

B.Sc Mathematics
(Learning Outcome/ Acquisition)
SUBJECTS AND OUTCOMES

DEPARTMENT: MATHEMATICS
SUBJECT : ALGEBRA

Year: I Semester: I
SUBJECT CODE:TAM1A

1. Solve problems on polynomial equations, transformation of equations and reciprocal equations.
2. Find the approximate solution of roots of polynomials by suitable methods and solve problems based on exponential and logarithmic series.
3. Understand the concepts on skew symmetric, orthogonal matrix, Eigen values, Eigen vector and workout problems related to it.
4. Apply the concept of decomposition of composite number as a product of primes uniquely and Euler functions.
5. Understand the congruence modulo concept, Fermat's and Wilson's theorems.

DEPARTMENT: MATHEMATICS
SUBJECT :TRIGONOMETRY

Year: I Semester: I
SUBJECT CODE:TAM1B

1. Expand $\cos^n \theta, \sin^n \theta, \cos^m \theta \sin^n \theta$ for different values of n and m.
2. Expand $\sin x, \cos x, \tan x$ in terms of x and form equations with trigonometric roots.
3. Solve problems involving hyperbolic functions and inverse hyperbolic functions.
4. Solve problems based on Inverse function of exponential functions.
5. Sums of trigonometric series.

DEPARTMENT: MATHEMATICS
SUBJECT : CALCULUS OF FINITE DIFFERENCES
AND NUMERICAL ANALYSIS -I

Year: I Semester: I
SUBJECT CODE:SBAME

1. Understand the fundamentals of Solutions of Algebraic and Transcendental equations, Bisection method, Iteration Method, Regula falsi method, Newton Raphson method.
2. Acquire knowledge to solve the set of equations by Gauss elimination method, Gauss Jordan method, Gauss Siedal method, Crout's method.
3. Learn the concept of Finite differences- E operators and the relation between them, topics like differences of a polynomial, factorial polynomial, Differences of zero, Summation series also discussed to understand the operators better.

4. Understand the concepts of Interpolation with equal intervals by Newtons forward and backward interpolation.
5. Understand the concepts of Interpolation with unequal intervals and Inverse interpolation. The knowledge about Divided differences will also gained.

SEMESTER-II

DEPARTMENT: MATHEMATICS
SUBJECT DIFFERENTIAL CALCULUS

Year: I Semester:II
SUBJECT CODE:TAM2A

1. Solve problems on successive differentiation and Leibnitz theorem.
2. Find the partial derivative of a function of two functions and realise the maxima and minima of functions of two variables.
3. Understand and apply the concepts on envelops, Cartesian formula for radius of curvature.
4. Apply the concepts of slope of tangent in polar coordinates and angle of intersection of two curves in polar coordinates.
5. Understand the asymptote concepts.

DEPARTMENT: MATHEMATICS
SUBJECT: ANALYTICAL GEOMETRY

Year: I Semester: II
SUBJECT CODE:TAM2B

1. Frame the equations of chord, diameter of sphere and conjugate diameters of hyperbola.
2. Introduction of the concept of co-normal points, frame the equation of asymptotes of hyperbola.
3. Find the equation of the system of planes and the length of perpendicular to a plane and angle between the lines.
4. Find the equation of sphere and its intersection with the plane.
5. Find the equation of the circle, tangent plane, radical plane, coaxial system of spheres, orthogonal spheres.

DEPARTMENT: MATHEMATICS
SUBJECT : CALCULUS OF FINITE DIFFERENCES AND
NUMERICAL ANALYSIS -II:

Year: I Semester: II
SUBJECT CODE:SBAMG

1. Find the approximate values of the first derivative of continuous functions and discrete functions. Also finding maxima and minimum of the given functions.
2. Learn Trapezoidal Rule and Simpson's Rule also apply it in numerical integrations and estimate their errors.
3. Understand and able to solve Linear homogenous and nonhomogenous difference equation with constant coefficients and evaluate particular integrals.
4. Solve for Numerical solution of I order ordinary difference equations

5. Understand various numerical methods and solving ordinary differential equations and analyse their accuracy .

DEPARTMENT: MATHEMATICS
SUBJECT :INTEGRAL CALCULUS

Year: II Semester: III
SUBJECT CODE:TAM3A

1. Understand and apply the reduction formula and Bernoulli's formula aptly.
2. Find the area of curved surfaces, change the variables and integrate.
3. Define beta and gamma functions, derive their properties and apply them in evaluating integrals.
4. Compute gradient, divergence, curl, directional derivative, and unit normal to the surface.
5. Apply the theorems of Gauss, Greens and Stokes

