REGULATIONS & SYLLABUS
OF
BACHELOR IN COMPUTER APPLICATION (BCA)
3 year (Six Semesters) Regular Course
Utkal University
Bhubaneswar, Orissa

BCA-1st SEMESTER
PAPER – 1.1 MATHEMATICS -1

Unit-1

First Order differential Educations: Basic concepts, Separable equation & modeling. Exact differential equations., Integrating factors, Linear deferential equations & modeling. Orthogonal trajectories of curves.

Unit-II

Second Order Linear Differential Education: Homogeneous Linear equations, Homogeneous equations with constant coefficients & modeling. Differential Operators. Euler-Cauchy equations. Wornsnian, Non-homogeneous equations, solutions by undetermined coefficients and variation of parameters, Modeling.

Unit-III

Higher Order Linear Differential equations: Homogeneous equation with constant coefficients, Non-homogeneous equations, Methods of undetermined coefficients and variation of parameters.

System of Differential Equations: Basic concepts, Homogeneous linear systems with constant coefficients. Phase plane, critical points, Stability, Phase plane method for nonlinear system.

Unit-IV

Linear Algebra-I : Basic concepts, Operation of matrices, Linear systems of equation, Vector spaces, Linear independence & basis, Rank and inverse of a matrix, Determinants, Linear transformation.

Unit-V

Linear Algebra-II : Eigenvalue, Eigenvectors and application, Symmetric, Skew-Symmetric, Orthogonal, Hermitian, Skew-Hermitian and Unitary matrices, Diagonalization, quardraic forms and application to coinic sections.

Books Recommended :

1. Erwin Kreyszig Advanced Engineering Mathematics (7^{th} Ed.) John Wiley and Sons, Chapters-1 (excluding 1.10 & 1.11). 2(excluding 2.13)
   Ch.-4, (excluding 4.6). Ch.-7
2. J.Sinharay & S. Padhy- A Course on Ordinary and Partial Differential Equations, Kalyani Publishers, (Ch. 1,2,3)
3. V.Krishnamurthy, V. P. Mainra, J.I. Arora- Linear Algebra, Affiliated East, East Press.

Reference:

1. M.C. Potter, J. Goldberg- Mathematical Methods, Prentice Hall of India.

PAPER 1.2 BUSINESS PRACTICES

Unit-1

Nature and Purpose of Business: Classification of business activities, commerce & Trade, Objectives of business.

Forms of Business Organization: Sole proprietorship, Partnership, Joint-stock companies, Co-operative societies (Meaning, Characteristics, Advantages, Disadvantages of each forms of organization).

Unit-II

Joint Stock Companies: Types of companies, Registered companies, Statutory companies, Public company, Private company, Public enterprises.
Shareholders Funds: Share capital, types of share, reserves and surplus, Loan fund, secured loans, Unsecured loans, Debentures, Public deposits.

Unit-III

Trade: Home trade, foreign trade
Channels of distribution: Wholesaler and retailer, Meaning and characteristics.
Storage and Warehousing: Functions, Benefits and types.

Unit-IV

Transport: Models of transport, Land, Water and Air.
Insurance: Principles of Insurance, Re-Insurance, Double Insurance, Benefits of Insurance.

Unit-V

Financial Institutions: Meanings and Objectives.
Commercial Banks: Objectives and Functions.
Reserve Bank of India: Objectives and functions.

Books recommended:

1. Sharma & Gupta- Business Studies, Kalyani Publishers
2. C.L. Chaturvedi and I.N.Agrawal – Business Organisation, Shree Mahavir Book Depot.
3. S.P. Maheswari – Principles of Business Organisation, Pitamber

PAPER 1.3- DITITAL ELECTRONICS

Unit-I

Logic circuits, Circuit analysis and design.

Unit-II

Data Processing and Arithmetic circuits.

Unit-III

Flip-flops, Registers and Counters.

Unit-IV

Switching Circuits, Logic families and Semiconductor memories.

Unit-V

Clocks, Timers, D/A and A/D conversion.

Books Recommended:

1. D.P. Leach & A.P. Malvin- Digital Principles and Application, Mc. Graw Hill, International Edition.

Reference:

1. M.Mano: Digital Logic & Computer Design, Prentice Hall of India
2. R.P. Jain: Modern Digital Electronics, Tata Mc. Graw Hill publishing Co. Ltd.
3. R.K. Gaur: digital Electronics & Microcomputers, D.R. Publications.
4. Thomas Bartee: Digital Computer, Mc. Graw Hill.

PAPER 1.4 COMPUTER FUNDAMENTALS

Unit-I

Computer Basics & Data representation: Basic structure and functions of a computer, Elementary idea of algorithm and computer program, Concept of stored program execution, characteristics of computer, Data representation in computer, Binary, Octal and hexadecimal numbers and their Interco version, ASCII and EBCDI codes, Boolean operations, Logic gates and truth tables.

Unit-II

Memory & I/O Unit: Memory hierarchy, Serial access and Random access memory. Memory cell, Memory organization, Secondary storage, Hard disk, Floppy disk, CD ROM and magnetic tape, Description of various input and output devices.

Unit-III

Computer Architecture, Operating System and Languages: Interconnection of processor with other units, Structural components of CPU and their functions, Instruction Execution, Interrupt structure, Multiprogramming, functions of operating system, Basic Knowledge of various types of operating system, Distributed computer system, Parallel computer, special purpose computers and their applications.

Unit-V

Computer Applications: Importance of information and use of computer for information processing, communication with and among computers, Goals of computer networks, Internet and WWW, Network topologies, Local area networks. Applications of computer to scientific research, Business applications, Industrial applications, Defense, Weather forecasting, space applications. Use in law, medicine and education.

Books Recommended:

1. V. Rajaraman- Fundamental of Computers, Prentice Hall of India,3rd Ed.
2. P.K. Sinha- Computer Fundamental, BPB Publications.

Reference:

1. D.P. Curlin, K. Foley, K. Sen & C. Morin – Information Technology, Tata Mc.Graw Hill Education.
2. Roger Hunt and John Shelly – Computer and commonsense, Prentice Hall of India.
3. J.P. Hayes – Computer Architecture and Organization, Mc. Graw Hill international (Ed.)

