UNIVERSITY OF RAJASTHAN, JAIPUR

SYLLABUS
SCHEME OF EXAMINATION AND COURSES OF STUDY

BACHELOR OF COMPUTER APPLICATION

FACULTY OF SCIENCE

Part-I — 2014
Part-II — 2015
Part-III — 2016

UNIVERSITY OF RAJASTHAN, JAIPUR

Ordinance.###

BACHELOR OF COMPUTER APPLICATIONS

The Bchlor of Computer Applications will be a Three Part course in Faculty of Science extending over three academic sessions. Medium of instructions and examination will be English only. There shall be an examination at the end of each part. The examinaation of each of the part will consist of (i) nine theory papers, and (ii) three practical papers. In addition the candidates will be required to secure atleast pass percentage in three compulsory papers. However, marks secured in compulsory papers will not be counted in aggregate for determination of division and result. Each theory paper examination will be of three-hour durtion and shall carry 50 marks. Theory paper shll contain two parts. Part I, of one hour duration, will contain 40 questions of Multiple Choice type with one correct answer each carrying 1/2 mark. Part II of two hour durtion, will contain six descriptive type of questions each carrying 7.5 mrks and the candidtes will be required to attempt any four questions. Each practical examintion (Maximum marks 50) will be of four-hour duration on one day and carry 30 marks for exercise(s) assigned in the examination, 10 marks for Vivaa voce and 10 mrks for the Internal Assessment. Other rules and procedures of examintions will be common to those for B.Sc. course.

Provision for supplementary examination.

Passing of examination and promotion to next part :

The last four lines of the current syllabus (Edition 2005), namely, "A candidate will be promoted to Part III if he/she has passed 40% in four theory and two practicl papers of part II examination and with at least 50% in aggregte of these papers and has passed part I examination", be amended as follows:

"A candidate will be promoted to Part III if he/she has passed with 40% in four theory and two practical papers of Part II examination and with at least 50% in aggregate of these papers. However, if the candidate has not passed Part I Examination then also he/she be promoted to part III if the number of due papers (part I & Part II together) does not exceed Five theory Papers and Two Practicl Papers."

Passing of Examination and Promotion to next Part : A candidate must secure at least 40% marks in each paper and 50% marks in aggregate for passing a part examination. A candidate will be promoted to part II if he/she has secured atlest 40% in four theory and two practical papers of part I examintion and with atleast 50% in aggregate of these papers. A candidate will be promoted to Part III of he/she has passed atleast 40% in four theory and

two practical papers of Part II examination and with atlest 50% in aggregate of these papers, and has passed Part I examination.

Division and Honours : On sucessful passing out of all three part examinations (in first attempt), those securing 75% and above in aggregate of all the three parts (excluding awards in compulsory papers) will be awarded First division with Honours, and those securing between 60% or more but less than 75% will be awarded First division and rest will be awarded Second division.

Eligibility for Admission to BCA course session 2008-2009 "A candidate must have passed 10+2 examination or equivalent with securing 48% or more (minimum pass mark for SC/ST candidates)."

Eligibility for Admission to BCA Course from Session : 2009-2010 Onwards

To be eligible for admission to BCA Part I, a candidate must have Physics/Mathematics/Computer Science/Information Technology/Informatics Practices/Multimedia/Computer Applications as the optional subject at 10+2 level with securing 50% or more (45% marks only for SC/ST/OBC candidates) in aggregate without any approximations.

In regard to reservation of seats for admission to BCA Part I, the reservation policy of Govt. of Rajasthan will be followed.

Admission Procedure : Admission to BCA Part I course will be made on the basis of merit list.

Attendance : A candidate shall be required to put in a minimum of 75% attendance at the lectures and 75% attendance at the practicals separtely in each paper, as per university norms.

The admission to the BCA course w.ej acadmic session 2011-12:

(1.) The admission to the BCA course should be made irrespective of the stream (Arts/Science/Commerce) constrains i.e. it should be open to all with certain specified restrictions as given below:

Category A: Irrespective of the stream (Arts/Science/Commerce) a candidate must have passed 10+2 level exam with Physics / Maths /Bus.Maths /Computer Science /Information Tech. / Information Practices / Multimedia and Web.Tech. as one of the Optional subject with 50% or more (36% marks for SC/ST/ OBC/SOBC category) in aggregate without any approximation.

Category B: Irrespective of the stream (Arts/Science/Commerce) a candidate must have passed 10+2 level with 50% or more (36% SC/ST/OBC/SOBC category) in aggregate without any approximation subject to the condition that he/she has qualified BCA eligibility test conducted by the University.

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BACHELOR OF COMPUTER APPLICATIONS

Compulsory Papers

CP1. History of Science and Invention (Thy.) — be taken on

CP2. Technical Writing. (Lab.) on R. sheets all questions

CP3. Communication Skills (Lab.) are of ojective type

Core Papers marks — 100

Part	Lab./Thy.	Code	Paper
First	Thy.	111	Electrical Circuit and Circuit Analysis
First	Thy.	112	Semiconductor Physics, Electronics Devices and Circuits
First	Thy.	113	Business Accounting Fundamentals
First	Thy.	114	Discrete Mathematics
First	Thy.	115	Statistical Methods
First	Thy.	116	Computer Architecture
First	Thy.	117	Operating System Fundamentals
First	Thy.	118	Algorithms And Data Structures
First	Thy.	119	Principles of Programming Languages
First	Lab.	121	Electricity and Electronics Laboratory Course
First	Lab.	122	Programming Laboratory Course in C and C++
First	Lab.	123	Laboratory Course in Microcomputer Business and Office Applications
Second	Thy.	211	Financial and Marketing Management
Second	Thy.	212	Digital Electronics and Circuits
Second	Thy.	213	Mathematical Methods for Numerical Analysis and Optimization.

Second	Thy.	214	Database Management System
Second	Thy.	215	Object Oriented Programming
Second	Thy.	216	Networking Technologies And TCP/IP
Second	Thy.	217	System Analysis And Design
Second	Thy.	218	Internet And Intranet
Second	Thy.	219	Electronic Communication and Data Communication
Second	Lab.	221	Visual Basic, Visual C, and Visual Foxpro Programming
Second	Lab.	222	Web Authoring Tools, Java, and Perl Programming
Second	Lab.	223	Digital Electronics
Third	Thy.	311	Computer Graphics and Image Processing
Third	Thy.	312	Software Engineering
Third	Thy.	313	Simulation and Modeling
Third	Thy.	314	Advanced Computer Architecture
Third	Thy.	315	Management Information Systems
Third	Thy.	316	Network Security and Cryptology
Third	Thy.	317	E-Banking And Security Transactions
Third	Thy.	318	Internet Application Development
Third	Thy.	319	E-Commerce
Third	Lab.	321	Oracle/Autocad 2000
Third	Lab.	322	Web Site Development & Web Client Programming
Third	Lab.	323	Computer Architecture and Networking Lab

UNIVERSITY OF RAJASTHAN, JAIPUR
SYLLABUS AND SCHEME OF EXAMINATION
B.C.A. PART I EXAMINATION, 2006

Theory Examination :

Workload : Two hours per week for each theory paper.

Paper	111	Electrical Circuit And Circuit Analysis
Paper	112	Semi Conductor Physics, Electronics Devices And Circuits
Paper	113	Business Accounting Fundamentals
Paper	114	Discrete Mathematics
Paper	115	Statistical Methods
Paper	116	Computer Architecture
Paper	117	Operating System Fundamentals
Paper	118	Algorithms And Data Structures
Paper	119	Principles Of Programming Languages

Each theory paper examination will consist of two parts

Note : **Part I (Duration One Hour) (Max. Marks 20) :** Consisting of 40 Multiple Choice questions with four choice and student will have to pick the correct one.

Part II (Duration Two Hours) (Max. Marks 30): This part will contain six descriptive type of questions each carrying 7.5 marks and the candidates will be required to attempt any four questions.

Practical Examination :

Workload : Four hours per week for each Laboratory course.

Paper	121	Electricity And Electronics Laboratory Course
Paper	122	Programming Laboratory Course In C And C++
Paper	123	Laboratory course in Microcomputer Business And Office Applications

Compulsory Papers :

CP1.	History of Science and Invention (Thy.)
CP2.	Technical Writing. (Lab.)
CP3.	Communication Skills (Lab.)

Paper 111: Electrical Circuit and Circuit Analysis

[This course is of introductory nature, and therefore, emphasis

will be on basic concepts and direct applications of mathematical expressions without rigorous analysis].

Electric charge, conductors and insulators, Coulomb's Law, quantization and conservation of electric charge, the electric field, electric lines of force and Gauss' Law of electrostatics, electric potential energy, electric potential, energy and electrical power.

Capacitors, capacitance, capacitors in series and parallel, capacitors with dielectric.

Electric current, resistance, resistivity and conductivity, Ohm's law, electromotive force, series and parallel combination of resistances, current in a single loop, electrical power consumption, multiloop circuits, Kirchoff's current law, Kirchoff's Voltage law, Charging and discharging of a capacitor.

Magnetic field due to a bar magnet, Biot Savart's law, magnetic field due to a current carrying coil, Force between two parallel currents, Magnetic field inside solenoid and toroid, magnetic flux, Faraday's law of electromagnetic induction, magnetic properties of matter, (diamagnetic, paramagnetic, ferromagnetic and ferromagnetic materials), inductance, energy stored in an inductor, LR circuits.

Generation of Alternating emf, average and rms value of AC, analysis of AC.

Circuits (series LR, series RC, series LCR, parallel LCR circuit. Resonance, Three phase AC circuits.

DC Generator, DC Motor, Transformer, Single phase induction motor, three phase induction motor.

Measuring Instruments, Multimeters.

House wiring materials and accessories, types of wiring, basic principle of Earthing, wiring layouts for a computer lab.

Four terminal network analysis, Network theorems superposition, Thevenin, Norton, Reciprocity, Compensation, and Maximum Power transfer theorems.

Recommended reference books

1. Bernard Grob: Basic Electronics, Tata Mc Graw Hill.
2. Fowler : Electricity, Tata Mc Graw Hill.
3. Shivakumar, Engineering Physics, Tata Mc Graw Hill.

