BCA-101: Mathematics-I

Level of Knowledge: Expert Knowledge
Course Objective The objective of this course is to familiarize the students with Calculus.
Scheme of Examination
Total marks 100.
Internal marks 40.
External marks 60.
The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Review of Concepts of Function of one variable: Definition and types of functions

Limits: Definition, working rule for finding out the limit, fundamental property of limit, problems based on limit.

Continuity: Definition, point of discontinuity, classification of discontinuity, problems based on continuity & discontinuity.

Differentiability: Definition, Right and Left hand Derivatives, Condition for Derivability and problems related to differentiability.

Unit 2.

Successive Differentiation, Rolle's Theorem, Mean value theorems, Taylor's theorem, Taylor's & Maclaurin's Series, Indeterminate Forms.

Unit 3.

Tangents, Normals, Curvature, Asymptotes, Integration of Hyperbolic Functions and Reduction Formulae.

Unit 4.

Differentiation of Vector Function, Gradient, Directional derivatives , Divergence and Curl, Vector Functions of several scalar variables and their partial derivatives, level surface gradient in Cartesian and polar Coordinates, Divergence of vector and curl of a vector.

Unit 5.

Matrix – Definition, Types of matrix, special matrix, elementary transformation of matrix, inverse of a matrix – adjoint methods and Gaussian elimination, normal form of a matrix, rank of a matrix, nullity of matrix, consistency and solution of linear simultaneous equations.

Text Readings

1. Mathematics I by D.C.Agrawal Shree Sai Prakashan, Meerut 2nd Edition
2. A Text Book of calculus by Dr. H. S. Sharma, Ratan Prakashan, Indore.
3. A Text Book of Calculus by Dr. H. K. Pathak & D.C. Agrawal, Shikha Sahitya Prakashan, Indore 5th Edition
4. Vector Calculus & Geometry by Dr. H. K. Pathak & D.C. Agrawal Shikha Sahitya Prakashan, Indore 5th Edition.

BCA-102: Statistical Methods-I

Level of Knowledge: Expert Knowledge
Course Objective The objective of this course is to familiarize the students with Statistics.

Scheme of Examination
Total marks 100.
Internal marks 40.
External marks 60.

The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Variables & Graphs: Statistics, population & sample, discrete & continuous variables, graphs, equations, inequalities, logarithms.

Frequency Distributions: frequency distribution, histograms, frequency polygons, frequency curve, cumulative frequency distribution and Ogives.

Unit 2.

Measures of Central Tendency: The arithmetic mean, weighted arithmetic mean, geometric mean, harmonic mean, mean power of numbers, root mean square, median, mode, quartiles, deciles & percentiles.

Measures of Dispersion: The range, mean deviation, semi inter quartile range for quartile deviation, absolute & related dispersion, coefficient of variation.

Unit 3.

Moments Skewness & Kurtosis: Moments of various types, relation between moments, and sheppard's correction to moments, skewness & kurtosis, moment generating function.

Elementary Probability Theory: Sample space, events, classical definition of portability, relative frequency definition, theorems of total & compound probability, Independent & dependent event, mutually exclusive events, mathematical expectation.

Unit 4.

Theoretical distributions: Discrete & continuous probability distribution, Basic concepts & applications of degenerate, Bernoulli, Binomial, Geometric, Negative binomial, Hyper geometric, Poisson and normal distributions.

Curve fitting: Curve fitting, the method of least square, the least square lines, the least square parabola, regression.

Unit 5.

Correlation theory: Linear correlation, Measures of correlation, the least square regression lines, expected & unexpected variation, coefficient of correlation, rank correlation, correlation index, multiple & partial correlation for three variables.

Theory of Attributes: Consistency of data, association of attributes, coefficient of association, contingency tables.

Text Readings:

1. **Statistical** Methods I by D.C.Agrawal Shree Sai Prakashan Merrut 2nd Edition
2. Spiegel, M.R.: Statistics Schaum's outline series, McGraw Hill Publishing Company Edition, 2000.
3. Kapoor & Saxena: Mathematical statistics, S. Chand & sons 18th Edition.
4. Gupta & Gupta: Fundamentals of Statistics.
5. Statistical Methods by Dr. H.K. Pathak Shikha Sahitya Prakashan, Indore Revised Edition.

BCA-103: Physics-I

Level of Knowledge: Expert Knowledge
Course Objective The objective of this course is to familiarize the students with basic concepts of electricity.

Scheme of Examination
Total marks 100.
Internal marks 40.
External marks 60.
The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Frictional Electricity: Frictional electricity charges & their conservation, Coulomb's law, Electric field & Potential due to a point charge & Dipole. Dielectric Potential – An atomic view, dielectric Polarization, Dielectric Susceptibility; Forces on the surface of a charged conductor, energy stored in a dielectric medium.