PAPER 1.5
PROGRAMMING TECHNIQUE USING 'C'

Unit-I

Introduction to Problem Solving: Problem solving aspect, Top-down design, Implementation of Algorithms, Program verification, Efficiency of algorithms, Analysis of algorithms.

Unit-II

Type, Operator, expression and Control Flow: variable names, Data types and sizes, Constants, declarations, Arithmetic operators, Relational and logical operators, Type conversions, Increment and decrement operators, Bitwise logical operators, Assignment operators and expressions, Conditional expressions, precedence and order of evaluation, Statement and Blocks, If-else, Else-if, Switch, While and for loops, Do-while loops, Break and continue, Go to and labels.

Unit-III

Functions and Program Structures: Basic of functions, functions returning non-integers, External variables, Scope rules, Header files, Static variables, register variables, Block structure, Initialization, Recursion. The C Preprocessor.

Unit-IV

Pointers and arrays: Pointers and address, Pointers and function arguments, Pointers and arrays, Address arithmetic, Character pointer arrays, Pointers and functions, Pointer arrays, Pointers to pointers, Multidimensional arrays, initialization of pointer arrays, Pointer vs. Multi dimensional arrays, Command-line arguments, Pointer to functions.

Unit-V

Structures and I/O: Basic of structures, Structures and functions, Arrays, of structures, Pointers to structures, Self- referential structures, Table lookup, Type of, unions and bit-fields.

Input and Output: Standard input and output, formatted output-Print, Variable length argument lists, formatted input-scanf, File access, File descriptor, Low level I/O- Read and Write, Open, Create, Close, Unlink, Random Access-Lseek.

Books Recommended:

1. R.G. Dromey-How to Solve it by Computer, Prentice Hall of India,New Delhi.
2. B.W. Kernigham & D.M. Ritchie- The C Programming Language.(PHI)

Reference:

1. Balaguruswamy- The C Programming Language, TMH.
2. Gitfried – The C Programming Language, Schaum Series.

BCA- 2ND SEMESTER

PAPER -2.1 – MATHIMATICS – II

Unit-I

Converengence of Sequences and Series: Concept of convergence, Limit theorems, Weirstrass completeness principle, Subsequences and Boizano weirstrass theorem, Caucrtry's general principle of convergence, Limit superior and limit inferior, complex sequences, Convergence of series, of positive terms, Absolute convergence, Conditionally convergent series, Power series.

Unit-II

Series Solution of Differential Equations & special Functions: Power series method, Legendre's equation and Lengendre Polynomial, Frobenious method, Bassel's Equation and Bassel's function of first and second kind, Sturm liouville problems, Orthogonality and eigen function expansion.

Unit-III

Laplace Transforms: Laplace Transform, Inverse Transform, Transform of derivatives and integrals, s-shifting, unit step function, Dirac's delta function, Differentiation and Integration of Transforms, Convolution, integral equation, Partial fractions, Periodic functions and applications.

Unit-IV

Vector Differential Calculus: Vector and scalar functions and fields, derivatives, curves, Tangents, Arc Length, velocity and acceleration, Gradient of a scalar field, Directional derivative, Divergence and curl of a vector field.

Unit-V

Vector Integral Calculus: Line Integrals, Double integrals, Green's theorem in the plane surfaces and surface integrals, Triple integrals, Divergence theorem of Gauss, Applications of divergence theorem and Stoke's theorem.

Books Recommended:

1. G. Das & S. Patnaik – Fundamentals Mathematical Analysis, Tata Mc. Graw Hill, Ch. 4 (excluding 4.5 and 4.15)
2. E. Kreyszig- Advanced Engineering Mathematics, john Wiley & Sons, 7^{th} ed., Ch. 5, 6.8 (excluding 8.1,8.3,8.7,8.12) and 9
3. J. Sinharoy & S. Padhy- A Course on Ordinary and Partial Differential Equations, Kalyani Publishers, Ch. 9,10

Reference:

1. M.C. Potter & J. Goldberg – Mathematical Methods, Prentice Hall of India.

PAPER-2.2

DISCRETE MATHEMATICAL STRUCTURES

Unit-I

Fundamentals of Logic: Logical inferences, Methods of proof of an implication, first order logic and other methods of proof, Rules of inference for quantified propositions, Mathematical induction.

Unit-II

Sets and Fuzzy Sets: Relations and functions, Fuzzy relations, special properties of Binary relations, Equivalence relations, Ordering relations, and operations on relations.

Unit-III

Generating functions of Sequences: Recurrence relations, Solving recurrence relations by substitution and generating functions. The method of characteristic roots, solution of inhomogeneous recurrence relations.

Unit-IV

Semi groups, Groups and Coding: Semigroups, Groups, Products and Quotients of groups, Coding of Binary Information and Error Detection, Decoding and Error Correction.

Unit-V

Lattices, Boolean Algebras, Axioms of a Boolean Algebra, Finite Boolean algebra, Boolean exressions, rings, fields, polynomial rings, Field extensions.

Books Recommended:

1. J.I. Mott, A. Kandel, T.P. Kaker- Dis-create Mathematics for Computer Scientist and Mathematicians, Prentice Hall of India, 2nd ed. 1999, Ch. 1,3,4(4,1-4.5), 8(8.1)
2. B. Kolman, R.C. Busby and S. Ross- Discrete Mathematical Structures, Prentice Hall of India, 3rd ed. 1999 Ch. 5(5.1,5.2),9 (excluding 9.3), 11
3. Alan Doerr & K. Levasscur- Applied Structure for Computer Science, Galgotia Publications, 1995, Ch. 13(13.2-13.6), 16(16.1- 16.4)

Reference:

1. Tremblay & Manohar- Discrete Mathematical Structure with Applications to Computer Science, Tata Mc. Graw Hill, 1997
2. K.E. Rosen- Discrete Mathematics and its applications, Mc. Graw Hill International 4th ed., 1999

PAPER 2.3
PRINCIPLES OF MANAGEMENT & ORGANIZATIONAL BEHAVIOUR

Unit-I

Concept of Management: features of management, importance of management, Nature of Management, Management as profession, Social responsibility of management. Management functions.

Unit-II

Concept of Planning: Types of Plan, Steps in planning, Decision-making, Management by objectives (MBO), forecasting.

Concept of Organization, Organization structure, formal & informal organization, Matrix organization, Centralization & decentralization, Authority & responsibility, Delegation.

