MATHEMATICS

Sem I

USMT101	**CO 1:**	Demonstrate algebraic facility with algebraic topics including linear, quadratic, exponential, logarithmic, and trigonometric functions,
	CO 2:	Produce and interpret graphs of basic functions of the above types
	CO 3:	Compute limits of algebraic, trigonometric, and piece-wise defined functions
	CO 4:	Determine the continuity of a function at a point and on a set
	CO 5:	Define convergence and divergence of a sequence of real numbers
USMT102	**CO 1:**	Formulate problems in the language of sets and perform set operations, and will be able to apply the method of induction.
	CO 2:	Define and interpret the concepts of divisibility, congruence, greatest common divisor, prime, and prime-factorization
	CO 3:	Apply the different properties of injections, surjections, bijections, compositions, and inverse functions.
	CO 4:	Determine equivalence relations on sets and equivalence classes.
	CO 5:	Show relation between the roots and the coefficients of the polynomial

Sem II

USMT201	**CO 1**	Compute limits, derivatives, and definite & indefinite integrals of algebraic, logarithmic and exponential functions,
	CO 2	Analyze functions and their graphs as informed by limits and derivatives,
	CO 3	Solve problems using differentiation.
	CO 4	Use the derivative of a function to determine the properties of the graph of the function and use the graph of a function to estimate its derivative,
	CO 5	Determine the differentiability of a function at a point and on a set
	CO 6	Distinguish between the concepts of sequence and series, and determine the convergence and approximate sums of series.
USMT202	**CO 1:**	Solve system of linear equations using matrices.
	CO 2:	Analyze vectors in R^n geometrically and algebraically
	CO 3:	Recognize the concepts of the terms span, linear independence, basis, and dimension, and apply these concepts to various vector spaces and subspaces,
	CO 4:	Use matrix algebra and the related matrices to linear transformations,

SYBSc Sem III

USMT301	**CO 1:**	Represent vectors analytically and geometrically, and compute norm of vectors, distance between two points.
	CO 2:	Compute limits and derivatives of functions of 2 and 3 variables
	CO 3:	Apply derivative concepts to find tangent lines to level curves and to solve optimization problems,
	CO 4:	Differentiate vector fields and determine gradient vector fields
USMT302	**CO 1**	Assess properties implied by the definitions of groups
	CO 2	Use various canonical types of groups (including cyclic groups and groups of permutations)
	CO 3	Analyze and demonstrate examples of subgroups.
	CO 4	Use the concepts of isomorphism and homomorphism for groups and
	CO 5	Recognize and use the concept of coset
USMT303	**CO 1**	Students will be able to model and solve real-world problems using graphs and trees, both quantitatively and qualitatively.
	CO 2	Demonstrate different traversal methods for trees and graphs
	CO 3	Write model problems in computer science using trees and graphs
	CO 4	To introduce a large variety of applications and, through some of them, the algorithmic approach to the solution of problems.
	CO 5	Apply algorithms and theorems from graph theory on solving problems

SYBSc Sem IV

USMT401	**CO 1**	Analyse and apply Nested interval theorem
	CO 2	Checking whether a function is Riemann integrable.
	CO 3	Apply the Mean Value Theorem for integrals and the Fundamental Theorem of Calculus to problems in the context of real analysis, and
	CO 4	Identifying improper integrals of type 1 and type 2 and solve it
	CO 5	Apply the concept of double integration to calculate areas and volumes.
USMT402	**CO 1**	Model physical phenomena using differential equations,
	CO 2	Analyze first-order difference equations and first-order differential equations and small systems of such equations using analytic techniques,
	CO 3	Analyze basic population models, including both exponential and logistic growth models

	CO 4	Explain the method of solving Linear differential equation and Bernoulli's differential equation
USMT403	**CO 1**	Effectively use mathematical arguments in a programming software PYTHON to perform mathematical computations and display numerical and graphical summaries.
	CO 2	Write code using for/do loops, while constructions, conditional statements (if, then, else), and make use of logical constructs in the context of mathematics,
	CO 3	Do basic 2-D plotting,
	CO 4	Write code in the prescribed language for a number of algorithms for the topics covered given pseudo-code, or modify a given code to perform an indicated task,
	CO 5	Create functions or subroutines,
	CO 6	Debug code in the prescribed language at an appropriate level, and decide if they can make their code more efficient,
	CO 7	Identify algorithms with which to solve mathematical problems
	CO 8	Write programs from the underlying algorithms, and demonstrate the ability to employ good commenting and coding techniques.