4. Iyer, Circuit Theory, Tata Mc Graw Hill.

Paper 112 : Semiconductor Physics, Electronic Devices and Circuits

[This course is of introductory nature, and therefore, emphasis will be on basic concepts and direct applications of mathematical expressions without rigorous analysis]

Structure of matter (Molecule, Atom), Atomic Structure (Energy levels and electronic configuration), Intermolecular forces, Phases of matter, Types of solids, crystal structure of solids, atomic bonding (ionic, covalent and metallic bonding), Energy band theory of crystals, energy band structure of insulators, semiconductors and metals.

Mobility and conductivity, Electrons and holes in Intrinsic Semiconductor, Elementary properties of Germanium and Silicon, Donor and Acceptor Impurities, Extrinsic semi-conductors, Generation and recombination of charges, diffusion.

Energy band structure of open circuit p-n junction, depletion region, p-n junction as a rectifier, current components of a p-n diode, Ideal Voltage Ampere characteristics, temperature dependence of the V/I characteristics, diode resistance, varactor diodes, junction diode switching times, breakdown diodes, tunnel diode, semiconductor photodiode, photovoltaic effect, light emitting diodes.

Bipolar Junction transistors, bipolar transistor action, basic principle of operation open circuited transistor, transistor biased in the active region, current components in a transistor, characteristic curves in common emitter, common base and common collector configurations, expressions for α, β, and γ Hybrid parameters of a transistor.

Half-wave and Full-wave rectifiers, ripple factor, efficiency, voltage regulation, inductor filters, capacitor filters, L and π section filters, regulated power supplies, information about SMPS supply.

Transistor as an amplifier, Characteristics of an amplifier. Feedback concepts and Oscillators.

Elementary information about Field Effect transistors, thyristors, opto-electronic devices and display devices.

Recommended reference books

1. Albert Paul Malvino, Electronic Principles, Mc. Graw Hill.

2. G.K. Mithal, Electronics Devices and Circuits, Khanna Publishers, Delhi, 2000.

3. Sadra and Smith, Microelectronic Circuits, Oxford University Press, 1999.

4. R.P. Punagin, Basic Electronics, Tata McGraw Hill.

5. Jacob Millman and Christos C. Halkias : Electronic Devices and Circuits, Tata Mc-Graw Hill Publishing Company Ltd., 2000.

6. Donald A. Neamen, Semiconductor Physics and Devices, McGraw Hill, 1997.

Paper 113 : Business Accounting Fundamentals

Generally Accepted Accounting Principles : Concepts and conventions, Accounting equation.

Books of Original Record : Journal and Subsidiary books, Ledger, Trial Balance, Bills of Exchange, Depreciation, Provisions and Reserves. Rectification of Errors.

Preparation of Final Accounts with Adjustments.

Sectional and Self balancing Ledgers, Preparation of Accounts from Incomplete Records, Insurance claims for loss of stock and loss of profit, Departmental and Branch Accounts.

Company Accounts : Issue of Shares and Debentures, Redemption of Shares and Debentures, Preparation of Final Accounts and Companies. Valuation of Goodwill and Shares.

Recommended Reference Books:

1. Shukla & Grewal : Advanced Accounts

2. S.N. Maheshwari : Advanced Accountancy, Vol. I & II.

3. Sharma & Bhardwaj : Book-keeping & Accountancy.

4. Sharma, Shah & Agrawal : Financial Accounting.

Paper 114 : Discrete Mathematics

Number Systems : natural numbers, integers, rational numbers, real numbers, complex numbers, arithmetic modulo a positive integer (binary, octal, decimal and hexadecimal number systems), radix representation of integers, representing negative and rational numbers, floating point notation.

Binary Arithmetic, 2's complement arithmetic, conversion of numbers form one of binary/octal/decimal/hexadecimal number sys-

tem to other number systems, Codes (Natural BCD, Excess-3, Gray, Octal, Hexadecimal, Alphanumeric- EBCDIC and ASCII), Error Codes.

Logic and Proofs : Proposition, Conjunction, Disjunction, Negation, Compound proposition, Conditional propositions (Hypothesis, conclusion, necessary and sufficient condition) and Logical equivalence, De Morgan's laws, quantifiers, universally quantified statement, generalized De Morgan's Laws for Logic, component of Mathematical system (axiom, definitions, undefined terms, theorem, leema and corollary), proofs (direct proofs, indirect proofs, proof by contra-positie), valid argument, deductive reasoning, modus ponens (rules of inference), universal instantiation, universal generalization, existential instantiation, universal generalization resolution, principle of mathematical induction, structural induction.

Sets, Venn diagrams, ordered pairs, sequences and strings, relation (reflexive, symmetric, anti-symmetric, transitive, partial order), inverse relation and composition of relations, relational database, functions (injective, subjective, bijective), composition of functions, restriction and function overriding, function spaces, lambda notation for functions, lambda calculus, equivalence relations, interpretation using digraphs, cardinals, countable and uncountable sets, infinite cardinal numbers, Russell's paradox, operations on cardinals, laws of cardinal arithmetic.

Graph theory undirected graph, digraph, weighted graph, similarity graphs, paths and cycles, Hamiltonian cycles, shortest path algorithm, isomorphism of graphs, planar graphs.

Trees, characterization of trees, spanning trees, breadth first search and death first search method, minimal spanning trees, binary trees, tree traversals, decision trees and the minimum time for sorting, isomorphism of trees.

Recommended reference books :
1. C.I.Liu : elements of Discrete Mathematics Tata McGraw Hill publishing Company Ltd., 2000
2. Richard johnsonbaugh discrete mathematics prearson Asia 2001.
3. John Truss :Discrete Mathematics for Computer Scientists, Pearson Education, Asia, 2001.

4. Robert J.McEliece : Introduction to Discrete Mathematics, Tata Mc. Graw Hill, India.

5. Lipschutz :Discrete Mathematics, Tata Mc. Graw Hill, India.

6. Kenneth H. Rosen, Discrete Mathematics and Applications, Tata Mc. Graw Hill, India.

Paper 115 : Statistical Methods

Frequency distributions, Relative frequency distributions, cumulative frequency distributions and Ogives, Frequency curves, mean, median, mode and other measures of central tendency, Dispersion, standard deviation variance.

Combinations and permutations, concepts and axioms of probability, Addition and multiplication theorems of probability, theorem on conditional probability, Bayers' Theorem, Binomial coefficients, Random variables, discrete probability distributions, probability distribution of functions of random variables, convolutions, Mathematical expectation, Moments, Moment generating functions, Skewness and Kurtosis.

The Binomial, Normal and Poisson distributions, relationship between Binomial and Normal distributions, relationship between Binomial and Poisson distributions.

Sampling theory, random samples and random numbers, Computations of mean, variance and moments of grouped data.

Estimation theory, unbiased, efficient, point and interval estimates, reliability, maximum likelihood estimates.

Statistical Decision theory, statistical decisions and hypothesis, decision rules, type I & II errors, Two tailed and one tailed tests.

Small sampling theory, chi-square distribution, degrees of freedom, the F distribution, the chi square test, curve fitting and method of least squares, regressions.

Correlation theory, correlation and regression, measures of correlation, coefficients of correlation, correlation of time series and attributes, multiple and partial correlation, relationship between multiple and partial correlation coefficients.

Time series and forecasting, moving averages, smoothing of curves, forecasting models and methods.

Analysis of variance, Applications of tests of significance, the t-test, the F-test and the Z-test.

Recommended reference books

1. M.R. Spiegel and Larry J. Stephens : Statistics, Tata Mc. Graw Hill Edition.
2. M.R. Spiegel, J. Schiller and R. Alu Srinivasan : Probability and Statistics, Tata Mc. Graw Hill Edition.

Paper 116 : Computer Architecture
Part A (Informative only)

Anatomy of a Computer [Information only] : Mother Board (Special reference to Intel 810 Chipset motherboard). CISC Micro Processors (Special reference to Pentium, AMD, Cyrix). RISC processors (Motorola, Power PC, and 680x0 series), Memory (ROM, RAM, Flash, Cache, Virtual, Buffers, CMOS), types of RAM (FPM, EDO, BEDO, SDRAM), types of memory modules (SIMM, DIMM), System clock, Bus (Data, Address, Control), Bus architecture (ISA, MCA, EISA, PCI, AGP), Expansion slots and cards (Network adapter cards, SCSI card, Sound card, TV tuner card, PC card), Ports (Serial, Parallel, AGP, USB, Fire Wire), cables (RS 232, BIN), Input devices (keyboard, mouse, trackball, trackpad, pen, touch screen, bar code reader, scanner, OMR, OCR, voice input, video input, digital camera) Output devices[Monitors (refresh rate, resolutions, standards-CGA, VGA, SVGA, XGA, SXGA; LCD monitors, Video controllers and VRAM), Printers (Dot-Matrix, Line, Label, Ink-Jet, Laser, Color Laser, thermal wax, dye sublimation, fiery, IRIS), Plotters (Pen, Inkjet, electrostatic), Voice output], Storage devices [Storage types (Magnetic, Optical, Magneto-optical, Solid state), random versus sequential access, formatting, tracks and sectors, speed, storage capacity, Floppy Disk (5.25 inch, 3.5 inch; 2HD, Zip, Superdisk, HiFD) Hard Disk tracks, cylinders, sectors; Hard Drive Interfaces (IDE, EIDE, Fast SCSI, Fast/ wide SCSI, Ultra SCSI; Hard Disk Cartridges, RAID)); Optical Disks [pits and lands, CD (ROM, R, RW), DVD (ROM, R, RAM)], Magnetic tape (reels, streamers, DAT, DLT, stripe, Smart card), Modem (Fax/Data/Voice).

Part B (Beginners level only)

Computer System History and Architecture development (the mechanical era, electronic computers, and later generations); von Neumann machine.

Logic gates; basic combinatorial logic, multiplexers, decoders, encorders, comparators, adder and subtracters, BCD to 7 segment decoder; sequential circuits, RS, JK, D and T flip flops, counter and shift registers, programmable logic array (PLA), programmable array of logic (PAL), programmable logic device (PLD).

Addressing methods and machine program sequencing - memory locations addresses, encoding of information, instructions and instructions sequencing, addressing modes, paging, relative, indirect and indexed addressing.

Basics of Computer organization; system buses and instruction cycles, memory subsystem organizations and interfacing, I/O subsystem organizations and interfacing, Register transfer languages.

CPU design : specifying a CPU, design and implementation of a simple CPU (fetching instructions from memory, decoding and executing instructions, establishing required data paths, design of ALU, design of the control unit and design verification), design and implementation of a simple microsequencer, Features of Pentium microprocessors.