Unit-III

Fundamentals of Staffing: HRIS, Damand analyis, Recruitment and selection, Appraisal, Training and development, Promotion.

Unit- IV

Directing: Span of control, Management theory, supervision, Organizationbehaviour, Motivation, Group behavior, Group dynamic leadership, Decision-making.

Unit-V

Controlling Concept: Planning and controlling, types, Information control, Management information system, Management control, Case study.

Books Recommended:

1. L.M. Prasad- Principle and Practice management.
2. Harlod Koontz & Weihritz – Essential of Management, Tata Mc Graw Hill.

Reference:

1. P. Robbins & Mary Coutler- Managemet, PHI Publication
2. James A.F. Stoner- Management, Pears on Prentice Hall
3. Griffin- Management, ATTBS.

PPER 2.4
COMPUTER ORGANIZATION & ARCHITECTURE

Unit-I

Addressing Methods and Machine Program Sequencing: Memory Locations, Addressing and encoding of information, Main memory operations, Instructions and instruction sequencing, Addressing modes, Assembly language, Basis input output operations. Stacks and Queues, Subroutines.

Unit-II

Processing Unit: Fundamental concept, Execution of complete instruction, Hardwires control, Performance considerations, Micro programmed control.

Unit-III

Input, Output Organization: Accessing I/O devices, Interrupts, Direct memory access, I/O hardware, Standard I/O interfaces.

Unit IV

Memory: Basic concepts, Semiconductor RAM memories, Read only memories, speed, Size and cost, Cache memories, Performance considerations, Virtual memories, Memory management requirements.

Unit-V

Arithmetic: Number representations, Addition of positive numbers, Design of fast adders, Signed addition and subtraction, Arithmetic and branching conditions, Multiplication of positive numbers, Signed-operand multiplication, Fast multiplication, Integer division, Floating-point numbers and operations,

Books Recommended:

1. V.C. Hamacher, Z.G. Varanesie & S.G. Zaky- Computer Organization, Mc Graw Hill International.

Reference:

1. M. Mano- Computer System Architecture, Prentice Hall of India
2. J.P. Hayes – Computer Architecture and Organization, Mc Graw Hill International.

PAPER 2.5 - DATA STRUCTURE

Unit-I

Data, Data type, Abstract data type, Data structure and its classification, Arrays, Stacks and queues: Operations, Implementation and applications.

Unit-II

Dynamic Data Structure: Linked list, Linked stacks and queues, Application to polynomial arithmetic.

Unit-III

Graphs and Trees: Classification and representation, Binary tree traversal algorithms applications.

Unit-IV

Search techniques, search Trees: BST, AVL, Tree, B-tree, Implementation and applications, Hashing.

Unit-V

Sorting and Merging Techniques: Introduction to shortage allocation, Garbage collection and compaction, Time and space complexity of algorithms, Order notations.

Books Recommended:

1. R.I. Kruse, J.F. Leung & C.L. Tondo- Data Structure and Program Design in C, Prentice Hall of India.
2. Y. Langsam, MJ. Augestein & A.M. Tanenbaum- Data Structure Using C and C++, Prentice Hall of India.

Reference:

1. A.V. Aho, J.E. Hoferoft & J.D. Ullman – Data Structure and Algorithms (AM)
2. E. Horowitz & S. Sahani- Data Structure in Pascal, Galgotia
3. Trembly & S. Sorenson – Data Structure: Theory and Application, TMH.
4. D.E. Knuth- Fundamentals of Algorithms, Narosa PH.

BCA- 3rd SEMESTER
PAPER -3.1 -COMPUTER ORIENTED NUMERICAL METHODS

Unit-I

Interpolatation Language interpolating polynomial, Error, Inter polating polynomial using divided differences, Forward and backward interpolating, Newton interpolating polynomials, approximation of functions, Least squares approximation.

Unit-II

Solution of non linear equations, bisection method, Secant method, Netwon's Raphson Method, Fixed point interation method, Aitken's delta square process. Solution of linear system of equations, Gauss elimination method, Matrix factorization method (Crout, Dolittle and Cholesky's method) Gauss Jacobi and Gauss Seidel method.

Unit-III

Numerical integration: Newton Cotes Rules, Compound quardrature method, Romberg integration, Gauss quardrature rules, Gauss legendre rules, Numerical solutions of differential equations, Euler's method, Taylor's series method, and Runge- Kutta methods.

Unit-IV

Programming In FORTAN 90: Constants, variables, arithmetic expressions, input- output statements, conditional statements, loops, logical expressions, control structure, functions and subroutines, Arrsay.

Unit-V

Format Specifications, processing of strings and characters, procedures with array arguments, derived types, file processing, pointer data-type, use of methods.

Books Recommended:

1. B.P. Acharya, R.N. Das – A Course of Numerical Analysis, Chapter 2(2.1-2.4, 2.6-2.9), 3(3.1-3.4, 3.6-3.10), 4(4.3, 4.5). Ch.- 6(6.1-6.5, 6.8, 6.10, 6.11), Ch.-7(7.3,7.4, 7.6, 7.7) Ch.-8(8.1, 8.2, 8.4), Kalyani Publishers.
2. V. Rajaraman – Computer Programming in FORTRAN 90 and 95, Prentice Hall of India, 1997.

Reference:

1. John H. Mathews – Numerical Methods for Mathematics, Science & Engineering, Prentice Hall of India.

PAPER- 3.2- MANAGERIAL ECONOMICS

Unit-I

Meaning, Nature and Scope of Economics, Nature of human wants, Concepts of wealth utility. Value and price, Microeconomics: Its principles, Limitation and importance, Difference between micro and macro economics.

Unit-II

Managerial Economics: Factors influencing managerial decisions, Managerial economics and order disciplines, Objectives of the firms, Managerial descisions

Demand Analysis: Meaning and types of demand, Determinants of demand, Law of demand and exceptions to it, Law of diminishing marginal utlity, Equi-marginal utlity.

Unit-III

Elasticity of demand: determinants of Elasticity, Measurement of elasticity, Income elasticity and cross elasticity, Demand forecasting and its methods (in brief), Law of supply and exceptions to be the law of supply, Elasticity of supply.

Unit-IV

Production & Cost Analysis: Production Function, Factors of production, Law of variable proportion, Returns to scale, Managerial uses of production function.

