NETAJI SUBHAS UNIVERSITY

SCHEME AND SYLLABUS

BCA

(Bachelor of Computer Application)

(Effective from academic session: 2021-22)

SEMESTER-I

SEMESTER - 1								
THEORY		**PERIOD**			**Evaluation Scheme**			**Credit**	**Hours**
CODE	**NAME OF THE PAPER**	**LECTURES**	**TUTORIALS**	**PRACTICALS**	**IA**	**ESE**	**SUB-TOTAL**	**Credit**	**Hours**
BCA 101	**Communicative English**	4	0	0	30	70	100	4	4
BCA 102	**Basic Mathematics**	4	0	0	30	70	100	4	5
BCA 103	**Information Technology & Application**	4	0	0	30	70	100	4	4
BCA 104	**Programming in C**	4	0	0	30	70	100	4	4
BCA 105	**Principle of Programming**	4	1	0	30	70	100	5	5
BCA 106	**LAB 103**	0	0	4	20	30	50	2	4
BCA 107	**LAB 104**	0	0	4	20	30	50	2	4
							Total Credits:	**25**	

IA = Internal Assessment, **ESE** = End Semester Exam

BCA-101 COMMUNICATIVE ENGLISH

Introduction:
Definition, Objectives, Stages of Communication, Essentials of Good/EffectiveCommunication, 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 ofSpeech, Active & Passive Voice, Vocabulary.

Selected Short Stories:
Three short stories from the book, "Added Value: The Life Stories of Indian Business Leaders." by Peter Church, Lotus Collection, New Delhi
   1. Rahul Bajaj/ Bajaj Group (Page No. 20)
   2. Subhash Chandra/ Essel Group/Zee TV (Page No. 40)
   3. NR Narayana Murthy/Infosys (Page No. 148)

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 McGrawHill
   3. Business Communication: R.K. Madhukar; Vikas Publication.

BCA-102 BASIC MATHEMATICS

Matrices: Basic Definitions, matrix operations- addition, multiplication, transpose, Adjoint and inverse. Determination of a square matrix (up to 3X3 matrix)
Statements (Propositions), Logical Operations, Truth Table, Tautologies, Contradiction, Logical Equivalence, Algebra of Propositions, Conditional and bi-conditional Statement, Argument, Logical Implication, Propositional Functions, Quantifiers, Negation of Quantifiers Statements, Normal.

Integers: Properties of integers, order and inequalities, Absolute value, Mathematical Induction, Division Algorithm, Divisibility, Primes, Greatest Common Divisor(GCD),Euclidean Algorithm, Fundamental Theorem of Arithmetic, congruence Relation.

Sets: Introduction, Sets and their representations, empty set, Finite & infinite sets, equal sets, subsets, power sets, universal sets, complements of a set. Cartesian products of sets.

Relations: Types of relations, reflective, symmetric, transitive and equivalence relations. Functions: one to one and onto functions, composite functions, inverse of a function, Binary operations, recursively defined functions.

Text Books:

1. Mathematics Volume I By R.D. Sharma (DhanpatRai Publication)
2. Mathematics Volume II By R.D. Sharma (DhanpatRai Publication)
3. Discrete mathematics By Vinay Kumar (BPB)
4. Discrete mathematical Structure By Dr. K.C. Jain, Dr. M.L. Rawat.
5. Grewal B.S., Higher Engineering Mathematics, Delhi Khanna Publishers.

Reference Book:
1. Engineering Mathematics Volume I By S.S. sastry (Prentice-Hall of India)
2. Discrete mathematics Schaum's Series By Seymour LipSchutz, Marc Lipson (Tata McGraw Hill)

BCA-103 INFORMATION TECHNOLOGY AND APPLICATION

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

Input / Output devices and Memory
Introduction, Keyboard, Pointing Devices, Speech Recognition, Digital Camera, Scanners, Optical Scanners. Classification of Output, Printers, Plotters, Computer Output Microfilm (COM), Monitors,

Audio Output, Projectors. Random Access Memory (RAM),Types of RAM, Read Only Memory (ROM), Types of ROM. Classification of Secondary Storage Devices.

Software Concepts

Introduction to Software, Relationship between Software and Hardware, System Software, Application Software and its types, Utility Software, Algorithm, Flowchart, Program, and Pseudo code (P-Code).Features of a Good Programming Language.

Data Communication and Computer Network

Introduction, Data Communication, Transmission Media, Multiplexing, Switching, Computer Network, Network Topologies, Communication Protocols, Network devices.
World Wide Web, Hypertext, Uniform Resource Locator, Web Browsers, IP Address, Domain Name, Internet Services Providers, Internet Security, Internet Requirements, Web Search Engine, Net Surfing, Internet Services
MS-Office – MS-Word, MS-Excel, Ms-Power Point.

Text Books:
1. V. Rajaraman, Fundamentals Of Computers, 3rd Edition , PHI Publications
2. Nasib S. Gill, Essentials of Computer & Network Technology, Khanna Publications.
3. Deepak Bharihoke, Fundamentals of Information Technology, Excel Books.

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

BCA-104 PROGRAMMING IN C

Fundamentals of C: History of Programming language. Identifier and keywords - data types - constants - Variables - Declarations -Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions. Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue, goto statements - Comma operator.

Functions -Definition - prototypes –types-Passing arguments–Recursion and its types- Storage Classes - Automatic,External, Static, Global and Register Variables.

Arrays - Defining and Processing - Passing arrays to functions - Multi-dimension arrays - Arraysand Strings.

Structures and unions - User defined data types - Passing structures to functions - Self-referentialstructures - Unions - Bit wise operations.

Pointers - Declarations - Passing pointers to Functions - Operation on Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers.

Files: File Handling in C Using File Pointers, Open a file using the function fopen ( ), Close a fileusing the function fclose ( ), Input and Output using file pointers, Character Input and Output in Files, String Input / Output Functions, Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files, Positioning the File Pointer.