Memory systems, storage media; virtual and cache memory;

Input and Output organization : Asynchronous data transfers, programmed I/O. Interrupts (types, processing of interrupts, implementing interrupts inside CPU), Direct memory access, I/O processors, serial communication.

Reduced Instruction Set Computing (RISC) RISC rationale, RISC instructions sets, instructions pipelines and register windows, RISC vs. CISC.

Recommended reference books

1. V.C. Hamacher, Z.G. Vranesic, and S.G. Zaky: Computer Organization, Mc Graw Hill International Edition.
2. John D. Carpinelli: Computer Systems Organization & Architecture, Pearson Education Asia, 2001.

3. M. Morris Mano: Computer System Architecture, Prentice Hall of India.

4. John P. Hayes, Computer Architecture and Organization, Mc Graw Hill International Edition.

5. Vincent P. Heuring and Harry F. Jordan: Computer Systems Design & Architecture, Addison Wesely, Pearson Education Asia, 2001.

6. James L. Antonakos: An Introduction to the Intel Family of Microprocessors, Pearson Education Asia, 2001.

7. Peter Norton's Introduction to Computers, Third Edition, Mc Graw Hill.

8. Karen Miller: An Assembly Language Introduction to Computer Architecture, Oxford University Press.

Paper 117 : Operating System Fundamentals

Necessity of an Operating System. Operating system terminology, Evolution of Operating Systems (multiprogramming systems, batch systems, timesharing systems, process control and Real-time systems). Factors in OS Design (performance, protection and security, correctness, maintainability, application integration, portability, and interoperability).

Device Management: General device characteristics, I/O Programming concepts, device controllers, device drivers, Interrupts, I/O system organization, Direct I/O with Polling, Interrupt Driven I/O, Memory Mapped I/O, Direct Memory Access, Buffering, Device drivers interface, CPU device interaction, I/O optimization. Device Management Scenarios (serial communications, sequentially accessed storage devices, randomly accessed devices).

Process Management: Process definition, Process control, initializing Operating System, Process Address Spaces, Process Abstraction, Resource Abstraction, and Process Hierarchy.

Scheduling Mechanisms, Partitioning a process into small processes, Non-preemptive strategies (first come-first served, shortest job next, priority scheduling, deadline scheduling), Preemptive strategies (Round Robin, two queues, multiple level queues).

Basic Synchronization principles: Interactive processes, coordi-

nating processes, Sempahores, Shared memory multiprocessors, AND Synchronization, Interprocess communications, interprocess messages, mailboxes.

Deadlocks, Resource Status Modeling, Handling deadlocks, deadlock detection and resolution, deadlock avoidance.

· Memory Management: Requirements on the primary memory, mapping the address space to primary memory, dynamic memory for data structures, Memory allocation (Fixed partition Memory Strategies (Variable - partition memory strategies, contemporary allocation strategy), Dynamic Address Relocation, Memory Manger Strategies (Swapping, Virtual Memory, Shared Memory Multiprocessors). Virtual Memory: Address translation, paging, Static and dynamic paging algorithms.

Information Management: Files (Low level files, structured files, database management systems, multimedia storage). Low level file implementation. Storage Abstraction (Structured sequential files, indexed sequential files, Database Management Systems, Multimedia documents). Memory mapped files, Directories, directory implementation, file sharing, sharing information across network, remote disk systems, remote file systems, file-level caching. Security threats. Viruses and Worms, Security Design principles, Authentications, Protection mechanisms, Encryption, Protection of User Fiels.

Distributed Computing: Distributed process management, message passing, remote procedure call, distributed memory management, security in distributed environment.

Recommended reference books:

1. Gary Nutt: Operating Systems-A Modern Perspective (Second Edition), Pearson Education, 2000.

2. D.M. Dhamdhere: Systems Programming and Operating Systems (Second Edition), Tata Mc-Graw Hill Publishing Company Limited, 2000.

3. Stuart E. Madnick, John J. Donovan: Operating Systems, Tata Mc-Graw Hill Publishing Company Limited, 2000.

4. Achyut S. Godbole: Operating Systems, Tata Mc-Graw Hill Publishing Company Limited, 2000.

5. Harvey M. Deitel, Operating Systems, Pearson Education, 2001.
6. Tanenbaum A.S., Modern Operating Systems, PHI Publ.
7. Ritchie: Operating Systems, BPB Publications.

Paper 118 : Algorithms and Datastructures

Algorithms, pseudocode, efficiency of algorithms, analyzing algorithms and problems, complexity measures, basic time analysis of an algorithm, space complexity.

Data abstraction and basic data structures, data types, abstract data types and c++ classes.

String processing (storing strings, string operations, word processing, pattern matching algorithms).

Arrays and their representation, representation of linear arrays in memory, sorting and searching, bubble sort and binary search, multidimensional arrays, pointers, pointer arrays, records and record structures.

Linked lists, representation of linked list in memory, insertion, deletion and searching of linked list, two way lists. Stacks, array representation of stacks, arithmetic expressions, Polish notations, quicksort, recursion, Queues, deques, priority queues.

Tables and searching. Linear search, binary search, Hash tables. Trees, Binary and N-ary trees, representation of binary trees in memory, traversing binary trees, traversal algorithms using stacks, header nodes, threads, binary search trees, heap, heapsort, Huffman's algorithm.

Graphs and their representations, sequential representation, Warshall's algorithm, linked representation of graphs, operations on graphs, traversing a graph.

Sorting and Searching: Sequential, Binary and hashed searching, Internal and external sorting techniques, Bubble sort, Insertion sort, Selection sort, Merge sort, Radix sort and quick sort comparisons.

Recommended reference books

1. S. Lipschutz: Data Structures, Mc Graw Hill International Edition.
2. A.V. Aho, J.E. Hopcroft, and J.D. Ullman, Data Structures and Algorithms, Pearson Education Asia.

3. A. Michael Berman: Data Structures via C++, Oxford University Press.

4. Sara Baase and Allen Van Gelder: Computer Algorithms, Pearson Education Asia.

5. Jean-Paul Tremblay and Paul G. Sorenson, An Introduction to Data structures with applications, TMH Publishing Co.Ltd.

Paper 119 : Principles of Programming Language

Basic concepts of programming languages: Programming domains, language evaluation criterion and language categories, evolution of the major programming languages (FORTRAN, ALGOL 60, COBOL, BASIC, PL/I, ALGOL 68, ADA, C, C++, JAVA)

Describing Syntax and Semantics, formal methods of describing syntax, recursive descent parsing, attribute grammars, dynamic semantics.

Names, Variables, Binding, Type checking, Scope and lifetime, data types, array types, record types, union types, set types and pointer types, arithmetic expressions, type conversions, relational and Boolean expressions, assignment statements, mixed mode assignment.

Statement level control structures, compound statements, selection statement, iterative statements, unconditional branching, guarded commands.

Subprogram, fundamentals of subprogram, design issues, parameter passing methods, overloaded subprograms, generic subprograms, separate and independent compilation, design issues for functions, accessing nonlocal environment, user defined overloaded operators, coroutines, implementing subprograms, blocks, implementing dynamic scooping.

Programming in C and C++: Character set, variables and constants, keywords, Instructions, assignment statements, arithmetic expression, comment statements, simple input and output, Boolean expressions, Relational operators, logical operators, control structures, decision control structure, loop control structure, case control structure, functions, subroutines, scope and lifetime of identifiers, parameter passing mechanism, arrays and strings, structures, array of structures, Console Input and Output functions, Disk I/O functions,

Interaction with hardware, Interrupts and Interrupt Vector table, Unions of structures, operations on bits, usage of enumerated data types. Bitfields, Pointers to Function, Function returning Pointers, Graphics in C.

Object oriented programming in C++: Basic Concepts of Object Oriented Programming. Characteristics of Object-Oriented Languages, Object, Classes in C++. Constructors, Destructors, Complex Class, Matrix class; Classes, Object and Memory; Structures and Classes; C++ Free Store, Static Class Data, Overload Assignment Operator, Copy Constructor, Data Conversion between Objects of different classes. Data structure through C++, Handling Data files (sequential and random), opening and closing files, stacks and queues, linked lists, trees, Inheritance Multiple, Private and Protected Inheritance, Virtual Functions, Objects Slicing. Input/Output in C++, User defined manipulators, Predefined Stream Objects, File I/O with Streams, Strstreams, Classes within classes, Smart Pointers, Templates, Exception Handling.

Recommended reference books:

1. Robert W. Sebesta : Concepts of Programming Language, Addison Wesley, Pearson Education Asia, 1999.
2. Ramon A. Mata-Toledo and Pauline K. Cushman: Introduction to Computer Science, McGraw Hill International Edition.
3. D. Appleby and JJ Vande Kopple: Programming Languages, Tata McGraw Hill, India.
4. Deitel and Deitel: How to Program C, Addison Wesley, Pearson Education Asia, 1999.
5. K.R. Venugopal, Rajkumar, T. Ravishankar: Mastering C++, Tata McGraw Hill, India.
6. Yashwant Kanetkar: Working with C, BPB Publications.
7. Timothy Budd: An Introduction to Object Oriented Programming, Addison Wesley, Pearson Education Asia, 2000.
8. Bruce Eckel: Thinking in C++, Addison Wesley, Pearson Education Asia 2000.
9. Bryon Gottfried, Programming with C, McGraw Hill International.

10. John R. Hubbard, Programming with C++, McGraw Hill International.
11. Yashwant Kenetkar, Let us C++, BPB Publications.
12. S.B. Lippman and Josee Lajoie, C++ Primer, Pearson Education Asia.

Paper 121 : Electricity and Electronics Laboratory Course

Minimum 12 experiments (6 from each section) to be performed out of following

The Practical examination (Max. Marks 50) will be of four hours duration on one day involving two experiments one from each section. Distribution of marks will be 15 marks for each experiment assigned, 10 marks for Internal Assessment and 10 Marks for the Viva-voce examination.

Section A

1. To study and familiarize with use of various measuring instruments like multimeter, function generator, oscilloscope and power supply.
2. To study series and parallel combination of resistances using DC source.
3. To study the variation of charge and current in a RC circuit for different time constants using a DC source.
4. To study the rise and decay of current in a LR circuit using a DC source.
5. To study resonance in a Series LCR circuit with an AC source.
6. To study resonance in a Parallel LCR circuit with an AC source.
7. To study electromagnetic induction and to verify Farady's law.
8. To study conversion of a galvanometer into an ammeter.
9. To study conversion of a galvanometer into a voltmeter.