Capacity: Capacity, units of capacity, Potential energy of a charged conductor, Principle of condenser or Capacitor.

Unit 2.

Magnetic Properties of Materials & Magnetic Circuits : Para, Dia & Ferromagnetic substances, Magnetic circuit , Magnetomotive force, Reluctance, Permeance, Ohm's Law and comparison with electric circuits, Relation between M & H, Hysterisis loop, Energy loss, Determination of Susceptibility & Permeability.

Unit 3.

A. C. Circuits: Definitions, Different forms of e.m.f. equations, Effective, virtual or Rms value, Mean and Average value of AC quantities, Forms factor, AC circuits containing Resistance, Capacitance, Inductance, Separately & simultaneously, Series and Parallel Resonance Circuit (Phasor diagram treatment).

Unit 4.

Ohm's Law, factors affecting resistance, color code, variable resistors, power and energy, D.C series and parallel circuits, Kirchoff's voltage and current laws, voltage and current divider rules, Network Theorems : Maximum power transfer theorem, Thevenin's theorem , Norton's theorem, Super position theorem, Millman's Theorem, Reciprocity theorem.

Unit 5.

Classification of Solids: Energy bands in solids, Conductor, Semiconductor & Insulator, Chemical bands in Germanium & Silicon, Intrinsic & Extrinsic Semiconductors, Conductivity Diode & the Transistor, Super conductivity and superconductor.

Text Readings:

1. Engineering Physics: R. K. Gaur & S. L. Gupta. Dhanpat Rai Publication8th Edition
2. Physics Part II: Resnick & Halliday.7th Edition
3. Modern Engineering Physics : A.S.Vasudera

BCA-104: Programming and Problem Solving Through 'C'-I

Level of Knowledge: Expert Knowledge

Course Objective The objective of this course is to make the student understand programming language, programming, concept of loops, reading a set of data, stepwise refinement, function, control structure and arrays. After completion of this course the student is expected to analyze the real life problems and write a program in 'C' language to solve problem. The main emphasis of the course will be on problem solving aspect that is developing proper algorithms.

Scheme of Examination

Total marks 100.

Internal marks 20.

Practical Marks 20

External Marks 60

The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Algorithm for Problem solving: Introduction, properties of an algorithm, Classification, Algorithm logic, Flowchart.

Program Design and Implementation Issues: Programming System design techniques, Programming Techniques, basic constructs of structured programming, modular designing of programs

Programming Environment: High level Programming language, low level programming language, middle level programming language, Assembler, Compiler, Interpreter.

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Unit 2.

What is C: Historical Development of C, Where C stands**,**

Getting Started with C: The C character set, Types of C constants, Types of C variables, C Keywords, Identifier, Literals

C Instructions: Type declaration Instruction, Arithmetic Instruction, integer, long, short, signed, unsigned, storage classes, Integer and Float conversions, type conversion in assignment, hierarchy of operations

Unit 3.

Decision control structure: Control instructions in C, if else, Use of Logical Operators, Hierarchy of Logical Operators, Arithmetic Operators, Relational Operators, Assignment Operators, Increment and Decrement Operator, Conditional Operator, Bitwise Operators, Special Operators "&,*,.,->,size of"

Loops control structure: while loop, for loop, do-while loop, odd loop, nested loop, break, continue, case control structure, goto, exit statement.

Unit 4

Arrays: What are Arrays, array initialization, bound checking, 1D array, 2D array, Initialization of 1D and 2D array, memory map of 1D and 2D array, multidimensional array.

Strings: What are strings, standard library string functions: strlen(),strcpy(), strcat(),strcmp(),2Darray of characters

Unit 5.

Structure: Why use structure, declaration of structure, accessing structure elements, how structure elements are stored, array of structure, use of structure.

Preprocessor: Features of C preprocessor, Macro expansion, Macro with arguments, file inclusion, conditional compilation, #if, #elif, miscellaneous directives, #undef, #pragma directives

List of Suggested Practical

1. To Sum n different numbers using arrays
2. To generate Fibonacci series
3. To generate prime no series
4. To find nth prime number
5. To find GCD of two numbers
6. Binary search and Linear search
7. Bubble sort
8. Selection sort
9. Matrix addition
10. Matrix multiplication
11. Exchanging values of two numbers without using third variable
12. Exchanging values of two numbers using third variable
13. Find the sum of series
    i) 1+2+----------
    ii) 2+4+----------
    iii) 1+3+----------
    iv) 1+2/2! +3/3! +--------
    v) $1+X/1! +X^2/2! + X^3/3! +$--------
    vi) $1-X/1! +X^2/2! - X^3/3! +$--------
14. Find the Factorial of given number using for loop
15. Find whether given year is leap or not.

