(B.C.A) Bachelor of Computer Application

SEMESTER -1

BCA 1001: MATHEMETICS – I

***Differential Calculus*:** Successive Differentiation, Leibritz Theorem, Taylors theorem with Lagrange forms of remainders, Expansion of a function of one variable in Taylors and Meclarin's infinite series. Maxima and Minima of one variable, partial derivatives, Euler's theorem, change of variables, total differentiation, Errors and approximation, Taylor's series in two variables, Maxima and Minima of two or more variables.

Integral Calculus: Definite integral and its application for area, length and volume, Multiple integrals, Change of order of integration, Transformation of integral from Cartesian to polar applications in areas, volume and surfaces.

Differential Equation: First degree and first order Differential equation; Higher order differential equation with constant coefficients, Linear partial differential equation of first order P.D.E. of higher with constant coefficients.

Books:

1. Das BC and Mukherjee, Differential Calculus, Calcutta, U.N. Dhar Publishers.
2. Das BC and Mukherjee, Intergral Calculus, Calcutta, U.N. Dhar Publishers.
3. Grewal B.S. Higher Engineering Mathematics, Delhi Khanna Publishers.

BCA 1002: INTRODUCTION TO COMPUTER SCIENCE

Introduction to Computer Science:
Introduction, Characteristics of computers, Evaluation of computers, generation of computers, classification of computer, the computer system, application of computers.

Number Systems and Logic Gates:
Introduction, Number systems, Convention between number bases, Artithmetic system, signed and unsigned numbers, concept of overflow, binary coding, Logic gate, Boolean algebra, combination of logic gates.

Computer Architecture:
Introduction, Central Processing Unit (CPU), Memory communication between various units of a computer system, The instruction format, Instruction set, Processor speed, Multiprocessor systems.

Primary Memory
Introduction, Memory Hierarchy Random Access Memory (RAM), Type of RAM, Read Only Memory (ROM), Types of ROM

Secondary Storage
Introduction, Classification of secondary storage devices, Magnetic Tape, Magnetic Disk, Magneto Optical Disk.

Input Devices:
Introduction, Keyboard, Pointing devices, speech recognition, Digital Camera, Scanners, Optical scanner.

Output Devices:
Introduction, Classification of output, Hard Copy output devices, Printers, Plotters, Computer Output Microfilm (COM), soft copy output devices, Monitor, Audio output Projector, Terminals

Computer Program:
Introduction, Developing a program, Algorithm, Flowchart, Pseudo code (P-Code)

Computer Languages:
Introduction, Evolution of Programming Languages, Classification of Programming Languages, generation of programming languages

Computer Software:
Introduction, Software: Definition, Relationship between software and hardware, software categories, system software, Application software, software terminology.

Operating System:
Introduction, Operating system, Evolution of operating system, Type of operating system, function of an operating system, Modern operating systems.

Data Communication And Computer Networks:
Introduction, Data Communication, Transmission Media, Multiplexing, Switching, Computer Network, Network Topologies, Communication Protocols, Network Devices

Internet Basics:
Introduction, Evolution of Internet, Basic Internet Terms, getting connected to Internet, Internet Application, Electronic Mail: An Introduction How E-Mail works, Searching the web (Search Engines), Languages of Internet, Internet and Viruses.

Text Book:

1. Introduction to computer science, ITL Eduction solution Limited, R&D Wing, PEARSON Education Edition 2004.

Reference Book:

1. Rajaraman V- Fundamentals of Computers, Prentice Hall of India Pvt. Ltd, New Delhi – 2nd Edition 1996.

BCA 1003 : PROGRAMMING IN C

History and Importance of C, Sample programming, Basic Structure and execution of C programmes, Constants, Variables, and Data Types and various type of declarations, Different type operators and Expressions, Evaluation of Expressions, Operator Precedence and Associability, Mathematical Functions.

Managing Input and Output operations, Decision Making and Branching Decision Making and Looping.

One – dimensional Arrays and their declaration and Initialisations, Two-dimensional Arrays and their initialisations, Multidimensional Arrays, Dynamic Arrays, String Variables, Reading and Writing Strings, Arithmetic Operations on characters, Putting Strings together, Comparison of Two Strings, String – handling functions, Table and other features of Strings.

