

Department of Mathematics (Undergraduate)

Program Specific Outcomes (PSO)

10. Develop the skill to deal with the abstract ideas of Mathematics.
11. Become proficient in writing proofs.
12. Expertise in problem solving.
13. Acquire the skill to pursue career not only in school education but also in business, civil services, banking, finance etc.
14. Can continue study of Mathematics at the post graduate level and more.
15. Can apply Mathematical methods in problems of Mathematics and related fields of science and engineering.
16. Learn how to teach Mathematics in undergraduate level.
17. Develop the ability of analytical and logical thinking which will help them in all aspects of life.

Course Outcomes (CO)

1+1+1 System

PAPER I

CLASSICAL ALGEBRA, MODERN ALGEBRA I, ANALYTICAL GEOMETRY OF TWO AND THREE DIMENSIONS AND VECTOR ALGEBRA:

Learn concepts of Classical Algebra such as Complex numbers, Inequality, Integers, Theory of Equations, introductory ideas of Modern Algebra such as Set, Mapping, Relations and introduction of Group Theory and Analytical Geometry which includes Transformation of axes, Pair of Straight Lines, Circle, Ellipse, Parabola, Hyperbola, Rectangular Cartesian coordinates in Space, Equations of Plane, Straight lines in Space, Position Vectors, Vector Products, Application of Vector Algebra, Vector Equations

PAPER II

ANALYSIS I , EVALUATION OF INTEGRALS, LINEAR ALGEBRA AND VECTOR CALCULUS I:

Get the basic knowledge of Analysis including Real Number System, Set and Sequences of Real Numbers, Countability of Sets, Continuity of Real Valued Functions of Real Variables. Apart from that Methods of Evaluation of Definite and Indefinite Integrals, Matrices, Determinants, Vector Space, Vector Differentiation, Scalar and Vector Field.

PAPER III

MODERN ALGEBRA II AND LINEAR PROGRAMMING, GAME THEORY, ANALYSIS II AND DIFFERENTIAL EQUATIONS I:

In extension to the Modern Algebra Course in Paper I student learns Cosets, Cyclic Groups, Rings and Fields. Learn theories and problem solving mechanisms of Linear Programming Problems and Game Theory. Also as an extension of Paper II Analysis course, learns the Infinite Series of Real Numbers, Derivatives of Real Valued Functions of Real Variables. Finally methods to solve ordinary Differential equations and introduction to Partial Differential Equations

PAPER IV

REAL VALUED FUNCTIONS OF SEVERAL VARIABLES, APPLICATION OF CALCULUS, ANALYTICAL GEOMETRY OF THREE DIMENSIONS II, ANALYTICAL STATICS I AND ANALYTICAL DYNAMICS OF A PARTICLE I:

Learn concepts of function of several variables, for example Point Sets, Limit, Continuity, Differentiability, Jacobian etc. Then Application of Calculus which involves Asymptotes, Curvature, Envelopes, Concavity, Convexity, Sphere, Cone, Cylinder, Ellipsoid, Hyperboloid, Paraboloid, Surface of Revolution, Transformation of Axes, Friction, Astatic Equilibrium, Newton's Laws, Impact of Elastic Bodies, Accelerations, Damped Harmonic Oscillators, Motion in a Plane under Laws of Resistance,

PAPER V

ANALYSIS III, LINEAR ALGEBRA II, MODERN ALGEBRA II, TENSOR CALCULUS, DIFFERENTIAL EQUATION II OR GRAPH THEORY:

Get ideas of Compactness in \mathbb{R} , Functions of Bounded Variations, Riemann Integration, Sequence and Series of Real Functions, Linear Transformation, Normal Subgroup, Homomorphism, Isomorphism, Tensor Calculus, Laplace Transformation and Series Solution of Ordinary Differential Equations or Graph Theory

PAPER VI

VECTOR CALCULUS II, ANALYTICAL STATICS II, ANALYTICAL DYNAMICS OF A PARTICLE II, HYDROSTATICS AND RIGID DYNAMICS:

Learns advance Vector Calculus, advance Analytical Statics and Dynamics, Hydrostatics and Rigid Dynamics

PAPER VII

ANALYSIS IV, METRIC SPACE, COMPLEX ANALYSIS, PROBABILITY AND STATISTICS:

Learns Improper Integral, Fourier Series and Multiple Integrals, Metric Space and Complex Functions and probability and statistical methods in detail.