Text Book:
1. E. BalaguruSwamy - ANSI C Programming Language, 2nd Edition, PHI, 1988.
2. Kanetkar Y., Let us C, BPB Pub., New Delhi, 1999.
3. ReemaThareja - Programming in C

Reference Book:
1. H. Schildt, C: The Complete Reference, 4th Edition, TMH Edition, 2000.
2. Byron Gotlfried – C Programming; Oxford University Press

BCA-104 PRINCIPLE OF PROGRAMMING

Algorithm; Generalized Algorithms; Avoiding infinite loops in Algorithms-By Counting, by using sentinel value; Different ways of Representing an Algorithm-As a Program, As a Flowchart, As a Pseudo Code; Need for Planning a program before coding, Program Planning Tools- Flow Charts, Structure Charts, Pseudo codes

Programming Techniques: Top down, Bottom up, Modular, Structured, Features, Merits, Demerits and their Comparative study. Importance of use of indentation in programming; structured Programming concepts- Need of careful use of "GoTo Statement"; Sequence Logic, selection logic, logic and iteration Logic, functions

Programming Language: Types –Machine, Assembly and High –level Languages; Scripting and Natural Languages; Their relative advantages and Limitations; High Level Programming Language Tools- Compiler, Linker, Interpreter, Intermediate Language Compiler and Interpreter, Editor

Overview of some popular High Level Languages- FORTRAN, COBOL, BASIC, Pascal, C, C++, JAVA, LISP, PROLOG, PYTHON; Characteristics of a Good Programming Language; Selecting a Language out of many available languages for coding an Application; Subprograms.

Testing and Debugging: Difference; Types of Program errors ; Testing a Program; Debugging a program for Syntax Errors; Debugging a program Logic Errors; Concepts of APIs and Libraries. Program Documentation: Need for Documenting Programs and Software; Forms of Documentation- Comments, System Manual, User Manual; Documentation Standards and Notations

Reference Book:
1. Fundamentals of Programming languages by Ellis Holowits, Springer
2. Fundamentals of Programming languages by Tolani, Pearson
3. Programming Languages: Principles and paradigms by Maurizio Gabbrielli and Simone Martini, Springer

SEMESTER-II

SEMESTER - 2								
THEORY		PERIOD			Evaluation Scheme			Credit	Hours
CODE	NAME OF THE PAPER	LECTURES	TUTORIALS	PRACTICALS	IA	ESE	SUB-TOTAL	Credit	Hours
BCA 201	Data Structure using C	4	0	0	30	70	100	4	4
BCA 202	Computer Organization	4	1	0	30	70	100	5	5
BCA 203	Operating system	4	0	0	30	70	100	4	4
BCA 204	Introduction of Statistics	4	0	0	30	70	100	4	4
BCA 205	System Analysis & Design	4	0	0	30	70	100	4	4
BCA 206	LAB 201	0	0	4	30	70	100	2	4
BCA 207	LAB 203	0	0	4	30	70	100	2	4
							Total Credits:	25	

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BCA-201 DATA STRUCTURE USING C

Primitive and Composite Data Types, Time and Space Complexity of Algorithms, Stack and Primitive Operation on Stack.Applications- Infix, Postfix, Prefix and Recursion. Queues, Primitive Operations on Queues, Circular Queue, De Queue and Priority Queue.

Linked List: Basic Operation on Linked List, Circular Linked List, Doubly Linked List, Linked Representation of Stack and Queue, Application of Linked List.

Trees: Basic Terminology, Binary Trees, Tree Representation as Array and Linked List, Basic Operation on Binary Tree, Traversal of Binary Tree – In Order, Preorder, Post Order, Application of Binary Tree, Threaded Binary Tree, B-Tree and Height Balance Tree(AVL).

Sorting & Searching: Sequential Search, Binary Search, Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, and Comparison of Sorting Methods.

Graph: Introduction to Graphs, Definition, Terminology, Directed, Undirected, Weighted Graph, Representation of Graphs, Graph Traversal – Depth First and Breadth First, Spanning Trees, Minimum Spanning Trees, Shortest Path Algorithm.

Text Book:
1. Expert Data Structure with 'C' By R.B Patel (Khanna Book Publishing Co.(P))
2. Data structure By Lipschutz (Tata McGraw Hill)
3. Data Structure By YashvantKanitkar (BPB)

Reference Book:
1. An Introduction to Data Structures with Applications, By Jean-Paul Tremblay, Paul G.Sarerson (Tata McGraw Hill)
2. Data Structure Using C and C++ By Yedidyahlangsam, Moshe J.Augenstein, Arora M. Tenenbaum (Prentice- Hall India)

BCA-202 COMPUTER ORGANIZATION

Components of a Computer: Processor, Memory, Input-Output Unit, Difference betweenOrganization and Architecture, Hardware Software Interaction. **Number System:** Concept of Bitand Byte, types and conversion. **Complements:** 1's complement, 2's complement. **BinaryArithmetic:** Addition, overflow, subtraction.

Logic gates: Boolean Algebra, Map Simplification. **Combinational circuits**: Half Adder, FullAdder, Decoders, Multiplexers. **Sequential circuits:** Flip Flops- SR, JK, D, T Flip-Flop.

Input Output Organization: Peripheral devices, I/O Interface, Asynchronous Data Transfer,Modes of Data Transfer, Direct Memory Access, I/O Processor.

Memory Organization: Types and capacity of Memory, Memory Hierarchy, Cache Memory,Virtual Memory.

Central Processing Unit: Introduction, General Register Organization, Stack Organization,Instruction Formats, Addressing Mode, Data Transfer and Manipulation, Program Control.

Text Book:

1. Computer System Architecture, By M. Morris Mano (Pearson, Prentice Hall)
2. Carter Nicholas, "Computer Architecture", Schaun outline Sevies , Tata McGraw-Hill.

Reference Book:
1. J.P. Hayes, "Computer Architecture & Organization", Tata McGraw Hill
2. Digital Computer Electronics By Malvino Leach, Jerald A. Brown(McGraw Hill)

BCA-203 OPERATING SYSTEM

Introduction to Operating System, layered Structure, Functions, Types; Process: Concept, Process States, PCB; Threads, System calls; Process Scheduling: types of schedulers, context switch.

