

DIRECTORATE OF DISTANCE EDUCATION

MAHARSHI DAYANAND UNIVERSITY, ROHTAK



New Scheme of Examination

Bachelor of Computer Applications (BCA)

Three Year Programme (Semester System)

First Year

First Semester

Paper	Nomenclature	Marks
BC1001	Computer & Programming Fundamentals	100
BC1002	PC Software	100
BC1003	Mathematics	100
BC1004	Logical Organization of Computer-I	100
BC1005	Practical software Lab – Based on paper BC1002 i.e Word, Excel and Power point	100

Second Semester

Paper	Nomenclature	Marks
BC1006	‘C’ Programming	100
BC1007	Logical Organization of Computer-II	100
BC1008	Mathematical Foundations of Computer Science	100
BC1009	Structured System Analysis and Design	100
BC1010	Practical software Lab – Based on paper BC1006, i.e. ‘C’ Programming	100
BC1011	Environment Studies(qualifying subject)*	100

Important Note: *The Environmental studies is a qualifying paper for all UG Courses. Students are required to qualify the same, otherwise final result will not be declared and degree will not be awarded.

Second Year

Third Semester

Paper	Nomenclature	Marks
BC2001	Introduction to Operating System	100
BC2002	DATA STRUCTURES – I	100
BC2003	Introduction to database system	100
BC2004	Communication skills (English)	100
BC2005	Practical software Lab – Based on paper BC2002 & 2003 using C Language and SQL	100

Fourth Semester

Paper	Nomenclature	Marks
BC2006	WEB DESIGNING	100
BC2007	DATA STRUCTURES – II	100
BC2008	Object Oriented Programming Using C++	100
BC2009	Software Engineering	100
BC2010	Practical software Lab– Based on paper BC2006 & 2008, i.e.HTML and C++ Programming	100

Third Year

Fifth Semester

Paper	Nomenclature	Marks
BC3001	Management information system	100
BC3002	Computer Graphics	100
BC3003	Data Communication and Networking	100
BC3004	Visual Basic	100
BC3005	Practical software Lab– Based on paper BC3002 &3004 i.e. Visual Basic	100

Sixth Semester

Paper Code	Nomenclature	Marks
BC3006	E-Commerce	100
BC3007	Object Technologies & Programming using Java	100
BC3008	Artificial Intelligence	100
BC3009	Introduction to .NET	100
BC3010	Practical software Lab– Based on paper BC3007 & 3009 Using Java & .NET	100

BACHELOR OF COMPUTER APPLICATIONS (BCA)

First Semester

COMPUTER & PROGRAMMING FUNDAMENTALS

PAPER CODE: BC1001

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT-I

Computer Fundamentals: Generations of Computers, Definition, Block Diagram along with its components, characteristics & classification of computers, Limitations of Computers, Human-Being VS Computer, Applications of computers in various fields.

Memory: Concept of primary & secondary memory, RAM, ROM, types of ROM, Cache Memory, flash memory, Secondary storage devices: Sequential & direct access devices viz. magnetic tape, magnetic disk, optical disks i.e. CD, DVD, virtual memory.

UNIT-II

Computer hardware & software: I/O devices, definition of software, relationship between hardware and software, types of software.

Overview of operating system: Definition, functions of operating system, concept of multiprogramming, multitasking, multithreading, multiprocessing, time-sharing, real time, single-user & multi-user operating system.

Computer Virus: Definition, types of viruses, Characteristics of viruses, anti-virus software.

UNIT-III

Computer Languages: Analogy with natural language, machine language, assembly language, high-level languages, forth generation languages, compiler, interpreter, assembler, Linker, Loader, characteristics of a good programming language, Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming, Advantages and disadvantages of Structured programming.

UNIT-IV

Overview of Networking: An introduction to computer networking, Network types (LAN, WAN, MAN), Network topologies, Modes of data transmission, Forms of data transmission, Transmission channels(media), Introduction to internet and its uses, Applications of internet, Hardware and Software requirements for internet, Intranet, Applications of intranet.

REFERENCE BOOKS

1. Balagurusamy E, Computing Fundamentals and C Programming, Tata McGraw Hill.
2. Norton, Peter, Introduction to Computer, McGraw-Hill
3. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
4. Rajaraman, V., Fundamentals of Computers, PHI
5. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.
6. Chhillar, Rajender Singh: Application of IT to Business, Ramesh Publishers, Jaipur.
7. Gill, Nasib Singh: Essentials of Computer and Network Technology, Khanna Books Publishing Co., New Delhi

Note: Latest and additional good books may be suggested and added from time to time.

**PC SOFTWARE
PAPER CODE: BC1002**

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT - I

MS-Windows: Operating system-Definition & functions, basics of Windows. Basic components of windows, icons, types of icons, taskbar, activating windows, using desktop, title bar, running applications, exploring computer, managing files and folders, copying and moving files and folders. Control panel – display properties, adding and removing software and hardware, setting date and time, screensaver and appearance. Using windows accessories.

UNIT - II

Documentation Using MS-Word - Introduction to word processing interface, Toolbars, Menus, Creating & Editing Document, Formatting Document, Finding and replacing text, Format painter, Header and footer, Drop cap, Auto-text, Autocorrect, Spelling and Grammar Tool, Document Dictionary, Page Formatting, Bookmark, Previewing and printing document, Advance Features of MS-Word-Mail Merge, Macros, Tables, File Management, Printing, Styles, linking and embedding object, Template.

UNIT - III

Electronic Spread Sheet using MS-Excel - Introduction to MS-Excel, Cell, cell address, Creating & Editing Worksheet, Formatting and Essential Operations, Moving and copying data in excel, Header and footer, Formulas and Functions, Charts, Cell referencing, Page setup, Macros, Advance features of MS-Excel-Pivot table & Pivot Chart, Linking and Consolidation, Database Management using Excel-Sorting, Filtering, Validation, What if analysis with Goal Seek, Conditional formatting.

UNIT - IV

Presentation using MS-PowerPoint: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

TEXT BOOKS

1. Microsoft Office – Complete Reference – BPB Publication
2. Learn Microsoft Office – Russell A. Stultz – BPB Publication

REFERENCES BOOKS

1. Courter, G Marquis (1999). Microsoft Office 2000: Professional Edition. BPB.
2. Koers, D (2001). Microsoft Office XP Fast and Easy. PHI.
3. Nelson, S L and Kelly, J (2002). Office XP: The Complete Reference. Tata McGraw-Hill.

