

Department of Mathematics, VNIT, Nagpur
Lecture Schedule
MATHEMATICS-I(MAL 101)

Objective: The objective of this subject is to expose student to understand the basic importance of Differential calculus, Integral calculus, Infinite series and Matrix theory in science and engineering.

Contents	Minimum number of lectures required
Differential Calculus:	
Functions of single variable & Limit	1
Continuity and differentiability	1
Mean value theorems: Rolle's theorem	1
Lagrange's theorem	1
Cauchy's theorem	1
Taylor's theorem with remainders	2
Indeterminate forms	--
Curvature	2
Curve tracing	4
Integral Calculus:	
Fundamental theorem of Integral calculus	1
Mean value theorems	1
Evaluation of definite integrals: Applications in Area, Length	1
volumes and surface of solids of revolutions	1
Beta and Gamma functions	3
Differentiation under integral sign	1
Infinite series:	
Sequences	1
Infinite series of real and complex numbers: Cauchy criterion	1
Tests of convergence	2
Absolute and conditional convergence	1
Improper integrals	2
Improper integrals depending on a parameter	1
Uniform convergence	1
Power series, radius of convergence.	1
Matrices:	
Rank of matrix	1
Consistency of a system of equations	1
Linear dependence and independence	1
Linear and orthogonal transformations	1
Eigen values and eigen vectors	2
Cayley – Hamilton theorem	1
Reduction to diagonal form	1
Hermitian and skew Hermitian matrices	1
Quadratic forms	1
Total :	42 Hrs

Reference Books

1. Kreyszig, E. ; Advanced Engineering Mathematics (Eighth Edition); John Wiley & Sons, 1999.
2. Piskunov, N. : Differential and Integral calculus, Vol. 1, Vol. 2, MIR Publishers, Moscow - CBS Publishers and Distributors (India),1996.
3. Thomas, G.B. and Finney, R.L.; Calculus and Analytic Geometry (Ninth Edition); Addison Wesley Longman, Inc ; 1998.
4. Michael D. Greenberg: Advanced Engineering Mathematics, Pearson Education Pvt. Ltd 2009 .
5. Jain, R.K. and Iyengar, S.R.K.; Advanced Engineering Mathematics; Narosa Publishers 2005.