CPU Scheduling, Pre-Emptive Scheduling, Scheduling Criteria- CPU Utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling Algorithms- FCFS, SJF, Priority Scheduling, Round Robin Scheduling, MLQ Scheduling.

Synchronization: Critical Section Problem, Requirements for a solution to the critical section problem; Semaphores. Deadlock: Characterization, Prevention, Avoidance, Banker's Algorithm, Recovery from Deadlock.

Memory Management: Physical and virtual address space, Paging, Overview of Segmentation; Virtual   Memory   Management: Concept, Page Replacement techniqueFIFO.Linux: features of Linux, steps of Installation, Shell and kernel, Directory structure.

Linux: Users and groups,file permissions, commands- ls, cat, cd, pwd, chmod, mkdir, rm, rmdir, mv, cp, man, apt, cal, uname, history etc. ; Installing packages; Shell scripts: writing and executing a shell script,shell variables, read and expr, decision making (if else), for and while loops.

Text Book:
1. Operating System Concepts And Design By Milan MilenKovic (Tata Mcgraw Hill)
2. Modern Operating System Andrew S. Tanenbaum, Herbert Bos
3. Linux in easy steps, Mike McGrath, in easy steps limited

Reference Book:
1. Modern Operating System Andrew S. Tanenbaum, Herbert Bos
2. Operating System Principals By Abraham Silberschatz, Peter Baer Galvin (John Wiley And Sons Inc.)
3. Unix concepts and apllications , TMH, Sumitabha Das

BCA-204 INTRODUCTION OF STATISTICS

COMBINATORICS: Permutation and Combination, Repetition and Constrained Repetition,Binomial Coefficients, Binomial Theorem.

Frequency distributions, Histograms and frequency polygons, Measures of central tendency: Mean Mode, Median, Dispersion, Mean deviation and standard deviation. Moments, Skewness, kurtosis,

Elementary probability Theory: Definition, conditional probability, Probability distribution,mathematical expectation'

Theoretical Distribution: Binomial, Poisson and Normal distribution, Relation between thebinomial, poisoned Normal distribution.

Correlation and Regression: Linear Correlation, Measure of Correlation, Least Square Regressionlines.
Curve fitting: Method of least square, least square line, least squares Parabola. Chi-square test:Definition of chi-square; signification test: contingency test, coefficient of contingency.

Basic of sampling theory: Sample mean and variance, students t-test, test of Hypotheses andsignificance, degree of freedom, Z-test, small and large sampling, Introduction to Monte Carlo method.

Text Book:
1. Numerical Analysis: S.S. Sastry; Prentice Hall of India, 1998.
2. Mathematical Statistics: J.N. Kapoor and H.C. Saxena.
3. Mathematical Statistics: M. Ray and H. Sharma

Reference Book:
1. Advanced Engineering Mathematics: H.K. Dass; S. Chand & Co., 9 Revised Edition, 2001.
2. Discrete Mathematics: S.K. Sarkar; S. Chand & Co., 2000.

BCA-204 SYSTEM ANALYSIS AND DESIGN

Introduction of SAD: Fundamentals of System, Important Terms related to Systems, Classification of Systems, Real Life Business Subsystems, Real Time Systems, Distributed Systems, Development of a successful System, and Various Approaches for development of Information Systems. Structured Analysis and Design Approach, Prototype, Joint Application Development.

Systems Analyst-A Profession: Why do Businesses need Systems Analysts? Users, Analysts in various functional areas, Role of a Systems Analyst Duties of a Systems Analyst, Qualifications of a Systems Analyst, Analytical Skills, Technical Skills, Management Skills, Interpersonal Skills.

Process of System Development: Systems Development Life Cycle, Phases of SDLC, Project Identification and Selection, Project Initiation and planning, Analysis, Logical Design, Physical Design, Implementation, Maintenance, Product of SDLC Phases, Approaches to Development, Prototyping, Joint Application Design, Participatory Design.

Introduction to Documentation of Systems: Concepts and process of Documentation, Types of Documentation, System Requirements Specification, System Design Specification, Test Design Document, User Manual, Different Standard for Documentation, Documentation and Quality of Software, Good Practices for Documentation.

Process of System Planning: Fact finding Techniques, Interviews, Group Discussion, Site Visits, Presentations, Questionnaires, Issues involved in Feasibility Study, Technical Feasibility, Operational Feasibility, Economic Feasibility, Legal Feasibility, Cost Benefit Analysis, Preparing Schedule, Gathering Requirements of System, Joint Application Development, Prototyping.

Modular and Structured Design: Design Principles, Top down Design, Bottom Up Design, Structure Charts, Modularity, Goals of Design, Coupling, Cohesion.

System Design and Modeling: Logical and Physical Design, Process Modeling, Data Flow Diagrams, Data Modeling, E-R Diagrams, Process Specification Tools, Decision Tables, Decision Trees, Notation Structured English, Data Dictionary.

Forms and Reports Design: Forms, Importance of Forms, Reports, Importance of Reports,Differences between Forms and Reports, Process of Designing Forms and Reports, Deliverables and Outcomes, Design Specifications, Narrative Overviews, Sample Design, Testing and Usability Assessment, Types of Information, Internal Information, External Information.

Audit and Security of Computer Systems: Introduction, Definition of Audit, Objectives of Audit.

Text Book:
1. Elias M. Award : System Analysis and design Galgotia
2. James A. Sen : Analysis of Design of Information System TMH
3. Rojer S. Pressman : Software Engineering : A Practitioners Approach,MCH
4. PankajJalote : An Integrated Approach to Software Engineering; Springer.