Note: Latest and additional good books may be suggested and added from time to time.

MATHEMATICS
PAPER CODE: BC1003

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT I

SETS: Sets, Subsets, Equal Sets Universal Sets, Finite and Infinite Sets, Operation on Sets, Union, Intersection and Complements of Sets, Cartesian Product, Cardinality of Set, Simple Applications.

DETERMINANTS: Definition, Minors, Cofactors, Properties of Determinants, Applications of determinants in finding area of triangle, Solving a system of linear equations.

MATRICES: Definition, Types of Matrices, Addition, Subtraction, Scalar Multiplication and Multiplication of Matrices, Adjoint, Inverse, solving system of linear equation Cramer's Rule.

UNIT II

RELATIONS AND FUNCTIONS: Properties of Relations, Equivalence Relation, Partial Order Relation
Function: Domain and Range, Onto, Into and One to One Functions, Composite and Inverse Functions.

LIMITS & CONTINUITY: Limit at a Point, Properties of Limit, Computation of Limits of Various Types of Functions, Continuity of a function at a Point, Continuity Over an Interval, Sum, product and quotient of continuous functions, Intermediate Value Theorem, Type of Discontinuities.

UNIT III

DIFFERENTIATION: Derivative of a function, Derivatives of Sum, Differences, Product & Quotient of functions, Derivatives of polynomial, trigonometric, exponential, logarithmic, inverse trigonometric and implicit functions, Logarithmic Differentiation, Chain Rule and differentiation by substitution.

UNIT IV

INTEGRATION: Indefinite Integrals, Methods of Integration by Substitution, By Parts, Partial Fractions, Integration of Algebraic and Transcendental Functions, Reduction Formulae for simple and Trigonometric Functions, Definite Integral as Limit of Sum, Fundamental Theorem of Integral Calculus, Evaluation of definite integrals by substitution, using properties of definite integral,

TEXT BOOKS

1. C.L.Liu: Elements of Discrete Mathematics, McGraw Hill.
2. Lipschutz, Seymour: Discrete Mathematics, Schaum's Series
3. Babu Ram: Discrete Mathematics, Vinayek Publishers, New Delhi.
4. Trembley, J.P & R. Manohar: Discrete Mathematical Structure with Application to Computer Science, TMH.
5. Kenneth H. Rosen: Discrete Mathematics and its applications, TMH.
6. Doerr Alan & Lévasséur Kenneth: Applied Discrete Structures for Computer Science, Galgotia Pub. Pvt. Ltd.
7. Gersting: Mathematical Structure for Computer Science, WH Freeman & Macmillan.
8. Hopcroft J.E, Ullman J.D.: Introduction to Automata theory, Languages and Computation, Narosa Publishing House, New Delhi.

Note: Latest and additional good books may be suggested and added from time to time.

LOGICAL ORGANIZATION OF COMPUTER-I

PAPER CODE: BC1004

Marks: 100

Time: 3Hrs

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UNIT - I

Information Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode

UNIT - II

Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions – Venn Diagram, Karnaugh Maps.

UNIT - III

Digital Logic: Introduction to digital signals, Basic Gates – AND, OR, NOT, Universal Gates and their implementation – NAND, NOR, Other Gates – XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT implementations of digital circuits, Combinational Logic – Characteristics, Design Procedures, analysis procedures, Multilevel NAND and NOR circuits.

UNIT - IV

Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Parallel binary adder/subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven-Segment Decoder.

TEXT BOOKS

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS

1. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
2. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

Note: Latest and additional good books may be suggested and added from time to time.

Practical- Software lab

PAPER CODE: BC1005

(Based on paper BC1002 i.e. Word, Excel and Power point)

Second Semester
‘C’ PROGRAMMING
PAPER CODE: BC1006

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT-I

Overview of C: History of C, Importance of C, Elements of C: C character set, identifiers and keywords, Data types, Constants and Variables, Assignment statement, Symbolic constant, Structure of a C Program, printf(), scanf() Functions, Operators & Expression: Arithmetic, relational, logical, bitwise, unary, assignment, shorthand assignment operators, conditional operators and increment and decrement operators, Arithmetic expressions, evaluation of arithmetic expression, type casting and conversion, operator hierarchy & associativity.

UNIT-II

Decision making & branching: Decision making with IF statement, IF-ELSE statement, Nested IF statement, ELSE-IF ladder, switch statement, goto statement.

Decision making & looping: For, while, and do-while loop, jumps in loops, break, continue statement, Nested loops.

UNIT-III

Functions: Standard Mathematical functions, Input/output: Unformatted & formatted I/O function in C, Input functions viz. getch(), getche(), getchar(), gets(), output functions viz., putchar(), puts(), string manipulation functions.

User defined functions: Introduction/Definition, prototype, Local and global variables, passing parameters, recursion.

UNIT-IV

Arrays, strings and pointers: Definition, types, initialization, processing an array, passing arrays to functions, Array of Strings. String constant and variables, Declaration and initialization of string, Input/output of string data, Introduction to pointers.

Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime.

Algorithm development, Flowcharting and Development of efficient program in C.

TEXT BOOKS

1. Gottfried, Byron S., Programming with C, Tata McGraw Hill
2. Balagurusamy, E., Programming in ANSI C, 4E, Tata McGraw-Hill

REFERENCE BOOKS

1. Jeri R. Hanly & Elliot P. Koffman, Problem Solving and Program Design in C, Addison Wesley.
2. Yashwant Kanetker, Let us C, BPB.
3. Rajaraman, V., Computer Programming in C, PHI.
4. Yashwant Kanetker, Working with C, BPB.

Note: Latest and additional good books may be suggested and added from time to time.

LOGICAL ORGANIZATION OF COMPUTER-II

PAPER CODE: BC1007

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT - I

Sequential Logic: Characteristics, Flip-Flops, Clocked RS, D type, JK, T type and Master-Slave flip-flops. State table, state diagram and state equations. Flip-flop excitation tables

UNIT - II

Sequential Circuits: Designing registers – Serial Input Serial Output (SISO), Serial Input Parallel Output (SIPO), Parallel Input Serial Output (PISO), Parallel Input Parallel Output (PIPO) and shift registers. Designing counters – Asynchronous and Synchronous Binary Counters, Modulo-N Counters and Up-Down Counters

UNIT - III

Memory & I/O Devices: Memory Parameters, Semiconductor RAM, ROM, Magnetic and Optical Storage devices, Flash memory, I/O Devices and their controllers.