PAPER VIII

NUMERICAL ANALYSIS, COMPUTER PROGRAMMING AND PRACTICALS: Familiarize oneself with the application of method of estimation in absence of exact solution or when finding exact solution is tough and also learn to write the computer programming of the numerical methods in C or Fortran, fundamentals of Computer Science and Boolean Algebra.

Course Outcomes (CO)

CBCS System

CC1

CALCULUS, GEOMETRY AND VECTOR ANALYSIS:

Learn the foundational knowledge of Calculus, Geometry and Vector Analysis and learn to plot graphs of functions, sketch parametric curves, trace conics etc using free software.

CC2

ALGEBRA:

Develop the basic ideas of Classical Algebra(Complex Number, Theory of Equation, Inequality), Abstract Algebra(Relation, Mapping, Integers) and Linear Algebra(Rank of a Matrix, System of Linear Equations etc).

CC3

REAL ANALYSIS:

Get the ideas of Real Numbers, Countable and Uncountable Sets, Bounded and Unbounded Sets, Limit Points, Interior Points, Real Sequence, Subsequence in detail and learn to plot sequences and verify theorems through plotting of sequences.

CC4

GROUP THEORY-I:

Learn Group, its properties and examples, Subgroup, its properties and examples, Cyclic Group, Permutation, Quotient Group, Homomorphisms, Isomorphisms.

CC5

THEORY OF REAL FUNCTIONS:

Acquire the knowledge of Limit, Continuity and Differentiability of Real Functions.

CC6

RING THEORY AND LINEAR ALGEBRA-I:

Learn the definition of Ring, Subring, Integral Domain, Field, Ideals, Ring Homomorphism and their properties and theorems in the Ring Theory and in Linear Algebra, the fundamentals of vector Space, Linear Transformation, Algebra of Linear Transformation, Eigen Values, Eigen Vectors.

CC7

ORDINARY DIFFERENTIAL EQUATION & MULTIVARIATE CALCULUS-I:

Learn methods to solve Ordinary Differential Equations and introductory ideas of Multivariate Calculus (Concept of Neighbourhood, Limit Point, Interior Point, Chain Rule, Directional Derivatives).

CC8

RIEMANN INTEGRATION & SERIES OF FUNCTIONS:

Get the knowledge of Riemann Integration, Improper Integral, Sequence and Series of Functions, Power Series, Fourier Series.

CC9

PARTIAL DIFFERENTIAL EQUATION & MULTIVARIATE CALCULUS-II:

Learn methods to solve Partial Differential Equations (PDE) and some problems involving PDE and in Multivariate Calculus, learn Multiple Integrals, Vector Field, Divergence, Curl, Green's Theorem, Stoke's Theorem and Divergence Theorem.

CC10

MECHANICS:

Learn Coplanar Forces in general, an arbitrary force system in space, Equilibrium in the presence of Sliding Friction force, Virtual Work, Stability of Equilibrium, Kinematics of a particle, Newton Laws of Motion and Law of Gravitation, Problems in Particle Dynamics, Planar motion of a particle, Motion of a particle in three dimensions, Linear Momentum Principle, Angular Momentum Principle, Energy Principle.

CC11

PROBABILITY & STATISTICS:

Learn probability and statistical methods in detail and also learn to do the graphical representation of data.

CC12

GROUP THEORY-II & LINEAR ALGEBRA-II:

Get the idea of Automorphism, External Direct Product, Inner Product Spaces and Norms, Dual Spaces, Eigen Spaces.

CC13

METRIC SPACE & COMPLEX ANALYSIS:

Get the concept of Metric Spaces, Compactness, Connectedness and in Complex Analysis Stereographic Projections, Differentiability, Power Series, Complex Integration etc.

CC14

NUMERICAL METHODS:

Familiarize oneself with the application of method of estimation in absence of exact solution or when finding exact solution is tough and also learn to write the computer programming of the numerical methods.

- From the elective SKILL ENHANCEMENT COURSES one can learn C, C++, Scientific Computing with SageMath and R and Mathematical Logic.
- From the elective DISCIPLINE SPECIFIC ELECTIVE COURSES one can get an overview of specialized sections of Mathematics which will help to choose the right track for future.