Need and Elements for user defined Functions, Definition of Functions, Return values and their types, Function calls and Declaration, Arguments and corresponding return values, Functions that return multiple values, Nesting of functions, Recursion, Passing arrays and strings to functions, The Scope, Visibility and Life time of variables.

Defining Structure, Declaring Structure Variable and Accessing Structure Members, Initialisation of Structure, Comparing Structure Variables, Operation on Individual Members, Arrays of Structures, Structures within structures, Structures and Functions, Unions, Size of Structures, Bit Fields.

Understanding Pointers, Accessing the Address of a Variable, Declaration and Initialisation of Pointer Variables, Accessing a Variable through its Pointer, Chain of Pointers, Pointer Expressions, Pointer Increments and Scale Factor, Pointers and Arrays, Pointers and Character Strings, Arrays of Pointers, Pointers and Function Arguments, Functions Returning Pointers, Pointers to Functions, Pointers and Structures, File Management in C.

Text Book:

1. E. Balagurusamy – Programming in ANSI C, 3rd Edn. , TMH, New Delhi ; 2004

Reference:

1. Programming with C, B.S.Gottfried (TMH)
2. Y. Kanetkar – Let us C, 4th Edition, BPB Publication , New Delhi ; 2002

BCA 1004: ENVIRONMENTAL SCIENCE

Environmental awareness: Multidisciplinary nature of environmental science, Definition, scope, importance and need for public awareness.

***Ecology and Environment* :** Concept of an ecosystem, structure and function of an ecosystem, producer, consumer and decomoposer, energy and nutrient flow biogeochemical cycles, food chain, food web, ecological pyramid.

***Environmental Pollution* :** Segments of environment, sources, pathways and fate of environmental pollutants, causes of environmental pollution, physical, chemical, and biological transformation of pollutants, population explosion, environment and human health, human rights, value education, women and child welfare.

Air Pollution : Various segments of atmosphere and their significance, classification of air pollutions, toxic effects, sampling and analysis, stationary and mobile enission, sources and their cuntrol, photochemical smog, sulphurous smog, green house effect, global warning, ozone depletion, Air (prevention and control of pollution) Act.

Water Pollution: Water resources sources of water pollution, various pollutants, their toxic effect, potability of water, municipal water supply, disinfection, characteristics of waste water, primary and secondary waste water treatment, BOD and COD measurment and their significance, rain water harvesting, water shed managment, Water (pollution and control) Act.

***Natural Resources and Biodiversity*:** Renewable and non renewable resources, Forest resource, consequences of deforestation, floods and draughts, equitable use of resources for sustainable develoment, Dams benefits and problems, Biodiversity: ecosystem diversity, theans to biodiversity, conservation of biodiversity.

A Brief introduction to Noise Pollution, Soil Pollution , Solid Wate Management.

Recommended Books :

1. De A. K., Environmental Chemistry, Wiley Eastern Ltd.
2. Miller T.G.Jr., Environmental Science, Wadswarth Pulishing Co. (TB)
3. Sharma B.K., 2001, Environmental Chemistry, Goel Publishing House, Meerut
4. Odem, E.P., 1971, Fundamentals of Ecology, W.B.Sannders Co. U.S.A.

BCA 1005: COMMUNICATION SKILLS/ TECHNICAL ENGLISH

Introduction:
Definition, Objectives, Stages of Communication, Essentials of Good/ Effective Communication, Benefits of Good Communication, Gaps in Communication, Communication and Information Technology.

Business Correspondence:
Structure of a Letter, Inquiry Letter, Sales Letter, Order Letter, Complaints, Complaint Handling, Telemarketing.

Government Correspondence:
Noting, Routine Letter, Demi-Official Letter Memorandum, Circular, Telegrams, Newsletter.

Writing Skills :
Report Writing, Scientific Paper Writing, Writing Small Paragraphs & Essays, Composition.

Grammar :
Sentence Structure, Idiomatic Usage of Language, Tenses, Direct & Indirect Parts of Speech, Active & Passive Voice, Vocabulary.