UNIT - IV

Instruction Design & I/O Organization: Machine instruction, Instruction set selection, Instruction cycle, Instruction Format and Addressing Modes. I/O Interface, Interrupt structure, Program-controlled, Interrupt-controlled & DMA transfer, I/O Channels, IOP.

TEXT BOOKS

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS

1. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
2. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

Note: Latest and additional good books may be suggested and added from time to time.

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
PAPER CODE: BC1008

Marks: 100

Time: 3Hrs

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UNIT-I

Basic Statistics: Measure of Central Tendency, Preparing frequency distribution table, Mean, Mode, Median, Measure of Dispersion: Range, Variance and Standard Deviations, Correlation and Regression.

UNIT-II

Algorithm: Algorithms, merits and demerits, Exponentiation, How to compute fast exponentiation. Linear Search, Binary Search, "Big Oh" notation, Worst case, Advantage of logarithmic algorithms over linear algorithms, complexity.

Graph Theory: Graphs, Types of graphs, degree of vertex, sub graph, isomorphic and homeomorphic graphs, Adjacent and incidence matrices, Path Circuit ; Eulerian, Hamiltonian path circuit.

UNIT-III

Tree: Trees, Minimum distance trees, Minimum weight and Minimum distance spanning trees.

Recursion: Recursively defined function.

Merge sort, Insertion sort, Bubble sort, and Decimal to Binary.

UNIT-IV

Recurrence Relations: LHRR, LHRRWCCs, DCRR. Recursive procedures.

Number Theory: Principle of Mathematical induction, GCD, Euclidean algorithm, Fibonacci numbers, congruences and equivalence relations, public key encryption schemes.

REFERENCE BOOKS

1. Gupta S.P. and Kapoor, V.K., Fundamentals of Applied statistics, Sultan Chand & Sons, 1996.
2. Gupta S.P. and Kapoor, V.K., Fundamentals of Mathematical statistics, Sultan Chand and Sons, 1995.
3. Graybill, Introduction to Statistics, McGraw.
4. Anderson, Statistical Modelling, McGraw.
5. Babu Ram : Discrete Mathematics

Note: Latest and additional good books may be suggested and added from time to time.

STRUCTURED SYSTEM ANALYSIS AND DESIGN
PAPER CODE: BC1009

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks..

UNIT-I

Introduction to system, Definition and characteristics of a system, Elements of system, Types of system, System development life cycle, Role of system analyst, Analyst/user interface, System planning and initial investigation: Introduction, Bases for planning in system analysis, Sources of project requests, Initial investigation, Fact finding, Information gathering, information gathering tools, Fact analysis, Determination of feasibility.

UNIT-II

Structured analysis, Tools of structured analysis: DFD, Data dictionary, Flow charts, Gantt charts, decision tree, decision table, structured English, Pros and cons of each tool, Feasibility study: Introduction, Objective, Types, Steps in feasibility analysis, Feasibility report, Oral presentation, Cost and benefit analysis: Identification of costs and benefits, classification of costs and benefits, Methods of determining costs and benefits, Interpret results of analysis and take final action.

UNIT-III

System Design: System design objective, Logical and physical design, Design Methodologies, structured design, Form-Driven methodology(IPO charts), structured walkthrough, Input/Output and form design: Input design, Objectives of input design, Output design, Objectives of output design, Form design, Classification of forms, requirements of form design, Types of forms, Layout considerations, Form control.

UNIT-IV

System testing: Introduction, Objectives of testing, Test plan, testing techniques/Types of system tests, Quality assurance goals in system life cycle, System implementation, Process of implementation, System evaluation, System maintenance and its types, System documentation, Forms of documentation.

REFERENCE BOOKS:

1. Systems Analysis and design BY e.m. aWAD Galgotia Pub.(P) Ltd.
2. Data Management and Data Structures by Loomis (PHI)
3. System Analysis and Design by Elias Awad.
4. Introductory System analysis and Design by Lee Vol. I & II

Note: Latest and additional good books may be suggested and added from time to time.

Practical- Software lab
PAPER CODE: BC1010
(Based on paper BC-1006 i.e. C Programming)

QUALIFYING SUBJECT
ENVIRONMENTAL STUDIES
PAPER CODE: BC1011

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

Unit I

The Multidisciplinary nature of environmental studies. Definition, scope and importance. Need for Public awareness

Unit II Natural Resources

Renewable and non-renewable resources:

Natural resources and associated problems:

Forest resources : Use and over-exploitation : deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits & problems,

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

Food resources: World food problems, changes, caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

Energy resources : Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

Case studies. Land resources : Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of and individual in conservation of natural resources.

Equitable use of resources for sustainable life styles.

Unit III 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 IV Biodiversity and Its Conservation

- Introduction - Definition: Genetic, species and ecosystem diversity.
- Biogeographically classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, 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. (8 lectures)

Unit V 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 hazards

Solid waster 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 VI 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 VII Human population and the Environment

Population growth, variation among nations. Population explosion - Family Welfare Programme. Environment and human health. Human Rights. Value Education.

– HIV/AIDS.

– Woman and Child Welfare.

Role of Information Technology in Environment and human health.

Case Studies.

Unit VIII 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.

References

1. Agarwal, K.C. 2001, Environmental Biology, Nidi Pub. Ltd. Bikaner.
2. Bharucha, Frach, The Biodiversity of India, Mapin Publishing Pvt: Ltd. Ahmedabad 380013, India, Email: mapin(g)jcenet.net (R).
3. Brunner R.C. 1989, Hazardous Waste Incineration, Mc.Graw Hill Inc. 480p.
4. Clark R.S., Marine Pollution, Slanderson Press Oxford (TB).
5. Cunningham, W.P. Cooper, T.H. Qorhani, E. & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Pub. House, Mumbai 1196p.
6. De A.K. Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environment (R).
8. Gleick, H.P., 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press. 473p.
9. Hawkins R.E, Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay. (R)
10. Heywood, V.H. & Watson, R.T 1995. Global Biodiversity Assessment. Cambridge Uni.
11. Jadtrav, H and Bhosale.-VM-. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p.
12. Mckinney, M.L. and Schoch, RM 1996. Environmental Science Systems & Solutions, Web enhanced edition. 639p.
13. Mhaskar A.K., Matter Hazardous, Tekchno-Science Publications (TB).
14. Miller T.G. Jr. Environmental Sciences, Wadsworth Publishing Co. (TB).
15. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p.
16. Rao M.N. and Datta, A.K; 1987. Waste Water Treatment. Oxford & IBH Publ. Co: Pvt. Ltd.
17. Sharma, B.K. 2001, Environmental Chemistry, Goel Publication House, Meerut.
18. Survey of the Environment, The Hindu (M).
19. Townsend C, Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (TB).

