Govt. College, Amargarh

Course Outcomes of BA

Department: - Mathematics

Class: - B.A I (SEM-I)

Calculus-I (MM 101)

1. Determine the existence of, estimate numerically and graphically, and find algebraically the limits of functions.
2. Recognize and determine infinite limits and limits at infinity and interpret with respect to asymptotic behavior.
3. Determine the derivative and higher derivatives of a function explicitly using differentiation formulas.
4. Determine derivatives implicitly.
5. Use the first and second derivatives to analyze and sketch the graph of a function, including asymptotes, intervals on which the graph is increasing, decreasing, concave up, or concave down, and any local extremes and inflection points.

Differential Equation (MM 102)

1.Will be able to explain the concept of differential equation.

2.Classifies the differential equations with respect to their order and linearity.

3.Explains the meaning of solution of a differential equation

4.Solves exact differential equations

5. Converts separable and homogeneous equations to exact differential equations by integrating factors
6. . Expresses the basic existence theorem for higher- order linear differential equations. 3.2. Solves the homogeneous linear differential equations with constant coefficients.
7. Applies the method of undetermined coefficients to solve the non-homogeneous linear differential equations with constant coefficients.
8. . Uses the method "variations of parameters" to find to solution of higher-order linear differential equations with variable coefficients

Linear Algebra (MM 103)

1. Analyze and Solve systems of linear equations

2. Develop an understanding of the algebra of matrices in order to solve applied and theoretical problems using inverses of matrices, determinants and other algebraic operations. 3-Found Skills QTR

3. Analyze linear combinations of vectors in Rn and identify sets of vectors that are linearly independent

4. Determine if a set of vectors is a vector space, a subspace, or a basis for a vector space

5. Compute eigenvalues and eigenvectors, determine if a matrix is diagonalizable, and solve systems of linear ordinary differential equations

Class: - B.A I (Sem-II)

Subject: Calculus-II (MM 201)

- To inculcate the knowledge about the concept of Double and Triple Integral and their applications
- Memorize definition of directional derivative and gradient and illustrate geometric meanings with the aid of sketches.
- Memorize theorem relating directional derivative to gradient and reproduce proof.
- Calculate directional derivatives and gradients.
- Apply gradient to solve problems involving normal vectors to level surfaces.
- Explain the concept of a vector integration a plane and in space

Subject: - Partial Differential Equation (MM 202)

- Classify partial differential equations and transform into canonical form.
- Solve linear partial differential equations of both first and second order
- Apply partial derivative equation techniques to predict the behavior of certain phenomena.
- Apply specific methodologies, techniques and resources to conduct research and produce innovative results in the area of specialization.
- Extract information from partial derivative models in order to interpret reality.
- Identify real phenomena as models of partial derivative equations.

Subject: - Analytic Geometry (MM 203)

- To understand the concept about Conic Section
- To evaluate the polar equation of a conic
- To identify conic section.
- To Classify Quadratic Equations.
- Evaluation of Distance and angle.
- Introduction of oblique axes.

Class: - B.A II (Sem-III)

Subject: - Analysis-I (MM 301)

On completion of the course, student will be able to

1. Understand the concept of Sequences
2. Analyze the theorems and practical problems regarding Infinite Series
3. Solve and Analyze the problems and theorems of Riemann Integration
4. Understand the Concept of Function Of Bounded Variation and Rectifiable Curves

Subject: - Linear Programming (MM 302)

On completion of the course, student will be able to

1 – Understand a basic thoughtfulness for linear programming problem

2 – Apply the techniques of LPP to solve real world problems

3 – Distinguish use of different methods to various kinds of LPP on the basis of type of constraints and number of variable

4 – Judge Importance of solution obtained in terms of uniqueness, bound and optimality

5 – Formulate mathematical model for management and technical problems using LPP concepts.

6 – Create an interest to solve transportation and assignment problems with its physical significance.

Subject: - Mechanics (MM 303)

On completion of the course, student will be able to

• Understand Ingredients of mechanics and their properties

• Understand Fundamental laws of Newtonian mechanics

• Analyze equilibrium of a particle, systems of particles and their properties

• Understand Couples, work and potential energy , principle of virtual work , mass center and center of gravity , gravitational potential and their results .

• Understand Flexible cables in contact with smooth and rough curve , kinematics of a particle , motion of a rigid body parallel to a plane and their results .