Cost Concepts: Types of costs, shortrun cost curves and longrun cost curves, Determinants of costs.

Unit-V

Definition & Classification of Markets: Revenue concepts of pricing, Average, Marginal and total revenue, Determinants of price, Pricing under different objectives, Pricing under different market structures and equilibrium of firm (perfect and monopoly) price discrimination.

Books Recommended:

1. Joel Dean – Managerial Economics
2. Dwivedi – Managerial Economics (Vikas)
3. Varshney & Maheshwari – Managerial Economics (SCS)
4. V.L. Mote Paul & Gupta – Managerial Economics Concepts and Cases.
5. Gokhel & Others – Business Economics
6. Ahuja – Micro Economics - S. Chand
7. Jhingan – Micro Economics - Vrinda
8. Samuelson & Mordthans – Economics

PAPER- 3.3- OPERATING SYSTEM

Unit-I

What is and OS? Early systems, batch systems, time shared systems, PC systems, parallel systems, distributed systems, Real-time systems, System structures, Computer system operation. I/O structure, Storage structure, Hardware protection, system architecture, System components, OS services, System calls, System programs, System structure, Virtual machines, System design and implementation, system generation.

Unit-II

Processes: Process concept, Process scheduling, Operation on processes, Cooperation processes, Threads and inter process communication.

CPU: Scheduling basic concepts, scheduling criteria, Scheduling algorithms, multiple process or scheduling, Real-time scheduling.

Unit-III

Process Synchronization: Back ground, critical section problem, Synchronization hardware, Semaphores, Classical problems of synchronization, Critical regions, Monitors and automatic transactions,

Deadlocks: System model, Deadlock characterization, Methods for handling deadlocks, Deadlock prevention, Deadlock avoidance, Deadlock detection, recovery from deadlock.

Unit-IV

Memory Management: Background, Logical vs. physical address space, scrapping contiguous allocation, paging, segmentation, segmentation with paging.

Virtual Memory: Background, demand paging, page replacement with algorithms, allocation of frames, thrashing and demand segmentation.

Unit-V

File system: File concepts, access methods, directory structure, protection, file system structure, allocation methods, free-space management, directory implementation and recovery, Secondary-storage.

Structure: Disk structure, disk scheduling, disk management, scrap-space management, disk reliability, and staple- storage implementation.

Books Recommended:

1. A. Siberschata & P.B. Galvin- Operating System Concepts, Addison – Wesely)
2. William Stallings - Operating Systems, Prentice Hall of India
3. Milan Milenkovic – Operating Systems, Mc Graw Hill

PAPER -3.4 FILE STRUCTUES

Unit-I

Data Processing Activities and File Organization: Data vs. information cost and value of information, Data processing functions, Data recording, I/O and storage devices, Files, File organization, File operations, Performance considerations, File Storage Devices: Characteristics of file storage devices, Magnetic tape vs. magnetic disk storage other direct access storage devices.

Unit-II

Sequential File Organization and File Sorting: Sequentially organized files, creation, retrieval, update and design of sequential files, sorting and merging files, natural merge, balanced merge and polyphase merge cascade merge, sort, / merge performance.

Unit-III

Relative File Organization: Relative files, direct mapping techniques, absolute vs. relative addressing, directory look up techniques, address calculating techniques, hashing techniques, approaches to the problems of collisions- linear probing, double hashing, synonym chaining, bucket addressing.

Unit-IV

Indexed- Sequential file Organization: Indexed-sequential file- dense vs. non dense index, Primary vs. secondary index, multilevel index, clustering index, structure of index sequential files, ISAM vs. VSAM implementation of indexing-binary search tree, m-way search tree, b-tree etc.

Unit-V

Multikey File Organization and Introduction to DBMS: Multi Key files, need for multiple access paths, inverted file vs. multi list file organization, comparison and trade-off, file design summary, Introduction to DBMS databases, database views, database models, E.R model, relational model, database implementation support, DBMS. **Books Recommended:**

1. Mary E.S. Loomis – Data Management and File Structures, Prentice Hall of India
2. A.S. Philioppakis & I.J. Kazmier – Information Systems Though Cobol, Mc Graw Hills

PER- 3.5
OBJECT ORIENTED PROGRAMMING WITH C++

Unit-I

C++ An Overview: Principles of objective oriented programming, Object-based and object oriented programming, Concepts of C++, C++ tokens, Basic data types, User-defined data types, Derived data types, Expressions, Operators, Control statements.

Unit-II

Procedure-based Programming: Functions, main function, function prototyping, Call-by-reference, Return-by-reference function, Inline function, Scope and lifetime, overloaded function, function templates, Exception Handling.

Unit-III

Object-based Programming: Class, Class initialization, defining member functions, Private member functions, Object as functions, Object as function argument, Friend function, Constructor, Destructor, Overloaded operators, Class templates.

Unit-IV

I/O & File Handling: Console I/O operations, Opening and closing a file, file modes working with files.

Books Recommended:

1. S.B. Lippman & J. Lajole- C++ Primer, AWL
2. Balaguruswamy - OPP With C++, TMH

3. B.Stroustrup- Programming with C++, AWL

BCA -4th - SEMESTER
PAPER-4.1- PROBABILITY AND STATISTICS

Unit-I

Statistics: Definition and use, Statistical data, Frequency distribution and its characteristics, Sample space, Events, and algebra of events, Probability axioms, Additive and multiplicative laws of probability and applications. Conditional probability, independence of events, Bayes Rule.

Unit-II

Random Variables: Discrete and continuous, discrete random variable, The Probability mass function, special distributions, Binomial and poisson distributions, Discrete random vectors, independent random variables, Continuous random variables, Probability density function and probability distribution function, Uniform. Normal and exponential distributions, functions of a random variable, Jointly distributed random variables, Distribution of sums, function of Normal variables. The reliability, Failure density and hazard function.

Unit-III

Expectation of Random Variable: Moments, Expectation of functions of more than one random variable, Moment of important distributions, Conditional distribution and conditional expectation, Inequalities and limit theorems, Markov inequality, Chebychev inequality, Weak law of large numbers and central theorem (without proof).