Reference Book :
1. J. L. Whitten & L. D. Bentley : System Analysis and Design Method; TMH
2. J. B. Dixit &Rajkumar : Structured system Analysis and Dseign; University Science Press
3. K.C. Landon & J. P.Landon : MIS ; Macmillan

SEMESTER-III

SEMESTER - 3									
THEORY		**PERIOD**			**Evaluation Scheme**			**Credit**	**Hours**
CODE	**NAME OF THE PAPER**	**LECTURES**	**TUTORIALS**	**PRACTICALS**	**IA**	**ESE**	**SUB-TOTAL**		
BCA 301	**Software Engineering**	4	1	0	30	70	100	5	5
BCA 302	**Object Oriented Programming with C++**	4	0	0	30	70	100	4	4
BCA 303	**Database Management System**	4	0	0	30	70	100	4	4
BCA 304	**Computer Networking**	4	0	0	30	70	100	4	4
BCA 305	**Principle of Management**	4	0	0	30	70	100	4	4
BCA 306	**LAB 302**	0	0	4	30	70	100	2	4
BCA 307	**LAB 303**	0	0	4	30	70	100	2	4
							Total credit:	**25**	

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BCA-301 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-Delphiand Basic COCOMO, Introduction to Halstead's Software Science, Staffing Level Estimation-Putnam's Model. Software Requirements Specification: SRS Documents, their Characteristics and Organization.

Software Design: Classification, Software Design Approaches, Function Oriented SoftwareDesign, 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 Reliability and Quality Assurance: Reliability Metric- Musa's Basic Model.

Software Quality Assurance: ISO 9000 and SEI CMM and their Comparison. SoftwareMaintenance: Maintenance Process Models and Reverse Engineering, Estimation of Maintenance Costs.

Text Book:
1. Rajib Mall -Fundamentals of Software Engineering, Prentice Hall of India, New Delhi, 2005.
2. PankajJalote- An Integrated Approach to Software Engineering, 3rd Edition, Narosa Publishing House, New Delhi, 2005

Reference Book:
1. Richard Fairley- Software Engineering Concepts, Tata McGraw Hill, New Delhi, 2006.
2. Roger S Pressman – Software Engineering; T.M.H

BCA-302 OBJECT ORIENTED PROGRAMMING USING C++

Object Oriented System**:** Difference Between Procedural and Object Oriented Languages, Object Oriented Paradigm, Inheritance, Polymorphism, Abstraction, Encapsulation, Benefits and

Application of Oops. Introduction to C++: Character Set, Token, Constants, Variables and Data Types, Enumeration Types, Operators, Expressions, Operator Precedence and Associatively, Input, Output, Conditional Statements, Scope of Variables, Type Conversion.

Iteration, Break, Continue, goto; Pointers: Introduction, implementation advantage and disadvantage. Functions - Standard and User-Defined Function, Recursive Function, Passing By Value And Reference, Function Overloading Pointer and Function: Function Returning Pointer, Passing pointer as argument, Reference and Functions. Structures and Pointers.

Array: introduction, advantage, One, Two and Multidimensional, Passing Array to a Function,

Array and Pointers: Pointer to One and Two Dimensional Arrays, Array of Pointers. Dynamic Arrays, String Processing. Class: Introduction to Class and Object, Declaring Members and Methods in a class, declaring objects.

Functions and objects, Inline Function, Friend Functions and Its Usage, Abstract Class, Function Overriding. Constructor and Destructor- Needs and Its Usage, Types of Constructors, Destructor, Static Data Members and Methods. Inheritance - Need of Inheritance, Types of Inheritance and its implementation.

Operator Overloading: Need and Rules of Operator Overloading, Overloading Through Member Function and Friend Function. Compile Time and Run Time Polymorphism- Virtual Function and virtual class.

Text Book:
1. E. Balagursamy : Object oriented programming with C++; TMH Publication.
2. Deitel and Deitel : C++ How To Program (currently in its 4th edition); PHI.

Reference Book:
1. Robert Lafore : Object oriented programming in Turbo C++; Galgotia Publication
2. Object Oriented Programming With C++ By E. Balagurusamy (Tata Mcgraw Hill)

BCA-303 DATABASE MANAGEMENT SYSTEM

Introduction: Characteristics of database approach, Advantages, Database system architecture, Overview of different types of Data Models and data independence, Schemas and instances, Database languages and interfaces; E-R Model : Entities, Attributes, keys, Relationships, Roles, Dependencies, E-R Diagram.

Introduction to Relational model, Constraints: Domain, Key, Entity integrity, Referential integrity; Keys: Primary, Super, Candidate, Foreign; Relational algebra: select, project, union, intersection, cross product, different types of join operations.

SQL: Data Types, statements: select, insert, update, delete, create, alter, drop; views, SQL algebraic operations; Stored procedures: Advantages, Variables, creating and calling procedures, if and case statements, loops, Functions, Triggers.

Normalization: Definition, Functional dependencies and inference rules, 1NF, 2NF, and 3NF; Transactions processing: Definition, desirable properties of transactions, serial and non-serial schedules, concept of serializability, conflict-serializable schedules.

Concurrency Control: Two-phase locking techniques, dealing with Deadlock and starvation, deadlock prevention protocols, basic timestamp ordering algorithm; Overview of database recovery techniques; concept of data warehousing.

Text Book:
1. Database System Concepts By Korth, Silberschatz, Sudarshan (Mcgraw Hill)
2. An Introduction to Database Systems ByBipin C. Desai (Galgotia Publication.)
3. SQL, PL/SQL Programming By Ivan Bayross (BPB)
4. Commercial Application Development Using Oracle Developer 2000 By Ivan Bayross (BPB)

Reference Book:
1. Fundamentals of Database Systems,Ramez A. Elmasri, Shamkant Navathe,5th Ed(Pearson)

BCA-304 COMPUTER NETWORKING

Data Communication and Networking: Overview, Network Types, LAN Technologies, Topologies, Models- OSI Model, TCP/IP Stack

Physical Layer: Introduction, Digital Transmission, modes, digital to digital, analog to digital,Analog Transmission, digital to analog, analog to analog, Transmission media, Wireless Transmission, **Switching techniques:** Circuit Switching, Packet switching, Message switching.
Data Link Layer: Introduction, Data Link Control: Line Discipline- Enq/Ack, Poll/Select, **Flow Control:** Stop And Wait, Sliding Window, **Error Control:**ARQ, Stop and Wait ARQ, SlidingWindow ARQ.