Section B

1. To identify and test various electronic components.
2. To study the characteristics of a semiconductor junction diode.
3. Determination of the band gap using a junction diode.
4. To study characteristics of a PNP/NPN transistor in common emitter/base configuration.
5. To study characteristics of a zener diode.

6. To study half wave rectification using single diode and L section filter.

7. To study full wave rectification using two diodes and π section filter.

8. To study a single stage transistor audio amplifier.

9. To study behavior of a SMPS power supply.

Paper 122: Programming Laboratory Course in C and C++

The Practical examination (Max. Marks 50) will be of four hours duration on one day involving two hours for each section of Laboratory Course. These shall extensively probe the working knowledge of the specified laboratory courses. Distribution of marks will be 15 marks for Exercise(s) assigned in each section, 10 marks for Internal Assessment and 10 Marks for the Viva-voce examination.

Section A (Programming in C and C++): Character set, variables and constants, keywords, Instructions, assignment·statements, arithmetic expression, comment statements, simple input and output, Boolean expressions; Relational operators, logical operators, control structures, decision control structure, loop control structure, case control structure, functions, subroutine scope and lifetime of identifiers, parameter passing mechanism, arrays and strings, structures, array of structures, Console Input and Output functions, Disk I/O functions, Interaction with hardware, Interrupts and Interrupt Vector table, Unions of structures, operations on bits, usage of enumerated data types, Bitfields, Pointers to Function, Function returning Pointers, Graphics in C.

Section B (Programming in C++) : Basic Concepts of Object Oriented Programming, Characteristics of Object-Oriented Languages, Object, Classes in C++, Constructors, Destructors, Complex Class, Matrix class; Classes, Objects and Memory; Structures and Classes; C++ Free Store, Static Class Data, Overload Assignment Operator, Copy Constructor, Data Conversion between Objects of different classes, Data structure through C++, Handling Data files (sequential and random), opening and closing files, stacks and queues, linked lists, trees, Inheritance Multiple, Private and Protected Inheritance, Virtual Functions, Objects Slicing, Input/Output in C++, User de-

fined manipulators, Predefined Stream Objects, File I/O with Streams, Strstreams, Classes within classes, Smart Pointers, Templates, Exception Handling.

Recommended reference books:

1. Bryon Gottfried, Programming with C, McGraw Hill International.
2. Deitel and Deitel: How to Program C, Addison Wesley, Pearson Education Asia, 1999.
3. Yashwant Kanetkar: Working with C, BPB Publications.
4. K.R. Venugopal, Rajkumar, T. Ravishankar: Mastering C++, Tata McGraw Hill, India.
5. John R. Hubbard, Programming with C++, McGraw Hill International.
6. Yashwant Kanetkar: Let us C++, BPB Publications.
7. S.B. Lippman and Josee Lajoie, C++ Primer, Pearson Education Asia.

Paper 123 : Laboratory Course in Microcomputer Business and Office Applications

The Practical examination (Max. Marks 50) will be of four hours duration on one day involving two hours for each section of Laboratory Course. These shall extensively probe the working knowledge of the specified laboratory courses. Distribution of marks will be 15 marks for Exercise(s) assigned in each section, 10 marks for Internal Assessment and 10 Marks for the Viva-voce examination.

Section A

Word Processing Software-MS Word 2000: Creating and Saving documents, Entering, Editing, Moving, Copying and Formatting Text, Page formatting, Finding and replacing text, Spell checking and Grammar checking, enhancing documents, Indexing, Columns, Tables and feature there in, Inserting (Objects, picture, files etc.), Using Graphics, templates and wizard, using mail merge, using Word Art, customizing MS Word. Designing pages with MS Publisher, Inserting and Manipulating Objects. Editing Fills and recoloring pictures.

Spreadsheet Software- MS Excel 2000 : Spreadsheet terminol-

ogy, organization of the worksheet area, entering information, editing cells using commands and functions, moving copying, inserting and deleting rows and columns, formatting worksheet, printing worksheet, creating charts, modifying and enhancing charts, using date, time and addressing modes, naming range and using statistical, mathematical and financial functions, database in a worksheet, creating, sorting, querying and maintaining the database, multiple worksheets and Macros, working with objects.

Presentation Software- MS Power Point 2000: Anatomy of a Power Point Presentation, Creating and Viewing a presentation, Managing Slide Shows, Navigating through a presentation, Using hyperlinks, advanced navigation with action setting and action buttons, organizing formats with Master Slides, applying and modifying designs, adding graphics, multimedia and special effects, creating presentation for the web.

Section B

Data Base management Software- MS Access 2000: Planning a database (tables, queries, forms, reports), Creating and editing database, customizing tables, linking tables, designing and using forms, modifying database structure, maintaining database, Sorting and Indexing database, Querying a database and generating Reports, modifying a Report, exporting a Report to another format.

Relational Database Management Systems-SQL: Relational Data Structure, Database Design, Normalization, Characteristics and advantages of SQL, SQL language levels, SQL data types and Literals, SQL Operators, types of SQL commands, Tables, Indexes, Views, Nulls, Aggregate Functions, Select statement, Subqueries, Insert, Update and Delete operations, Joins, Unions, Data security, integrity and concurrency, Backup and recovery, numeric and text data in SQL, dealing with dates, Synonyms, Snapshots, Programming with SQL.

Recommended reference books

1. R.K. Taxali: PC Software for Windows, Tata McGraw Hill.
2. The O'Leary Series, Microsoft Word 2000, Tata Mc Hraw Hill.
3. Content Development Group: Working with MS Office 2000, Tata McGraw Hill.

4. Courter: Mastering Office 2000, BPB Publications.
5. Bott and Leonhard: Using Microsoft Office 2000, Prentice Hall of India.
6. Alexis Leon and Mathews Leon: SQL - A Complete Reference, Tata McGraw Hill.
7. R. Radhakrishnan and J. Gehrke: Database management Systems, Tata McGraw Hill.
8. Gruber: Mastering SQL, BPB Publications.

COMPULSORY PAPERS FOR BCA PART I:

CPI : History of Science and Invention

Examination : (Duration Two Hours) (Max Marks 100) : Consisting of 100 Multiple Choice questions with four choices and student will have to pick the correct one. To pass the examination the candidate will have to secure at least 40%. However he/she will be given, in all three chances to qualify the examination with either Part I or Part II or Part III.

Scope of Course : This paper is based on the book entitled 'The Evolution of Wired Life' by Charles Jonscher, John Wiley & Sons, Inc. (1999) covering Chapters 1 to 9.

CP2 : Technical writing (Lab. Course)

Examination (Duration two-hour) (Max Marks 50) : Consisting of appropriate set of exercises/questions to test the technical writing and editing skills. To pass the examination the candidate will have to secure at least 40%. However he/she will be given, in all three chances to qualify the examination with either Part I or II or Part III.

This course aims to teach both the technical writing and editing skills needed to create specifications design documents, and user or programming guides. Topics include:

1. The writing process: Gathering, writing, reviewing, editing, indexing testing, production and printing, distribution, maintaining and managing releases and soliciting and using customer feedback.
2. Different types of writing : Marketing, business overviews, user

guides reference guides, programming guides, online help and websites.

3. The diplomacy of Technical writing: Handling sticky work situations, how to approach a busy engineer, working with a group/ on your own/in a large company or small start up, and role playing.

CP 3: Communication Skills (Lab. Course)

Examination (Duration two-hour) (Max Marks 50): Consisting of appropriate set of exercises and oral examination of candidate's communications skills. To pass the examination the candidate will have to secure at least 40%.However he/she will be given, in all three chances to qualify the examination with either Part I or II or Part III.

The development of effective communications skills for a business environment; the nature of communication; Written (reports, letters, electronic communications, etc.); oral (presentation skills) and interpersonal communications (perceptions, listening; nonverbal communication, group dynamics conflict, negotiations etc.).

B.C.A. PART-II EXAM, 2007
Paper 211 : Financial and Marketing Management

Nature, scope and objective of Financial Management, Basic Financial Concepts Statement of changes in financial Position. Working capital, cash and total resource basis, Financial Statement Analysis- Ratio analysis, Capital Budgeting: Principles and Techniques, Analysis of risk and uncertainty, Concept and measurement of cost of capital, merger/amalgamation and acquisitions/takeovers, lease financing, Operating financial and combined leverage, capital structure, cost of capital and valuation, designing capital structure, Theory of working capital management, planning of working capital, working capital financing, measurement of cash and marketable securities, inventory management.

Role of marketing in modern organizations, the market environment, market planning, marketing research and information system, understanding the buyer, organizational buying behavior, segmenting and targeting the market, market measurement and forecasting, prod-

uct management, new product decisions, brand equity, pricing deci-
sions, promotion decisions, advertising management, sales promo-
tion, personal selling, managing the sales force, managing the distri-
bution function, marketing strategy, marketing organization, market-
ing performance and control.

Reference books

1. M.Y. Khan and P.K.Jain, Financial Management, Tata Mc-Graw
   Hill.
2. Prasanna Chandra, Financial Sense, Tata McGraw Hill.
3. Ranjan Saxena, Marketing Management, Tata McGraw Hill.
4. William J. Stanton, Michael J. Etzel, Bruce J. Walker, Funda-
   mentals of Marketing, Mc Graw Hill International.

Paper 212 : Digital Electronics and Circuits

Review : Positive and negative logic, Logic functions- NOT,
AND, OR, NOR, EX-OR, EX-NOR, Truth tables, Boolean Algebra,
de Morgan's theorems; Standard forms for logical expressions, Sum
of Products, Product of Sums specification of logical functions in
terms of Minterms and Maxterms, Karnaugh Maps, simplification of
logical functions, introduction of "don't care" states, Quine-McLuskey
algorithm, Synthesis using only NAND or only NOR gaters.

Digital Logic Families : Characteristics of Digital ICs, Intro-
duction to Bipolar Families (RTL, DCTL, DTL, ECL), Introduction
to Unipolar Logic families (PMOS, NMOS, CMOS), TTL Circuits,
7400, 74H00, 74L00, 74S00, 74LS00, 74AS00 series, TTL param-
eters, Sourcing and sinking, Loading rules, Three state TTL devices,
External Drive for TTL Loads, Positive and Negative Logic, ECL
OR/NOR Gates, ECL characteristics. Combinational Circuits, Multi-
plexer- IC 74150 and IC 44151, Demultiplexer-IC 74154, Decorder-
IC 74139, BCD to Decimal Decode-IC 7445, BCD to Seven segmant
De-coder IC 7446/7447 IC 7448/7449 Decimal to BCD Priority
Encoder - IC 7447, parity Checkers - IC 741 80, Magnitude Compa-
rator IC 7485.

