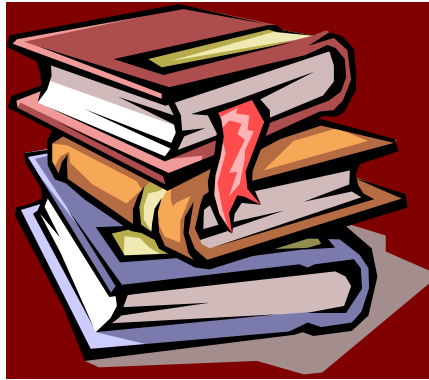


BACHELOR OF COMPUTER APPLICATIONS

(BCA)

THREE YEAR FULL - TIME PROGRAMME



COURSE CURRICULUM



INSTITUTE OF MANAGEMENT STUDIES

(An ISO 9002 Certified Institution)

Lal Quan, G. T. Road, Ghaziabad-201 009
National Capital Region of India

PHONES: 0120 – 2866033, 2866035 **FAX:** 0120-2866034
Email: ims@del2.vsnl.net.in **URL:** [ims – ghaziabad.ac.in](http://ims-ghaziabad.ac.in)

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<p style="text-align: center;"><i>COURSE CONTENT FOR SEMESTER - I</i></p>

BCA 101 : Mathematics-I

Sets : Sets and subsets, finite and infinite sets. Algebra of sets: Union, Intersection, complementation, Demorgan laws. Common applications of algebra of sets.

Functions: Interval and sub-intervals. Definition of function and examples, polynomial, rational, exponential, logarithmic and trigonometric functions. Graph of some simple functions like polynomial (upto 3rd deg), rational trigonometric functions, modulus, function, step functions, rational functions, composite functions.

Sequences: Sequences, subsequences, finite and infinite sequences, limits of sequences, simple cases.

Continuous functions at a point and on an interval, graphs of continuous functions, simple cases

Differentiation of function. Derivative of some common function, polynomial, rational exponential; logarithmic and trigonometric functions.

Integration as inverse process of differentiation, integration of simple functions, method of change of variable and substitution for integrals, definite integrals, simple problems of line integral.

Vectors and Matrices: Vector, vector algebra Addition, subtraction, scalar multiplication, magnitude, vector multiplication. Simple applications of vectors.

Matrices: Matrix, submatrix, types of matrices, such as symmetric, square, diagonal Matrices, singular and nonsingular matrices. Addition, subtraction, multiplication of matrices. Rank of a matrix, Matrix equation, solution by cramer's rule and Gauss elimination method.

BCA- 102 Discrete Mathematics

Mathematical Logic

Statements, Negation operation, Logic connectives and compound statements, conjunction, disjunction, Truth tables, Duality, Conditional and in-conditional statements, valid arguments, Laws of detachments and syllogism, tautologies and fallacies.

Boolean Algebra:

Development of Boolean Algebra, Truth functions, AND, OR, NOT operators Laws of Boolean Algebra, Reducing Boolean expressions, Bodean expressions and logic digrams, Universal laws, Building blocks, Negative logic Minterms, Truth tables and maps, Reduction of maps, Hybrid functions.

Graph Theory

Definition of a graph, finite and infinite graphs, Incidence and degree, null graph Sub graphs, walks, Paths an circuits in a graph, connected graphs, Trees, Properties of Trees, cut sets and cut vertices, Planner graphs, Incidence Matrix, Directed graphs, Fundamental circuits in Diagraphs, Adjacency matrices of a diagraph.

Suggested Readings

1. Elements of Discrete Mathematics (McGraw Hill) 1985 : C.L.Liu
2. Graph Theory with Applications to Engineering and Computer Science (PHI) 1993 : N. Deo
3. Discrete Mathematical Structure for Computer Science (PHI) 1989 : B. Colman and Robert C. Busby
4. Graphs, Networks and Algorithms (Wiley Inter Science, NY) 1989 : M.N.S Swamy and K. Thulasiraman

BCA- 103 Computer Fundamentals and Programming Concepts

Computer Fundamentals: Number system : decimal, octal. binary and hexadecimal. Representation of integers, fixed and floating points, character representation : ASCII, EBSDIC

Functional units of computer, I/O devices, primary and secondary memories.

Programming Fundamentals : Algorithm development, Techniques of problem solving, Flowcharting, stepwise refinement, Algorithms for searching, Sorting (exchange and insertion). Merging of order lists.