Third Semester

Introduction to Operating System PAPER CODE: BC2001

Marks: 100

Time: 3Hrs

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UNIT – I

Fundamentals of Operating system: Introduction to Operating System, its need and operating System services, Early systems, Structures - Simple Batch, Multi programmed, timeshared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems.

Process Management: Process concept, Operation on processes, Cooperating Processes, Threads, and Inter-process Communication.

UNIT-II

CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms : FCFS, SJF, Round Robin & Queue Algorithms.

Deadlocks: Deadlock characterization, Methods for handling deadlocks, Banker's Algorithm.

UNIT-III

Memory Management: Logical versus Physical address space, Swapping, Contiguous allocation, Paging, Segmentation.

Virtual Memory: Demand paging, Performance of demand paging, Page replacement, Page replacement algorithms, Thrashing.

UNIT-IV

File management: File system Structure, Allocation methods: Contiguous allocation, Linked allocation, Indexed allocation, Free space management: Bit vector, Linked list, Grouping, Counting.

Device Management: Disk structure, Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, C-LOOK.

Suggested Readings

1. Abraham Silberschatz, Peter B. Galvin, "Operating System Concepts", Addison-Wesley publishing. Co., 7th. Ed., 2004.
2. Nutt Gary, "Operating Systems", Addison Wesley Publication, 2000.
3. Andrew S. Tannenbaum, "Modern Operating Systems", Pearson Education Asia, Second Edition, 2001.
4. William Stallings, "Operating Systems, "Internals and Design Principles", 4th Edition, PH, 2001.
5. Ekta Walia, "Operating Systems Concepts", Khanna Publishes, New Delhi, 2002.

Note: Latest and additional good books may be suggested and added from time to time.

DATA STRUCTURES – I

PAPER CODE: BC2002

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

Introduction: Elementary data organization, Data Structure definition, Data type vs. data structure, Categories of data structures, Data structure operations, Applications of data structures, Algorithms complexity and time-space tradeoff, Big-O notation.

Strings: Introduction, Storing strings, String operations, Pattern matching algorithms.

UNIT – II

Arrays: Introduction, Linear arrays, Representation of linear array in memory, address calculations, Traversal, Insertions, Deletion in an array, Multidimensional arrays, Parallel arrays, Sparse arrays.

Linked List: Introduction, Array vs. linked list, Representation of linked lists in memory, Traversal, Insertion, Deletion, Searching in a linked list, Header linked list, Circular linked list, Two-way linked list, Threaded lists, Garbage collection, Applications of linked lists.

UNIT – III

Stack: Introduction, Array and linked representation of stacks, Operations on stacks, Applications of stacks: Polish notation, Recursion.

Queues: Introduction, Array and linked representation of queues, Operations on queues, Deques, Priority Queues, Applications of queues.

UNIT – IV

Tree: Introduction, Definition, Representing Binary tree in memory, Traversing binary trees, Traversal algorithms using stacks.

Graph: Introduction, Graph theory terminology, Sequential and linked representation of graphs.

TEXT BOOKS

1. Seymour Lipschutz, “Data Structure”, Tata-McGraw-Hill
2. Horowitz, Sahni & Anderson-Freed, “Fundamentals of Data Structures in C”, Orient Longman.

REFERENCE BOOKS:

1. Trembley, J.P. And Sorenson P.G., “An Introduction to Data Structures With Applications”, Mcgrraw-Hill International Student Edition, New York.
2. Mark Allen Weiss Data Structures and Algorithm Analysis In C, Addison- Wesley, (An Imprint Of Pearson Education), Mexico City. Prentice- Hall Of India Pvt. Ltd., New Delhi.
3. Yedidyan Langsam, Moshe J. Augenstein, and Aaron M. Tenenbaum, “Data Structures Using C”, Prentice- Hall of India Pvt. Ltd., New Delhi.

Note: Latest and additional good books may be suggested and added from time to time.

INTRODUCTION TO DATABASE SYSTEM

PAPER CODE: BC2003

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

Basic Concepts – Data, Information, Records and files. Traditional file –based Systems-File Based Approach-Limitations of File Based Approach, Database Approach-Characteristics of Database Approach, advantages and disadvantages of database system, components of database system, Database Management System (DBMS), Components of DBMS Environment, DBMS Functions and Components, DBMS users, Advantages and Disadvantages of DBMS, DBMS languages.
Roles in the Database Environment - Data and Database Administrator, Database Designers, Applications Developers and Users .

UNIT – II

Database System Architecture – Three Levels of Architecture, External, Conceptual and Internal Levels, Schemas, Mappings and Instances .
Data Independence – Logical and Physical Data Independence .
Classification of Database Management System, Centralized and Client Server architecture to DBMS .
Data Models: Records- based Data Models, Object-based Data Models, Physical Data Models and Conceptual Modeling.

UNIT – III

Entity-Relationship Model – Entity Types, Entity Sets, Attributes Relationship Types, Relationship Instances and ER Diagrams, abstraction and integration.
Basic Concepts of Hierarchical and Network Data Model, Relational Data Model:-Brief History, Relational Model Terminology-Relational Data Structure, Database Relations, Properties of Relations, Keys, Domains, Integrity Constraints over Relations, .

UNIT – IV

Relational algebra, Relational calculus, Relational database design: Functional dependencies, Modification anomalies, 1st to 3rd NFs, BCNF, 4th and 5th NFs, computing closures of set FDs, SQL: Data types, Basic Queries in SQL, Insert, Delete and Update Statements, Views, Query processing: General strategies of query processing, query optimization, query processor, concept of security, concurrency and recovery.

TEXT BOOKS:

1. Elmasri & Navathe, “Fundamentals of Database Systems”, 5th edition, Pearson Education.

REFERENCE BOOKS:

1. Thomas Connolly Carolyn Begg, “Database Systems”, 3/e, Pearson Education
2. C. J. Date, “An Introduction to Database Systems”, 8th edition, Addison Wesley N. Delhi.