Sequential Circuits : RS Flip Flop, Clocked RS Flip Flop, D
Flip Flop, Edge Triggered D Flip Flop, JK Flip Flop, Master-Slave
Technology and its advantage, Shift Register as Flip Flop system, IC

7496, UP/DOWN counters, 74 series asynchronous counters, 74 series synchronous counter.

Reference Books :

1. Albert Paul Malvino and Donald P. Leach, Digital Principles and Applications, (Fourth Edition) Tata Mc Graw Hill Publishing Company Ltd, New Delhi.

2. S. Salivahanan and S. Arivazhagan, Digital Circuits and Design, Vikas Publishing House Pvt. Ltd.

3. R.P. Jain, Modern Digital Electronics, Tata Mc Graw Hill Publishing Company Ltd. New Delhi.

4. Adel S. Se&a, and Kanneth C. Smith, Microelectronic Circuits, Oxford University Press.

Paper 213: Mathematical methods for
Numerical Analysis and Optimization

Computer arithmetics and errors. Algorithms and programming for numerical solutions. The impact of parallel computers : introduction to parallel architectures. Basic algorithms. Iterative solutions of nonlinear equations : bisection method, Newton - Raphson method, the Secant method, the method of successive approximation. Solutions of simultaneous algebraic equations, the Gauss elimination method, Gauss-Seidel Method, Polynomial interpolation and other interpolation functions, spline interpolation, system of linear equations, partial pivoting, matrix factorization methods. Numerical calculus: numerical differentiating, interpolatory quadrature. Gaussian integration. Numerical solutions of differential equations. Euler's method. Runge-Kutta method. Multistep method. Boundary value problems: shooting method.

Reference Books

1. E. Balagurusamy, Numerical Methods, Tata Mc Graw Hill.

2. V. Rajaraman, Computer Oriented Numerical Methods, Prentice Hall of India Pvt. Ltd.

3. M.K. Jain, S.R.K. Iyenger and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, Wiley Eastern Ltd.

4. S.S. Sastry, Introductory Methods of Numerical analysis, Prentice Hall of India Pvt. Ltd.

5. Curtis F. Geraid and Patrick O. Wheatley, Applied Numerical Analysis, Addison Weseley.

6. J.H. Mathews, "Numerical Methods for Computer Science, Engineering and Mathematics", Prentice Hall of India Pvt. Ltd.

Paper 214 : Database Management System

Data and information [Basic concepts, Problems of Early Information Systems, Advantages of a DVMS].

Database architectures [Three levels of the architecture: external, conceptual and internal level], centralized and distributed. Database models; hierarchical [Concepts of a Hierarchy, IMS Hierarchy], relational [Concepts of relational model, relational algebra, relational calculus], network [Concepts of a Network, DBTG Network, DBA Scheme declaration] and object oriented database [only basic information about OODBMS and ORDBMS]. Database query languages [basic retrieval capability, retrieval and explosion, update commands, QBEL, client/server design, Standard Query Language [Basic SQL Query, Nested Queries, Aggregate Operators, Null Values].

Data Management Issues: backup, recovery, maintenance, and performance. Database design [Scheme Refinement, Functional Dependencies, Normal forms, Decompositions, Normalization], tuning [Tuning indexes, Tuning queries and views, tuning the conceptual scheme, DBMS benchmarking], security [Access control, Discretionary and Mandatory Access control, Encryption] and implementation.

Reference Books :

1. Ramakrishnan and Gharke, Database Management Systems, Tata Mc Graw Hill Pub. Co. Ltd.

2. Date, Database Management Systems, Pearson Education Asia.

3. Geraid V Post, Database Management Systems, Tata Mc Graw Hill.

4. Naveen Prakash, Introduction to Database Management Systems, Tata Mc Graw Hill.

5. Leon, and Lcon, SQL, Tata Mc Graw Hill Pub. Co. Ltd.

6. Ivan Bayross, Database Technologies, Sybex Computer Books Inc.

7. Abbey and Corey, Oracle 8, Tata Mc Graw Hill Pub. Co. Ltd.
8. Abbey and Corey, Oracle 8, Tata Mc Graw Hill Pub. Co. Ltd.
9. Occardi, Relational Database, BPB Publications.

Paper 215 : Object Oriented Programming

Necessity of Object Oriented Programming, Essentials of OOP (Encapsulation, Constructors, Destructors, Inheritance, Pointers to Objects, Polymorphism).

Java programming basic, Instantiable Classes and Constructors, Processing Input with Applets.

Programming in Visual Basic : Object model, Visual Basic Environment Visual Basic Code Statements, Controls, Coding for the controls, variables, constants and calculations, decision control structure, loop control structure, nested Ifs statements, Input validations, Calling event procedures, Menus, Sub Procedures and Sub Functions, Multiple forms, Variables and Constants in Multiple Form Projects List Boxes and Combo Boxes, Using Mfg Box and String Function, Arrays, Using List Boxes and Arrays, Multidimen-sional Arrays, Classes, initializing and terminating events, Collections, Using the Object browser, Data Files, Sequential File Organization, Random Data Files. Accessing Database files, Navigating the database in Code, Displaying Data in Grids, Validation and Error Trapping, Dragging and Dropping Multiple Objects, Graphics, Layering, Simple Animation, Active X, Dynamic Link Libraries, Object Linking and Optimizing VB Code, OLE Automation and VBA, automating Word, Excel and Outlook 98.

Programming in Java : Constants, Variables, Data types, arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement operator, Conditional Operator, Bit-wise Operator, arithmetic expression, Type conversion in expressions, Mathematical Functions, decision control structure, loop control structure, Classes, Objects and Methods, Boolean Methods, void Methods, Overloading, Nesting of Methods, Constructors, Class Invariants, Composition, Recursive. Classes, Extending a class, Overriding Method, Inheritance versus Compositions, Class hierarchies, Arrays and Vector, String Arrays, Wrapper Classes, Defining,

extending and implementing interfaces, accessing interface variables, Graphics, Managing Layouts, Event drieven programming, applets, Thread and exceptions. Managing Input Output files, Reusable classes, Searching, Sorting and recursive algorithms.

Reference Books

1. C. Thomas Wu, An Introduction to OOP with Java, Mc Graw Hill.
2. Timothy Wood, An Introduction to Object Oriented Programming, Addison Wesely.
3. Deitel and Deitel, Java, How to Program, Pearson Education Asia.
4. Cay S. Horstmann and Gary Comell, Core Java, Pearson Education Asia.
5. E. Balaguruswmy, Programming with Java, Tata McGraw Hill.
6. Zukowski: Mastering Java.2, BPB Publications.
7. Herbert Scliildt, Java 2, Tata Mc Graw Hill.
8. Julin Case Bradley and Anita C. Millspaugh: Programming in Visual Basic 6.0, Tata McGraw Hill.
9. Dan Rahmel: Visual Basic 6, Tata McGraw Hill.
10. Wayne S. Freeze : Visual Basic 6, BPB Publications.

Paper 216 : Networking Technologies And TCP/IP

Network architecture, configuring network, network strategies, networks types, LAN, MAN and WAN, [Basic concepts, Line configuration, topology, transmission mode, identify key components of network, categories of network, differentiating between LAN, MAN, WANS and Internet].

The OSI model, The physical layer (bandwidth limited signals, transmission media, wireless transmission), the data link layer, error detection and correction, data link protocols, the medium access sublayer, the channel allocation problem, multiple access protocol, IEE standard 802 for LANs and MANs, Bridges, the network layerm routing algorithm, congestion control algorithm, internet working, the transport layer, the application layer, MAC protocols for high speeds LANs.

Introduction to TCP/IP [Understand the TCP/IP Protocol Suite,

its history and modification processes compare TCP/IP to the Open Systems Interconnection (OSI) reference model, Examine a number of TCP/IP applications such as FTP, Telnet, DNS, DHCP, Boot, etc.

Reference Books

1. Andrew S. Tanenbaum, Computer Networks, Prentice Hall
2. Behrouz A forouzan, TCP/IP, Tata McGraw Hill Pub. Co.
3. DE Corner and DL Stevens, Internet working with TCP/IP Volume I-III, Prentice Hall of India.
4. Wright and Stevens, TCP/IP Illustrated, Pearson Education Asia.
5. Karanjit S Siyan, Inside TCP/IP, Techmedia.
6. Minasi, Mastering LAN, BPB Publications.
7. Minoli, Internet, Interanct Engineering, Tata Mc Graw Hill Pub. Co. Ltd.

Paper 217 : System Analysis and Design

Introduction to Systems Design Environment : Systems Development Approaches-Function Oriented. Data Oriented, Object Oriented, Development Process, Methodologies, Tools, Modeling Methods, Processing Types and Systems, Batch Processing, Real-time Processing, Management Process, Management, Systems Analysis, Programmers, Computer Operators, End Users, System Structure, People, processes, and data, Databases, Personal Systems, Centralized Systems, Data Warehousing, data mining, Distributed Systems, Evolution of Distributed processing, Client server systems. Agent Oriented systems.

System Development Life Cycle, Linear or Waterfall Cycle, Linear cycle phase problem definition, system specification, system design, system development, testing, maintenance Problems with Linear Life Cycle, Iterative Cycles, Spiral model Requirements analysis, Importance of Communication, Identifying Requirements, Data and Fact Gathering Techniques, Feasibility Studies, Introduction to Prototyping, Rapid Prototyping Tools, Benefits of prototyping.

Interface design tools, user interface evaluations, Introduction to Process Modeling, Introduction to Data Modeling.

System Design Techniques, Document Flow Diagrams, Documents, Physical Movement of documents, Usefulness of Document

Flow diagrams, Data Flow Diagrams, DFD notation, Context diagram, DFD leveling, Process descriptions structured English, Decision Trees and Decision Tables, Entity Relationship Diagrams, Entities, Attributes, Relationships, Degree, Optionality, Resolving many to many relationships, Exclusive relationships, Structure Charts, Modules, Parameter passing. Execution sequence, Structured Design, Conversion from Data Flow Diagrams to Structure Charts.