Network Layer: Introduction, Network Addressing, Routing, Internetworking, Tunneling, Packet Fragmentation, Network Layer Protocols, ARP, ICMP, IPv4, IPv6

Transport Layer: Introduction, Transmission Control Protocol, User Datagram Protocol

Application Layer: Introduction, Client-Server Model, Application Protocols

Text Book:
1. Computer Forensics by Marie- Helen Maras
2. Data Communication and Networking ByForozan (Tata McGraw Hill)
3. Data Communication And Computer Networks By Dr. Madhulika Jain, Satish Jain (BPB)
4. Data Communication and Computer Networks", Vikas Publishing house Ltd. , 2005.

Reference Book:
1. A. S. Tanenbaum, "Computer Networks", Fourth Edition, Pearson Education.
2. A. Leon-Gracia and I. Widjaja, "Communication Networks", Tata McGraw Hill, 2004.
3. William Stallings, "Data and Computer Communications", Pearson Education, 2008.

BCA-304 PRINCIPLE OF MANAGEMENT

Concept of Management: Definition, Nature, and scope, and overall view of Management,Relation with other social sciences and industry.

Evolution of Management thought:

(A) Classical Theory of Management.
(A1) Bureaucracy- Introduced by Max Weber.

(A2) Scientific Management - F.W. Taylor and his followers.
(A3) Process Management - H. Fayol and others.
(B) Neoclassical Theory of Management.
(B1) Human Relations - B.E. Mayo and Roethlisberger
(B2) Behavioral Science approach - By D. McGregor, A. Maslow & others.
(C) Modern Management theories: Peter Drucker.

Management Functions: Planning, Organizing, Staffing, Directing, and Controlling.

Executive Functions: Production, Marketing, Finance, Personnel.

Planning: Concept, Nature, Importance, Objectives, Policies, Procedure, Strategies andMethod of Decision Making

Organization: Definition, Theories of Organization, Forms of organization, Formal andInformal Organization, Types of Formal Organizations, Departmentation, Line and Staff Relationship, Span of Management, Authority, Responsibility, Delegation, Centralization, Decentralization, Committees.

Staffing: Selection, Recruitment, Training, Development and Welfare

Directing: Leadership and Supervision, Motivation and Communication

Controlling: The Elements, Process and style of Control, Techniques of control. SocialResponsibility of business

Text Books:
1. Koontz and O'Donnel - Principles of Management, Essentials of Management.
2. Theo Haiman - Management Theory and Practice.

Reference Books:
1. P.F. Drucker - Management - Task and Responsibility
2. P.F. Drucker - The Practice of Management
3. S. N. Banerjee - Principles of Management

SEMESTER-IV

SEMESTER - 4									
THEORY		**PERIOD**			**Evaluation Scheme**			**Credit**	**Hours**
CODE	**NAME OF THE PAPER**	**LECTURES**	**TUTORIALS**	**PRACTICALS**	**IA**	**ESE**	**SUB-TOTAL**		
BCA 401	**Java Programming**	4	1	0	30	70	100	5	4
BCA 402	**Discrete mathematics**	4	1	0	30	70	100	5	4
BCA 403	**Environmental Science**	4	1	0	30	70	100	5	5
BCA 404	**Artificial Intelligence**	4	1	0	30	70	100	5	5
BCA 405	**Internet & Web Design**	4	0	0	30	70	100	4	4
BCA 406	**LAB 401**	0	0	4	30	70	100	2	4
BCA 407	**LAB 405**	0	0	4	30	70	100	2	4
							Total Credit:	**28**	

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BCA-401 JAVA PROGRAMMING

Introduction to java: evolution, features, comparison with C and C++; Java program structure;tokens, keywords, constants, variables, data types, type casting, statements, Operators and Expression; Conditional Statements and Loop Statements.

Class: syntax, instance variable, class variables, methods, constructors, overloading ofconstructors and methods. Arrays, Strings and Vectors.

Inheritance: types of inheritance, use of super, method overriding, final class, abstract class, wrapper classes. Interface, Packages and visibility controls.

Errors and Exceptions: Types of errors, Exception classes, Exception handling in java, use oftry, catch, finally, throw and throws. Taking user input, Command line arguments. **Multithreaded Programming:** Creating Threads, Life cycle of thread, Thread priority, Threadsynchronization, Inter-thread communication, implementing the Runnable Interface;

Applet: Applet Life Cycle, Applet Tag, Adding Applet to HTML File; Passing Parameters toApplets, Getting Input From User. **AWT :** AWT Classes, Working With Frame Windows, Working With Graphics, Working With Colour, Adding And Removing Controls, Responding To Controls, Labels, Buttons, Checkbox, Checkbox Group, Choice Control, Lists, Text Field, Text Area. Menus, Dialog Box, Handling Events.

Text Book:
1. Java: A Beginner's Guide, Sixth Edition: A Beginner's Guide by Herbert Schildt, McGraw-Hill Osborne Media
2. Programming in JAVA By E. Balagurusamy (TMH)
3. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)

Reference Book:
1. The Complete reference Java Ninth Edition By Herbert Schildt (Tata McGraw Hill)
2. Core Java Volume I--Fundamentals (9th Edition) by Cay S. Horstmann, Gary Cornell, Prentice Hall

BCA-402 DISCRETE MATHEMATICS

Fundamental- Sets and Subsets, Operations on Sets, Sequences, Properties of Integers, Matrices. **Logic-** Proposition and Logical Operations, Conditional Statements, Methods of Proof,Mathematical Induction.

Mathematical Logic-Statements and Notation, Connectives, Normal Forms, The Theory ofInference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

Counting- Permutations, Combinations, The Pigeonhole Principle, Recurrences Relations.
Relations and Digraphs- Product Sets and Partitions, Relations and Digraphs, Paths in Relationsand Digraphs, Properties of Relations, Equivalence Relations, Manipulation of Relations, Transitive Closure and WarsHall"s Algorithm.

Functions- Definition and Introduction Function for Computer Science, Permutation Functions.

Graph Theory- Basic Concept of Graph Theory, Euler Paths and Circuits, Hamiltonian Paths andCircuits.