Note: Latest and additional good books may be suggested and added from time to time.

**COMMUNICATION SKILLS (ENGLISH)
PAPER CODE: BC2004**

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT-I

Introduction to Basics of Communication: Communication and its various definition, features/characteristics of the communication, process of communication, communication model and theories, barrier to effective communication.

UNIT-II

Improving LSRW: introduction, verbal and nonverbal communication, listening process, group discussion, forms of oral presentation, self-presentation, dyadic communication, 5C's of communication, Developing dialogues, soft skill.

UNIT-III

Basic vocabulary: how to improve vocabulary, prefix/suffix, synonyms/antonyms, one word substitution, spellings

Developing fluency: grammar (conjunction, auxiliaries, prepositions, articles, tenses.....), language games.

UNIT-IV

Proper use of Language: The Communication Skills, The effective Speech.

Effective self-presentation & facing interview: The interview process & preparing for it, The presentation skills.

Suggested Readings

1. Vik, Gilsdorf, "Business Communication", Irwin
2. K K Sinha, "Business Communication", Himalaya Publishing House / Galgoria Publication
3. Bovee, "Business Communication", Pearson ' PHI
4. Mohan, Banerjee, Business Communication, Mac millan
5. Raman, Singh – Business communication – Oxford Press

Note: Latest and additional good books may be suggested and added from time to time.

**PRACTICAL- SOFTWARE LAB
PAPER CODE: BC2005**

(Practical Based on Paper BC2002 & 2003 Using C LANGUAGE AND SQL)

FOURTH SEMESTER

WEB DESIGNING PAPER CODE: BC2006

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

Introduction to Internet and World Wide Web; Evolution and History of World Wide Web; Basic features; Web Browsers; Web Servers; Hypertext Transfer Protocol, Overview of TCP/IP and its services; URLs; Searching and Web-Casting Techniques; Search Engines and Search Tools;

UNIT – II

Web Publishing: Hosting your Site; Internet Service Provider; Web terminologies, Phases of Planning and designing your Web Site; Steps for developing your Site; Choosing the contents; Home Page; Domain Names, Front page views, Adding pictures, Links, Backgrounds, Relating Front Page to DHTML. Creating a Website and the Markup Languages (HTML, DHTML);

UNIT – III

Web Development: Introduction to HTML; Hypertext and HTML; HTML Document Features; HTML command Tags; Creating Links; Headers; Text styles; Text Structuring; Text colors and Background; Formatting text; Page layouts;

UNIT – IV

Images; Ordered and Unordered lists; Inserting Graphics; Table Creation and Layouts; Frame Creation and Layouts; Working with Forms and Menus; Working with Radio Buttons; Check Boxes; Text Boxes; DHTML: Dynamic HTML, Features of DHTML, CSSP(cascading style sheet positioning) and JSSS(JavaScript assisted style sheet), Layers of netscape, The ID attributes, DHTML events.

TEXT BOOKS:

1. Raj Kamal, “Internet and Web Technologies”, Tata McGraw-Hill.
2. Ramesh Bangia, “Multimedia and Web Technology”, Firewall Media.

REFERENCE BOOKS:

1. Thomas A. Powell, “Web Design: The Complete Reference” , 4/e, Tata McGraw-Hill
2. Wendy Willard, “HTML Beginners Guide”, Tata McGraw-Hill.
3. Deitel and Goldberg, “Internet and World Wide Web, How to Program”, PHI.

Note: Latest and additional good books may be suggested and added from time to time.

DATA STRUCTURES – II

PAPER CODE: BC2007

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

Tree: Header nodes, Threads, Binary search trees, Searching, Insertion and deletion in a Binary search tree, AVL search trees, Insertion and deletion in AVL search tree, m-way search tree, Searching, Insertion and deletion in an m-way search tree, B-trees, Searching, Insertion and deletion in a B-tree, B+tree, Huffman's algorithm, General trees.

UNIT – II

Graphs: Warshall's algorithm for shortest path, Dijkstra algorithm for shortest path, Operations on graphs, Traversal of graph, Topological sorting.

UNIT – III

Sorting: Internal & external sorting, Radix sort, Quick sort, Heap sort, Merge sort, Tournament sort, Searching: Linear search, binary search, merging, Comparison of various sorting and searching algorithms on the basis of their complexity.

UNIT – IV

Files: Physical storage devices and their characteristics, Attributes of a file viz fields, records, Fixed and variable length records, Primary and secondary keys, Classification of files, File operations, Comparison of various types of files, File organization: Serial, Sequential, Indexed-sequential, Random-access/Direct, Inverted, Multilist file organization.

Hashing: Introduction, Hashing functions and Collision resolution methods .

TEXT BOOKS

1. Seymour Lipschutz, "Data Structure", Tata-McGraw-Hill
2. Horowitz, Sahni & Anderson-Freed, "Fundamentals of Data Structures in C", Orientlongman.

REFERENCE BOOKS

1. Trembley, J.P. And Sorenson P.G., "An Introduction to Data Structures With Applications", Mcgrraw-Hill International Student Edition, New York.
2. Mark Allen Weiss, "Data Structures and Algorithm Analysis in C", Addison- Wesley, (An Imprint Of Pearson Education), Mexico City.Prentice- Hall Of India Pvt. Ltd., New Delhi.

Note: Latest and additional good books may be suggested and added from time to time.

Object Oriented Programming Using C++

PAPER CODE: BC2008

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT-I

Object Oriented Programming Concepts : Procedural Language and Object Oriented approach, Characteristics of OOP, user defined types, polymorphism and encapsulation. Getting started with C++: syntax, data types, variables, string, function, namespace and exception, operators, flow control, recursion, array and pointer, structure .

UNIT-II

Abstracting Mechanism: classes, private and public, Constructor and Destructor , member function, static members, references;

Memory Management: new, delete, object copying, copy constructor, assignment operator, this input/output

UNIT-III

Inheritance and Polymorphism: Derived Class and Base Class, Different types of Inheritance, Overriding member function, Abstract Class, Public and Private Inheritance, Ambiguity in Multiple inheritance , Virtual function, Friend function, Static function.

UNIT-IV

Exception Handling: Exception and derived class, function exception declaration, unexpected exception, exception when handling exception, resource capture and release.

Template and Standard Template Library: Template classes, declaration, template functions, namespace, string, iterators, hashes, iostreams and other types.