Unit-IV

Population, Sample, Random sampling, simple random sampling and stratified sampling, Parameter, Statistic and its sampling distribution, Standard error random sampling from a probability distribution, Sampling distribution of mean and variance in sampling from normal distribution, Statistical difference- parameter estimation and method of moments, Method of maximum likelihood, Interval estimation- Confidence intervals, Testing of hypothesis- Type-I and Type- II error, power of a least, Level of significance, Neyman- Pearson theory (concept only). Most powerful test, Tests of significance based on normal, t,F and Chi-square distributions.

Unit-V

Correlation and Regression: Meaning and concept, Linear correlation, Measurement, Coefficient of correlation, Regression lines- method of computations. Non-linear regression, Coefficient of determination, Test of regression relationship, Multiple correlation and regression, Computation and analysis of variance.

Books Recommended:

1. Kishore S. Trivedi :-Probability and Statistics with Reliability, Queuing and Computer Science Applications, PHI
2. A.K.P.C. Swain – A First Course With Statistics and Applications, Kalyani Publishers.
3. Goon Gupta Dasgupta – Fundamentals of Statistics (Vol-I), World Press.

PAPER- 4.2- ACCOUNTING AND FINANCIAL MANAGEMENT

Unit-I

Accounting: The language of business, Accounting as an information system, Generally accepted accounting principles, Accounting equations, Accounting standards.

Unit-II

Types of Accounts: Process of recording financial information, Journal and Ledger, Manual accounting system and computerized accounting system.

Unit-III

Sub-Division of Journal: Cash Book, Bank reconciliation statement, Capital and revenue items, Trial balance and errors.

Unit-IV

Preparation of Final Account: Manufacturing account, Trading account, Profit and loss account and balance sheet, Adjustments in final account.

Unit-V

Company Accounts: Share capital and loan capital, Understanding company final accounts, Annual reports of the company.

Books Recommended:

1. Meigs & Meigs: Accounting – The Basic for business decisions, Mc Graw Hill
2. Bhattacharya & Dearden – Accounting for management, Test & cases, Vani
3. Juneja & Sarena, Chawla " Accounting" – Theory and Practice, Kalyani
4. Grewal, T.S. – Introduction to Accountancy, S. Chand
5. Agrwal – Financial Accounting, Advance, Pitamber
6. Prasanna Chandra – Managers Guide to Finance & Accounting,(TMH)
7. Maheswari – Introduction to Accounting.

PAPER 4.3- BUSINESS COMMUNICATION SKILLS

Unit-I

Nature and modes of communication, Speaking and writing, Audience, Subject, Time and place, Purpose, Different ways of communication-narrative, description, Exposition, Argument

Unit-II

Documentation: references, Notes and bibliographies, Technical reports. Placing orders, Making of use of Audio Visual Aids.

Unit-III

Business letters fax and E-mail

Unit-IV

Application for a job and constructing a curriculum vitae, facing the interview, Participating in the group discussion, Presentations,

Unit-V

Organizing a Meeting: The chair person's job, Preparing an agenda, Introducing a guest, Proposing a vote of tanks, Writing the minutes, interpersonal effectiveness: Useful expressions in everyday life situations – Introductions, Greeting, Thanks, Apologies, regret, Saying goodbye, suggestions, Invitations, Good whishes, Requests, Asking permission, Speaking on the telephone.

Books Recommended:

1. Chand J.K. & Das B.C – A. Millennium Guide to Writing and Speaking English,Friend's Publishers, Cuttack.
2. Harris, S. – Human communication, BPB Publications.
3. Pradhan, Bhenda Thakur – Busuness Communication, Himalayas Publishing House
4. Seelay John – Oxford Guide to Writing and Speaking, OUP
5. Krishna Mohan & Mira Banarji – Developing Communication Skills, Macmillan

Reference:

1. The Chicago Manual of style, 13th Ed., Prentice Hall of India

PAPER-4.4- DATABASE MANAGEMENT SYSTEM

Unit-I

Database system Concept and Architecture: Data models and instances, DBMS Architecture and data independence, Database languages and interfaces, Database system environment, Data modeling using entity relationship model, Entity types, Entity sets, Attributes and keys, Relationships, Relationship types, Rules and structural constraints.

Unit-II

Network Data Modeling:Concepts constraints in the network model, Network DDI and Network DML, Hirechical data structures, Integrity constraints in hierarchical model, hierarchical DDI and Hierarchical DMI.

Unit-III

Relational Model concepts: Relational constraints and relational database Schemes, Update operations and constraints violations, Basic relational Algebraic operations.

Unit-IV

Functional Dependencies and Normalization for RDBMS: Design guidelines for relational schemes, functional dependencies, Normal forms based on primary keys, second and third normal forms, Boyee-code normal forms, Algorithms for relational database scheme design, Multivalues dependencies and fourth normal form, Join dependencies and fifth normal form.

Unit-V

Transaction Processing: Transaction and system concepts, Desirable properties of transactions, Scheduled and recoverability, Serialisability of schedules, Locking techniques in concurrency control, Concurrency control based on time stamped ordering, Recovery concepts.

Books recommended:

1. Elmasari, R & Navather, S.B.: Fundamentals of Database System 3rd ed.

Reference:

1. Rama Krishna, R & Geki- Ke, J.: Database Management Systems 2nd ed.

PAPER 4.5- COMPUTER GRAPHICS

Unit-I

Survey of computer graphics applications, overview of graphic system – video display devices, raster scan systems, graphics monitors and workstations, input devices, hard copy devices, graphics software, graphical user interface and interactive input methods- The user dialogue, input of graphical data, input function, interactive picture construction, virtual reality environment, Output primitives- Line, circle and cllipse, generating algorithms, pixel addressing, filled area primitive, character generation.

Unit-II

Attributes of output primitives – Line and curve attributes, colors and gray scale levels and area-fill attributes, character attribute, bundled attribute, and anti-aliasing, Two dimensional geometric transformation- basic transformation – translation, rotation, saling and matrix representation. Composite transformation- translation, rotating, reflection, share, Transformation between coordinate system, offline transformation, Two dimensional viewing – viewing coordinates, point, line, polygon, curve and text clipping.

Unit-III

Structure and hierarchical modeling: Three dimensional display methods, there dimensional object representations- polygon surface, quardratic surface, straight line representation, Bezier curves and surfaces, b-straight line, curves and surfaces, displaying straight line curves, sweep representation, constructive solid geometry methods. BSP trees, fractal geometry method.