Other Relations and Structure- Partially Ordered Sets, Lattices, Finite Boolean Algebras,Functions of Boolean Algebras, Boolean Functions As Boolean Polynomials. **Trees-** Introduction, Undirected Trees, Minimal Spanning Trees.

Semi Group and Groups- Binary Operations Revisited Semi Groups, Products and Quotients ofSemi Groups, Groups, Products and Quotients of Groups.

Text Books:
1. J.P. Tremblay and R. Manohar, "Discrete Mathematical Structure with Applications to Computer Science", TMH, ISBN- 0-07-463113-6
2. Bernard Kolman, Robert C. Busby and Sharon Ross, "Discrete Mathematical Structure", PHI,ISBN- 978-81-203-3689-6

References:
1. E. Goodaire , "Discrete Mathematics with Graph theory", PHI,. ISBN--10: 0131679953
2. J. K. Sharma, "Discrete Mathematics", McMillan, ISBN-9780230322301

BCA-403 ENVIORNMENTAL 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 itsavailability, wind power and its potential, hydropower as a clean source of energy, coal, oil,natural gas etc.

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 vegetation. 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. Agarwal, A, Narain; S. State of India's Environment, Published by Centre for Science and Environment,New Delhi, 1999.
3. Ambasht, R.S. and P.K. Ambasht; Environment and Pollution-An Ecological Approach, third edition, CBS Publishers, New Delhi, 1999.

BCA-404   ARTIFICIAL INTELLIGENCE

UNIT- I

AI History and Applications: Defining AI: Acting Humanly (Turing Test Approach), Thinking Humanly (Cognitive Modeling Approach), Thinking Rationally (laws of thought approach), Acting Rationally (Rational Agent Approach); Foundations of Artificial Intelligence; History of AI, AI techniques, Expert Systems.

UNIT –II

Problem Solving by Search: Defining the problem as a State Space Search Strategies: Breadth – first Search, Depth- first search. Heuristic Search Techniques: Hill Climbing, Simulated Annealing, Best First Search: OR Graphs, Heuristic Functions, A* Algorithm.

UNIT- III

Knowledge Representation: Representations and mappings, Approaches to knowledge Representation, Procedural versus Declarative knowledge; Predictive Logic: Representing Simple facts, Instance and Isa relationships in Logic, Proposition versus Predicate Logic, Computable Functions and Predicates- not, Rules of Inferences and Resolution-not, Forward versus Backward Reasoning, Logic Programming and Horn Clauses

UNIT –IV

AI Programming Languages (PROLOG): Introduction, How Prolog works, Backtracking, CUT and FAIL operators, Built –in Goals, Lists, Search in Prolog.

TEXT BOOKS:
1. Stuart Russel and Peter Norvig: Artificial Intelligence – A Modern Approach, 2nd Edition Pearson Education
2. N.P. padhy: Artificial Intelligence and Intelligent Systems, Oxford Higher Education, Oxford University Press

REFERENCES:
1. George F Luger: Artificial Intelligence- Structures and Strategies for complex Problem Solving, 4th Ed. Pearson Education
2. Ivan Bratko: PROLOG Programming 2nd Ed., Pearson Education

BCA-405 INTERNET AND WEB DESIGN

Basics of Internet: Basic concepts, Communication on the Internet, Internet Domains, Internet Server Identities, Establishing Connectivity on the Internet, Client IP Address, A brief overview of TCP/IP and its Services, Transmission Control Protocol, Web Server, Web Client, Domain Registration.

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, Frames.

Java Script : Java Script in Web Pages, Advantages of Java Script, Advantages of JavaScript, DataTypes and Literals, Type Casting , Java Script Array, Operators and Expression, Conditional Checking , Function, User Defined Function. Understanding XML: SGML, XML, XML and HTML

Creation of Dynamic Web pages using JSP: Dynamic Web Page, 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- 200
3. H.M Dietal and P.J Dietal - Java How to Program, PHI, New Delhi- 2005

Reference Book:
1. Java Server Side Programming -WROX Publication

SEMESTER-V

SEMESTER - 5									
THEORY		PERIOD			Evaluation Scheme			Credit	Hours
CODE	NAME OF THE PAPER	LECTURES	TUTORIALS	PRACTICALS	IA	ESE	SUB-TOTAL		
BCA 501	**Windows Programming using VB.Net**	4	1	0	30	70	100	5	4
BCA 502	**Organizational Behaviour**	4	1	0	30	70	100	5	5
BCA 503	**Python Programming**	4	1	0	30	70	100	5	5
BCA 504	**E-Commerce**	4	0	0	30	70	100	4	4
BCA 505	**Business English**	4	0	0	30	70	100	4	4
BCA 506	**LAB 501**	0	0	4	30	70	100	2	4
BCA 507	**LAB 503**	0	0	4	30	70	100	2	4
							Total Credit:	**27**	

IA = Internal Assessment, **ESE** = End Semester Exam

BCA-501 WINDOWS PROGRAMMING USING VB.NET

Introduction to .Net Technology:
Why .Net? The .Net Framework Class Library, Working with the .Net FCL, Namespaces, Types of a .Net Namespace.

The Visual Basic.Net Language
VB.Net Data types, Operators, Decision Statements- If..then, If..then..else, Select.. Case, Loop Statements- While, Do.. Loop, For .. Next, For Each ..Next, Arrays.

OOP using VB.Net
Object Oriented features- Abstraction, Encapsulation, Polymorphism, Inheritance, Declaring Classes, Implementing Typecasting, Procedures and Functions, Optional arguments, Error handling in Procedures, Properties, Public and Private variables, Types of Properties, Polymorphism, Inheritance, Method Overriding.

Windows Form
Introduction to Class Libraries, Event and Event Handlers, Windows Application, Windows GUI, First Win Forms Application, Controls, Text controls, Selection List Controls, VB.Net is overridden, Some controls with examples. **Error handling In Windows Forms:** Types of Validations, Types of Errors, Exceptions, Classified Runtime based Exceptions. **SDI and MDIApplications:** SDI and MDI interfaces, Characteristics of MDI components, Creating MDI Forms.