Suggested Readings

1. Herbert Schildts : C++ - The Complete Reference, Tata McGraw Hill Publications.
2. Balaguru Swamy : C++, Tata McGraw Hill Publications.
3. Balaguruswamy : Object Oriented Programming and C++, TMH.
4. Shah & Thakker : Programming in C++, ISTE/EXCEL.
5. Johnston : C++ Programming Today, PHI.
6. Object Oriented Programming and C++, Rajaram, New Age International.
7. Samanta : Object Oriented Programming with C++ & JAVA, PHI.

Note : Latest and additional good books may be suggested and added from time to time.

Software Engineering
PAPER CODE: BC2009

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models.

Software Requirements Analysis & Specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS .

UNIT – II

Software Project Management Concepts: The Management spectrum, The People The Problem, The Process, The Project.

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, Risk Management.

UNIT - III

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics

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

UNIT - IV

Software Testing: Testing Process, Design of Test Cases, Types of Testing, Functional Testing, Structural Testing, Test Activities, Unit Testing, Integration Testing and System Testing, Debugging Activities.

Software Maintenance: Management of Maintenance, Maintenance Process, Reverse Engineering, Software Re-engineering, Configuration Management, Documentation.

Suggested Readings

1. Pressman : Software Engineering, TMH.
2. Gill, Nasib Singh : Software Engineering, Khanna Book Publishing Co. (P) Ltd. N. Delhi.
3. Jalote, Pankaj : An Integrated Approach to Software Engineering, Narosa Publications.
4. Chhillar Rajender Singh : Software Engineering : Testing, Faults, Metrics, Excel Books, New Delhi.
5. Ghezzi, Carlo : Fundamentals of Software Engineering, PHI.
6. Fairely, R.E. : Software Engineering Concepts, McGraw-Hill.
7. Lewis, T.G.: Software Engineering, McGraw-Hill.
8. Shere : Software Engineering & Management, Prentice Hall.

Note : Latest and additional good books may be suggested and added from time to time.

PRACTICAL- SOFTWARE LAB
PAPER CODE: BC2010

**PRACTICAL BASED ON PAPER BC2006 & BC2008 i.e HTML AND C++
LANGUAGE**

Fifth Semester

MANAGEMENT INFORMATION SYSTEM PAPER CODE: BC3001

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

Introduction to system and Basic System Concepts, Types of Systems, The Systems Approach, Information System: Definition & Characteristics, Types of information, Role of Information in Decision-Making, Sub-Systems of an Information system: EDP and MIS management levels, EDP/MIS/DSS.

UNIT –II

An overview of Management Information System: Definition & Characteristics, Components of MIS, Frame Work for Understanding MIS: Information requirements & Levels of Management, Simon's Model of decision-Making, Structured Vs Un-structured decisions, Formal vs. Informal systems.

UNIT – III

Developing Information Systems: Analysis & Design of Information Systems: Implementation & Evaluation, Pitfalls in MIS Development.

UNIT – IV

Functional MIS: A Study of Personnel, Financial and production MIS, Introduction to e-business systems, ecommerce – technologies, applications, Decision support systems – support systems for planning, control and decision-making

TEXT BOOK:

1. J. Kanter, “Management/Information Systems”, PHI.
2. Gordon B. Davis, M. H. Olson, “Management Information Systems – Conceptual foundations, structure and Development”, McGraw Hill.

REFERENCE BOOK:

1. James A. O’Brien, “Management Information Systems”, Tata McGraw-Hill.
2. James A. Senn, “Analysis & Design of Information Systems”, Second edition, McGraw Hill.
3. Robert G. Murdick & Joel E. Ross & James R. Claggett, “Information Systems for Modern Management”, PHI.
4. Lucas, “Analysis, Design & Implementation of Information System”, McGraw Hill.
5. **Note:** Latest and additional good books may be suggested and added from time to time.

COMPUTER GRAPHICS

PAPER CODE: BC3002

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT-I

Graphics Primitives: Introduction to computer graphics, Basics of Graphics systems, Application areas of Computer Graphics, overview of graphics systems, video-display devices, and raster-scan systems, random scan systems, graphics monitors and workstations and input devices.

Output Primitives: Points and lines, line drawing algorithms, mid-point circle and ellipse algorithms. Filled area primitives: Scan line polygon fill algorithm, boundary fill and flood-fill algorithms .

UNIT-II

2-D Geometrical Transforms: Translation, scaling, rotation, reflection and shear transformations, matrix representations and homogeneous coordinates, composite transforms, transformations between coordinate systems.

2-D Viewing: The viewing pipeline, viewing coordinate reference frame, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland and Cyrus-beck line clipping algorithms, Sutherland – Hodgeman polygon clipping algorithm.

UNIT-III

3-D Object Representation: Polygon surfaces, quadric surfaces, spline representation, Hermite curve, Bezier curve and B-Spline curves, Bezier and B-Spline surfaces. Basic illumination models, polygon-rendering methods.

UNIT-IV

3-D Geometric Transformations: Translation, rotation, scaling, reflection and shear transformations, composite transformations.

3-D Viewing: Viewing pipeline, viewing coordinates, view volume and general projection transforms and clipping.

Suggested Readings

1. Donald Hearn and M. Pauline Baker : Computer Graphics, PHI Publications.
2. Plastock : Theory & Problem of Computer Gaphics, Schaum Series.
3. Foley & Van Dam : Fundamentals of Interactive Computer Graphics, Addison-Wesley.
4. Newman : Principles of Interactive Computer Graphics, McGraw Hill.
5. Tosijasu, L.K. : Computer Graphics, Springer-Verleg.

Note : Latest and additional good books may be suggested and added from time to time.

DATA COMMUNICATION AND NETWORKING

PAPER CODE: BC3003

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

Introduction to Computer Communications and Networking Technologies; Uses of Computer Networks; Network Devices, Nodes, and Hosts; Types of Computer Networks and their Topologies; Network Software: Network Design issues and Protocols; Connection-Oriented and Connectionless Services; Network Applications and Application Protocols; Computer Communications and Networking Models: Decentralized and Centralized Systems, Distributed Systems, Client/Server Model, Peer-to-Peer Model, Web-Based Model, Network Architecture and the OSI Reference Model, TCP/IP reference model, Example Networks: The Internet, X.25, Frame Relay, ATM.