Unit-IV

There dimensional geometric and modeling transformation- translation, rotating, scaling, reflection, shares, coordinates transformation. Three dimensional viewing- viewing coordinates, projection, projection transformation and clipping.

Unit-V

Visible surface detection methods- depth buffer, A-buffer, depth sorting, BSP tree method, Ray-casting method, Illumination models, displaying light inensities method, Dithering techniques, polygon-rendering methods- ground shading, phong shading, computer animation: Design of animation sequences, General computer- Animation functions, Raster animations, computer animation Languages, Ke-frame.

Book Recommended:

1. D. Hearn & M.P. Baker – Computer Graphics, PHI
2. R.S. Wright Junior, M. Sweet – Open GL Super Bible, Tech. Media

Reference:

1. J.D. Folay, A. Vandan, Feinersteven, Hugh John – Computer Graphic: Principles & Practice (Add. Wesely PUB, 1999

BCA-5th - SEMESTER

PAPER- 5.1– COMBINATORICS & GRAPH THEORY

Unit-I

Graph, finite & infinite Graphs, Incidence and Degree, Isolated vertex, pendent vertex Null graph, Konisberg Bridge, isomorphism, subgraphs, walk, paths, circuits, connected graphs, disconnected graphs, components, Euler graphs, operations, on graphs, Hamiltonian paths and circuits, Traveling salesman.

Unit-II

Tree and fundamental circuits, Cuts seps and cut-vertices

Unit-III

Planner and dual graph, Vector spaces of a graph,

Unit-IV

Matrix representation of graph coloring covering and partitioning, directed graphs, enumeration of graphs, Graph theoretic algorithms and computing programs.

Unit-V

Elementary Combinatories: and permutations, Elumeration of combinations and permutations, enumerating permutes with constrained repetitions, Binomial coefficients and Malfunctional theorems, Principles of Inclusion exclusion.

Books Recommended:

1. N. Dep – Graph Theory, Prentice Hall of India
2. J. L. Mott, A. Kandel & T. P. Barker – Discrete mathematics for Computer scientist and Mathematicians, Prentice Hall of India.

PAPER - 5.2– COMPUTER COMMUNICATIONS & NETWORKING

Unit-I

Introduction: Uses of computer network, Network hardware, Network software, Reference model, Example of network, Transmission terminology: Simplex, Half duplex, full duplexs, Frequency spectrum and bandwith, Analog and digital data transmission, Transmission, Transmission impairments, Transmission media and its characteristics.

Unit-II

Data encoding and communication techniques, Modulation: AM, FM, PM, PCM, Asynchronous and synchronous transmission, Communication interfaces: Rs. 232C, X-21, Multiplexing: FDM, TDM, Modems, Multiplexer/ demultiplexer, Concentrator, Front-end processors.

Unit-III

Data encoding and communication, Framing error detection and correction, FEC, REC, CRC, Hamming and other codes, MAC sub-layer: Advantage of multiple access sharing of channels, ALOHA, CSMA, CSMA / CD. Polling based MAC protocols, Token bus and Token ring.

Unit- IV

Network Layer: Layer functionality, connection- oriented and connectionless service, routing – static and dynamic routing algorithms, IP- Protocols, IP – routing, Congestion control, Transport layer: TCPAP, protocol- TCP and UDP.

Unit-V

Application Layer: Network Security, DNS, SNMP, E-mail and Introduction to ATM.

Books Recommended:

1. Tannenbaum, A .S. – Computer Network, Prentice Hall of India
2. Forouzan, B. A. – Data Communication and Network, Tata Mc. Graw Hill
3. Black, U. – Computer Networks- Protocols, Standards and Interfaces, Prentice Hall of India
4. Stallings, W. – Computer Communication Networks, 4th ed. Prentice hall of India.

PAPER -5.3 – SOFTWARE ENGINEERING

Unit-I

Introduction: The software problem, Software engineering problems, the software engineering approach.

Software Processes: Software process, Characteristics of software process, Software development process, Project management process, Software configuration management process,

Software requirements: Need of SRS, Requirement process.

Unit-II

Planning a Software Project: Cost estimation, Project scheduling, Staffing and personnel planning, Software configuration management plans, Quality assurance plans, Project monitoring plans.

Unit-III

Function Oriented Design: Design principles, Module level concepts, design notation and specification, Structured design methodology.

Unit-IV

Detailed Design: Module specifications, PDL, Logic/ Algorithm design, Verification, Cyclometic complexity, Data binding and cohesion metrics, Coding: Programming practice, Verification, Size, Complexity and style metrics.

Unit-V

Testing : Testing fundamentals, functional testing, Structural testing, Testing process, Reliability estimation.

Books Recommended:

1. Jalote, P. – An Integrated Approach to Software Engineering, Narosa

Reference:

1. Pressman, R.S. – Software Engineering: A Practitioner,s Approach, 5th ed. Mc Graw Hill
2. Somerville, I – Software Engineering, 6th ed., Pearson Education
3. Fairley, R. E. – Software Engineering Concepts, Mc Graw Hill
4. Mail, R. – Fundamentals of Software Engineering, Prentice Hall of India

PAPER- 5.4– UNIX & SHELL PROGRAMMING

Unit-I

General Overview of the System: History of Unix, Reasons for its success, system architecture (Layered structure). File system Characteristics and structure). Processing environments, Building block primitives, OS services, Modes of operations, Interrupts and exceptions, Processor execution levels, Memory management.

Unit-II

Introduction to the Kernel: Architecture set of system calls (for file sub-system and process control sub-system). Overview of file sub-system: internal representation, Data structures, file system structure, Processes: Regions of processes, Data structure, Context of process, Process states, State transitions.

Unit-III

Vi- editor and its commands: Shall commands: General purpose utilities, navigating the file system, Handling files, Basic file attributes, Filters, Processes, Communications.

Unit-IV

Shall Programming: Shall meta -characters, shall variables, shell scripts, shell commands, Environment, Shell scripts, The for loop, the case statement, while and until loops, if statement, the test command, error checking.

Unit-V

Unix system tools: Grep, egrep, sed, tr, awk,

Books Recommended:

1. Maurice, J. Bach – The Design of the Unix Operating System, Prentice Hall of India.
2. Stephen Prata – Advanced UNIX, A Programmer's Guide, SAMS, BPB, Publications.