Programming in C : Representation of integers, Character, reals. Data types : constants and variables; Arithmetic Experssion, Assignment statement, Logical expression, Sequencing, Alteration and iteration; Arrays, String processing; sub programmes, Recursion, files and Pointers structured programming concepts; Top down design, Development of efficient programs, Program Correctness; Debugging and testing of Progarms.

BCA- 104 Principles of Management

- Conceptual Framework of Management

- Evolution and Foundation of Management Theories
- Study of Management Processes.

Planning, Organising, Directing, Staffing, Communicating, Controlling, Coordinating

- Types of Organisational Structures & Designs.
- Relevance of Computer Applications in Different Functional Areas of

Management Viz : Financial Management, Materials Managements, Production Management, Human Resources Management and Marketing Management.

Suggested Readings :

1. Management Principles & Practices : Parag Diwan & L.N. Agarwal
2. Organisational Behaviour : Fred Luthans
3. Principles & Practices of Management : L.M. Prasad.

QUALIFYING PAPER

ENVIRONMENTAL STUDIES (CODE-008)

UNIT-1: THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Definition, Scope and Importance, Need for Public Awareness.

UNIT-2: NATURAL RESOURCES

- ❖ Renewable and Non-renewable Resources:

NATURAL RESOURCES AND ASSOCIATED PROBLEMS: -

- a) *FOREST RESOURCES:* use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- b) *WATER RESOURCES:* use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
- c) *MINERAL RESOURCES:* use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- d) *FOOD RESOURCES:* World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture,

fertilizer-pesticide problems, water logging, salinity, case studies.

- e) ENERGY RESOURCES: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, case studies
- f) LAND RESOURCES: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- ❖ Role of an individual in conservation of natural resources.
- ❖ Equitable use of resources for sustainable lifestyles

UNIT-3: ECOSYSTEMS

- ❖ Concept of an ecosystem
- ❖ Structure and function of an ecosystem
- ❖ Producers, consumers and decomposers
- ❖ Energy flow in the ecosystem
- ❖ Ecological succession
- ❖ Food chains, food webs and ecological pyramids
- ❖ Introduction, types, characteristic features, structure and function of the following ecosystem: -
 - a) Forest ecosystem
 - b) Grassland ecosystem
 - c) Desert ecosystem
 - d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-4: BIODIVERSITY AND ITS CONSERVATION

- ❖ Introduction – Definition: genetic, species and ecosystem diversity.
- ❖ Biogeographical classification of India
- ❖ Value of biodiversity: Consumptive use, productive use, social, ethical, and aesthetic and option values.
- ❖ Biodiversity at global, National and local levels.
- ❖ India as a mega-diversity nation
- ❖ Hot-spots of biodiversity.
- ❖ Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts.
- ❖ Endangered and endemic species of India
- ❖ Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT-5: ENVIRONMENTAL POLLUTION

DEFINITION:

- ❖ Causes, effects and control measures of: -
 - a) Air pollution
 - b) Water pollution
 - c) Soil pollution
 - d) Marine pollution
 - e) Noise pollution
 - f) Thermal pollution
 - g) Nuclear pollution
- ❖ Solid waste Management: Causes, effects and control measures of urban and industrial wastes.
- ❖ Role of an individual in prevention of pollution
- ❖ Pollution case studies
- ❖ Disaster Management: Floods, earthquake, cyclone and landslides.

UNIT-6: SOCIAL ISSUES AND THE ENVIRONMENT

- ❖ From Unsustainable to Sustainable development
- ❖ Urban problems related to energy.
- ❖ Water conservation, rain water harvesting, watershed management
- ❖ Resettlement and rehabilitation of people; its problems and concerns. Case Studies
- ❖ Environmental Ethics: Issues and possible solutions.
- ❖ Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies.
- ❖ Wasteland reclamation.
- ❖ Consumerism and waste products
- ❖ Environment Protection Act.
- ❖ Air (Prevention and Control of Pollution) Act
- ❖ Water (Prevention and Control of Pollution) Act
- ❖ Wildlife Protection Act
- ❖ Forest Conservation Act
- ❖ Issues involved in enforcement of environmental legislation
- ❖ Public awareness

UNIT-7: HUMAN POPULATION AND THE ENVIRONMENT

- ❖ Population growth, variation among nations.
- ❖ Population explosion: Family Welfare Programme.
- ❖ Environment and human health
- ❖ Human Rights
- ❖ Value Education
- ❖ Women and Child Welfare
- ❖ Role of Information Technology in Environment and human health
- ❖ Case Studies

UNIT-8: FIELD WORK

- ❖ Visit to a local area to document environmental assets-river / forest / grassland / hill / mountain.
- ❖ Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- ❖ Study of common plants, insects, birds.
- ❖ Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours).