Class:- B.A II (Sem-IV)

Subject: Analysis-II (MM 401)

On completion of the course, student will be able to

- Functions of Bounded Variation, Total variation, Additive property of total variation, Total Variation
- Additive and continuity Property of Arc Length
- The Riemann-Stieltjes integrals: Definition, elementary properties
- Reduction to Riemann integral, step functions as integrators. Reduction ofRiemann's Condition
- Comparison Theorems, Mean value theoremsfor Riemann-Stieltjes, Fundamental theorem of integral calculus, Mean value theorems for Riemann Integrals

Subject: Numerical Methods (MM 402)

On completion of the course, student will be able to

- Measurement of error
- Types of error
- Solution of Non Linear Equations by different types of method such as Bisection method, Iteration method,Newton-Raphson method, Birge-Vieta method, Bairstrow method.
- Evaluation of Linear System of Equations by Gauss-Elimination method, Pivot element, Pivoting strategies, Partial and complete

Pivoting, Gauss Jordan and Triangularization method, Jacobi method etc.

- Interpolation through Finite differences, Divided differences, Newton Gregory Forward and Backward formula, Lagrange's Formula, Newton's Formulae, Central Differences, Stirling, Bessel's and Everett's formulae, Error in linear and quadratic interpolation.

Subject: Number theory (MM 403)

On completion of the course, student will be able to

- An Application to cryptography, primitive roots
- Introduction of indices, quadratic residues, Legendre Symbol
- Euler's criterion, Gauss Lemma., Quadratic reciprocity Law, Jacobi Symbol
- Various types of Function such as Arithmetic functions u(n), d(n), phi(n), sigma(n)
- Divisibility, Greatest common divisor
- Euler-Fermat theorem, Wilsons's theorem, Linear congruence, Chinese Remainder theorem and its application

Class:- B.A III (Sem-V)

Subject:- Abstract Algebra (MM 501)

On completion of the course, student will be able to

- Assess properties implied by the definitions of groups and rings,
- Use various canonical types of groups (including cyclic groups and groups of permutations) and canonical types of rings (including polynomial rings and modular rings),
- Analyze and demonstrate examples of subgroups, normal subgroups and quotient groups,
- Analyze and demonstrate examples of ideals and quotient rings,
- Use the concepts of isomorphism and homomorphism for groups and rings, and
- Produce rigorous proofs of propositions arising in the context of abstract algebra.

Subject:- Mathematical Methods (MM 502)

By the end of this unit, students:

- Understand the concepts and techniques in Fourier series
- Solve problems Beta and Gamma Function
- Evaluate mathematical regarding Laplace transform

- Solve the Problem connecting with Inverse Laplace Transform and Covolution Theorem

Subject:- Discrete Mathematics (MM 503)

On completion of the course, student will be able to

- To understand logical concepts and to show logical equivalences by using truth tables and rules in logics.
- Learn concept related to Graph theory, Trees, Pigeonhole Principle.
- Introduction to advanced counting
- Solve the problems of The Inclusion-Exclusion Principle.
- Analyze the concept of Probability , Permutation and Combination

Class:- B.A III (Sem-VI)

Subject: Optimization Techniques (MM 601)

On completion of the course, student will be able to

- Mathematical optimization including numerical techniques such as linear and nonlinear programming, integer programming
- Treatment of nonlinear constraints
- Methods of decision-making
- Concept of Economic Ordering (EOQ)
- EOQ models with shortages: EOQ with constant rate of demand
- Characteristics of Inventory Systems and Classifications

Subject: Mathematical Methods (MM 602)

On completion of the course, student will be able to

- To enable the students to study Fourier Transforms and some concepts of infinite Fourier Sine and Cosine transforms, finite Fourier Sine and Cosine transforms and applications to solve some infinite and boundary value problems using finite and infinite transforms.
- To understand the concept of Hankel Transform and its application such as Inverse Theorem for Hankel transform. Hankel sine and cosine transforms and their inversion formulae. Linearity property of Hankel transforms

Subject: Complex Analysis (MM 603)

- Define and analyze limits and continuity for complex functions as well as consequences of continuity,
- Apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra,
- Analyze sequences and series of analytic functions and types of convergence,
- Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula
- To understand the concept about Polar forms of complex numbers, roots of complex numbers, Euler's formula, nth roots of unity, Vector interpretation and Spherical representation of complex numbers, Stereographic Projection and Complex Conjugate Coordinates