Fundamental of Mathematical Statistics", Sultan Chand & Sons.

BCA – 301: Introduction to Software Engineering

Introduction to Software Engineering: Characteristics, Emergence of Software Engineering, Software Metrics & Models, Process & Product Metrics.

Software Life Cycle Models: Waterfall, Prototype and Spiral Models and their Comparison.

Software Project Management: Size Estimation- LOC and FP Metrics, Cost Estimation-Delphi and Basic COCOMO.

Software Requirements Specification: SRS Documents, their Characteristics and Organization.

Software Design: Classification, Software Design Approaches, Function Oriented Software Design, Structured Analysis- Data flow Diagrams and Structured Design, Introduction to Object Oriented Design.

Coding and Testing of Software: Unit Testing, Block Box Testing, White Box Testing, Debugging, Program Analysis Tools, System Testing.

Software Quality Assurance: ISO 9000 and SEI CMM and their Comparison.

Software Maintenance: Maintenance Process Models and Reverse Engineering, Estimation of Maintenance Costs.

Software Development Tools: Introduction to "Rational Rose".

Text Book:

1. Rajib Mall -Fundamentals of Software Engineering, Prentice Hall of India, New Delhi, 2005

Reference Book:

1. PankajJalote- An Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House, New Delhi,2005
2. Richard Fairley- Software Engineering Concepts, Tata McGraw Hill, New Delhi, 2006.

BCA – 302: OOPS using C++

Basics of Object Oriented programming and software design

C++ object-oriented programming

C++ & ANSI standard C, Predefined classes in C++

Building objects with classes, Introduction to Constructor and its types, Destructor, Defining operations on objects, Using Inheritance in C++, Types of Inheritance, Concepts of Overloading, Virtual functions and Polymorphism.

Introduction of Template and its type.

Introduction of Exception handling.

Different operations on File.

Using C libraries in C++ programs, Using commercial class libraries (Standard template library)

Text book:

1.Object Oriented Programming and C++, Balaguruswamy, TMH

2.Programming in C++, Shah &Thakker, ISTE/EXCEL

3.C++ Programming Today,Johnston,PHI

4.Revolutionary Guide to Object Oriented Programming Using C++,Olshevsky,SPD/WROX

BCA – 303: Database Management System

DATABASE SYSTEM CONCEPTS & ARCHITECTURE:

Data Independence, Schemas, Instances, Database Languages, Database System Environments Data Models, Basic Structure of Oracle System, Storage Organization in Oracle.

DATA MODELING:

Use of High -level Conceptual Data Models, ER Diagrams, Subclasses, Superclasses and Inheritance, Specialization & Generalization, Conceptual Object Modeling using UML Class Diagrams, Knowledge Representation Concepts, Exercises.

RELATIONAL DATA MODEL:

Relational Constraints, Domain Constraints, Key Constraints Referential Integrity Constraints, Relational Algebra, Fundamental Operations of Relational Algebra & their Implementation, Interdependence of Operations, Example Queries.

ER AND EER TO RELATIONAL MAPPING:

Mapping EER Model Concepts to Relation, Tuple Relational Calculus, Domain Relational Calculus Queries.

DATABASE DESIGN:

Functional Dependencies, Irreducible Sets of Dependencies, Nonloss Decomposition, 1st, 2nd & 3rd NF, Dependency Preservation, Boyce Codd NF, Multivalued Dependency & 4th NF, Join Dependency & 5 NF, Domain Key Normal Form, Restriction -Union Normal Form, Denormalization.

DATABASE SECURITY & AUTHORIZATION:

Specifying Privileges, Revoking Privileges, Propagation of Privileges, Statistical Database Security.

TEXT BOOKS:

1. Fundamental of Database Systems- ElmasriNavathe- Pearson Education Asia

2. Database- Principles, Programming and Performance- Parick O' Neil Elizabeth O' Niel, Harcourt Asia PTE Limited

REFERENCES BOOKS:

1. An Introduction to Database Systems- C.J.Date, Addison Wesley, Pearson Education Press

2. Database System Concepts- Abraham Silberschat, Henry F. Korth, S.Sudarshan, Tata McGraw Hill.

BCA – 304: Environmental Science

Ecosystems and how they work: Structure and function of an ecosystem, Types of Eco-Systems, Producers, Consumers and Decomposers, Food chains, food webs and ecological pyramids, Energy flow in the ecosystem.

Introduction, Types, Characteristic features, Structure and Function of Forest ecosystem, Desert ecosystem, Aquatic ecosystems.