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<p><i>COURSE CONTENT FOR SEMESTER - II</i></p>
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BCA-201 : Mathematics-II

The real number system as a complete ordered field, neighbourhood, open and closed sets, limit points of sets.

Limits, continuity, sequential Continuity, algebra of Continous functions, Continuity of composite functions, Contiuity on (a,b) implying boundedness.

Sequenece, convergent sequence, Cauchy Sequence, monotonic sequence, Sub-sequence, Limit superior and limit inferior of sequences.

Infinite series, convergence of series, series of positive terms, comparision tests, Cauchy's n^{th} root test, D' Almberts ratio test, Raabe's test.

Alternating series and Maclaurin's series for $\sin x$, $\cos x$, $\log(1+x)$, $(1+x)^n$. Applications of mean value theorem to monotonic functions and inequalities. Maxima and minima; Indeterminat forms (applications of Maxima and Minima to simple Problems).

Suggested Readings :

1. Engineering Mathematics : E. Kreyzig
2. Higher Engineering Mathematics : B. S. Grewal
3. Differential Calculus : Shanti Narayan

BCA- 202 : Data Structure & Programming with “C”

SECTION A

C-Language Programming :

(At least two questions are to be attempted out of four questions.)

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

SECTION-B

Data Structure :

(At least two questions are to be attempted out of four questions.)

Introduction to Algorithm Design and Data Structure : Design & analysis of algorithm, Topdown and Bottom-up approaches to algorithm design, Analysis of algorithm, Frequency count, Complexity measures in terms of time and space.

Arrays; Stacks and Queues : Representation of array (single & multi dimensional arrays), Address calculation using column & row major ordering, representation of stacks & Queues using arrays and their operations, circular queues, Applications of arrays, stacks & queues, conversions from Infix to postfix & prefix and evolution of prefix expressions using stack.

Linked list: Singly linked list (Operations on list), Linked stacks and queues, polynomial representation and manipulation using linked list. Application : Reading and writing

polynomials, polynomial addition. Circular linked list and doubly linked list, Generalized list, sparse matrix representation using generalized list structure.

Trees : Logical level of binary search tree, BST transversal methods (Preorder, Postorder and Inorder), Recursive and non-recursive algorithms for traverse method, Insertion into and deletion from a BST and their implementation, preorder and Postorder, traversal, Insertion in Threaded tree, B-tree (Insertion and Deletion algorithms).

Searching and Sortings : Sequential and binary searches, Indexed search, Hashing schemes, Sorting methods (Insertion, Selection, Bubble, Quick, Merge and Heap Sorts).

Suggested Readings:

- | | |
|--|---|
| 1. The C Programming Language (PHI) 1990 | : Kerighan and Ritchie |
| 2. Data Structure and Program Design in “ C” (PHI) 1998
Tondo | : Kruse, Leung and |
| 3. How to Program (Prentice Hall) 1996 | : Deitel & Deitel –C |
| 4. Fundamentals of Data Structure (Galgotia Publication) 1994 | : Ellis Horowitz & Sartaj
Sahni |
| 5. Introduction to Data Structures and Algorithm Analysis with
Pascal, 2 nd Edition, (West Publishing Company) | : Thomas L. Naps and G.
J. Pothering |
| 6. Algorithm + Data Structures = Programs (Prentice Hall) 1976 | : N. Writh |

BCA- 203 DBMS (Data Base Management System)

Unit- 1 Overview of Database Management System

- 1.1 Elements of Database System
- 1.2 DBMS and its architecture
- 1.3 Advantage of DBMS (including Data independence)
- 1.4 Types of database users.
- 1.5 Role of Database administrator

Unit –2 Data Models

- 2.1 Brief overview of Hierarchical and Network Model
- 2.2 Detailed study of Relational Model (Relations, properties of Relational Model, Key and Integrity rules)
- 2.3 Comparison of Hierarchical, Network and Relational Model
- 2.4 CODD's rules for Relational Model
- 2.5 E-R diagram

