Mathematical Sciences

IDC-I: Foundations of Mathematical Sciences-I

UNIT-I: Numbers, Division algorithm, Divisibility test, Test of prime numbers, Definition of number system (decimal and binary), Conversion from decimal to binary system and vice-versa, Indices, Logarithm and Antilogarithm, Laws and properties of logarithms.

No of contact hours: 10

UNIT-II: Percentage, Average, Discount, Profit and Loss, Problems based on Age, Time, speed& distance, Time &work, clock &calendar, Partnership, Ratio &Proportions, Simple Interest and Compound Interest, Effective rate of interest, Present value, net present value and future value, Annuities, Calculating value of Regular Annuity, Pipes and Cisterns, Mixture and Allegation, Boats and Streams, Races and Games.

No of contact hours: 13

UNIT-III: Historical development of statistics, statistics in everyday life, statistics through observed data, Scope, limitations, importance and applications of statistics in other fields, roles of computer in statistics, Statistical data: primary and secondary data and method of their collection. Time series data, qualitative data and quantitative data. Data Representation: Frequency distribution, Graphical representation of frequency distribution Histogram, Frequency polygon, Frequency curve, Ogive.

No of contact hours: 11

UNIT-IV: Data analysis, Arithmetic mean, Geometric mean, Harmonic mean, Median, Mode and their properties. Partition Values: Quartiles, Deciles, Percentiles, Graphical location of Mode, Quartiles, Deciles and Percentiles.

No of contact hours: 11

IDC-2: Foundations of Mathematical Sciences-II

UNIT-I: Mathematical Reasoning, Meaning of mathematical statement, Negation, Compound statements, Quantifiers, Converse and Contrapositive of the statement, Implications, Validating statements, Sequence and series (AP, GP), Logical reasoning, Odd man out and series, Blood relations, Coding Decoding, Logical sequence, Logical matching, Logical thinking, missing numbers, Logic puzzles.

No of contact hours: 11

UNIT-II: Factorial notations, Permutations & Combinations, Pigeonhole principle, Mathematical induction, Binomial theorem, Principle of Inclusion and Exclusion, Inversion Formula, Inequalities, Solutions of inequalities, Trigonometry, problems based on heights and distances, Mensuration, Area, Volume, surface area and perimeter.

No of contact hours: 12

UNIT-III: Measures of dispersion, Range, Inter-quartile Range, Quartile deviation, Mean Deviation, Standard Deviation, Coefficient of variation, Ideal measures of dispersion, Idea of skewness and kurtosis (without moments), Idea of Moment and Moment generating function.

No of contact hours: 12

UNIT-IV: Bivartite distribution, Scalier diagram, Correlation and regression, Karl Pearson's Correlation coefficient and its properties, two regression lines (without derivation), principle of least squares and fitting of polynomials, Relation between correlation coefficient and regression coefficients.

No of contact hours: 10

IDC-3: Foundations of Mathematical Sciences-III

UNIT-I: Set theory and its simple applications, Types of sets and their notations, Subsets, Classes of Sets, Power Sets, Venn diagrams, Operation on sets, Ordered pairs, Cartesian product of two sets, Finite sets, Fundamental Principle of Counting, sum rule and product rule of counting, Relations & Functions.

No of contact hours: 10

UNIT-II: Matrices and determinants, Addition, Subtraction and Multiplication of matrices with their properties, Determinants with properties and solution of system of linear equations with the help of determinant problem related to economics and business.

No of contact hours: 10

UNIT-III: Differential Calculus: Basic concept of limit and continuity of a function, derivative of a function, Rule of differentiation, Derivative as a rate of change, Product rule, Quotient rule, Chain rule, Derivatives of Logarithmic functions, Exponential functions, Elasticity of demand and functions, Second order derivatives, Maxima and Minima of function related to cost, revenue and profit functions.

No of contact hours: 13

UNIT-IV: Probability, Idea of probability generating function and characteristic function and its utility in statistics, Random experiments, sample space, events and algebra of events, Classical, statistical and axiomatic probability, Conditional Probability, laws of addition and multiplication, independent events, theorem of total probability, Random variables: discrete and continuous random variables.

No of contact hours: 14