



M.E.S MAMPAD COLLEGE (AUTONOMOUS)

MAMPAD COLLEGE P.O, MALAPPURAM, KERALA, INDIA, 676542

Affiliated to University of Calicut

Accredited by NAAC with A grade

Syllabus Year	2019-20
Department	Mathematics
Programme	BSc

Programme outcome.

Sl.No	Programme Outcome
PO1	Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study.
PO2	A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning
PO3	Ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.

Continue adding rows till the POs are completely added.

Programme specific out come

Sl.No	Programme Specific Outcome.
PSO1	Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand
PSO2	Formulate and develop mathematical arguments in a logical and critical manner
PSO3	Acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses.

Continue adding rows till the POs are completely added

Course Outcome (add sufficient Number of rows in each semester)

Semester	Course Code	Course Name	Course out come
I	MT1B01	Basic Logic and Number Theory:	Think systematically, to express ideas in precise and concise mathematical terms and to make valid arguments.
			Use logic to arrive at the correct conclusion in the midst of confusing and contradictory statements
			Enjoy and master several techniques of problem solving such as recursion, induction etc., the importance of pattern recognition in mathematics, the art of conjecturing and a few applications of number theory.
			Read and enjoy on their own a few applications of number theory in the field of art, geometry and coding theory.
			Prove results involving divisibility, greatest common divisor, least common multiple and a few applications.
			Understand the theory and method of solutions of LDE.
			Understand the theory of congruence and a few applications.
			Solve linear congruent equations
			Learn three classical theorems viz. Wilson's theorem, Fermat's little theorem and Euler's theorem and a few important consequences.
II	MT2B02	Calculus of Single variable-1	Knowing about the tools for expressing the relationship between static quantities, the concepts necessary to explore the relationship between moving/changing objects are provided in calculus.
			Introduce students to the fundamental ideas of limit, continuity and differentiability and

			<p>also to some basic theorems of differential calculus.</p> <p>sketch the curves to find the solution of some optimization problems of interest in real life.</p> <p>Find the area of a planar region.</p> <p>Define Definite integral with the notion of limit.</p> <p>Aware about Fundamental Theorem of Calculus, which not only gives a practical way of evaluating the definite integral but establishes the close connection between the two branches of Calculus.</p> <p>Use definite integral to solve the area problem and to find out the arc length of a plane curve, volume and surface areas of solids.</p> <p>Know about a tool for solving problems in physics, chemistry, biology, engineering, economics and other fields.</p>
III	MT3B03	Calculus of Single variable-2	<p>Define the natural logarithm function, natural exponential function, general exponential function, hyperbolic functions and examine their properties.</p> <p>Model the growth of a biological population, the spread of a disease, the radioactive decay of atoms, the study of heat transfer problems and the study of shapes of cables hanging under their own weight.</p> <p>Study a related notion of convergence of a series, by applying several different tests such as integral test, comparison test.</p> <p>Study on power series- their region of convergence, differentiation and integration.</p> <p>Study about planes and space.</p> <p>Get the idea of parametrization of curves, to calculate the arc length, curvature, to find the area of surface of revolution of a parametrized plane curve.</p> <p>Know about the relationship between various coordinate systems.</p>

			To calculate the arc length and surface areas of revolution of a curve whose equation is in polar form.
			To handle vectors in dealing with the problems involving geometry of lines, curves, planes and surfaces in space.
			To sketch curves in plane and space, given in vector valued form.
IV	MT4B04	Linear Algebra	To understand the concepts of linear systems of equations, vector spaces, and linear transformations.
			To learn on eigenvalues and eigenvectors of a given matrix (equivalently, that of the corresponding matrix operator)
			Understand the idea of diagonalization of a matrix (and hence the diagonalization of a matrix operator)
			learn a few fundamental results involving diagonalization and eigenvalues which enable them to check whether diagonalization is possible.
			To apply linear algebra in several different fields such as data communication, computer graphics, modelling etc.
V	MT5B05	Theory of Equations and Abstract Algebra	Method of finding algebraic solutions or solutions by radicals of polynomial equations.
			Find out the relationship between the roots and coefficients of an n^{th} degree polynomial and an upper and lower limit for the roots of such polynomials.
			Method to find out integral and rational roots of a general n^{th} degree polynomial with rational coefficients.
			Basic ideas and results of Abstract Algebra
			Knowledge about fundamental results on group theory
			Knowledge about Isomorphism, Cyclic groups, Permutation groups and homomorphism.

	MT5B06	Basic Analysis	Learn finite,infinite, countable sets, denumerability of Q, Algebraic and order properties of R, Absolute value and the real line., open and closed sets in R.
			Learn The completeness property of R, Applications of the supremum property, The Archimedean property.
			Understand the concept of sequences and their limits, limit theorems, monotone sequences, Subsequences and the bolzano weierstrass theorem, the Cauchy criterion.
			Learn Complex numbers and their properties,complex plane, polar form of complex numbers, powers and roots, sets of points in the complex plane, complex functions, complex functions as mappings.
	MT5B07	Numerical analysis	Understanding the concept of finding the approximate solutions of algebraic and transcendental equations using various numerical methods.
			Finding the approximate polynomial function using the equal and unequal spaced data points with error bound.
			Learning to compute the differentiation and integration numerically and its error analysis
			To find the solution of linear system of equations and solving the matrix using various methods
			Compute the numerical solution of ordinary differential equation and verify with the exact solution.
	MT5B08	Linear Programming	Solve linear programming Problems geometrically.Understand the drawbacks of geometric methods.
			Solve LP problems more effectively using Simplex algorithm via. The use of condensed tableau of A.W. Tucker.Convert certain related problems, not directly solvable by simplex method , into a form that can be attached by simplex method
			Understand duality theory, a theory that establishes relationships between linear programming problems of maximization and minimization.
Understand Game Theory.			