Selected Short Stories :
2-3 classic short stories, 2-3 great short stories by Indian writers.

Preparation for Job :
Writing Applications for Jobs, Preparing Curriculum Vitae, Preparing for Interviews, Preparing for Group Discussions.

Text Books:

1. Organisations - Structures, Processes and Outcomes; Richard h Hall; Prentice Hall of India .
2. English for the Secretary; Yvonne Hoban; Tata McGraw Hill.
3. Technical Communication : M. Raman & S. Sharma; Oxford University Press.
4. Business Communication Process and Product : M.E. Guffey; Thomson Learning.

Reference Book :

1. Human Behaviour at Work; John W Newstorm & Keith Davis; Tata McGraw Hill.
2. The Most Common Mistakes in English Usage; Thomas Elliot Berry, Tata McGraw Hill
3. Business Communication: R.K. Madhukar; Vikas Publication.

Additional Optional Course

BCA 1008 DISCRETE MATHEMATICAL STRUCTURES

Sets, Logic, Direct Proof and Proof by Contra positive, Proof by Contradiction, Prove or Disprove, Equivalence Relations, Functions, Mathematical Induction, Cardinalities of Sets.

Understanding of the basic ideas of sets and functions, including boolean combination of sets, and be able to manipulate such expressions, understanding of the standard propositional logic connectives and be able to convert logical exporessions into conjunctive and disjunctive normal form, understanding of the universal and existential quantifiers, familiar with the general concept of binary relation, equivalence and order relations and methods of combining relations, standard graphical representations of relations, principle of mathematical induction, inclusion-exclusion principle in simple counting examples, basic ideas of probability.

Calculate probabilities in simple experiments.

Text Books:

1. TRUSS, J.K. Discrete Mathematics for Computer Scientists. (ISBN 0-201-175-649) 2nd Edition, Addison Wesley 1998.

BCA 1009 PHYSICS – I

Waves and Oscillations

Wave motion: Longitudinal and transvers waves, wave equation, plane waves, phase velocity, wave packets and group velocity, superposition of waves, equation of motion of simple harmonic oscillator and solution, damped harmonic motion, forced oscillations. (6).

Fields

Vector and scalar fields, gradient, divergence and curl (Cartesian coordinates only), Gauss's theorem and Stokes' theorem (Statements only). (5)

Electromagnetic Theory

Gauss's law in integral and differential form, electric potential and relation with E (SS* - capacitance and electric energy density), dielectrics, three electric vectors, dielectric susceptibility boundary conditions and E and D. (5)

Amper's law in integral and differential form, applications, Hall effect, Three magnetic vectors, magnetic permeability and susceptibility, Boundary conditions on B and H.(5)

Faraday's law in integral and differential form, (SS – Inductance, Magnetic energy density, continuity equation for charge), Displacement current, Maxwell's equations in free space, electromagnetic wave equation for place waves in a conducting medium, relation between E,B and K, Poynting vector. (5)

Plasma Physics

Plasma State, Types of plasma, applications of plasma.

Physical Optics

Interferences : Two – Beam Interference, Interference in Thin Films and Wedge-Shaped Layers, Reflection and Anti-Reflection Coatings, Applications of Interferometry : Newton's rings, Michelson's Interferometer. (5)

Diffraction: Fraunhofer Diffraction by Single Slit, Double Slit and Grating, Limit of Resolution, Rayleigh Criterion and Fresnel Diffraction (Qualitative),

Polarization: Polarization of light, Malus's law, polarization by reflection, Brewster's low, Double refraction, Analysis of linearly and circularly polarized light, Fresnel's equations and their applications. (7)

SS* - Self Study

Text Books

1. Mathew N.O. Sadiku, Elements of Electromagnetics, Oxford Univ. Press. (2001)
2. A. Ghatak, Optics, TMH (1992).
3. Resnick, Halliday and Krane, Physics Part-I & II, John Wuley, 5th Ed. (2002)
4. M.R. Srinivasan, Physics for Engineers, New Age International, 1996
5. H.J. Pain, The Physics Vibrations and Waves.