Text Readings

1. Let us C, Y. Kanetkar, BPB Publications, New Delhi, 6th Edition
2. Programming and Problem Solving through 'C'(ELSEVIER) 3rd Edition
3. First Course in Programming with 'C', T. Jeyapoovan (Vikas Publication, New Delhi)
4. Programming in 'C', E. Balagurusamy (TATA McGRAW Hill) 4th Edition
5. The C Programming language by Brain W Kernigham and Dennis M Ritchie. 2nd Edition
6 Practical C Programming, 3rd Edition (A Nutshell Handbook)3rd Edition

BCA-105: PC Software

Level of Knowledge: Expert Knowledge

Course Objective The objective of this course is to give knowledge about the basics of a computer and its applications

Scheme of Examination

Total marks 100.

Internal marks 20

Practical marks 20

External marks 60

The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.

Basic computer organization – Von Numann M/c, Types of computers, block diagram of modern Digital Computer, types of memory devices, printers.

Number system – representation of number system,, integer representation floating point representation, binary number, octal number , hexadecimal number, system and their conversion..

Character coding – BCD, ASCII, and EBCDIC.

Unit 2.

Operating System – types of operating system. DOS – booting, external and internal commands, filters, pipes, comparison between COM, EXE and BAT files, simple batch processing creating and execution.

Unit 3.

Windows –2000– Features of Windows 2000, startup screen, desktop screen management (Display Properties), utility of recycling bin, network neighborhood and dial up settings.

Control Panel – Installation of S/W, addition of new hardware. Installation of modern , sound card, printers.

Unit 4.

MS Word: types of word processor, creating documents in Ms-Word, formatting features of Ms-word Word standard tool bar, word drawing toolbar, text formatting, header and footer, auto text, table handling features, insertion files, pictures, clipboard, graphs, mail merge, macros.

Unit 5.

MS PowerPoint : Different presentation styles, editing slides, inserting menu facility, slide sorter , Slide Miniature, Slide show, inserting chart, slide transaction, formatting slides, tool menu, present animation of slides, animation preview.

Text Readings:

1. Computer fundamentals: P. K. Sinha, BPB Publication, 4th Edition
2. Dos: Peter Norton Dos Guide, BPB Publication, 3rd Edition
3. Windows 2000: Sam Publication
4. Microsoft Office: Ron Mansfield, BPB Publication

BCA-106: English

Level of Knowledge: Expert Knowledge
Course Objective The objective of this course is to give knowledge about the basics of English language.

Scheme of Examination
Total marks 100.
Internal marks 40.
External marks 60.
The question paper will contain questions equally distributed in all units. The papers may contain the combination of Numerical/Objective/ Conceptual /Analytical/ Theoretical in each question.

Course Contents

Unit 1.
Short-answer question
Unit 2.
Reading comprehension and vocabulary.
Unit 3.
Paragraph Writing
Unit 4.
Letter Writing (Both Formal & Informal)
Unit 5**.**
Grammar (20 Items from the prescribed text book to be asked an 15 to be attempted.)

Structural Items:
1) Simple, compound and complex sentences.
2) Co-ordinate clauses (with, but, or, either-or, neither-nor, otherwise or else).
3) Subordinate clauses noun clauses as subject object and complement, Relative clauses (restrictive and non-restrictive clauses), Adverb Clauses (Open and Hypothetical conditional with because, though, here, so that, as long as, as soon as).
4) s clauses (as+ = adjective/adverb + as-no sooner---------Than).

Tenses:
1) Simple present, progressive and present perfect
2) Simple past, progressive and past perfect
3) Indication of futurity.
The passive (Simple present and past, present and past perfect and to infinitive structure)
4) Reported Speech: i) Declarative sentences ii) Imperatives iii) Introgative-wh-questions and exclamatory sentences.
5) Modals (will, shall, should, would, ought to, have to, have got to, can-could, may might and need)
6) Verb structures (infinitive and gerundial).
7) Linking Devices

NOTE: The above language items will be introduced to express the following communicative functions:

a. Seeking and imparting information
b. Expressing attitudes-intellectual and emotional
c. Persuasion and dissuasion etc.

Questions on all the units shall be asked from the prescribed text, which will comprise specimens of popular creative writing and the following items.

i) Indian Art

Meaning of Art, Features of Indian Art
Elementary Knowledge of Paintings, Music, Dancing, Sculpture, Archaeology, Iconography and other social Arts.

ii) Indian Literature

Ancient Indian Literature
Elementary Knowledge of Vedic Literature, Mahabharata, Ramayana and other main Granthas.

iii) Indian Freedom Struggle

Freedom struggle of 1857, National consciousness, Non cooperation Movement, Civil Disobedient Movement, Contribution of Revolutionaries in Freedom Struggle

iv) Indian Constitution

Introduction, Main Features of Constitution, Fundamental rights, Fundamental duties

Text Readings:

1. English Language and Indian Culture: published by M.P. Hindi Granth Academy, Bhopal
2. English Grammar by Wren Martin (S Chand Publication)