UNIT – II

Analog and Digital Communications Concepts: Concept of data, signal, channel, bit-rate, maximum data-rate of channel, Representing Data as Analog Signals, Representing Data as Digital Signals, Data Rate and Bandwidth, Capacity, Baud Rate; Asynchronous and synchronous transmission, data encoding techniques, Modulation techniques, Digital Carrier Systems; Guided and Wireless Transmission Media; Communication Satellites; Switching and Multiplexing; Dialup Networking; Analog Modem Concepts; DSL Service.

UNIT - III

Data Link Layer: Framing, Flow Control, Error Control; Error Detection and Correction; Sliding Window Protocols; Media Access Control: Random Access Protocols, Token Passing Protocols; Token Ring; Introduction to LAN technologies: Ethernet, switched Ethernet, VLAN, fast Ethernet, gigabit Ethernet, token ring, FDDI, Wireless LANs; Bluetooth; Network Hardware Components: Connectors, Transceivers, Repeaters, Hubs, Network Interface Cards and PC Cards, Bridges, Switches, Routers, Gateways.

UNIT – IV

Network Layer and Routing Concepts: Virtual Circuits and Datagrams; Routing Algorithms: Flooding, Shortest Path Routing, Distance Vector Routing; Link State Routing, Hierarchical Routing; Congestion Control Algorithms; Internetworking; Network Security Issues: Security threats; Encryption Methods; Authentication; Symmetric –Key Algorithms; Public-Key Algorithms.

TEXT BOOKS:

1. Michael A. Gallo, William M. Hancock, “Computer Communications and Networking Technologies”, CENGAGE Learning.
2. Andrew S. Tanenbaum, “Computer Networks”, Pearson Education.

REFERENCE BOOKS:

1. James F. Kurose, Keith W. Ross, “Computer Networking”, Pearson Education.
2. Behrouz A Forouzan, “Data Communications and Networking”, McGraw Hill.

Note: Latest and additional good books may be suggested and added from time to time.

Visual Basic
PAPER CODE: BC3004

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

Introduction to VB: Visual & non-visual programming, Procedural, Object-oriented and eventdriven programming languages, The VB environment: Menu bar, Toolbar, Project explorer, Toolbox, Properties window, Form designer, Form layout, Immediate window. Visual Development and Event Driven programming.

UNIT – II

Basics of Programming: Variables: Declaring variables, Types of variables, Converting variables types, User-defined data types, Forcing variable declaration, Scope & lifetime of variables. Constants: Named & intrinsic. Operators: Arithmetic, Relational & Logical operators. I/O in VB: Various controls for I/O in VB, Message box, Input Box, Print statement.

UNIT – III

Programming with VB: Decisions and conditions: If statement, If-then-else, Select-case. Looping statements: Do-loops, For-next, While-wend, Exit statement. Nested control structures. Arrays: Declaring and using arrays, one-dimensional and multi-dimensional arrays, Static & dynamic arrays, Arrays of array. Collections: Adding, Removing, Counting, Returning items in a collection, Processing a collection.

UNIT – IV

Programming with VB: Procedures: General & event procedures, Subroutines, Functions, Calling procedures, Arguments- passing mechanisms, Optional arguments, Named arguments, Functions returning custom data types, Functions returning arrays.

Working with forms and menus : Adding multiple forms in VB, Hiding & showing forms, Load & unload statements, creating menu, submenu, popup menus, Activate & deactivate events, Form-load event, menu designing in VB Simple programs in VB.

TEXT BOOKS:

1. Steven Holzner, “Visual Basic 6 Programming: Black Book”, Dreamtech Press.
2. Evangelos Petroustos. “Mastering Visual Baisc 6”, BPB Publications.
3. Julia Case Bradley & Anita C. Millspaugh, “Programming in Visual Basic 6.0”, Tata McGraw-Hill Edition

REFERENCE BOOKS:

1. Michael Halvorson, “Step by Step Microsoft Visual Basic 6.0 Professional”, PHI
2. “Visual basic 6 Complete”, BPB Publications.
3. Scott Warner, “Teach Yourself Visual basic 6”, Tata McGraw-Hill Edition
4. Brian Siler and Jeff Spotts, “Using Visual Basic 6”, Special Edition, PHI.

Note: Latest and additional good books may be suggested and added from time to time.

PRACTICAL- SOFTWARE LAB

PAPER CODE: BC3005

Practical Based on Paper BC3002 & BC3004 i.e. Visual Basic)

Sixth Semester

E-COMMERCE PAPER CODE: BC3006

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT-I

Electronic Commerce: Overview of Electronic Commerce, Scope of Electronic Commerce, Traditional Commerce vs. Electronic Commerce, Impact of E-Commerce, Electronic Markets, Internet: Commerce, e-commerce in perspective, Application of E-Commerce in Direct Marketing and Selling, Obstacles in adopting E-Commerce Applications; Future of E-Commerce.

UNIT-II

Value Chains in Electronic Commerce, Supply chain, Porter's value chain Model, Inter Organizational value chains, Strategic Business unit chains, Industry value chains.

Security Threats to E-commerce: Security Overview, Computer Security Classification, Copyright and Intellectual Property, security Policy and Integrated Security, Intellectual Property Threats, electronic Commerce Threats, Clients Threats, Communication Channel Threats, server Threats.

UNIT-III

Implementing security for E-Commerce: Protecting E-Commerce Assets, Protecting Intellectual property, Protecting Client Computers, Protecting E-commerce Channels, Insuring Transaction Integrity, Protecting the Commerce Server.

Electronic Payment System: Electronic Cash, Electronic Wallets, Smart Card, Credit and Change Card.

UNIT-IV

Business to Business E-Commerce: Inter-organizational Transitions, Credit Transaction Trade Cycle, a variety of transactions, Electronic Data Interchange (EDI): Introduction to EDI, Benefits of EDI, EDI Technology, EDI standards, EDI Communication, EDI Implementation, EDI agreement, EDI security.

Suggested Readings:

1. R. Kalakota and A.B. Whinston, Readings in Electronic Commerce, Addison Wesley.
2. David Kosiur, Understanding E-Commerce, Microsoft Press, 1997_3) Soka, From EDI to Electronic Commerce, McGraw Hill, 1995.
3. David Whitely, E-commerce Strategy, Technology and application, Tata McGraw Hill.
4. Gary P. Schneider and Jame Perry, Electronic Commerce Thomson Publication.
5. Doing Business on the Internet E-Commerce S_Jaiswal; Galgotia Publications.
6. E-Commerce: An Indian Perspective; P_T_Joseph; S.J.; PHI.
7. E-Commerce; S. Jaiswal – Glgotia.
8. E-Commerce; Efrain Turbon; Jae Lee; David King; H Michael Chang.