Lithosphere, Biosphere and Hydrosphere, Major issues of Biodiversity, Biosphere reserves, National Parks and sanctuaries.

Concept of sustainability and international efforts for environmental protection :

Concept of Sustainable Development, Emergence of Environmental Issues, International Agreement on Environmental Management.

Human Population Growth and its effects on the environment: Problem of Population growth, poverty and environment, Population Explosion, Family Welfare Programme.

Renewable and non-renewable resources: Defining resources, classification of resources, soil and land degradation, economic development and resources use, natural resources accounting.

Energy needs, renewable and non renewable energy resources, Solar energy and its availability, wind power and its potential, hydropower as a clean source of energy, coal, oil, natural gas etc., bio fuel.

Pollution and Public Policy

Water Pollution: Water resources of India, Hydrological Cycle, methods of water conservation and management, ground and surface water pollution. Recycling and management of water and wastewater (domestic and industrial). Water borne diseases and health related issues.

Air Pollution: Air pollution and air pollutants, sources of air pollution, its effect on human Health and vegetations. Green house effect, global warming and climate change. Ambient air quality standards, steps taken by Government to control air pollution.

Noise pollution and its impacts on human health.

Solid Waste: Municipal Solid Waste Management, segregation, disposal methods, composting, land fill sites etc. Hazardous waste management, biomedical waste management.

Environmental Impact Assessment (EIA) and Environmental Management System

(EMS): Introduction to EIA, its impact and case study, environmental information system (EIS), role of information technology in environment.

Indian Environmental laws: Legal framework: Constitutional provisions, the Indian Penal Code, Role of Judiciary in Environmental Protection, Wild Life (Protection) Act, 1972, Water (Prevention and Control of Pollution) Act, 1974, Environment (Protection) Act, 1986, Air (Prevention & Control of Pollution) Act, 1981, Forest Conservation Act

Text Books:

1. Gupta N.C.; *Social Auditing of Environmental Law in India*, edited book, New Century Publications, Delhi-2003.
2. Divan, Shyam and RosenCeranz; *Armin. Environmental Law and Policy in India, Cases, materials and statutes*, second edition, Oxford University Press, 2001.
3. Uberoi, N.K.; *Environmental Management*, Excel Books, New Delhi, 2000.
4. Agarwal, A, Narain; *S. State of India's Environment*, Published by Centre for Science and Environment, New Delhi, 1999.
5. Ambasht, R.S. and P.K. Ambasht; *Environment and Pollution-An Ecological Approach*, third edition, CBS Publishers, New Delhi, 1999.

BCA – 401: Computer Networking

Data Transmission Basic Concepts and Terminology: Data Communication Model, Communication Tasks, Parallel & Serial Transmission, Transmission Models, Transmission Channel, Data Rate, Bandwidth Signal Encoding Schemes, Data Compression, Transmission Impairments, Layering and Design Issues, OSI Model, Services and Standards.

Computer Network: Network Topology, Performance of Network, Network Classification, Advantages & Disadvantages of Network, Transmission Media (guided and unguided), Network Architecture, OSI Reference Model, TCP/IP.

Data Line Devices: Modems, DSL, ADSL.

Data Link Layer: Need for Data Link Control, Frame Design Consideration, Flow Control & Error Control (Flow control mechanism, Error Detection and Correction techniques) Data Link Layer Protocol, and HDLC.

Network Layer: Routing, Congestion control, Internetworking principles, Internet Protocols (IPv4 packet format, Hierarchical addressing sub netting, ARP, PPP), Bridges, Routers.

Physical Layer: Function and interface, physical layer standard, null modem.

Network Security: Security Requirement, Data encryption strategies, authentication protocols, Firewalls.

Basic Applications: Telnet, FTP, NFS, SMTP, SNMP and HTTP.

Text Book:

1. Prakash C. Gupta -Data Communications & Computer Networks, PHI, New Delhi.

Reference Books:

1. William Stallings- Data & Communications, 6th Edition, Pearson Education.

2. Tanenbaum- Computer Networks, 3rd Edition, PHI, New Delhi.

BCA – 402: Introduction to Java

Java Evolution and Overview of Java Language: How Java differs from C and C++, Java and Internet, Java and World Wide Web, Introduction, Simple Java Program, More of Java, An Application with Two Classes, Java Program Structure, Java Tokens, Java Statements, Implementing a Java Program, Java Virtual Machine

Constants, Variables, and Data Types: Introduction, Constants, Variables, Data Types, Declaration of Variables, Giving Values of Variables, Scope of Variables, Symbolic Constants, Type Casting, Getting Values of Variables, Standard Default Values.