Data access with ADO.Net
Overview of Microsoft Database Access Technology, ADO.Net, Creating a Database, ADO.Net Architecture, ADO.Net Class Libraries, Databound Controls, Creating a Data Set, Using XML Data.

Text Books:
1. "Dot Net Technology" by Damini Grover

2. "Visual Basic .NET Programming Black Book" by Steven Holzner

Reference Book:

1. "Programming with C# .Net" by Sathiaseelan J G R
2. "Peter Aitken's Visual Basic .Net Programming" by Peter Aitken

BCA-502 ORGANIZATIONAL BEHAVIOUR

Fundamentals of Organizational Behavior: Nature, Scope, Definition and Goals of Organizational Behavior, Fundamental Concepts of Organizational Behaviour,Models of Organizational Behavior ,Emerging aspects of Organizational Behavior: TQM, Managing Cultural Diversity, Managing the Perception Process

Attitude Values and Motivation: Effects of employee attitudes   Personal   and   Organizational Values Job SatisfactionNatureand Importance of MotivationAchievement Motive Theories of WorkMotivation: Maslow's Need Hierarchy Theory, McGregcrs's Theory 'X' and Theory 'Y'

Personality: Definition of Personality, Determinants of Personality Theories of Personality – Trait and Type Theories, The Big Five Traites, Mytes-Briggs Indicator, Locus of Control, Type A and Type B Assessment of Personality

Work Stress: Meaning and definition of Stress, Symptoms of Stress Sources of Stress: Individual Level, Group Level, Organizational Level Stressors, Extra Organizational Stressors Effect of Stress – Burnouts Stress Management – Individual Strategies, Organizational Strategies Employee Counseling

Group Behavior and Leadership: Nature of Group, Types of Groups Nature and Characteristics of team building, Effective Teamwork Nature of Leadership, Leadership Styles Traits of Effective Leaders

Text Books:

1. Organizational Behavior Text, Cases and Games- By K. Aswathappa, Himalaya
Publishing House, Mumbai, Sixth Edition (2005)

2. Organizational Behavior Human Behavior at Work By J. W. Newstrom, Tata McGraw Hill Publishing Company Limited, New Delhi, 12 th Edition (2007)
3. Organizational Behavior through Indian Philosophy by N.M Mishra Himalaya Publication House.

BCA-503 PYTHON PROGRAMMING

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.
3. Learning Python, Lutz and Ascher, O'Reilly publications

Web Resources:
1. http://files.swaroopch.com/python/byte_of_python.pdf
2. https://www.cs.uky.edu/~keen/115/Haltermanpythonbook.pdf
3. http://greenteapress.com/thinkpython/thinkpython.pdf
4. Python turorials: https://docs.python.org/3/tutorial/index.html

BCA-504 E-COMMERCE

Introduction to E-commerce: E-commerce: The revolution is just beginning, The visions andforces 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 worldwide 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:
1. K.C. Laudon& C.G. Traver, E-commerce, Pearson Education, 2003.

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

BCA-505 BUSINESS ENGLISH

Grammar: Expressing in Style; Words often confused; One-word substitution; Phrases; Idioms.

Advanced Reading: Paraphrasing; interpreting visual information: Tables, Graphs, Charts; Speed Reading. Comprehension and Analysis of the book, "Who Moved My Cheese."

Effective Writing: Business Correspondences: Fax, Email; Taking Notes; Making Inquiries; Placing Orders; Asking & Giving Information; Registering Complaints; Handling Complaints; Drafting Notices; Job Applications; Expository Composition; Argumentative Composition; Techniques of Argument; Logical Presentation; Descriptive Composition; Narrative Composition; Summary Writing, Proposal; Abstract, Agenda, Minutes.

Speaking: Business Etiquettes; Impromptu Speech; Debate; Role Play; Presentations.

Listening: Business-related Conversation Exercises.

Text Book:
1. Spencer Johnson; Who Moved My Cheese; Vermilion; (2009).
2. Balasubramanian, T., A Textbook of English Phonetics for Indian Students; Macmillan India, Delhi (1998).
3. McLearn, Stephen., Writing Essays and Report: A Student's Guide; Viva Books, New Delhi (2011).

Reference Books:
1. Burton Roberts, N., Analysing Sentences; Longman, London (1986).
2. Wekker, H. And Haegeman, L., A Modern Course in English Syntax; Croom Helm, London (1985).

SEMESTER-VI

SEMESTER - 6								
THEORY		**PERIOD**			**Evaluation Scheme**		**Credit**	**Hours**
CODE	**NAME OF THE PAPER**	**LECTURES**	**TUTORIALS**	**PRACTICALS**	**IA**	**ESE**	**SUB-TOTAL**		
BCA 601 (A)	**Advanced web Technology**	5	0	0	30	70	100	5	5
BCA 601 (B)	**Data Mining & Data warehouse**	5	0	0	30	70	100	5	5
BCA 602	**Software Project Management**	5	0	0	30	70	100	5	5
BCA 603	**Project & Viva**	0	0	0	0	0	300	12	0
							Total Credit:	22	

NOTE: -Students have to select one of the papers from 601(A) or 601(B)

IA = Internal Assessment, **ESE** = End Semester Exam

BCA-601 (A) ADVANCED WEB TECHNOLOGY (ELECTIVE-1)

Web2.0 and XHTML: What Is Web 2.0? Introduction to Web 2.0 terms: Search, Content Networks, Blogging, Social Networking, Social Media, Rich Internet Applications (RIAs), Web Services, Introduction to XHTML, Syntactic Differences between HTML and XHTML, Standard XHTML Document Structure, An example of XHTML covering Basic Syntax, Images, Hypertext Links, Lists and Tables, Creation of an XHTML Form, Internal Linking and MetaElements.

Introduction to XML: XML Basics, XML Document Structure, XML Name-spaces, Document Type Definitions, XML Schema, Displaying XML Documents, XSL and CSS.

Programming with Java Script – DOM and Events: The Document Object Model, Element Access in Java Script, Traversing and Modifying a DOM Tree, DOM Collections and Styles, Events, Examples of Event Handling from Body, Button, Text Box and Password Elements, Dynamic Documents using JavaScript – element moving, visibility, positioning etc., Example program (s), Introduction and example of AJAX.