			Solve transportation and assignment problems by algorithms that take advantage of the simpler nature of these problems.
	MT5B09	Introduction to Geometry	Understand several basic facts about parabola, hyperbola and ellipse (conics) such as their equation in standard form, focal length properties, and reflection properties, their tangents and normal. Recognise and classify conics.
			Understand Kleinian view of Euclidean geometry. Understand affine transformations, the inherent group structure, the idea of parallel projections and the basic properties of parallel projections.
			Understand the fundamental theorem of affine geometry, its use in the proof of Median theorem, Ceva's theorem, Menelaus' theorem etc
			Understand which conics are affine-congruent to each other Realise the basic difference in identifying two geometric objects in Euclidean and affine geometries.
			Understand Kleinian view of projective geometry Understand the idea of homogeneous coordinate of a point in projective plane and writedown the equation of a line in projective plane passing through two homogeneous coordinate.
			Identify some projective properties. Write down the projective transformation that maps a given set of four points to another set of four points.
			Appreciate the advantage of interpreting a Euclidean theorem as a projective theorem by learning a simpler proof for Desargues and Pappu's theorem. Understand the concept of cross ratio and calculate it Find an application of cross ratio in the context of aerial photography.
	MT5D01	Applies calculus	Know about equations, coordinate system, slope, functions
			Draw graph of functions. Solving quadratic equations
			Finding the limit, continuity, derivative and applications in Business and economics
			Evaluate higher order derivatives, implicit differentiation and increasing , decreasing function and finding concavity, extreme, inflexion points..
			Able to draw curve sketching of the functions. Learn exponential and logarthmic functions and their properties
			Learning the basics of integration. and applications in life and social sciences.

	MT6B10	Real Analysis	<p>The students will be able to state the definition of continuous functions, formulate sequential criteria for continuity and prove or disprove continuity of functions using this criteria.</p> <p>Understand several deep and fundamental results of continuous functions on intervals .</p> <p>Realise the difference between continuity and uniform continuity. Develop the notion of Reimann integral, understand the significance of integration theory, two forms of fundamental theorem.</p> <p>Learn sequence of functions, interchange of limits, improper integral and their convergence.</p> <p>Understand several deep and fundamental results of continuous functions on intervals .</p>
	MT6B11	Complex Analysis	<p>To understand the difference between differentiability and analyticity of a complex function and construct examples.</p> <p>to understand necessary and sufficient conditions for checking analyticity and to know of harmonic functions and their connection with analytic functions .</p> <p>To know a few elementary analytic functions of complex analysis and their properties.</p> <p>To understand the definition of complex integral, its properties and evaluation. To know a few fundamental results on contour integration theory such as Cauchy's theorem, Cauchy-Goursat theorem and their applications.</p> <p>to understand and apply Cauchy's integral formula and a few consequences of it such as Liouville's theorem, Morera's theorem and so forth in various situations.</p> <p>To see the application of Cauchy's integral formula in the derivation of power series expansion of an analytic function. • to know a more general type of series expansion analogous to power series expansion viz. Laurent's series expansion for functions having singularity.</p>

			To see another application of residue theory in locating the region of zeros of an analytic function.
	MT6B12		To understand the concepts of multivariable functions and their representation in graphs and contour diagrams and to know the idea of limit and continuity of functions of several variables.
			To get the idea of directional derivative and relationship with the partial derivatives. With the help of this to know gradient and the concepts of tangent plane and normal line.
			To calculate maxima and minima values of a multivariable function and the application in real life problems.
			To extend this concept to integral of functions of two and three variables and practise to do problems in double and triple integrals.
			To understand vector field, divergence, curl, idea of line and surface integral and their evaluations.
	MT6B13	Differential equations	Identify a number of areas where the modelling process results in a differential equation.
			Understand ODE, IVP: their solutions and to classify DEs
			Solve DEs that are in linear, separable and in exact forms and also to analyse the solution.
			Realise the basic differences between linear and non linear DEs and also basic results that guarantees a solution in each case.
			Learn a method to approximate the solution successively of a first order IVP.
			Become familiar with the theory and method of solving a second order linear homogeneous and nonhomogeneous equation with constant coefficients.
			Find out a series solution for homogeneous equations with variable coefficients near

		ordinary points.
		Acquire the knowledge of solving a differential equation using Laplace method which is especially suitable to deal with problems arising in engineering field.
		Learn the technique of solving partial differential equations using the method of separation of variables
MAT 6B14	Graph Theory	To understand graphs as a model, knowing the basic concepts of graph theory like vertex degree, path and cycle and matrix representation of a graph.
		To understand the connectivity concepts like bridge, cutvertex and spanning tree.
		To identify the graphs like Eulerian, Hamiltonian and planar graphs using Euler's formula.
MT6P15	Project Viva	Mainly intended to inculcate the concepts creating ideas and materialising it into theoretical and applied level. and to develop the research attitude.