Operators and Expressions: Introduction, Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evolution of Expressions, Precedence of Arithmetic Operators, Type Conversion in Expressions, Operator Precedence and Associativity, Mathematical Functions.

Decision Making and Branching: Introduction, Decision Making with if Statement, Simple If Statement, The if... else Statement, Nesting of if ... else Statements, The else if Ladder, The switch Statement, The? Operator.

Decision Making and Looping

Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods, Inheritance: Extending a. Class, Overriding Methods, final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control.

Arrays, String and Vectors: Arrays, One-Dimensional Arrays, Creating an Array, Two-Dimensional Arrays, Strings, Vectors, Wrapper Classes.

Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, implementing Interfaces, Accessing Interface Variables.

Packages: Putting Classes Together: Introduction, Java API Packages, Using system Packages, Naming Conventions, Creating Packages, Accessing a Packages, Using a Package, Adding a Class to a Package, Hiding Classes.

Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, and Synchronization.

Managing Errors and Exceptions: Introduction, Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using finally Statement, Throwing Our Own Exceptions, Using Exceptions for Debugging.

Text Book:

1. E. Balagurusamy, Programming with Java, A Primer Second Edition, Tata McGraw Hill, New Delhi.

Reference Books:

1. H.M.Deitel&P.J.Deitel- JA V A- How to Program, 5th Edn, Pearson Education, New Delhi-2004.

2. P.Naughton and H. Schildt-JAVA: The Complete Reference, TMH, New Delhi 2005.

BCA – 403: Computer Graphics

Overview of Graphics Systems: Video Display Devices, Refresh Cathode Ray Tubes, Raster-Scan and Random-Scan Systems, Input Devices, Hard-Copy Devices and Graphics Software.

Output Primitives: Points, Line Drawing Algorithms (DDA and Bresenham's Line Drawing Algorithm), Circle- Generating Algorithms (Bresenham's and Midpoint Circle Algorithms), Ellipse-Generating Algorithms (Midpoint Ellipse Algorithm only), Filled- Area Primitives: Scan-Line Polygon Fill Algorithm, Boundary-Fill Algorithm, Flood- Fill Algorithm.

Two Dimensional Geometric Transformations: Basic Transformations, Matrix Representations and Homogeneous Coordinates, Composite Transformations, Reflection and Shear, Transformations between Coordinates Systems, Raster Methods for Transformations.

Two-Dimensional Viewing: The Viewing Pipeline, Viewing Coordinate Reference Frame, Window-to-View Port Coordinate Transformation, Clipping- Point, Line (Cohan-0Sutherland Line Clipping and Liang -Barsky Line Clipping and Nicholl-Lee- Nicholl Line Clipping) and Polygon Clipping(Sutherland- Hodgeman Polygon Clipping, Weiler-Atherton Polygon Clipping).

Three Dimensional Geometric Transformations: Translation, Rotation, Scaling, Reflection and Shears, Composite Transformations, Modeling and Coordinate Transformations.

Three Dimensional Viewing: Viewing Pipeline, Viewing Coordinates, Projections and Clipping.

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Text Books:

1. D. Hearn & M. P. Baker -Computer Graphics C Version, 2nd Edn, Pearson Education, New Delhi, 2006

2. J. F. KoegelBuferd -Multimedia Systems, Pearson Education, New Delhi, 2006

Reference Books:

1. R.A. Plastock et.al.- Computer Graphics(Schaums Outline Series), 2nd Edn, TMH, New Delhi, 2006.

BCA – 404: Data Mining

Data Mining – Motivation, Importance of DM Functionalities, Basic Data Mining Tasks, DM Applications, and Social Implications

Differences between Operational Database and Data Warehouse – Multi-dimensional Data Model - From Tables to Data Cubes. Schemas, Measures, DW Implementation – Efficient Computation of Data Cubes.

Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and concept of Hierarchy Generation, Task relevant Data, Background Knowledge, Presentation and Visualization of Discovered Patterns.

Association Rule Mining, Classification and Prediction – Decision Tree, Bayesian Classification Back Propagation, Cluster Analysis, Outlier Analysis.

