National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	**Bachelor of Technology**	Year of Regulation	**2017-18**
Department	**Mathematics**	Semester	**I**

Course Code	Course Name	Pre-requisite	Credit Structure				Marks Distribution			
			L	T	P	C	INT	MID	END	Total
MA101	**Differential Calculus and Linear Algebra**	**NIL**	**3**	**1**	**0**	**4**	**50**	**50**	**100**	**200**

Course Objectives		Course Outcomes		
	To introduce the fundamental concepts of differential calculus, ordinary differential equations and linear algebra.		CO1	Able to understand the concept of limit, continuity and differentiation for functions of single and multivariables, and the consequences of different mean value theorems for differential functions
			CO2	Able to apply Taylor series to approximate differentiable functions of single and multivariables and estimate the error.
	To apply these concepts of in modeling and analyzing several engineering problems		CO3	Able to understand the idea of optimization and be able to solve extreme value problems, and relate such problems with real world problems
			CO4	Able to solve ordinary differential equations analytically and apply the ODEs to model real world problems
			CO5	Able to understand the basic concepts of vector spaces and matrix algebra
			CO6	Able to solve systems of linear equations

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**2**														
2	CO2	**3**														
3	CO3	**2**														
4	CO4	**3**														
5	CO5	**2**														
6	CO6	**3**														

SYLLABUS

No.	Content	Hours	COs
I	**Differential Calculus of Single Variable:** Limit; continuity; differentiation, Rolle's theorem, mean value theorems of Lagrange and Cauchy; Taylor's and Maclaurin's series, indeterminat forms, L' Hospital's rule	**11**	**CO1** **CO2**
II	**Differential Calculus of Multi-variable:** Real valued functions of two/three variables, limit, continuity, differentiability, partial differentiation; Euler's theorem for homogeneous functions; Taylor's and Maclaurin's series for function of two variables; Extreme values of functions of two variables; Lagrange's method of undetermined multipliers.	**16**	**CO1** **CO2** **CO3**
III	**Ordinary Differential Equations:** Linear differential equations with constant co-efficients, Euler- Cauchy forms; Method of variation of parameters	**10**	**CO4**
IV	**Linear Algebra:** Vector space over R, subspaces, bases and dimension; Echelon form, rank of a matrix, system of linear equations; eigen values and eigen vectors; Symmetric, skew-symmetric, Hermitian, skew-Hermitian, othogonal, unitary matrices.	**11**	**CO5** **CO6**
Total Hours		**48**	

Essential Readings

1. J. Stewart, "Calculus", Cengage Learning India Pvt. Limited, 7th edition, 2017.
2. E. Kreyszig, "Advanced Engineering Mathematics", John Wiley & Sons, 10th edition 2015

Supplementary Readings

1. R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", Narosa Publishing House, 5th edition, 2016.