The Server Side Scripting: Server side scripting and its need ,Two-Tier, Three-Tier, N-Tier and Enterprise Architecture, Various Languages / Technologies for server scripting, HTTP Methods (such as GET,POST,HEAD, and so on), Purpose, Technical characteristics, Method selection, Use of request and response primitives, Web container – Tomcat.

JSP – Basics: Basic JSP Life-cycle, JSP Directives and Elements, Script-lets, Expressions, Action Elements, Standard Actions, Comments and Template Data, JSP variables, The out Object, Request, response, sessions and application objects.

JSP Applications: Exceptions and exception handling using JSP, Cookies and sessions, Managing Email using JSP.

JSP Application Development: Applications using JSP, What is JDBC? Need for JDBC, Database Drivers, Connection using JDBC API, Application development and deployment.

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

Reference Book:
1. Java Server Side Programming -WROX Publication
2. David S. Plat : Introducing Microsoft .Net, Microsoft Press.

BCA-601 (B) DATA MINING AND DATA WAREHOUSING (ELECTIVE-2)

Data mining Introduction: Definition, Data mining tasks, Data mining as a step of Knowledge discovery process, Applications of Data mining; Data objects and types of attributes, recalling mean, median, mode and weighted arithmetic mean.

Data quality, overview of data preprocessing. Classification analysis- definition, Overview of various classification techniques; Decision tree induction- working, examples ,specifying attribute test conditions.

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 andTransformation, 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, Baysian Classification Back Propagation, Cluster Analysis, Outlier Analysis.

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

Reference Books:

1. Jiawei I-lan&MichelineKambler, "Data Mining: Concepts and Techniques",
2. Harcourt India Pvt. Ltd., First Indian Reprint, 2001
3. Margaret H. Dunham, "Data Mining : Introduction and Advance Topics", Pearson Education, First Indian Reprint, 2003
4. Arun K. Pujari, "Data Mining Techniques", University Press (India) Limited, First edition, 2001

BCA-602 SOFTWARE PROJECT MANAGEMENT

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 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.

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 PerformanceIndex
(SPI), Interpretation of Earned Value Indicators, Error Tracking, Software Reviews, Types of Review: Inspections, Deskchecks, Walkthroughs, Code Reviews, Pair Programming.

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.

Text Books:
1. Software Project Management by M.Cotterell
2. Information Technology Project Management
3. Software Project Management by S.A Kelkar

BCA-603 PROJECT

Practical Training and Project Work:

1. Project Work may be done individually or in groups(maximum three) in case of bigger projects. However if project is done in group each student must be given a responsibility for a distinct module and care should be taken to monitor the individual student.

2. *Project Work can be carried out in the college or outside with prior permission of college.*

3. The Student must submit a synopsis of the project report to the college for approval. The Project guide can accept the project or suggest modification for resubmission. Only on acceptance of draft project report the student should make the final copies.

GUIDELINES FOR SUBMISSION OF BCA FINAL YEAR (VI Semester) PROJECT

All the candidates of BCA are required to submit a project-report based on the work done by him/her during the major/minor/summer assignment period.

SUMMARY/ABSTRACT

All students must submit a summary/abstract separately with the project report. Summary, preferably, should be of about 3-4 pages. The content should be as brief as is sufficient enough to explain the objective and implementation of the project that the candidate is going to take up. The write up must adhere to the guidelines and should include the following:

- Name / Title of the Project
- Statement about the Problem
- Why is the particular topic chosen?
- Objective and scope of the Project
- Methodology (including a summary of the project)
- Hardware & Software to be used
- Testing Technologies used
- What contribution would the project make?

TOPIC OF THE PROJECT- This should be explicitly mentioned at the beginning of theSynopsis. Since the topic itself gives a peep into the project to be taken up, candidate is advised to be prudent on naming the project. This being the overall impression on the future work, the topic should corroborate the work.

OBJECTIVE AND SCOPE: This should give a clear picture of the project. Objectiveshould be clearly specified. What the project ends up to and in what way this is going to help the end user has to be mentioned.

PROCESS DISCRIPTION: The process of the whole software system proposed, to bedeveloped, should be mentioned in brief. This may be supported by DFDs / Flowcharts to explain the flow of the information.

RESOURCES AND LIMITATIONS: The requirement of the resources for designing anddeveloping the proposed system must be given. The resources might be in form of the hardware/software or the data from the industry. The limitation of the proposed system in respect of a larger and comprehensive system must be given.

CONCLUSION: The write-up must end with the concluding remarks- briefly describinginnovation in the approach for implementing the Project, main achievements and also any other important feature that makes the system stands out from the rest.

Submission Copy:
The Student should submit spiral bound copy of the project report.

Format of the Report:
   (a) Paper:
             The Report shall be typed on White Paper of A4 size.

   (b) Final Submission:
         The Report to be submitted must be original.

   (c) Typing:
         Font: - Times New Roman
         Heading: - 16 pt., Bold
         Subheading: - 14 pt, Bold
         Content: - 12 pt.
         Line Spacing: - 1.5 line.
         Typing Side:-One Side
         Font Color: - Black.

   (d) Margins:

         The typing must be done in the following margin:
         Left: 0.75"

Right:0.75"
Top:1"
Bottom:1"
Left Gutter: 0.5"

(e) Binding:

The report shall be Spiral Bound.

(f) Title Cover:

The Title cover should contain the following details:
Top: Project Title in block capitals of 16pt.

Centre: Name of projectdeveloper'sand Guide name.

Bottom: Name of the university, Year of submission all in block capitals of 14pt letterson separate lines with proper spacing and centering.

(g) Blank sheets:

At the beginning and end of the report, two white blank papers should be provided, one for the Purpose of Binding and other to be left blank.

(h) Content:
I. Acknowledgement

II. Institute/College/Organization certificate where the project is being developed.

III.Table of contents

IV. A brief overview of project
V. Profiles of problem assigned
VI. Study of Existing System
VII. System Requirement
VIII. Project plan

- Team Structure
- Development Schedule
- Programming language and Development Tools