Web Content Mining, Web Structure Mining, Web Usages Mining, Spatial Mining, Generalization and specialization, Spatial Rules, Spatial Classification and Clustering Algorithms, Temporal Mining, Modeling Temporal Events, Times Series, Pattern Detection, Sequences.

TEXT BOOKS:

1. Margaret H. Dunham, "Data Mining : Introduction and Advance Topics", Pearson Education, First Indian Reprint, 2003
2. Arun K. Pujari, "Data Mining Techniques", University Press (India) Limited, First edition, 2001

BCA –501:Web Programming

Introduction to HTML: HTML, HTML Tags, Commonly Used HTML Commands, Title and Footers, Text Formatting, Text Style, Lists, Adding Graphics to HTML Documents, Tables, Linking Documents, and Frames.

Java Script: Java Script in Web Pages, Advantages of Java Script, Advantages of Java Script, Data Types and Literals, Type Casting, Java Script Array, String, Date Operators and Expression, Conditional Checking, Function, User Defined Function, Validation in web-pages by DOM

Creation of Dynamic Web pages using Servlet and JSP: Dynamic Web Page using servlet, Introduction of JSP, Pages Overview, JSP Scripting, Standard Action, Page Directive, Include Directive.

Text Books:

1. Ivan Bay Ross- Web Enable Commercial Application Using HTML, DHTML, BPB Publication
2. Michel Morrison -HTML and XML for Beginners, PHI, New Delhi- 2001
3. H.M Dietal and P.J Dietal -Java How to Program, PHI, New Delhi- 2005

BCA –502: E-Commerce

Introduction to E-commerce: E-commerce: The revolution is just beginning, The visions and forces behind E-commerce, Understanding E-commerce.

E-commerce business models and concepts: E-commerce business models, Major business-to-consumer (B2C) business models, Major business-to-business (B2B) business models, Business models in emerging E-commerce areas, How the internet and the Web change business.

E-commerce infrastructure: The Internet, Technology background, The internet today, The world wide web.

Building an E-commerce web site: A systematic approach, choosing server software, choosing the hardware for an E-commerce site, other E-commerce site tools.

Security and Encryption: The E-commerce security environment, Security threats in the E-commerce environment, Technology solutions, Policies, Procedures and Laws.

E-commerce payment systems: Payment systems, Credit card E-commerce transactions, E-commerce digital payment systems in the B2C arena, B2B payment systems.

Ethical, Social, and Political issues in E-commerce: Understanding ethical, social, and political issues in E-commerce, Privacy and information rights, Intellectual property rights, Governance, Public safety and welfare.

Text Book:

K.C. Laudon& C.G. Traver, E-commerce, Pearson Education, 2003

Reference Books:

1. R. Kalakota&A.B.Whilston-' Frontiers of Electronic Commerce, Pearson Education- 2006.
2. K.K.Bajaj&D.Nag- E-Commerce, Tata McGraw Hill, New Delhi, Second Edition.

BCA –503: Visual Basic

Integrated Development Environment: Introduction, Integrated Development Environment Overview, Project Window, Toolbox, Form Layout Window, Properties Window, Menu Bar and Tool Bar, A Simple Program: Displaying a Line of Text.

Introduction to Visual Basic Programming: Introduction, Visual Programming and Event-Driven Programming, A Simple Program: Printing a Line of Text on the Form, Another Simple Program: Adding Integers, Memory Concepts, Arithmetic, Operator Precedence, and Decision Making: Comparison Operators.

Control Structures: Introduction, Algorithms, Pseudo code, Introduction to Control Structures, If/Then Selection Structure, If Then/Else Selection Structure, While Repetition Structure, Do While Repetition Structure, Do Until Repetition Structure, Essentials of Computer- Controlled Repetition, For Repetition Structure, Examples Using the For/Next Repetition Structure, Select Case Multiple-Selection Structure, Do/Loop While Repetition Structure, Do/Loop Until Repetition Structure, Exit Do and Exit For Statements, Data Type Boolean, Constant Variables, Logical Operators, Structured Programming Summary, Visual Basic Data Types.

Sub Procedures and Function Procedures: Introduction, Form Modules, Sub Procedures, Function Procedures, Call-by-Value vs. Call-by-Reference, Exit Sub and Exit Function, Storage Classes, Scope Rules.

Arrays: Introduction, Arrays, Declaring Arrays, Examples Using Arrays, Passing Arrays To Procedures, Sorting Arrays, Searching Array: Linear Search and Binary Search,

Multidimensional Arrays, Control Arrays, Dynamic Arrays, Variable Arguments: ParamArray, Function Array.