Unit –3 Normalisation

- 3.1 Normalization concepts and update anomalies
- 3.2 Functional dependencies
- 3.3 Multivalued and join dependencies.
- 3.4 Normal Forms : (1 NF, 2 NF, 3NF, BCNF, 4NF, and 5NF)

Unit –4 SQL

- 4.1 SQL Constructs
- 4.2 SQL Join : Multiple Table Queries
- 4.3 Build-in functions
- 4.4 Views and their use
- 4.5 Overviews of ORACLE : (Data definition and manipulation)

Unit –5 Database Security, Integrity and Control

- 5.1 Security and Integrity threats
- 5.2 Defense mechanism
- 5.3 Integrity
- 5.4 Auditing and Control
- 5.5 Recent trends in DBMS- Distributed and Deductive Database

Suggested Readings:

1. An introduction to Database System : C. J. Data Vol. 1
2. An introduction to Database System : Bipin Desai

BCA- 204 Digital Electronics and Computer Organization**Digital Electronics**

(At least one question is to be attempted out of the given two questions)

Logic gates and circuits: Gates (OR, AND, NOR, NAND, XOR & XNOR); Demorgan's laws; Boolean laws, Circuit designing techniques (SOP, POS, K-Maps).

Combinational Building Blocks: Multiplexes; Decoders; Encoders; Adder and subtractor.

Sequential Building Blocks: Flip-Flops (RS, D, JK, Master-slave & T flip-flops); Registers & Shift registers; Counters : Synchronous and Asynchronous (Designing method).

Memories: ROMs, PROMs, EPROMs, RAMs, Hard Disk, Floppy Disk and CD-ROM.

Computer Organization:

(At least two questions are to be attempted out of the given five questions)

Central Processing Unit: Introduction, Register Organization; Stack Organization, Instruction format and addressing modes.

Control Unit : Control memory; Horizontal and vertical formats; Address sequencer; Multiprogramming Vs Hardwired control; RISC Vs CISC.

Arithmetic Algorithms: Integer multiplication using shift and add, Booth's algorithm, Integer division, Floating-point representations and arithmetic algorithms.

I/O Organization: Strobe based and handshake base communication; Vector and priority interrupt; DMA based data transfer.

Memory Organization: Basic cell of static and dynamic RAM; Building large memories using chips; Associative memory; Cache memory organization and Virtual memory organization.

Suggested Readings:

1. Digital Logic and Computer design (PHI).1998 : M.M. Mano
2. Computer Architecture (PHI). 1998. : M.M. Mano
3. Digital Electronics (TMH). 1998. : Malvino and Leach
4. Computer Organization and Architecture (PHI). 1998. : William Stallings
5. Digital fundamentals (Universal Book Stall) 1998 : Floyd, L. Thomas
6. Computer Organization (Mc Graw-Hill, Signapore).: Hamcher, Vranesic and Zaky

BCA-205 : Practical Software Lab based on BCA-202 & BCA-203

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*COURSE CONTENT FOR SEMESTER -
III*

BCA- 301 Computer Oriented Statistical & Optimization Methods

Unit –1 Collection of Data, Sampling & sampling designs, Classification and tabulation of Data, Graphical representation of Data, Measure of Central values, measure of dispersal, Skew, moments and kurtosis correlation and regression

Unit –2 Probability & Probability and distributions (Normal, Poisson's Binomial)

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

Suggested Readings:

- | | |
|--|-------------------------------|
| 1. Probability and Statistical Inference | : Hogg |
| 2. Introduction of Theory of Statistics | : Alexander M. Mood, Franklin |
| 3. Linear Programming | : G. Hadley |
| 4. Mathematical Planning Techniques | : N. S. Kambo |
| 5. Operations Research | : Handy A. Taha |

BCA- 302 Operation Systems

Operating Systems and Resource Manager, Operating system classifications, simple monitor, multiprogramming, timesharing, real time systems, multiprocessor systems, operating systems services.

File System : File supports, access methods, allocation methods-contiguous linked and index allocation; directory systems single level, tree-structure, a cyclic graph and general graph directory, file protection.

