Department of Mathematics

F.Y.B.Sc. (2013-14 to 2018-20)

Course: MT101: Algebra and Geometry
- To learn divisibility of integers and congruence relations.
- To learn operations on polynomials, finding GCD of two polynomials and roots of polynomials.
- To learn basic matrix algebra and method to find solutions to system of linear equations and rank of a matrix. Also to learn eigen values and eigenvectors of matrix.
- To learn application of Cayley Hamilton Theorem to find the inverse of a matrix.
- To learn concept of change of axis, translation, rotation and conic section.
- Solve the problems of lines in three dimension, planes, spheres, and cylinders and how geometry is related to algebra by using their algebraic equations.

Course: MT102: Calculus and differential equation

- To learn basic properties of real numbers and its subsets
- To study functions in detail which is a fundamental structure in all sciences, and to be able to check limit and continuity of a function.
- To apply notion of derivative in mean value theorem and also in higher order derivatives which arise in all applied sciences .
- Students will be familiar with the techniques of integration and differentiation of function with real variables
- Identify and apply the intermediate value theorem, Mean value theorem and L"Hospital"s rule
- Identify types of differential equations and solve differential equations such as Exact, homogeneous, non -homogeneous, and linear and Bernoulli's differential equations etc.
- To be able to solve first order and first degree differential equations.

S.Y.B.Sc. (Sem I)

Course: MT 211 : Multivariable Calculus
- To study functions of several variables.
- To study the notion of Continuity and Differentiability of multivariate functions.
- To find extreme values of multivariable functions using derivatives.
- To learn Concept of double and triple integration and its application to area and volume.

Course: MT212 (A) Discrete Mathematics

- To construct Truth table, Logical Equivalences, Nested quantifiers, Predicates, Rules of Inference.
- To learn Permutation, Combination.
- To learn advanced counting techniques.

Course: MT212 (B) Laplace Transform

- To learn the evaluation of Laplace transform of different functions, derivatives and integrations.
- To learn the evaluation of Inverse Laplace transform of functions, derivatives and integrations, and to learn application of Convolution theorem.
- To learn to apply Laplace Transform Theorem to solve Ordinary Differential equations with constant coefficients.
- To learn to evaluate the Fourier series of various even and odd functions.

S.Y.B.Sc. (Sem II)

Course : MT221 Linear Algebra

- To learn the importance of linear transformation in Physics, Engineering, Social sciences and various branches of Mathematics.
- To learn Eigen values and Eigen vectors of a matrix which is used in the study of vibrations, chemical reactions and geometry.
- To learn Inner Product spaces and Gram-Schmidt process of orthogonalization.

Course : MT222(B): Numerical Analysis

- To learn the various numerical techniques for solving real life problems.
- The problems which cannot be solved by usual formulae and methods can be solved approximately by using numerical techniques.
- To fit curve to the data by using five different methods of interpolation
- To find approximate solutions to difficult differential equations occurring in engineering sciences.
- To learn evaluation of Numerical derivatives and integration
- To learn to find the numerical solution of first order differential equation.

Course : MT222(A): Multivariable Calculus II

- To learn the concept of vector valued function and limit , continuity, derivatives and integrations of vector function.

- To learn evaluation line integral of vector function and Greens's Theorem .
- To learn evaluation Surface integral and volume integral of vector function, Stoke's Theorem and Gauss Divergence Theorem.

T.Y.B.Sc. (Sem III)

Course: MT331Metric Spaces

- Learn the basic abstract ideas of analysis
- To learn the basic ideas open sets, closed sets, limit point, isolated points, boundary points, subspace, product metric spaces.
- To learn concept of completeness, compactness, connectedness and use them to solve the problems.
- Identify the continuity of a function which is defined on metric spaces, at a given point and identify the set of points on which a function is continuous by using different theorems.

Course: MT332 Real Analysis I

- To study various types of sets and relations, and concept of countable and uncountable..
- To study concept of sequence, convergent, monotone, divergent and cauchy sequence
- To study series and hence find sum of infinite terms with different methods.

Course : MT335 Group Theory

- To learn fundamental properties and mathematical tools such as closure, identity, inverse and generators.
- To study algebraic structures of Groups, subgroups , Cyclic groups
- To learn concept of permutation, cosets and Direct Product.
- Compare two groups of same orders on the basis of isomorphism Criteria.

Course : MT335 Ordinary Differential Equation

- To learn methods to solve linear differential equation with constant coefficients.
- To learn methods for solving non-homogenous differential equation.
- To learn power series solution method using ordinary and singular points.
- To solve system of first order differential equations.

Course : MT337A Operations Research

- Students learn conversion of real life problems into mathematical models which enhance their problem solving and decision making abilities.
- Students learn to calculate optimal solution of models through graphical and iterative methods.
- Students study transportation and assignment models and methods to solve them.
- This helps them to get optimum solutions within the given constraints to problems arising in industry.

Course : MT337F: Number Theory

- After this course, use the basic concepts of divisibility and their applications in basic algebra. Apply Division Algorithm to find GCD and LCM, Euclid''s algorithm and Fermat Number
- To learn properties of congruences,Fermat's Theorem, Euler's Theorem and Wilson's Theorems
- Students can find integer solutions to the system of equations which arises in real life problems by Chinese remainder theorem.
- To learn Greatest integer function, Quadratic residues, Legendre's symbol and it's properties.
- To study Diophantine equation, it's solutions and Pythagorean triplets

T.Y.B.Sc. (Sem IV)

Course : MT341 Complex Analysis

- To learn basic algebraic properties of complex numbers and limit and continuity of Complex functions.
- To learn analytic functions and the C-R equations as its necessary and sufficient conditions.
- To learn tools which are useful in finding integration of Complex valued functions.
- To learn sequences and series of Complex valued functions.
- To learn applications of residues and poles in integrals of complex functions.