Reference:

1. Behrouz A. Forouzan – Unix and Shell Programming with InfoTech(A Text Book)
2. Stephen Kochan – Unix Shell Programming, Revised Edition.

PAPER- 5.5
VISUAL AND WINDOWS PROGRAMMING

Unit-I

Mastering The Integrated Development Environment (IDE): Features: Menu bar, Tool bar, Project explorer, Properties window, Form layout, Window, Tool box, Form designer, Object browser, Creation of applet, Working with forms: The border, Title bar, Caption, Control menu, Minimize button, The minimize/ Restore button, Working with form properties, (Back color, Border style, Caption, control box, Fore color, Height, Icon, Left, Max button, Min button, name, window state) Form events: The active event, Deactivate event, Load event, Resize event, Unload event, Working with multiple document interface (MDI) Forms: Creating child form, Manipulation on MDI form, Control objects: Command button, Test boxes, Labels, Option button, check box.

Unit-II

Events and Methods, Frame Control, List boxes, Combo boxes, Image object, Picture Object, Timer, Scroll bar, Drive list, Directory list boxes, File list box, Status bar, Manipulating controls at run time, Early and late binding variable.

Unit-III

Active X Control, ADO (Active Data Object), ADODB, Generating a windows GUI Program (Creating and building the program, the program classes and file, How the program work, Implementing the view)

Unit-IV

Implementing the Document, Storing the graphic date, Redraw the window, Adding the menu command, Detailing the menu commands, Storing documents in disk files, Scorlling and splitting the views.

Unit-V

Including Docking Toolbars and Status Bars, Creating custom dialog boxes, Writing dialog based applications. Performing character I/O.

Books Recommended:

1. Denise Santoro, Gray Masers – Visual Basic 6 (Complete reference), BPB. Publication.
2. Peter Wright – Beginning visual Basic 6, SPD Pvt. Ltd. Work press.
3. Michael J. Young – Mastering – Mastering Visual C++, BPB, Publication.

BCA - 6TH- SEMESTER
PAPER- 6.1 – OBJECT ORIENTED DESIGN USING UML

Unit-I

Introduction: What is Object Orientation? What is Object Oriented Development? Object Oriented Themes. Evidence for usefulness of object oriented development modeling as a design technique modeling. The object modeling technique object modeling: Objects and classes, Links and Association Advanced Link and Association concepts. Generalization and Inheritance,

Grouping constructs, Advanced object modeling: Aggregation, Abstact classes, Generalization as extension and restriction, Multiple Inheritance, Metadata, Candidate Keys, Constrains.

Unit-II

Dynamic Modeling: Events and States, Operations, Nested state diagrams, Concurrency, Advanced dynamic modeling concepts, Relation of objects and dynamic models, Functional modeling functional models, Data flow diagrams, Specifying operations, Constrains, Methodology preview and OT as a software engineering methodology. The OMT Methodology, Impact of an object oriented approach.

Unit-III

Analysis: Overview of Analysis, Problem Statement, Object modeling, Dynamic modeling, Adding operation, System design, Over view of system design, Breaking a system into sub-systems. Identifying concurrency, Allocating subsystem to processors and Tasks, Management of data stores. Handling global resources, Choosing software control implementation. Handling boundary conditions, Setting Trade- Off priorities, Common architectural frameworks, Object design, Overview of object design, Combining the Three Models, Design algorithms, Design optimization, Implementation of control, Adjustment of Inheritance, Design of Associations, Object representation, Physical packaging.

Unit-IV

Methodology Summary: Analysis, System design, Object design comparison of methodologies structures analysis / structure design, Jackson structures development, Information modeling notations, Object Oriented work, form design to Implementation: Implementation using a programming language, Implementation using a database system, Implementation outside a computer.

Unit-V

Programming Style: Object Oriented Style, Reusability extensibility, Robustness, Programming in the large object oriented language, Translating a design into an implementation. Class definitions, Creating objects, Calling operations, Using Inheritance, implementing associations, Object oriented language features, relational database: General DBMS concepts, Relational database design, Advanced Relational DBMS.

Books Recommended:

1. G. Booch, J. Rumbaurge, I. Jacobson – The Unified Modeling Language User Guide, Addition Wesley Longmans, (relevant portions)
2. B. Booch – Object Oriented Analysis & Design with Applications, 2nd ed., Addition Wesley, 1994, (Chapter 2,3)
3. C. Larman – Applying UML and Patterns: An Introduction to Object Oriented Analysis & Design, Prentice Hall, PTR, 1998

Reference:

1. J. Rumbaugh, M. Blaha, W. Premerlari, F. Eddy, W. Lorensen – Object Oriented Modeling and Design, Prentice Hall of India, 1991
2. I. Jacobson, G. Booch, J. Rumbaugh – The Unified Software Development Process, Addson Wesley Longmans, 1999
3. I. Jocobson, G. Booch, J. Rumbaugh – The Unified Modeling Language Reference Manual Addson Wesley Longmans, 1999
4. R. W. Brock, B. Wilkerson, U. Winner – Designing Object Oriented Software, prentice Hall of India, 1990
5. S. S. Alhir – UMI in a Nutshell O Relly, 1998

PAPER-6.2- E- COMMERCE

Unit-I

Introduction: What is e-commerce? Forces behind-e-commerce, e-commerce industry framework, brief history of e-commerce.

Inter organizational e-commerce. Intraogaizational e-cimmerce, consumer-to-business e-commerce, architecture framework.
Network Infrastructure for I- way, access equipment, global information distribution, broadband telecommunication.

Unit-II

Mobile Commerce: Introduction to mobile commerce, Mobile computing applications, WAP, WAP technology, mobile information devices.
Web Security: Introduction to web security, firewalls, transaction security, cliehnt- server network, emerging client-server security threats, firewall & network security.

Unit-III

Encryption: WWW and security, encryption, transaction security, secret and public key encryption, virtual private network, implementation of management issues.

Unit-IV

Electronic Payment system (EPS): Over view of EPS, smart card, credit card and debit card based EPS, financial instrument. Home banking, On-line banking.

Unit-V

Net Commerce: EDI, EDI application in business, legal requirement in e-commerce. Introduction to supply chain management, CRM (Consumer Relationship Management), Issues in CRM.

