

Course Code	GP 103	Course Name	Mathematics I			
Credits	3	Time Allocation (hrs)	Lecture	Tutorial & class room work	Practical	Assignment
Status	Core					
Prerequisite	None		36	18	-	-
Aim	To train the students to solve some basic math problems arising in the areas of elementary calculus, coordinate geometry, complex numbers and infinite series. Give an exposure to functions of several variables and differential equations.					
Learning Outcomes (LOs)	<p>By the end of this course, students should be able to:</p> <p>LO1. Identify, analyze and understand the mathematical concepts of elementary calculus, coordinate geometry, complex numbers and infinite series in this course.</p> <p>LO2. Relate the course to any of the engineering disciplines.</p> <p>LO3. Analyze and solve a given basic mathematical problem as an individual.</p> <p>LO4. Do self-studies in some of the advance topics in mathematics.</p>					
Course Outline	<ul style="list-style-type: none"> • Sets and their Applications • Real Number System: Its properties and the real axis, definitions and rules • Functions of a Single Variable: Concept of a function , Description and classification of functions, The inverse function, Maximum and minimum, Sketching curves, Limiting behaviour of functions, Indeterminate forms , Continuity, Differentiability, Leibnitz theorem, Method of mathematical induction • 2-D Coordinate Geometry: Cartesian coordinate system, Conic sections, Polar, intrinsic and the pedal coordinate system in 2-D, Curvature, radius and centre of curvature • 3-D Euclidean Geometry: • 3-D Euclidean Coordinate Geometry: • Complex Numbers: A review, Polar coordinates of a complex number, Demoivre's theorem, Application to trigonometric equations, Loci in complex plane, Euler form of complex numbers and its operations • Function of positive integers: Sequence (monotonic sequence and bounded sequence), Convergence, divergence and oscillation of a sequence, Examples of common sequences • Recurrence Relation: Related to sequence, Numerical computation of roots of an equation • Infinite Series: Standard examples of infinite series, Conditions for convergence, Alternating series, Absolute and conditional convergence • Real Power Series: Power series of function $f(x)$, Binomial expansion, Maclaurin and Taylor series approximation, • Special Functions: Hyperbolic functions • Integrations • Function of Several Variables: Partial derivatives, Total differential , Approximation, Chain rule, Higher derivatives 					

	<ul style="list-style-type: none"> Introduction to Differential Equations: Examples, Motion in a resistive medium (simple harmonic motion), Solution techniques for first order differential equations 	
Method of Assessment	Mid semester exam	30%
	Tutorials/ Assignments	10%
	End of semester exam	60%