DEPARTMENT: MATHEMATICS
SUBJECT :DIFFERENTIAL EQUATIONS

Year: II Semester: III
SUBJECT CODE:TAM3B

1. Solve Homogeneous equations, find solutions of exact equations, use the method of reduction of order to find a second linearly independent solution of a second order, linear homogeneous equation when one solution is given.
2. Use the method of undetermined coefficients to solve second order, linear homogeneous equations with constant coefficients, Use the method of variation of parameters to find particular solutions of second order, linear homogeneous equations.
3. Solve first order linear differential equations, find the solution of homogeneous linear systems of equations. Properties of the solution and its Wronskian.
4. Form a partial differential equations by eliminating the arbitrary constants and functions, find different types of solutions like complete integral, singular integral and general integral. Solve Lagrange's equation.
5. Solve partial differential equations using Charpit's method, classify partial differential equations to five special types.

DEPARTMENT: MATHEMATICS
SUBJECT : MATHAMATICAL STATISTICS-I

Year: II Semester: III
SUBJECT CODE:SBAOA

1. Understand the basic concept of Statistics, Sampling, and also apply statistical Measures which are used to analyse the data.
2. Understand the concept of Probability theory and its application in practical situations.
3. Understand the concept of Random variables and its characteristics.
4. Acquire knowledge on statistical analysis of the collected data by using correlation and regression and also able to fit the statistical data.
5. Understand the concept of probability distribution functions of a random variable.

DEPARTMENT: MATHEMATICS
SUBJECT TRANSFORMS TECHNIQUES

Year: II Semester: IV
SUBJECT CODE:TAM4A

1. Find Laplace transform for various functions, properties of Laplace Transform. Find Laplace for periodic functions.They also learn about initial and final value theorem.
2. Properties of inverse Laplace transform, find inverse Laplace transform using the properties and Convolution theorem.
3. Find Fourier series expansions for periodic functions, odd and even functions.Find half range sine and cosine series.
4. Find Fourier Transform, properties of Fourier transform, Fourier sine and cosine transforms. Solve the problems using Parseval's identity and Convolution theorem.
5. Application of Laplace Transform to ordinary and partial differential equations and application of Fourier and Laplace transform to initial and boundary value problem.

DEPARTMENT: MATHEMATICS
SUBJECT : STATICS

Year: II Semester: IV
SUBJECT CODE:TAM4B

1. Understand the concepts of Mechanics and its mathematical application by Newton's laws of motion , resultant of two forces on a particle, Equilibrium of a particle- Limiting Equilibrium of a particle on an inclined plane
2. Understand the different types of forces, parallel forces and equivalent systems and rigid body.
3. Learn the Resultant of several coplanar forces- equation of the line of action of the resultant, Equilibrium of a rigid body under three coplanar forces – Reduction of coplanar forces into a force
4. Understand the basic concepts of centre of gravity and its applications.
5. Learn the operations of Virtual work, hanging strings, equilibrium of a uniform homogeneous string and suspension bridge

DEPARTMENT: MATHEMATICS
SUBJECT : MATHEMATICAL STATISTICS-II

Year: II Semester: IV
SUBJECT CODE:SBAOB

1. Understand the concept of Sampling Distributions and apply the concept of sampling to find the constants of population.
2. Acquire knowledge on Theory of Estimation and methods of estimating a parameter through sampling and test their Goodness.
3. Understand the concept of Test of significance and apply the same to test Population parameters by using Large and small sample tests.
4. Acquire knowledge on Interval Estimation and construction of confidence interval for population parameters.
5. Understand the concept of Testing of Hypothesis and also apply the same to test a hypothesis by using Neymann-Pearson LR test.

DEPARTMENT: MATHEMATICS
SUBJECT : ALGEBRAIC STRUCTURES

Year: III Semester:V
SUBJECT CODE:TAM5A

1. Understand and solve problems on groups and Lagrange's theorem.
2. Apply the concept of normal sub groups and quotient sub groups and get a clear idea about homomorphism and automorphism.
3. Solve problems on Cayley's theorem and permutation groups.
4. Apply the concept of homomorphism of rings, ideal and quotient rings and solve related problems.
5. Find the field of quotients of an integral domain and Euclidean Rings.

DEPARTMENT: MATHEMATICS
SUBJECT : REAL ANALYSIS-I

Year: III Semester: V
SUBJECT CODE:TAM5B

1. Acquire knowledge on the fundamentals of sets, functions, real valued functions and countable sets.
2. Understand the different types of sequences such as convergent, divergent, monotone and its properties.
3. Learn the operations of convergent, Cauchy sequences Limit superior and Limit inferior.
4. Understand the basic concepts of series such as convergent, divergent, and alternating and also the absolute and conditional convergence.
5. Learn the operations of limits of functions and metric spaces and reformulations.