System Implementation, Maintenance and documentation, Testing, Evaluation, Maintenance Activities, Documentation, Document Configuration Maintaining a Configuration.

Reference Books

1. Igor Hawryszkiewyez, Introduction to Systems Analysis and Design, 4th edition, Prentice-Hall.
2. Jeffrey L. Whitten, and Lonnie D. Bentey, Systems analysis and Design Methods 4th edition, Tata McGraw-Hill.
3. Philip L Weaver, Practical SSADM wer 4+ A Complete Tutorial Guider, Pitman publishing, 1995.
4. Mark Lejk, and David Deeks, an Introduction to Systems Analysis Techniques Prentice Hall.
5. Don Yeates, Maura Shields and David Helmy, System Analysis and Design Longman group limited, 1994.

Paper 218 : Internet and Intranet

Internet : Internet Accounts, Telephone, Cable and Satellite connections, Dial up networking, setting up a dial up connection, high speed connection (ISDN, ADSL and Cable modems), Networking Essentials (Lease Line, Routers, Modems), Intranets, E-mail concepts (receiving, sending, addressing, downloading, formatting, sending attachments), sending and receiving Secure E-mail, chatting and conferencing, E-mail mailing list, Newsgroup, IRC, ICQ, Yahoo Pager, Voice mail and Video conferencing.

World Wide Web : Elements of the Web, Web browser, viewing pages with a browsers, using a browser for Mail, News and chat, Security and Privacy issues (cookies, firewalls, executable Applets and scripts, blocking systems), Netscape navigator and Communicator and features therein Internet Explorer and features therein, Lynx,

Opera, finding and installing Players, Plug - Ins and Active X controls, dealing with Web pages that contain Active X, Java and Java Script, playing streaming Audio and Video, playing MP music. Using Search engines, subscriptions and channels, making use of Web resources (Portal, News and weather, Sports, Personal Financing and Investing, Entertainment, Shopping, Computers and Internet, Travel, Health and Medicine, Communities and Clubs), Introduction to E-Commerce.

Creating and Maintaining Web Sites : Planning, Navigation and Themes, Elements of a Web Page, steps of creating a site, publishing and publicizing site, structuring web site, starting a Web Page (HTML Tags Standard Tags), Formatting Text, Adding Pictures and links, Gathering information in forms, formatting page in frames, formatting web page by using styles, creating web page by using web page editors (Netscape composer, Front Page Express 2000), creating web graphics, using GIF, JPEG, getting Web Clip Art, Progressive Display and Transparency, optimizing images on the web, animating web graphics, Anti-aliasing, Image Slicing, Seamless Tiling, Multimedia graphics, Capturing Audio, generating digital file, editing, processing, encoding and linking the audio file, unloading web pages, unloading by using FTP, Netload, Front Page Express and Netscape Composer, analysing web traffic, building traffic to your site, File Transfer Protocol (FTP) and File Transfer Protocol Programs.

HTML tables, Javaseript, CGI, Introduction to Perl, perl: control structures, hashes, basic I/O, regular expressions Simple CGI Scripts, HTML style sheets. Perl : regular expressions, string handling, sorting, formatting data CGI programming.

The basics of HTML as used with ASP. Using forms to obtain information from users ASP variables and arrays, ASP control structures (loops, conditions, procedures, functions) ASP objects Creating and reading cookies, Connecting a web page to a database (retrieving updating, and inserting data into a data base. Error handling and debugging ASP scripts.

Introduction to XML, Setting up Web servers, Configuring Web and FTP servers.

Reference Books :

1. M.L. Young : Internet Millennium Edition, Tata McGraw Hill.
2. Harley Hahn : The Internet, Tata McGraw Hill.
3. G. Robertson : Hands on HTML, BPB Publications.
4. D.A. Tauber, B. Kienan : Microsoft From Page 2000, BPB Publications.
5. Joel Sklar : Principles of Web Design, BPB Publications.
6. Stephen W. Active Server Pages, Techmedia.

Paper 219 : Electronic Communication and Data Communication

Modulation [Principles of Modulation, AM and FM Modulator Circuits, Pulse Code Modulation, Baseband Modulation, M-ary Pulse Modulation waveforms, Duobinary signaling and decoding. Digital Band-pass Modulation] Demodulation [Basics of Demodulation and detection, signals and Noise, Detection of Binary Signal in Gaussian Noise, Demodulation of shaped Pulses, Digital Band Pass Demodulation], Data transmission [Basic Concepts. Data Communication Systems, Serial Data fortnats, encoded data formats, error detection and correction], information about microwave [Electromagnetic spectrum, Characteristics, Use of Microwave in Communications, FM Microwave Radio Repeaters[, Satellite [Artificial Statellites, Geosynchronous Satellites, Look angles, Orbital classifications, Spacing and Frequency allocation, Multiple accessing, Channel Capacity.] and optical fiber communication [Basic concept of light propagation, Fiber Cables, Optical fiber versus Metalic cable facilities, Light sources, Optical Detectors, Fiber cable losses, wave division multiplexing, fiber distributed data interface the fiber channel, S ONET]. ISDN [ISDN services, subscriber access to ISDN, B Channels, D Channels, H channels, ISDN layers, Broadband ISDNI, DSL [Digital Subscriber Lines : HDSL, VDSL, SDSI, IDSL].

Reference Books :

1. M.A. Miller, Data and Network Communications, Thomson Learning.
2. Behrouz A Forouzan, Data Communications and Networking, Tata Mc Graw Hill.

3. Bernard Sklar, Digital Communications, Pearson Education Asia.
4. Wayne Tomasi, Electronic Communications Systems, Pearson Education Asia.
5. B.P. Lathi, Modern Digital Analog Communication Systems, Oxford University Press.
6. Fred Harshall, Data Communications, Communication Networks, Pearson Education Asia.
7. W.A. Sahay, Understanding Data Communication Network, Vikas Publishing House.
8. Gilbert Held, Understanding Data Communication, Techmedia.
9. Kennedy, 'communication Systems', Tata Mc Graw Hill.

Paper 221 : Visual Basic, Visual C, and Visual Foxpro Programming (Laboratory)

Visual Basic Programming

○ Event driven programming : objects, properties, methods, events.
○ Introduction to Visual Basic : development environment, forms controls, menus, dialogue boxes.
○ Programming in Visual, Basic : data types, data structures, control structures, subprograms, intrinsic functions, error handling, file handling.
○ Multiple Form Programming - Information Kiosks.
○ Windows API : functions, API viewer, 'declare' statements, making API calls.

Visual C Programming

○ List the major elements of Visual C Frame work.
○ Analyze the basic structure of a Visual C application and be able to document, debug, compile, and run a simple application.
○ Create, name, and assign values to variables.
○ Use common statements to implement flow control, looping, and exception handling.
○ Create methods (functions and subroutines) that can return values and take parameters.
○ Create, initialize, and use arrays.
○ Use common objects and reference types.

Visual Fox Pro Programming

- Variable naming conventions in Visual Foxpro.
- Creating a prototype, specifying title, application database, forms, reports, menu and other files, saying and running the project.
- Using Visual Foxpro's debugging facilities.
- Integrating Visual Foxpro with OOP.
- Communicating with other applications.
- Using Windows API.
- Creating a Visual Foxpro Database
- Using SQL in Visual Foxpro Applications
- Client/Server Database development using Visual Fox Pro.

Reference Books :

1. Julia Case Bradley and Anita C. Millspaugh: Programming in Visual Basic 6.0, Tata Me Graw Hill.
2. Dan Rahmel : Visual Basic 6, Tata McGraw Hill.
3. Wayne S. Freeze : Visual Basic 6, BPB Publications. 4 Chapman, Visual C. Techmedia.
4. Paddock, Petersen, talmage and Ranft, Visual Fox Pro 6, BPB.

Papger 222 : Web authoring Tools,
Java and Perl Programming (Laboratory)

[The Web authotring Tools course teaches students the World Wide Web Design with HTML, DHTMS, and javaseript. The necessary theoretical aspects and basics should be explained during the practical class of the Instructor. The latest version of HTML, DHTML and Javascript should be used. In addition to the standard form, the extensions developed by Microsoft and Netscape should also be used. Extensive practical exercises should take students through all major aspects of the design and development of Web sites.]

- Build HTML documents from scratch.
- View HTML document using a variety of Web Browsers
- Organize information using Lists
- Use HTML frames and tables for page layout.
- Connect to a variety of resources by using hypertext links.
- Create style sheets to format the look and feel of the pages
- Understand key image theory concepts.
- Create new images from scans or from scratch

- Optimize image sizes.
- Create animated gifts and transparent images.
- Be able to create graphical elements for use on web pages : buttons, banners navigation bars, background tiles.
- Embed images and other multimedia.
- Post information to HTTP server.
- Evaluate a document design for effectiveness, usability and efficiency.
- Using DHTML create functionalities like animation, stage- based presentations, splash pages, pull-down menus, drop down menus, drag drop techniques.
- Integrating Javascript with HTML and DHTML.
- Using Javascript Object Model, Javascript's Event System. Manipulating User defined Objects and variables.
- Dynamically updating Objects in a Window, focussing and defocusing method.
- Using Javascript's Time Out Mechanisms and Cookie Mechanism.
- Red and write cookies to store visitor's information.

Java Programming

[The Java Programming Language course teaches students the syntax of the Java programming language; object-oriented programming with the Java programming language; creating graphical user interfaces (GUI), exceptions; file input/output (110); threads and networking. The necessary theoretical aspects should be explained during the practical class only. The Java 2 Software Development Kit (SDK) or any later version should be used. Extensive practical exercises should take students through all major aspects of the design and development of Java programs.)

- Learn about getting and installing the Java Development Kit.
- Learn about Java programming language structure and syntax.
- Learn about control statements (The If statement, Logical Operators, The Conditional Operator, The Switch Statement, Variable Scop, Loops).
- Learn about Java arrays, Java Strings, Operations on Strings and String Buffer Objects.

- Learn about Class, Objects, Methods and Problem solving using classes, objects and relationships.
- Learn about console and file I/O.
- Learn about Java 2 SDK tools : Javac, Java, Javadoc, and Jar.
- Learn about Java Exceptions, Inheritance and Polymorphism.
- Create sophisticated Java applications that leverage object-oriented features of the java language, such as inheritance and polymorphism.
- Use the file I/O class libraries to read and write to and from data and text files.
- Create and use Java GUI components such as panels, buttons, labels, text fields and text areas.
- Create stand-alone Java applications, and use the frame and menu classes to add graphics to Java applications.
- Create basic Java applets and launch them from a Web browser.