Strings, Dates and Times: Introduction, Fundamentals of Characters and Strings, String Data Type, String Cop. Catenation with & and +, Comparing Character Strings, Operator Like, Manipulating the Individual Characters in a String: Mid\$, Left\$, Right\$, and InStr, Searching for Substrings in String Using InStr and InStrRev, Ltrim\$, Rtrim\$, and Trim\$, Sting\$ and Space\$, Replacing Substrings in a String with Function Replace, Reversing Strings with Function StrReverse, Converting Strings to Uppercase and Lowercase, Conversion Functions, String Formatting, Date and Time Processing, Date and Time Formatting, String Arrays.

Basic Graphical User Interface Concepts: Introduction, Controls, TextBox Control, MaslEdit Control, ComboBox Control, ListBox Control, Scrollbars, Slider Control, Menus, Pop-Up Menus, Function MsgBox.

Advanced Graphical User Interface Concepts: Introduction, Multiple Document Interface (MDI), Multiple Forms.

Text Book:

Deitel & Deitel & T.R. Nieto-Visual Basic 6 How to Program, Pearson Education, New Delhi-2005.

BCA –601: Management Information System

Introduction to MIS: The Technical and Business Perspective, Organization Structure, Evaluation of MIS through Information System, MIS Organization within the Company.

Information Systems for Decision Making: Evolution of an Information System, Basic Information Systems, Decision Making and MIS, Decision Assisting Information System, Concepts of Balanced MIS Effectiveness and Efficiency Criteria.

Development of MIS: Methodology and Tools/Techniques for Systematic Identification, Evaluation and Modification of MIS.

Advanced MIS: Concepts, Needs and Problems in Achieving Advanced MIS, DSS.

Pitfalls in MIS Development: Fundamental Weakness, Soft Spots in Planning and Design Problems.

Text Book:

Murdic, Rose and Clagett- Information Systems for Modern Management, PHI, New Delhi.

Reference Book:

Laudon-Laudon- Management Information Systems, Pearson Education, New Delhi.

BCA 602:-Elective 001

E1-Cloud Computing

Architecture and Operation: Introduction to 8085, Microprocessor organization/ architecture & its operation Microprocessor based system, memory interfacing, basic interfacing concepts , interfacing I/O devices

Programming the 8085: Programming model, instruction classification , Instruction format, addressing modes, writing assembly level programs-overview of instruction set, timing diagrams data transfer, Arithmetic, Logic branch operations.

Memory Interface: Memory and I/O mapping and interfacing concepts. Interrupts : 8085 vectored interrupts , Restart as Software instructions, additional I/O concepts and processes.

Interfacing of peripherals (I/Os) and applications: Interfacing Keyboard (linear and matrix) and 7 segment display including multiplexes, 8279 programmable keyboard /display interface, 8255 PPI , 8259 PIC , DMA and 8257 DMA controller , Serial communication using 8251, D to Aconverters and interfacing, RS232 serial

Text Books :-

1. Microprocessor Architecture, Programming, and Applications with the 8085" by R Gaonkar

2. Microprocessors: Principles and Applications by A Pal

E2-Information Security & Cyber Laws

Definitions - CD-ROM and the Multimedia Highway - where to use Multimedia - introduction to Making Multimedia: The stages of a Project - What you need - Multimedia Skills and Training : The terms - Macintosh and Windows Production Platforms: Macintosh Veruss PC - The Macintosh Platform - The Windows Multimedia PC platform - Networking Macintosh and Windows Computers - Hardware Peripherals Connection - Memory and Storage Devices - Input Devices - Output Hardware - Communication Devices.

Text Editing and Word Processing Tools - OCR Software - Painting and Drawing Tools - 3-D Modeling and Animation Tools - Image - Editing Tools - Sound Editing Tools - Animation, Video and Digital Movies Tools - Helpful Accessories - Making Instant Multimedia: Linking Multimedia Objects - Office Suites - Word Procçssors - Spread sheets - Databases - Presentation Tools. Multimedia Authoring Tools: Types of Authoring Tools - Card and page Based Authoring Tools - Icon - Based Authorised Tools - Time Based Authoring Tools - Object - Oriented Authoring Tools - Cross - Platform Authoring Notes.

The Power of Meaning - About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext - Sound: The Power of Sound - Multimedia System Sounds - MIDI Versus Digital Atidid - Digital Audio - Making MIDI Audio - Audio File Formats - Working with Sound on the Macintosh - Notation Interchange File Format (NIFF) - Adding Sound to Your multimedia Project - Toward professional Sound - The Red Books standard production tips.