CPU Scheduling: Basic scheduling concepts, Process overviews, process states, multiprogramming, Schedulers, and Scheduling algorithms, multiple- processor scheduling.

Memory Management: Bare machine approach , resident monitor, Partition, Paging and segmentation, virtual memory, demand paging.

Deadlocks : Deadlock Characterizations, deadlock prevention, avoidance detection and recovery.

Resource Protections : Mechanisms, Policies & domain of protection, Access matrix and its implementation, dynamic protection structures.

Case Study of Windows-NT: Design Principle; System components, Environment subsystem; File System, Programmer Interface.

Suggested Readings:

- | | |
|--|---------------------------|
| 1. Operating system Concepts
(Addison- Wesley Publishing Company) | : Peterson & Silberschatz |
| 2. Operating Systems (Mc-Graw Hill Book comp.) | : Madnick & Donovan |

3. Modern Operating Systems(PHI) 1998 : Tanenbaum, A. S.
 4. Operating Systems_A Design Approach (TMH) 1997 : Growley, Charles

BCA- 303 Computer Architecture and Assembly Language

Basic computer organisation and design. Instructions and instruction codes. Timing and control/ instruction cycle. Register/ types of register/ general purpose & special purpose registers/ index registers. Register transfer and micro operations/ register transfer instructions. Memory and memory function. Bus/ Data transfer instructions. Arithmetic logic micro-operations/ shift micro-operations. Input/ Output and interrupts. Memory reference instructions. Memory interfacing memory/ cache memory & cache controllers.

Central Processing Unit : General Register Organization/ stacks organizations, instruction formats, addressing modes, Data transfer and manipulation. Program control. Reduced computer, pipeline/RISC pipeline vector processing/array processing.

Computer Arithmetic : Addition, subtraction and multiplication algorithms, division algorithms. Floating point arithmetic operations, decimal arithmetic operations, decimal arithmetic operations.

Input- Output Organization: Peripheral devices. Input/Output interface, ALU Asynchronous Data transfer, mode of transfer, priority interrupts, Direct memory Address (DMA). Input/ Output processor (IOP), serial communication.

Evaluation of Microprocessor: Overview of intel 8085 to intel pentium processors. Basic microprocessor, architecture and interface, internal architecture, external architecture, memory and input/ output interface.

Assembly language, Assembler, Assembly level instructions, macro, use of macros in I/O instructions, program loops, programming arithmetic and logic subroutines, Input-Output programming.

Suggest Readings:

1. Introduction to Microprocessors,
Prentice Hall of India :Leventhal, L.A
2. Introduction to Microprocessors,
Tata McGraw Hill : Mathur, A.P.
3. Prospective in Computer Architecture
Prentice Hall of India : Rao, P.V.S.

BCA- 304 Production and Operations Management

1. Introduction to operations systems.
2. Historical Evolution of Operations Management
3. New Product Development
4. Product Design & Service Design
5. Technology Development Process and Technology Selection.
6. Capacity Planning
7. Process Selection, Product- process Strategy.

8. Facilities Location.
9. Layout Design
10. Production Planning and Control
11. Aggregate Planning
12. Introduction to Materials Management, Material Requirement Planning systems.
13. Application of JIT
14. Statistical Quality Control (SQC), Quality Assurance, Acceptance Sampling & Total Quality Management (TQM)
15. Case Studies on Various topics.

Suggested Readings:

1. Modern Production/Operations Management : Buffa & Sarin
2. Production & Operations Management : Ada & Ebert
3. Production & Operations Management : Chase & Aquilano
4. Principles of Operations Management : Render & Heizer

BCA- 305 Practical Software Lab based on BCA- 302 & BCA- 303

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<i>COURSE CONTENT FOR SEMESTER - IV</i>

BCA-401 : Computer Oriented Financial Management

1. Introduction to Accounting

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

2. Accounting Mechanics

- Cash Book
- Special Journals
- Rules of Debit and Credit
- General Ledger

- Bank Reconciliation Statement

3. Preparation of Financial Statement

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

4. Familiarity with and use of Standard Accounting Package (Ex-Tally)
5. Capital Budgeting : Basic Principles and Techniques.
6. Working capital Management : An over all view.