Perl Programming

- Learn about getting and installing the Perl 5.
- Learn about Perl 5 structure and syntax.
- Learn about control structures, (The If-then else, while, until, do while, for conditional statements), creating a counting loop, the next, last and redo control statements.
- Learn about lists Arrays and hashes in Perl.
- Learn about program flow and subroutines in Perl.
- Learn about Class, Objects, Methods and Problem solving using classes, objects and relationships.
- Learn about console and file I/O.
- Learn about Java 2 SDK tools: javac, java, javadoc, and jar. Creating and reading from files.
- Searching for files.
- Pattern matching Syntax
- Packages and modules, loading, libraries and importing a module. Interacting with data bases.
- Using the Perl DBI.
- Working CGI programs,
- Sending and receiving data.

○ Returning data

○ Cross platform functions.

Reference Books : [Web authoring Tools]

1. Elizabeth Castro, HTML 4, Pearson Education Asia.
2. D.S. Ray and E.J. Ray, Mastering HTML 4, Sybex Computer Books Inc.
3. Jeff Rule, DHTML, Tata Mc Graw Hill.
4. Joseph Schmuller, Dynamic HTML, Sybex Computer Books Inc.
5. Jason J manager, Javascript essentials, Osborne Mc Graw Hill.
6. Joel Sarkar, Principles of Web Design, Thomson Learning
7. C Xavier, WWW Design with HTML, Tata Mc Graw Hill.
8. Don Gosselin, Java Script, Thomson Learning.

Reference Books : [Java Programming]

1. H.M. Deitel and P.J. Deitel, Java How to Program, Pearson Education Asia.
2. E. Balagurusamy, Programming with Java, Tata McGraw Hill Pub. Co. Ltd., 2001.
3. Peter Norton, Peter Norton's Guide to Java Programming, Techmedia.
4. Ken Amold, James Gosling, David Holmes, The Java Programming, Pearson Education Asia (Addison Wesley).
5. A. Drozdek, Data Structures and Algorithms in Java, Vikas Publishing House, 2001.
6. J. Zukowski, Mastering Java 2.
8. Lafore, Data Structures & Algorithms in Java, Techmedia.
9. Gilbert, Object Oriented Programming in Java, Techmedia.

Reference Books : [Perl Programming]

1. R. Allen Wyke, and Donald B. Thomas, Perl: A beginners guide, Tata Mc Graw Hill.
2. Jon Orwant, Perl 5, Techmedia.
3. Laura Lemay Perl in 21 days, Techmedia.

Paper 223 : Digital Electronics Lab (Laboratory)

In this lab the student must perform. Ten experiments based on topics covered in the theory Paper 212 : Digital Electronics And Circuits, [which is outlined above].

B.C.A. PART-III EXAM, 2008

Paper 311 : Computer Graphics and Image Processing

Introduction to Computer Graphics : Definition, Application areas of Computer graphics, Graphical user interface, Cathod ray tubes, Random scan displays, Raster scan displays (with introduction to flickering, interlacing. American standard video etc), Color CRT monitors,, Flat panel displays (Plasma Panels, Liquid crystal displays, Electroluminescent displays), Graphics software (GKS, PHIGS), Color Models (RGB, CMYK, HSV, Lookup tables etc.)

Raster Graphics Algorithms : Line drawing algorithms (DDA, Bresenham's algo), Circle and Ellipse drawing algorithms, Filling (Scan-converting Polygon filling \, Inside outside tests boundary fill and area fill algo).

Transformations and Projections : 2-D transformations (Rotation, Reflection, shearing, scaling), Homogeneous coordinate representation, Translation, 3-D transformations, Projection classification, Parallel projections, Perspective projections (One point, Two point).

Two dimensional Clipping and visible surface detection methods: Viewing pipeline, window and viewport, Sutherland Cohen sub division algorithm, Cyrus-beck algorithm, classification of visible surface detection algorithm, Back face algo, Depth sorting method, Area subdivision method etc.

Introduction to Digital Image Processing : Definition and application areas Digital Image Processing, difference between computer graphics and Image processing. The storage and capture of digital images, File formas, Basic digital Image processing techniques like antialiasing, Convolutions, Thresholding etc, Image enhancement.

References:

1. Hearn & Baker: Computer Graphics (2nd Ed.). Prentice Hall India.
2. Krihsnamurthy N: Introduction to computer Graphics, Tata McGraw Hill Edition.
3. Zhigang X. & Plastock R.A. : Theory and problems of Computer Graphics (Schaum's Outline), Tata McGraw Hill.

4. Gonzalez & Gonzalez, Digital Image Processing, Pearson Education.

5. Jain V.K., Fundamentals of Digital Image processing, Pearson Education.

Paper 312 : Software Engineering

Software Characteristics, Components, Applications, Software process Models : Waterfall, spiral, Prototyping, Fourth Generation Techniques, Concepts of Project Management, Role of Metrics & Measurements.

S/W Project planning Objectives, Decomposition techniques : S/W Sizing, Problem-based estimation, Process based estimation, Cost Estimation Models : COCOMO Model.

S/W Design : Objectives, Principles, Concepts, Design methodologies Data design, Architectural design, procedural design, Object oriented concepts

Testing fundamentals : Objectives, principles, testability, Test cases: White box & Black box testing, Testing strategies: verification & validation, unit test, integration testing, validation testing, system testing

References:

1. Roger, S. Pressman, "Software Engineering—A Practitioner's Approach", Third Edition, McGraw Hill

2. R.E. Fairley, "Software Engineering Concepts", McGraw-Hill

3. Jalota, "An Integrated Approach to Software Engineering", Narosa Publishing House.

Paper 313 : Simulation and Modeling

Definition of System : Types of system-continuous and discrete; Modeling process and definition of a model; Computer work load and preparation of its models; Verification and validation modeling procedures; comparing model data with real system.

Simulation Process : Use of simulation discrete and continuous simulation procedures; simulation of a time sharing computer system.

Simulation languages: A brief introduction to important discrete and continuous simulation language; Algorithm development and pseudo code writing for simulation problems.

Use of database and A.I. techniques in the area of modeling and simulation.

References:

1. Payer, T.A.: Introduction to simulation, Mc Graw Hill, 1982
2. Spriet, W.A.: Computer Aided Modeling and Simulation-Academic press, 1982
3. Barnes, B: Modeling and performance Measurement of Computer systems.

Paper 314 : Advanced Computer Architecture

Parallel Computer Models: The state of computing, multiprocessors and multicomputers, multivector and SIMD computers, architectural development tracks.

Program and Network properties: conditions of parallelism, program partitioning and scheduling, program flow mechanisms.

System Interconnect Architectures: Network Properties and routing, Static interconnection network and dynamic interconnection networks.

Processors and memory Hierachy: Advanced processor technology-CISC, RISC, Superscalar, Vector VLIW and symbolic processors, memory hierarchy technology, Virtual memory technology.

Bus, Cache and Shared Memory.

Linerar Pipeline Processors, Nonlinear Pipeline processors, Instruction pipeline Design Arithmetic pipeline Design, Multiprocessors System Interconnets Vector Processing Principles, Multivector Multiprocessors.

Text:

1. Kai Hwang "Advanced Computer Architecture", McGraw-Hill.

Reference:

1. J.P. Hayaes "Computer Architecture and Organization", McGraw-Hill.
2. Harvey G. Cragon, "Memory Systems and Pipelined Processors", Narosa Publication.
3. V. Rajaranam & C.S.R. Murthy, "Parallel Computers", PHI.
4. R.K. Ghose Rajan Moona & Phalguni Gupta, "Foundation of parallel processing", Narosa Publications.

5. Kai Hwang and Zu, "Scalable parallel Computers Architecture", McGraw-Hill.

6. Stalling W., "Computer Organization & Architecture", PHI.

Paper 315: Management Information Systems

Introduction to systems and Basic System Concepts, Types of Systems. The Systems Approach, Information Systems: 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.

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 decisiohs, Formal Vs. Informal systems.

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

Functional MIS: A Study of Marketing, Personnel, Financial and production MIS.

References:

1. J. Kanter, "Management/ Information Systems". PHI.

2. Gordon B. Davis & M.H. Olson. "Management Information Systems: Conceptual Foundation, structure & Development".

3. Robert G. Murdick & Joel E. Ross & James R.Claggett, "Information Systems for Modern Management" PHI.

4. Lucas,"Analysis, Design & Implementation of Information System.

Paper 316: Network Security and Cryptology

Introduction: Goals and settings, The symmetric setting, The asymmetric setting. Other goals, Pseudorandom Number Generation, Authenticated key exchange, Coin flipping, What cryptography is about, Protocols, parties and adversaries, Cryptography and computer security, the rules of the game, Approaches to the study of cryptography, Phases in the cryptography's Development, Cryptanalysis-driven design, Shannon security for symmetric encryption, Compu-

tational complexity theory, Atomic primitives, The provable-security approach, theory for practice, What background do I need?, Historical notes, problems.

Block Ciphers: What is a block cipher? Data Encryption Standard (DES), Key recovery attacks on block ciphers, Iterated DES and DESX, Advanced encryption Standard (AES), Limitations of recovery key based security, Problems.

Pseudorandom Functions : Function families, Random functions and permutations, Pseudorandom Functions, Pseudorandom permutations, Modeling block ciphers, Example attacks, Security against key recovery, The birthday attack, The PRP/PRF switching lemma, Historical notes.

Symmetric Encryption: Some Symmetric Encryption schemes, Issues Iqn privacy, Indistinguishability under chosen-plaintext attack, Example chosen-plaintext attacks, IND-CPA implies PR-CPA, Security of CTR modes, Security of CBC with a random IV, Historical notes.

Hash Functions : The hash function SHAI, Collision resistant hash functions, Collision, attacks. One-way ness of collision resistant hash functions, Polynomial evaluation is an almost-universal hash, function, The CBC MAC function, Collision- resistance under hidden-key attack.

Message Authentication: The setting, Privacy does not imply authenticity, Syntax of message-authentication schemes, a definition of security for MACs, The PRF-as-a-MAC paradigm, The CBC MACs.

Number-Theoretic Primitives: Introduction to discrete algorithm related problems, The choice of group; The RSA system, Historical notes.