Text Books :

1. Tay Vaughan - Multimedia : Making it work - Fourth Edition - Tata McGraw-Hill Edition - 1999.

2. Walterworth John A - Multimedia Technologies and Application - Ellis Horwood Ltd. - London- 1991.

E3-Python

Overview of Programming: Structure of a Python Program, Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

Creating Python Programs: Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue), Defining Functions, default arguments, Errors and Exceptions.

Iteration and Recursion: Conditional execution, Alternative execution, Nested conditionals, The return statement, Recursion, Stack diagrams for recursive functions, Multiple assignment, The while statement, Implementing 2-D matrices.

Strings and Lists: String as a compound data type, Length, Traversal and the for loop, String slices, String comparison, Looping and counting, List values, Accessing elements, List length, List membership, Lists and for loops, List operations, List deletion. Cloning lists, Nested lists .

Object Oriented Programming: Introduction to Classes, Objects and Methods, Standard Libraries. Overview of stacks and queues.

Text Books:

1.T. Budd, Exploring Python, TMH, 1st Ed, 2011

2.Introduction to computation and programming python, by John Guttag, MIT Press.

Learning Python, Lutz and Ascher, O'Reilly publications

BCA 603 :Elective 002

E3-Software Project Management and Quality Assurance

Introduction and Software Project Planning:

Fundamentals of Software Project Management (SPM), Need Identification, Vision and Scope document, Project Management Cycle, SPM Objectives, Management Spectrum, SPM Framework, Software Project Planning, Planning Objectives, Project Plan, Types of project plan, Structure of a Software Project Management Plan, Software project estimation, Estimation methods, Estimation models, Decision process.

Project Organization and Scheduling

Project Elements, Work Breakdown Structure (WBS), Types of WBS, Functions, Activities and Tasks, Project Life Cycle and Product Life Cycle, Ways to Organize Personnel, Project schedule, Scheduling Objectives, Building the project schedule, Scheduling terminology and techniques, Network Diagrams: PERT, CPM, Bar Charts: Milestone Charts, Gantt Charts.

Project Monitoring and Control

Dimensions of Project Monitoring & Control, Earned Value Analysis, Earned Value Indicators: Budgeted Cost for Work Scheduled (BCWS), Cost Variance (CV), Schedule Variance (SV), Cost Performance Index (CPI), Schedule Performance Index(SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Desk checks, Walkthroughs, Code Reviews, Pair Programming.

Software Quality Assurance and Testing

Testing Objectives, Testing Principles, Test Plans, Test Cases, Types of Testing, Levels of Testing, Test Strategies, Program Correctness, Program Verification & validation, Testing Automation & Testing Tools, Concept of Software Quality, Software Quality Attributes, Software Quality Metrics and Indicators, The SEI Capability Maturity Model (CMM), SQA Activities, Formal SQA Approaches: Proof of correctness, Statistical quality assurance, Cleanroom process.

Project Management and Project Management Tools

Software Configuration Management: Software Configuration Items and tasks, Baselines, Plan for Change, Change Control, Change Requests Management, Version Control, Risk Management: Risks and risk types, Risk Breakdown Structure (RBS), Risk Management Process: Risk identification, Risk analysis, Risk planning, Risk monitoring, Cost Benefit Analysis, Software Project Management Tools: CASE Tools, Planning and Scheduling Tools, MS-Project.

Books:

1. Software Project Management by M.Cotterell
2. Information Technology Project Management
3. Management Information and Control by
4. Software Project Management by S. A.Kelkar

E4-Mobile Computing

Introducing the Mobile Internet: The Mobile Internet is here, The Rise of Mobile data. Key Services for the mobile Internet, Business opportunities.

WAP: the Mobile Internet Standard: Making the Internet Mobile: Challenges and Pitfalls, Overview of the Wireless Application Protocol.

Implementing WAP Services: The Wireless Markup Language, Enhanced WML: WML Script and WTAI, User Interface Design: Making Wireless Applications Easy to Use.

Advanced WAP: Tailoring Content to the Client, Push Messaging, Wireless Telephony Applications, Building and Deploying End-to-End WAP Services. Where Next: The Mobile Internet Future.

Text Books:-

1. SandeepSinghal, "The Wireless Application Protocol, Writing Applications for Mobile Internet", Pearson Education, 2000