



National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	Bachelor of Technology	Year of Regulation	2018-2019
Department	Mathematics	Semester	IV

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
MA272	Numerical Methods in Computing	2	0	0	2	50	50	100	200

Course Objectives	Course Outcomes	Course Outcomes	
		CO	Description
To introduce the fundamental concept of numerical methods for solving mathematical problems that arise in Science and Engineering To provide a basic understanding of the derivation, analysis, and use of these numerical methods To develop a rudimentary understanding of finite precision arithmetic and the conditioning and stability of the various problems and methods	CO1	Able to apply appropriate algorithms to solve mathematical problems numerically.	
	CO2	Able to compare different algorithms with respect to accuracy and efficiency of solution	
	CO3	Able to apply appropriate numerical methods to determine approximate solutions to systems of linear equations	
	CO4	Able to derive numerical methods for interpolations and integrations	
	CO5	Able to derive numerical methods for solving differential equations	
	CO6		

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

SYLLABUS

No.	Content	Hours	COs
I	Introduction: Representation of floating point numbers, errors in computation; Stability and accuracy.	2	CO2
II	Systems of Linear Equations: Direct methods: Gaussian elimination, LU-decomposition, pivoting strategies, error analysis and operations count, ill-conditioning and condition number; Iterative methods: Jacobi method and Gauss-Seidel method	10	CO1 CO2 CO3
III	Interpolation: Purpose for interpolation, choice of interpolating functions, polynomial interpolation	4	CO1 CO2 CO4
IV	Numerical Integration and Differentiation: Numerical integration: Newton-Cotes quadrature for equidistant points, Gaussian quadrature; Numerical differentiation: Finite difference method, Richardson extrapolation method.	8	CO1 CO2 CO5
Total Hours		24	

Essential Readings

1. M. T. Heath, "Scientific Computing: An Introductory Survey", McGraw-Hill, 2nd Edition, 2002.
2. W. H. Press, S. A. Teukolsky, W. T. Vetterling and B. P. Flannery, "Numerical Recipes: The Art of Scientific Computing", Cambridge University Press, 3rd edition, 2007.

Supplementary Readings

1. K. E. Atkinson, "An Introduction to Numerical Analysis", John Wiley & Sons, 2nd Edition, 1989.