Asymmetric Encryption: Asymmetric encryption schemes, Notions of security, one encryption query or many? Hybrid encryption, El Gamal scheme and its variants.

Digital signatures: Digital signature schemes, A notion of security, RSA based signatures.

References:

1. Crytographic & N/W security: Principles & Practices by Stalling, Prentice Hall.
2. Network Security Essentials: Application & standards by Stalling, Pearson Education Asia, 2003.

Paper 317 : E-Banking and Security Transactions

Introduction: Definition, Transaction websites components, E-Banking support services, Wireless Banking.

E-Baking Risk: Transaction/Operation Risk, Credit Risk, Liquidity/Internet Risk, Price Risk, Legal Risk, Strategic Risk, Reputation Risk.

Risk Management of E-Banking Activities: Board of Management oversight, Managing outsourcing relationship, Information security Program, Administrative control, Legal and compliance Issue.

Laws regulation and guidelines: Electronic money, Regulating e-transactions, Role of RBI and Legal issues, Transnational transactions of E-Cash, Credit Card and Internet, Laws relating to Internet credit cards, Secure Electronic Transactions.

E-security: Introduction to New Challenges and new Threats, Security, Legal consideration.

References :

1. Mark O'Neill "Web Services Security".
2. Nixon Brian "Teach yourself E-Banking".
3. E-Banking: Global Perspective by Vivek Gupta, Edition June 2000, ICFAI University Press.

Paper 318 : Internet Application Development

HTML Fundamentals : Introduction to HTML, Creating HTML Pages, Incorporating Horizontal Rules and Graphical Elements, Hyperlinks, Creating HTML Tables, Creating HTML Forms, HTML and Image Techniques, HTML and Page Accessibility. Introduction to Java: History, Java Features, JVM, Java vs C++, Java and WWW, Java and HTML, JDK tools.

Language Features : Data types - Primitives, Operators and Expressions, Type casting and conversion, Control flow.

Classes and Objects : Object References, static members, Constructor call orders, Issues with super, Wrapper classes, Compatible Object Referencing, Memory Management, Garbage collection.

Packages and Interfaces: Access specifies, Packages and subsystems, Import dependency, Interfaces, Abstractness in Java, Basics on of Interfaces, Use of Interfaces, Examples on interfaces. Other modifiers final-The three manifestations transient, static, volatile.

Exception handling in Java: Exception raising & handling, Exception classes, Throwing exceptions, Try - catch - finally, Exception Propagation, Runtime Exceptions, User defined Exceptions, Examples.

I/O in Java: Concept of Streams, Byte steams and Character streams, Random Access File, File and File Descriptor, Object Serialization and Persistence.

AWT based effective GUI in Java: Detailed overview of AWT classes, Graphics primitives and UI Components, Layout features, Standalone GUI applications, Layout Managers, Implementation of event driven mechanism, Delegation of even model, Listeners and Adapters, Inner classes.

Applets: Introduction to Applet coding, Applet life cycle, Graphics facility, Color and Font, Passing parameters to applets, Aplet context, Inter Applet Communication.

Threading in Java: Fundamentals of Multi-Threading, Java coding with Thread classes, Thread Management in Java, Implicit wait, Using Runnable interface, Thread Synchronization, Inter thread communication.

Overview of Networking in Java: URL class and its usage through connection, Sockets based connectivity, TCP/IP Sockets and server sockets, Datagram Sockets.

Java Database connectivity: JDBC Architecture, JDBC API 2.0.

Java Script Fundamentals: Introduction to JavaScript, Working with Variables and Data Functions, Methods and Events, Controlling Program Flow. The Java Script Object Model, Java Script Lan-

guage Objects, Developing Interactive Forms, Cookies and Java Script Security, Controlling Frames in Java Script, Client-side Java Script, Custom JavaScript Objects.

References :

1. Mastering HTML 4.0 by Deborah S. Ray and Eric J. Ray From BPB
2. Core Java Volume I by Sun series.
3. Mastering Java Script, BPB publication.

Paper 319 : E-Commerce

Introduction to Electronic Commerce : Definition of Electronic Commerce, The scope of Electronic Commerce.

Business Strategy in an Electronic Age : The value chain, Competitive advantage, Business strategy.

Business to Business Electronic Commerce: Inter-organisational transactions, Electronic markets, Electronic data interchange (EDI), EDI: the nuts and bolts, EDI and Business Inter organisational E-Commerce.

Designing (Technical, Detailed, High Level): Introduction to Technical Design and Construction. A Client Server Model of E-Commerce, Understanding Technical Design, Understanding Construction. Introduction to Detail Design: General Design Principles. Presentation Segment Design. Interaction Design. Using Interface Prototypes in Design, Applying Detailed Design. Any example of Applying Detailed Design: Introduction to High-Level Design, Understanding High-level Design, Performing High-level Design, High-Level design of Business Transactions, Applying High-Level design, Any Example of Applying High-Level Design, Challenges and Opportunities in Applying High-Level Design.

Testing & Implementation: Introduction to Testing. Understanding Testing. Applying Testing. Challenges and Opportunities in Applying Verification and Validation.

Implementation : Understanding Implementation. Applying Implementation Planning. An Example of Applying Implementation Planning. Challenges and Opportunities in Applying Implementation Planning.

References:

1. Developing E-Commerce Systems by Jim A. Carter, PHI.
2. E-Commerce new vistas for business by T.N. Chandra, R.K. Suri, Sanjiv Verma, Dhanpat Rai & Co.

Paper 321 : Oracle/Autocad 2000 (Laboratory)

Autocad : Installation of Autocad, Introduction of Autocad, Drawing commands, editing commands, Display commands, 3D commands, Drawing aids, Information commands, Blocks and Layers, Layout of Buildings etc.

OR

Oracle : Introduction to oracle, Components of Oracle, Applications on various DDL, DML commands, Queries, Multiple queries, Views, Reports, Triggers.

Paper 322 : Web Site Development & Web Client Programming (Laboratory)

Website Development using web authoring tools: Front Page, Visual Interdev, Flash and their relative comparison.

Detail studies of Server programming: ASP, JSP, PHP and relative comparison.

Paper 323 : Computer Architecture and Networking Lab. (Laboratory)

Windows 2000 advanced server/Linux - Shell programming, Creation of parent-chield processes. Inter-Process Communication Programming.

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UNIVERSITY OF RAJASTHAN JAIPUR

RULES FOR THE AWARD OF GRACE MARKS

A. **UNDER GRADUATE/POST GRADUATE (MAIN/ SUPPLEMENTARY) EXAMINATIONS UNDER THE FACULTIES OF ARTS, FINE ARTS, SCIENCE, COMMERCE, SOCIAL SCIENCE, EDUCATION, MANAGEMENT, HOMOEOPATHY, LAW, AYURVEDA AND ENGINEERING & TECHNOLOGY.**

Grace marks to the extent of 1% of the aggregate marks prescribed for an examination will be awarded to a candidate failing in not more than 25% of the total number of theory papers, practicals, sessionals, dissertation, viva-voce and the aggregate, as the case may be, in which minimum pass marks have been prescribed; provided the candidate passes the examination by the award of such Grace Marks. For the purpose of determining the number of 25% of the papers, only such theory papers, practicals, dissertation, viva-voce etc. would be considered, of which, the examination is conducted by the University.

N. B. : If 1% of the agregate marks or 25% of the papers works out in fraction, the same will be raised to the next whole number. For example, if the aggregate marks prescribed for the examination are 450, grace marks to the extent of 5 will be awarded to the candidate, similarly, if 25% of the total papers is 3.2, the same will be raised to 4 papers in which grace marks can be given.

B. DIPLOMA IN PHARMACY, BACHELOR OF PHARMACY, B.Sc. (NURSING) AND B.D.S. EXAMINATIONS

1. A Student who obtains the required minimum pass marks in the total aggregate but fails to obtain the minimum pass marks in (i) two subjects, (ii) in one subject and in one practical or (iii) in two practicals, as the case may be, will be given grace marks according to the following scale, provided the candidate passes the examination by the award of such grace marks.

For 1 to 6 marks above
   the min. aggregate   : 2 grace marks

For 7 to 12 marks above
   the min. aggregate   : 3 grace marks

For 14 to 18 marks above
   the min. aggregate   : 4 grace marks

For 19 and above the min. aggregate   : 5 grace marks

(i) The theoritical and practical tests (wherever held) in a subject will count as 2 subjects.

(ii) In case it is necessary to secure minimum pass marks in one part of a subject the above rule will be applicable as follows.

"If a candidate fails in the compulsory part of the subject as well as in the whole subject, he will be deemed to have passed in the subject if the greater of the two deficiencies or where the two deficiencies are equal, one of them is covered by the grace marks to which he is entitled under the rules.

2. No grace marks would be awarded to a candidate who appears in part/supplementary examination.

C. M.B.B.S AND B.A.S.L.P. (BACHELOR OF AUDIOLOGY, SPEECH AND LANGUAGE PATHOLOGY) EXAMINATIONS

1. The grace marks upto a maximum of **5 marks** will be awarded to a student who has failed only in one subject (Theory and/or practical) but has passed in all other subject.

2. No grace marks would be awarded to a candidate who appears in part/supplementary examination.

General

1. A candidate who passes in a paper/practical or the aggregate by the award of grace marks will be deemed to have obtained the necessary minimum for a pass in that paper/practical or in the aggregate and shown in the marks sheet to have passed by grace. Grace marks will not be added to the marks obtained by a candidate from the examiners nor will the marks obtained by the candidate be subject to any deduction due to award of grace marks in any other paper/practical or aggregate.

2. If a candidate passes the examination but misses First or Second Division by one mark, his aggregate will be raised by one marks so as to entile him for the first or second division, as the case may be. This one mark will be added to the paper in which he gets the least marks and also in the aggregate by showing +1 in the tabulation register below the marks actually obtained by the candidate. The marks

entered in the marks-sheet will be inclusive of one grace
mark and it will not be shown separately.

3. Non appearance of a candidate in any paper will make him
ineligible for grace marks. The place of a passed candidate
in the examination list will, however, be determined by the
aggregate marks he secures from the examiners, and he will
not, by the award of grace marks, become entitled to a
higher division.

4. Distinction won in any subject at the examination is not to
be forfeited on the score that a candidate has secured grace
marks to pass the examination.

Note : The grace marks will be awarded only if the candidate
appears in all the registered papers prescribed for the
examination.