DEPARTMENT: MATHEMATICS
SUBJECT :DYNAMICS

Year: III Semester:V
SUBJECT CODE:TAM5C

1. Understand the basic concepts of velocity, Acceleration and motion of particles in all planes.
2. Acquired adequate knowledge on Work, Energy and Simple Harmonic Mean. They can able to solve problems on that.
3. Understood the concept of forces and impact of the particles.
4. Acquired knowledge on conical pendulum, central orbits and general orbits.
5. Acquired knowledge on Moment of Inertia of various shapes.

DEPARTMENT: MATHEMATICS
SUBJECT : PROGRAMING IN C

Year: III Semester: V
SUBJECT CODE:TEM5A

1. Understanding the concept of Datatypes and Operators.
2. Get familiarized with Looping Statements.
3. Distinguish between call by value and call by reference.
4. Acquire the knowledge about functions.
5. Distinguish between Structure and union.

DEPARTMENT: MATHEMATICS
SUBJECT : DISCRETE MATHEMATICS

Year: III Semester: V
SUBJECT CODE:TAM5D

1. Recapitulate the properties of sets, integers, integers including mathematical induction.
2. Study of Boolean Algebra for the two element Boolean algebra, Disjunctive normal form, Conjunctive normal form of a Boolean Expressions.
3. Identify and use LOGICAL GATES , Construct and recognize truth tables for these gates and simple combinations of them with up to four inputs.
4. Understand linearhomogeneous recurrence relation .and relationship between sequencesand recurrence relations.
5. Understand the definition of graphs, subgraphs and fundamental concepts related to the Graph theory..

SEMESTER VI

DEPARTMENT: MATHEMATICS
SUBJECT : LINEAR ALGEBRA

Year: III Semester: VI
SUBJECT CODE:TAM6A

1. Understand and solve problems on linear independence and bases.
2. Apply the concepts on dual spaces and solve related problems.
3. Find the inner product spaces and solve problems related to it.
4. Find the linear transformation and their characteristics roots.
5. Solve problems on matrices, canonical forms and triangular forms.

DEPARTMENT: MATHEMATICS
SUBJECT : REAL ANALYSIS-II

Year: III Semester: VI
SUBJECT CODE:TAM6B

1. Understand the fundamentals of open and closed sets.
2. Acquire knowledge bounded sets, totally bounded sets, Complete metric space, Compact metric space, Continuous functions on a compact metric spaces.
3. Learn the concept of Sets of measure zero, Riemann integral and its Properties through various examples
4. Understand the essentials of Derivatives, Rolle's theorem, law of Mean, Fundamental theorem of calculus.
5. Learn the concepts of Taylors theorem, Pointwise convergence of sequences of functions, Uniform convergence of sequences of functions

DEPARTMENT: MATHEMATICS
SUBJECT : COMPLEX ANALYSIS

Year: III Semester: VI
SUBJECT CODE:TAM6C

1. Develop the basic algebraic and geometric properties of the complex number system \mathbb{C} and the concept of analyticity, Cauchy –Riemann relations.
2. Discusses bilinear transformations and various regions are transformed by these transformations.
3. Develop the theory of integration for complex functions and prove Cauchy's fundamental theorem and study the various consequences of this theorem.
4. Represent a given function as a power series. Also understanding the concept of singular points of a function and classify the singular points and discuss the behavior of the function in the neighborhood of a singularity.
5. Introduction of residue of a function at an isolated singular point and Cauchy's residue theorem. Also evaluation of certain types of real definite integrals.

DEPARTMENT: MATHEMATICS
SUBJECT :GRAPH THEORY

Year: III Semester: VI
SUBJECT CODE:TEM6B

1. Understand the definition of graphs, subgraphs and fundamental concepts related to the same.
2. Understand degree sequences, Connectedness and operations on graphs.
3. Understand Eulerian and Hamiltonian graphs.
4. Characterize planar graphs and solve problems related to trees.
5. Understand digraphs, matrices and tournaments.

DEPARTMENT: MATHEMATICS
SUBJECT : OPERATION RESEARCH

Year: III Semester: VI
SUBJECT CODE:TEM6C

1. Solve Linear programming problem by using graphical and algebraic method

2. Solve Transportation problem and Assignment problem
3. Understand the concept of Sequencing problem and Game theory
4. Understand Queuing theory basic concepts and solve Queuing theory problems
5. Compute CPM and PERT through Project Network Diagram