OBJECT TECHNOLOGIES & PROGRAMMING USING JAVA
PAPER CODE: BC3007

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT-I

Object Oriented Methodology-1: Paradigms of Programming Languages, Evolution of OO Methodology, Basic Concepts of OO Approach, Comparison of Object Oriented and Procedure Oriented Approaches, Benefits of OOPs, Introduction to Common OO Language, Applications of OOPs .

Object Oriented Methodology-2: Classes and Objects, Abstraction and Encapsulation, Inheritance, Method Overriding and Polymorphism.

UNIT-II

Java Language Basics: Introduction To Java, Basic Features, Java Virtual Machine Concepts, Primitive Data Type And Variables, Java Operators, Expressions, Statements and Arrays.

Object Oriented Concepts: Class and Objects-- Class Fundamentals, Creating objects , Assigning object reference variables; Introducing Methods, Static methods, Constructors , Overloading constructors; This Keyword; Using Objects as Parameters, Argument passing, Returning objects , Method overloading, Garbage Collection, The Finalize () Method.

Inheritance and Polymorphism: Inheritance Basics, Access Control, Multilevel Inheritance, Method Overriding, Abstract Classes, Polymorphism, Final Keyword.

UNIT-III

Packages : Defining Package, CLASSPATH, Package naming, Accessibility of Packages , using Package Members.

Interfaces: Implementing Interfaces, Interface and Abstract Classes, Extends and Implements together .

Exceptions Handling : Exception , Handling of Exception, Using try-catch , Catching Multiple Exceptions , Using finally clause , Types of Exceptions, Throwing Exceptions, Writing Exception Subclasses.

UNIT-IV

Multithreading : Introduction , The Main Thread, Java Thread Model, Thread Priorities, Synchronization in Java, Inter thread Communication.

I/O in Java : I/O Basics, Streams and Stream Classes ,The Predefined Streams, Reading from, and Writing to, Console, Reading and Writing Files , The Transient and Volatile Modifiers , Using Instance of Native Methods.

Strings and Characters : Fundamentals of Characters and Strings, The String Class , String Operations , Data Conversion using Value Of () Methods , String Buffer Class and Methods.

Suggested Readings

1. Programming in Java, E Balagurusamy .
2. The Complete Reference JAVA, TMH Publication.
3. Begining JAVA, Ivor Horton, WROX Public.
4. JAVA 2 UNLEASHED, Tech Media Publications.
5. Patrick Naughton and Herbertz Schildt, “Java-2 The Complete Reference”, 1999, TMH.

Note: Latest and additional good books may be suggested and added from time to time.

ARTIFICIAL INTELLIGENCE

PAPER CODE: BC3008

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

Overview of A.I: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.

Problems, problem space and search: Defining the problem as a state space search, Production system and its characteristics, Issues in the design of the search problem

Heuristic search techniques : Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction

UNIT - II

Knowledge Representation: Definition and importance of knowledge, Knowledge representation, Various approaches used in knowledge representation, Issues in knowledge representation.

Using Predicate Logic : Representing Simple Facts in logic, Representing instances and is_a relationship, Computable function and predicate.

UNIT - III

Natural language processing : Introduction syntactic processing, Semantic processing, Discourse and pragmatic processing.

Learning: Introduction learning, Rote learning, Learning by taking advice, Learning in problem solving, Learning from example-induction, Explanation based learning.

UNIT - IV

Expert System: Introduction, Representing using domain specific knowledge, Expert system shells.

Suggested Readings

1. David W. Rolston : Principles of Artificial Intelligence and Expert System Development, McGraw Hill Book Company.
2. Elaine Rich, Kevin Knight : Artificial Intelligence, Tata McGraw Hill.
3. D.W. Patterson, "Introduction to AI and Expert Systems", PHI, 1999 .
4. Nils J Nilsson , "Artificial Intelligence -A new Synthesis" 2nd Edition (2000), Harcourt Asia Ltd.

Note: Latest and additional good books may be suggested and added from time to time.

INTRODUCTION TO .NET

PAPER CODE: BC3009

Marks: 100

Time: 3Hrs

Note: Examiner will be required to set NINE questions in all. Question No. 1 will be compulsory which consists of 12 short-answer type questions each of 2 marks covering the entire syllabus out of which candidate will be required to attempt ten questions. In addition to Q.No. 1, candidate will be required to attempt four more questions from the remaining eight questions each carrying 20 marks.

UNIT – I

The Framework of .Net: Building blocks of .Net Platform (the CLR, CTS and CLS), Features of .Net, Deploying the .Net Runtime, Architecture of .Net platform, Introduction to namespaces & type distinction. Types & Object in .Net, the evolution of Web development .

UNIT – II

Class Libraries in .Net, Introduction to Assemblies & Manifest in .Net, Metadata & attributes . Introduction to C#: Characteristics of C#, Data types: Value types, reference types, default value, constants, variables, scope of variables, boxing and unboxing.

UNIT – III

Operators and expressions: Arithmetic, relational, logical, bitwise, special operators, evolution of expressions, operator precedence & associativity, Control constructs in C#: Decision making, loops, Classes & methods: Class, methods, constructors, destructors, overloading of operators & functions.

UNIT – IV

Inheritance & polymorphism: visibility control, overriding, abstract class & methods, sealed classes & methods, interfaces.

Advanced features of C#: Exception handling & error handling, automatic memory management, Input and output (Directories, Files, and streams).

TEXT BOOKS:

1. Introduction to C# using .NET By Robert J. Oberg, PHI, 2002.
2. Programming in C# By E. Balaguruswamy, Tata McGraw Hill.

REFERENCES BOOKS:

1. The Complete Guide to C# Programming by V. P. Jain.
2. C# : A Beginner's Guide, Herbert Schildt, Tata McGraw Hill.
3. C# and .NET Platform by Andrew Troelsen, Apress, 1st edition, 2001.

Note: Latest and additional good books may be suggested and added from time to time.

PRACTICAL- SOFTWARE LAB

PAPER CODE: BC3010

PRACTICAL BASED ON PAPER BC3007 and BC3009 Using Java & .NET