Books Recommended:

1. T.N. Chhabra, R. K. Suri and Sanjiv Verma – e-commerce: New Vistas for Business, Dhanpat Rai & Co. Publication.

Reference:

1. Kalakota & Webiston – Frontiers of e-commerce, Pearson.
2. Ritendra Goel – e-commerce-New Age International.
3. Elias M. Award – e-commerce, Person.

PAPER-6.3- MANAGEMENT INFORMATION SYSTEM

Unit-I

Management Support System: An over view, Managerial decision-making and information system, Managers and computerized support, Need for computerized decision support and the supporting technologies. Framework for decision support. The concept of DSS. GSS, Expert systems, Knowledge management systems, Decision Making: Introductions and definitions systems, Models, Decision making (The intelligence phase, the design phase and the choice phase), Evolution, the implementation phase.

Unit-II

DSS: An over view: What is a DSS? Characteristics and capabilities of DSS, Components of DSS, Data Management system, Model management sub-system Knowledge-based Management sub-system, Dialog sub-system, DSS vs. MIS, Data warehousing, Analysis, Mining and visualization: Data warehousing, Access, Analysis and visualization. The nature and source of data, Data collection, Problems and Quality, DBMS in DSS,GIS.

Unit-III

Modeling and analysis: Modeling for MSS, Static and Dynamic models, Treading certainty, Uncertainty and risk, MSS modeling in spreadsheets, Decision analysis of a few alternatives, DSS Development: Introduction to DSS Development, SDLC, Alternate development Methodologies, Prototyping, DSS technology levels and tools, DSS development platforms.

Unit-IV

Group support Systems: Group decision making, Communication and collaboration, Communication support, Collaboration support, Group support systems and its technologies, The GSS meeting process, Knowledge, Knowledge management: Knowledge, Organizational Learning and Organizational memory, Knowledge management, The chief Knowledge officer,

Knowledge management development, Knowledge management methods, Technologies and tools, Knowledge management success.

Unit-V

Implementation and Integrating MSS: Implementation, I major issues, Implementation strategies, Generic models of MSS integration, Model of ES and DSS Integration, Intelligent DSS, Intelligent modeling and model Management, Impacts of MSS: Over view of impacts, Organizational structure and related areas, MSS support to BPR, Personal management issues, Impact on individuals, Impacts on productivity, quality and competitiveness.

Books Recommended:

1. Efraim Turban & Jay, E, Aronson – Decision Support Systems and intelligent Systems.

Reference:

1. Efrem G. Maltach – Decision Support and Data Warehouse System.
2. George M. Marakas – Decision Support System.
3. V.S. Janakiram & Sarukest – Decision Support System.

PAPER-6.4- INTERNET AND JAVA PROGRAMMING

Unit-I

Running a Java Program, Data types, Variables, Operators, Control statement, Arrays, Introduction to classes, Classes/ Methods: Constructors and destructors, Garbage collection, Over- lording methods, Passing objects as parameters, Inheritance: Concept and use of supper class, Multileyel Hierarchy, Method of overriding, Using abstract classes, Packages, Interface.

Unit-II

Exception Handling, Multithreading Programming, Creating a Thread: Implementing the run –able interface, Extending the thread class, creating multiple threads, thread priorities, Synchronization of threads, Inter –thread communication, Stream classes, Character streams, Applet class, Event Handling, AWT, Working with windows, Graphics and text.

Unit-III

Common HTML commands using head, body, break, paragraph break, text styles, Different type of lists, Adding graphics of HTML, documents and tables, Using width, height, align, border, cell padding, cell spacing, BG color, column span, row span attributes of a table, linking documents and introduction to forms, Links, images as hyperlinks, Frameset, frame, name, targeting named frames.

Unit-IV

Building Up Java Script Syntax: Data types literals, type casting, creating variables, Incorporating variables a as script assisted style sheets DOM (JSS DOS) browser objects, Handling events in Java script, Dynamic HTML: Cascading style sheet: Font, color and back ground, text, border, margin, list attributes, Using span tag and <DIV> tag, external style sheets.

Unit-V

Client-Serves Concept in Internet and Communicating on the internet, Internet domains, Establishing connectivity on the internet, URL, Domain name registration, Introduction to WWW. Web server and Browser, Introduction to CGI.

Books Recommended:

1. E. Balaguruswamy- Programming with Java:- A Primer, Tata Mc Graw Hills, Publishing Co. Ltd. , 2nd ed.

2. Evan Bayrins – Web enabled Commercial Application Development, Using HTML, DHTML, Java Script, Perl, CGI, BPB. Publications.
3. Java in a Nutshell – Orally Publications.

PAPER 6.5- MULTIMEDIA AND APPLICATIONS

Unit-I

Introduction, Multimedia Literature, Media and data streams, (The perception medium, The representation medium, Presentation medium, Storage medium, Informal exchange, Values and representation spaces, Representation dimension). Main properties of multimedia system, Multimedia, Traditional data streams characteristics, Data stream characteristics for continuous media, Sound / Audio, basic sound concept, Music, speech, image graphics, Computer image processing.

Unit-II

Video & Animation (Television, Computer based Animation) Data compression (storage space, coding requirements, source, entropy and hybrid coding, JPEG, H, 216, MPEG, DVI.

Unit-III

Optical Storage Media, Computer technology (communication architecture, multimedia workstation). Multimedia Operating system, Networking system.

Unit-IV

Multimedia Communication System (Application subsystem, Transport subsystem, Quality of service and resource management). Database systems, Data analysis, Data structure.

Unit-V

Documents, Hypertext and MHEG (Documents, Hypermedia, document Architecture SGMI, Document architecture ODA, MHEG). User and Interface, Synchronization (Notion of synchronization, Presentation requirements), Multimedia applications (Media Preparation, Media composition, Media integration, Media communication).

Books Recommended:

1. Steinmetz R & Nahrstedt, K. – Multimedia: Computing, Communications & Applications, Pearson Education.
2. Unit-I (Chapters 1,2,3,4) Unit-II (Chapters 5,6), Unit-III (Chapters 7,8,9,10), Unit-IV (Chapters 11,12), Unit-V (Chapters 13,14,15,17).

Reference:

1. Vaughan Tay – Multimedia: Making it work 5th ed., Tata Mc Graw Hill
2. Halsall F. – Multimedia Communications, Pearson Education.