7. Capital Structure: Planning & Analysis

- Ratio Analysis
- Fund flow statement.
- Cash flow statement

Suggested Readings:

- | | |
|--------------------------------|--------------------|
| 1. Book Keeping | : T.S. Grewal |
| 2. Financial Management | : Prasanna Chandra |
| 3. Ex-Tally Accounting package | : --- |

BCA-402 : Computer Communication Networks

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

The Physical Layer : Transmission media : Twisted pair, Baseband and Broadband coaxial cable, Fiber optics; Wireless Transmission : Radio transmission, Microwave transmission, Infrared and light wave transmission; ISDN services; Virtual Circuits verses circuit Switching. Transmission in ATM Networks, Paging Systems, Cordless Telephones, Cellular telephones; Communication Satellite.

The Data Link Layer : Framing, Error control, Flow control; Error detection and Correction; Protocols : Simplex stop and wait protocols, One bit sliding window, Using Go-Back n, Example: The Data Link Layer in the Internet.

The Medium Access Sub Layer : Framing Static and Dynamic Channel Allocation in LANS and MANs; IEEE standard 802.3 and Ethernet; IEEE standard 802.4 and Token Bus, IEEE 802.4 and token Ring; Bridges; Bridges from 802 x to 802 y, Transparent Bridges, Source Routing Bridges.

The Network Layer : Network layer design issues, shortest path routing. Flooding, Flow based routine, Broadcast routine, Congestion control and prevention policies; Internet working; connectionless Internet working, Tunneling Internet work Routing, Fragementation, Firewalls, IP address, Internet control protocols.

The Transportation Layer : The transport service; Transport protocols : Addressing, Establishing and releasing a connection; The internet transport protocols : TCP.

The Application Layer : Network Security, Electronic mail.

Suggested Readings:

1. Computer Networks, (PHI) 1980 : Tanenbaum, A.S.
2. Data and Computer Communication, Prentice Hall of India, 1995 : Stallings, W.
3. Computer Communication Networks and ISDN Systems, Khanna publishers New Delhi, 1995 : Aggarwal R.B.

BCA-403 : Computer Graphics

Development of computer graphics, basic graphics system and standards. Raster scan and Random scan graphics, continual refresh and storages displays, display processors and character generators. Colour display techniques, frame buffer and Bitbit operations concepts in raster graphics.

Points/lines and curves/scan conversion/line drawing algorithms/circle and ellipse generation/polygon filling/conic-section generation, antialiasing.

Two-dimensional viewing, basic transformations, coordinate systems, windowing and clipping, segments, interactive picture construction techniques, interactive input/output devices.

Three-dimensional concepts, 3-D representation and transformations, 3-D viewing, algorithms for 3-D volumes, Spline curves and surfaces, Fractals, Quadtree and Octree data structures.

Hidden lines and surfaces, Rendering and Animation.

Suggested Readings :

1. Principles of Interactive Computer Graphics 1981. : Newman, W.M. and Spraul, R.F.

BCA-404 : Object Oriented Programming and C++

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

Object-Oriented Design : Origins of object-Oriented Design, Object Oriented design concepts, Object Oriented Design methods, class and object definition, Refining Operations, Program Components and Interfaces, Annotation for object-oriented Design, Implementation of Detail Design, An alternative object-oriented Design Strategy Integrating OOD with SA/SD.

Introduction to OOP and C++ : Advantages of OOP, Need of object Oriented design concepts, Object Oriented Design methods, class and object definition, Refining Operations, Program Components and Interfaces, Annotation for object-oriented Design, Implementation of Detail Design, An alternative object-oriented Design Strategy, Integrating OOD with SA/SD.

Introduction to OOP and C++ : Advantages of OOP, Need of object-oriented programming, characteristics of object-oriented languages, C++ and C.

C++ Programming Basics : Basic program construction, input/output using cin/count; Preprocessor Directives; Comments, integer, character, float data types manipulators Arithmetics operators; Library functions.

Loops and Decisions : Relational operators, Loops, Decisions, Logical Operators, Precedence, Control statements.

Structure and Functions : Structure, Enumerated Data Types, simple functions, Passing arguments to and returning values from functions, Reference Arguments. Overloaded functions, Inline functions, Default Arguments, Variable and Storage classes, Returning by reference.

Objects and classes : Specifying & using class & object, Constructors, objects as function arguments.

Arrays and Operator Overloading : Array Fundamentals, Arrays as class member data, Arrays of objects, strings, overloading Unray & Binary operators, Data conversion, Pitfalls of overloading & Conversion.

