B.Sc.: Mathematics

Programme Specific Outcomes

At the time of graduation, the students will be able to:

PSO1: Acquire knowledge in basic Mathematics

PSO2: Communicate solutions of mathematical problems effectively

PSO3: Equip knowledge in various concepts involve in Calculus, differential equation, real analysis and algebra

PSO4: Acquire a breadth and depth of understanding in mathematics

PSO5: Understand reasonableness of solutions including sign, size, accuracy and units of measurement

PSO6: Apply mathematical proof techniques in a wide variety of mathematical areas, including algebra and analysis

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Course Outcomes

F.Y. B.Sc.

Semester I

Differential Calculus At the end of the course, the students will be able to:

CO1: Solve problems on limits continuity and successive differentiation of Functions

CO2: Determine partial derivative of function more than one variable

CO3: Describe Rolle's Theorem, Lagrange's mean value theorem and Cauchy's mean value theorem

CO4: Determine expansion of ex, sinx, cosx, sinhx, coshx, tanhx, log (ax+b) etc.

CO5: Determine gradient, divergence and curl and directional derivatives

Differential Equations

At the end of the course, the students will be able to:

CO1: Determine solution of first order linear differential equation

CO2: Determine solution of exact differential equation

CO3: Determine solution of linear equation with constant coefficient using general and short method

CO4: Determine solution of linear homogeneous differential equation

CO5: Explain formation of partial differential equation by eliminating the arbitrary constants and functions

Semester II

Integral Calculus

At the end of the course, the students will be able to:

CO1: Apply reduction formula

CO2: Find integration of algebraic rational functions

CO3: Apply fundamental theorem of integral calculus

CO4: Find the area bounded by a curve.

CO5: Calculate the length of arc of a curve.

CO6: Find line integral and surface integrals.

CO7: Apply the theorems of Gauss, Green's and Stoke's theorem

Geometry

At the end of the course, the students will be able to:

CO1: Identify and use different type of equations of plane

CO2: Determine equations of the system of planes and the length of perpendicular to a plane

CO3: Determine equation of right line and the angle between the plane and line

CO4: Determine condition for coplanar lines and short distance between two lines

CO5: Determine equation of sphere and its intersection with the plane

S.Y. B.Sc. Semester III

Number Theory

At the end of the course, the students will be able to:

CO1: Describe division algorithm and solve the problem on it

CO2: Determine GCD and LCM by using Euclidean algorithm

CO3: Describe method of solving linear Diophantine equation

CO4: Determine solution of linear congruence

CO5: Describe Fermat's and Euler's theorem

Integral Transform

At the end of the course, the students will be able to:

CO1: Define beta and gamma functions and derive their properties and apply them in evaluating integrals

CO2: Determine Laplace transform for various functions, properties of Laplace transforms

CO3: Determine inverse Laplace transform, properties of inverse Laplace Transform, solve the problems using convolution theorem

CO4: Determine Fourier transform, properties of Fourier transform, Fourier sine and cosine transforms

CO5: Apply Laplace transform to find solutions of ordinary and partial differential equations

Mechanics-I

At the end of the course, the students will be able to:

CO1: Describe different types of forces, triangle law of forces, Parallelogram of forces, resultant of forces, sine rule and cosine rule

CO2: Explain resultant of several coplanar forces, equation of the line of action of the resultant, equilibrium of a rigid body under 3 coplanar forces

CO3: Explain Lammi's theorem and polygon of forces

CO4: Explain vector moment of a force and vector moment of couple

CO5: Describe basic concepts of centre of gravity and its applications

Semester IV

Numerical Methods

At the end of the course, the students will be able to:

CO1: Explain Bisection Method, Method of False Position, Newton-Raphson Method

CO2: Describe Finite Differences, Newton's Formula for Interpolation, Lagrange's Interpolation Formula, Divided Differences

CO3: Describe Least Square Curve Fitting Procedures, Fitting a straight line, Chebyshev polynomial, Power series

CO4: Calculate Solution of Linear system of equations, Eigen values and Eigen Vectors

CO5: Calculate solution of ordinary differential equation by Taylor's series Method, Picard's Method, Euler's Method

Partial Differential Equation

At the end of the course, the students will be able to:

CO1: Solve Lagrange's equation

CO2: Find different types of solutions like complete integral, Singular integral and general integral

CO3: Determine the solution of partial differential equations using Charpit's Method

CO4: Classify partial differential equations to special types

CO5: Describe Monge's Method, Method of transformation

Mechanics II

At the end of the course, the students will be able to:

CO1: Find velocity and acceleration in terms of vector derivatives, curvature, Angular speed and angular velocity

CO2: Describe Radial and Transverse components of velocity and acceleration, areal speed and velocity

CO3: Explain Newton's Law of motion, angular momentum, work, energy, vector point function, Field of force

CO4: Describe motion under gravity, projectile, Motion of projectile, Parabola of safety

CO5: Describe motion in resisting medium CO6: Describe areal velocity of central orbit, Pedal's equation

T.Y. B.Sc. Semester V

Real Analysis –I

At the end of the course, the students will be able to:

CO1: Describe sets, functions, real valued functions, countable sets, Least upper Bound axiom and greatest lower bound axiom.

CO2: Give different types of sequence such as convergent, Divergent, monotone and its properties

CO3: Describe limit superior, limit inferior and Cauchy sequence

CO4: Explain basic concepts of series such as convergent, divergent, alternating series

CO5: Describe absolute and conditional convergence of the series

Abstract Algebra- I

At the end of the course, the students will be able to:

CO1: Explain elementary concepts of sets, functions and integrals

CO2: Describe group, subgroup, counting principle, Normal subgroup, Quotient groups, Homomorphism

CO3: Define Ring, some special types of ring

CO4: Describe Ideals, Maximal Ideals CO5: Explain quotient ring, polynomial ring

Mathematical Statistics-I

At the end of the course, the students will be able to:

CO1: Explain frequency distribution, Histogram

CO2: Describe measures of central tendency

CO3: Describe Dispersion and Kurtosis

CO4: Explain concepts of random variables and its characteristics

CO5: Explain concept of the probability with illustration

Semester VI

Real Analysis –II

At the end of the course, the students will be able to:

CO1: Find Limits in Metric spaces

CO2: Explain continuous functions on Metric spaces

CO3: Describe connectedness, completeness and compactness

CO4: Describe set of Measure zero, Riemann integral, Fundamental theorem of calculus.

CO5: Explain Fourier series

Abstract Algebra- II

At the end of the course, the students will be able to:

CO1: Describe elementary basic concepts of vector spaces

CO2: Explain Linear independence and bases

CO3: Describe dual spaces

CO4: Describe inner product spaces

CO5: Explain modules with illustrations

Mathematical Statistics-II

At the end of the course, the students will be able to:

CO1: Find Mathematical Expectation and generating functions

CO2: Explain theoretical discrete probability distribution

CO3: Describe uniform distribution, binomial distribution, Normal Distribution, Gamma distribution

CO4: Describe correlation coefficient

CO5: Describe regression with examples