Course : MT342 Real Analysis II

- To learn Riemann Integral and its properties in detail, leading to fundamental theorem of calculus and Mean value theorems.
- To study different tests for solving improper integrals of first and second kind.
- To study pointwise and uniform convergence of sequences and series of functions.
- To study integration and differentiation of series of function.

Course : MT344 Ring Theory

After completing the course, students will able to
- To study the algebraic structure Ring in detail through various examples.
- To learn the construction of field of quotients of an integral domain.
- To study the Rings of polynomials and its factorization over a field.
- To study the notion of ideals and factor rings with examples.
- To study Unique Factorization domain, Euclidean Domain, Principal Ideal Domain and related results
- Use the concept of isomorphism and homomorphism for rings.

Course : MT345 Partial Differential Equations

- To understand the concept of Ordinary differential Equations in more than three variables.
- To learn the application of Ordinary differential Equations through method to find Orthogonal Trajectories.
- Introduction of first order Partial Differential Equations.
- Learn methods to solve first order Partial Differential Equations. Also Solve the problems on first order and higher degree partial differential equations and its Application.
- To learn Non linear first order partial differential Equation & to solve them by using different methods.

Course: MT347(D) Graph theory

- To introduce the concept of Graphs, which is an important tool for Mathematical Modelling.
- To study different types of graphs and operations on graphs.
- To study the concept of trees in detail and algorithms to find special spanning trees.
- To study Directed Graphs and its applications.
- To study the concept of connectivity & Tours.

Course: MT347(E) Lebesgue Integration

- To study the concept of measurable set and its properties. Also to study measurable functions.
- To study lebesgue integral for bounded and unbounded functions and its properties.
- To learn to evaluate the Fourier series of various even and odd functions and to study formulation of convergence problems

- Students learn the representation of objects in 2D and 3D in the form of matrices
- To study the transformations like reflection, rotation, scaling, shearing, translation of objects in 2D and 3D and their geometrical significance.
- Students learn to generate plane curves by using parametric equation
- All the concepts help students to learn graphic display of objects on computer.

(CBCS Pattern 2019-20)
F.Y.B.Sc.(Sem I)

Course: MT111: Algebra
- To study recall basic knowledge about sets, relations and functions.
- To learn divisibility of integers and congruence relations.
- To study complex number and basic concept.

Course: MT112: Calculus I

- To learn basic properties of real numbers and its subsets .
- To study concept of sequence, convergent, monotone, divergent and cauchy sequence .
- To study functions and its graph in detail which is a fundamental structure in all sciences.
- To be able to check limit and continuity of a function.

F.Y.B.Sc.(Sem II)

Course: MT121: Analytical Geometry

- To learn concept of change of axis, translation, rotation and conic section.
- Solve the problems of lines in three dimension, planes,
- To learn equation of spheres and intersection of sphere
- How geometry is related to algebra by using their algebraic equations.

Course: MT122: Calculus I

- To apply notion of derivative in mean value theorem and also in higher order derivatives which arise in all applied sciences.
- Students will be familiar with the techniques of differentiation of function with real variables
- Apply the intermediate value theorem, Mean value theorem and L"Hospital"s rule

- Identify types of differential equations and solve differential equations such as Exact, homogeneous .

S.Y.B.Sc. (Sem I)

Course: MT 231 : Calculus of several variables

- To study functions of several variables, graphs and level curves.
- To study the notion of Continuity and Differentiability of multivariate functions.
- To find extreme values of multivariable functions using derivatives.
- To learn Concept of double and triple integration and its application to area and volume.
- Students gains confidents in proving theorems and solving problems.

Course : MT232(A): Numerical Analysis and its applications

- To learn the various numerical techniques for solving real life problems.
- The problems which cannot be solved by usual formulae and methods can be solved approximately by using numerical techniques.
- To fit curve to the data by using five different methods of interpolation
- To find approximate solutions to difficult differential equations occurring in engineering sciences.
- To learn evaluation of Numerical derivatives and integration.
- To learn numerical solution of first order differential equation.
- Student develop theoretical, applied and computational skills.

Course: MT232(B) Graph theory

- To introduce the concept of Graphs, which is an important tool for Mathematical Modeling.
- To study different types of graphs and operations on graphs.
- To study paths and circuits.
- To study the concept of trees in detail and algorithms to find special spanning trees.
- To study the properties of cut-sets and cut-sets in a graph.

- To study the concept of connectivity & separability.

S.Y.B.Sc. (Sem II)

Course : MT341 Linear Algebra .

- To learn basic matrix algebra and method to find solutions to system of linear equations and rank of a matrix. Also to learn eigen values and eigenvectors of matrix.
- To learn basic concepts of vector spaces, subspace, linear dependent and independent.
- To study of rank and nullity of matrix.
- To learn the importance of linear transformation in Physics, Engineering, Social sciences and various branches of Mathematics.

Course : MT342(A): Vector Calculus

- To learn the concept of vector valued function and limit , continuity, derivatives and integrations of vector function.
- To study Arc length along space curve, unit tangent vector and speed on smooth curve.
- To learn evaluation line integral of vector function and Greens's Theorem .
- To learn evaluation Surface integral and volume integral of vector function, Stoke's Theorem and Gauss Divergence Theorem.