Inheritance : Derived class and their constructs, overriding member functions, class hierarchies, Public & Private Inheritance, Inheritance levels.

Pointers : Pointers with Arrays, functions, strings, pointer to objects, new-delete, Linked-Lists Virtual Functions, files and Streams : Virtual, friend and static function; the this pointer ; streams; string, character, object I/O; I/O with Multiple objects; File pointers; Disk I/O with member function; Error Handling; Redirection; ;command-line Arguments.

Suggested Readings:

1. The Waite's Group Object Oriented Programming using C++ : Lafore, Rober S.
(Galgotia Publications) 1994
2. Software Engineering, A Practitioner's Approach, (McGraw Hill book Co.) : Pressman, Rogers S.
International Edition 1992.
3. Object Oriented Programming in C++ : Barkakati, Nabajoti
(Prentice Hall of India) 1996

BCA-405 : Practical Software Lab based on BCA-401, BCA-402, BCA-403

& BCA-404

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COURSE CONTENT FOR SEMESTER -
V

BCA-501 : Software Engineering

Software Engineering : Definition and paradigms, A generic view of software engineering.

Requirements Analysis : Statement of system scope, isolation of top level processes and entities and their allocation to physical elements, refinement and review.

Analyzing a problem, creating a software specification document, review for correctness, consistency, and completeness.

Designing Software Solutions : Refining the software Specification; Application of fundamental design concept for data, architectural and procedural designs using software blue print methodology and object oriented design paradigm; creating design document : Review of conformance to software requirements and quality.

Software Implementation: Relationship between design and implementation: Implementation issues and programming support environment; Coding the procedural design, Good coding style and review of correctness and readability.

Software Maintenance: Maintenance as part of software evaluation, reasons for maintenance, types of maintenance (Perceptive, adoptive, corrective), designing for maintainability, techniques for maintenance.

Comprehensive examples using available software platforms/case tools, Configuration Management.

BCA-502 : Programming in Visual Basic

Visual Basic overview and environment. Overview of main screen/Titlebar/tool bar/tool box. Using menus/customizing a form/building the user interface/creating controls/command buttons/Text boxes/labels/image controls.

Program Elements: Statements in Visual basic/writing codes/dialog box, variables/ types of variables/strings/numbers. Writing procedures. Visual basic program structure. Project, Forms/modules and frames. Projects with multiple. Forms, Displaying information on Forms/picture boxes/Textboxes/Printer objects controlling program flow/built-in functions/user defined functions and procedures. Array, grids and records/sorting and searching of records. Objects/object oriented programming/creating objects/building classes.

Simple programmes in visual basic.

Suggested Reading:

1. Visual Basic for windows 95 : Gary Cornell
Tata Mcgraw-Hill.

BCA-503 : Information Systems : Analysis, Design and Implementation

Overview of System Analysis and Design : Systems Development Life Cycle; concept and Models: requirements determination, logical design, physical design, test planning, implementation, planning and performance evaluation, communication, interviewing, presentation skills; group dynamics; risk and feasibility analysis; group based approaches, JAD, structures walkthroughs, and design and code reviews; prototyping; database design software quality metrics; application categories software package evaluation and acquisition.

Information Requirement Analysis : Process Modeling with physical logical data flow diagrams, data modeling with logical entity relationship diagrams.

Developing a Proposal : Feasibility study and cost estimation.

System Design : Design of input and control, design of output and control, file design/database design, process, user interface design, prototyping; software constructors; documentation.

Application Development Methodologies and CASE tools : Information engineering, structured system analysis and design, and object oriented methodologies for application development data modeling, process modeling, user interface design, and prototyping, use of computer aided software engineering (CASE) tools in the analysis, design and implementation of information systems.

Design and Implementation on OO Platform : Object oriented analysis and design through object modeling technique, object modeling, dynamic modeling and functional, object oriented design and object oriented programming systems for implementation, object oriented data bases.

Managerial issues in Software Projects : Introduction to software markets; planning of software projects, size and cost estimates; project scheduling; measurement of software quality and productivity, ISO and capability maturity models for organizational growth.

Suggested Readings :

1. Introduction of System Analysis and Design (PHI) 1998. : I.T. Haryszkiewicz
2. Analysis and Design of Information Systems (PHI) 1991 : V. Rajaraman
3. Analysis and Design of Information Systems (Tata Mc Graw Hill Book Company) 1986. : J.A. Senn
4. System Analysis and Design Methods (Galgotia Publications Pvt. Ltd.) 1994 : J.K. Whiten. L.D. Bentley, V.M. Beslow

BCA-504 : Technical Documentation, Presentation & Communication Skills

TECHNICAL DOCUMENTATION PRESENTATION

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

COMMUNICATION SKILLS

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

BCA – 505 : Practical Software Lab based on BCA-502 & BCA-503

CHAUDHARY CHARAN SINGH UNIVERSITY, MEERUT
THREE YEARS BACHELOR OF COMPUTER APPLICATIONS PROGRAMME

*COURSE CONTENT FOR SEMESTER -
VI*

BCA-601: CLIENT SERVER TECHNOLOGY

Client-Server Technology and its uses, historical development, client-server technology and heterogeneous computing, Distributed Computer, Computing platform forms, Microprocessor integration and client server computing, implementations and scalability. Fundamentals of client server design, division of labour, Transition to client-server programming; Interaction of client and server communication Techniques and protocols, implementing client server applications, multitasking with process and threads.

Scheduling implementations, scheduler internals, preemptions Vs non-preemptions systems; synchronization-understanding and using semaphores, semaphore implementation in Novell Netware, windows NT and UNIX, Memory-management, Allocation, sharing and manipulating,

Client server computing with ORACLE-Overview of DBMS, client server relationships, ORACLE and client server computing, using SQL with SQL, *DBS, the ORACLE tools and design aids, SQL windows & Power Builder.

Suggested Readings:

1. Novell's Guide to client-server Applications : Jaffrey D. Schank
and Architecture (BPB Public. 1994)
2. Client/server Computing with ORACLE : Salemi
(BPB publications 1994)
3. Client/server computing : Smith and Guengerich
(PHI) 1998)
4. Client/server Computing : Dewire
(Mc Graw-Hill, International)
5. Client/Server Architecture : Bessen
(Mc Graw-Hill, International)
6. Building Client Server Networks : Bay Arinze
(TMH, 1997)
7. Power Builder: a guide for Developing : Banbara & Allen
Client/Server Applications (Mc Graw-Hill
International, 1998)
8. Client/Server System Design and : Vaughn
Implementation (Mc Graw-Hill International
1997)
9. Mastering ORACLE-7 Client/Server : Bobrowski
Computing (TMH 1998)

BCA-602: MULTIMEDIA AND ITS APPLICATIONS

Introduction and Hardware: Definition of Multimedia, CD-ROMs and Multimedia applications, Multimedia requirements-Hardware, Software, Creativity and organization, Multimedia skills and training Macintosh versus PC, the Macintosh platform,, PC platform, Connections, Memory and storage devices, input devices, output hardware, Communication devices.

Multimedia Software: Basic tools, painting and drawing tools, OCR software, Sound editing programs, Animation devices and digital movies and other accessories, Linking multimedia objects, office suites, word processor, spreadsheets presentation tools, Types of Authoring tools card and page based, icon based and time based authoring tools, object oriented tools.

Production Building Blocks: Test-using test in Multimedia, Computers and Text, Font editing and Design tools, Hyper media and Hyper text, Sounds-multimedia system sounds MIDI versus Digital Audio, Audio file formats, Working with sound in Windows, Notation interchange file format (NIFF), Adding sound.

Production Tips: Image-creation, making still images, images colors, Image, File format, Animation-principles of animation, making workable animations Video, using video, Broadcast video, Standard, Integrating Computer and TVs, shooting and editing Video, using Recording formats, Video tips, Video Compression.

Multimedia Project Development and Case Studies: Project planning, Estimating, RPFs and Bid proposals, Designing, Producing acquiring and using contents, Using Telnet, Testing, Preparing for delivery, CD-ROM Technology and Standards.

Designing for the Word Wide, working on the Web, Text for the Web, Images for the Web, Sound for the Web, Animation for the Web.

Suggested Readings:

1. Multimedia Making It Work (TMH) 1997 : Tay Vaughan
2. Multimedia Power Tools, 2 Edition : Peter Jerram and M. Gosney
(Random House Electronic Publishing)

BCA-603: Project Work-II

BCA-604: Practical Software Lab based on BCA-601 & BCA-602