

Mathematics-I(BSC-103)

1st Semester

Internal Marks: 40

External Marks: 60

Total Marks: 100

Course Outcomes

After studying this course, students shall be able to :

- Analyze the use of calculus and linear algebra to Engineering problems.
- Apply the concept of improper integrals to study Beta and Gamma functions.
- Explain utility of Taylor's theorem in error analysis.
- Apply the concept of rank to solve system of linear equations and diagonalization of matrices.
- Recognize and solve ordinary and linear differential equations.
- Infer the convergence of infinite series.

L	T	P	C
3	1	0	4

Detailed Contents:

PART A

1. Improper Integral: Evaluation of improper integrals, Beta and Gamma functions and their properties. **04 Hrs**

2. Ordinary Differential Equations: Exact, Leibnitz and Bernoulli's equations, Euler's equations, equations of first order and higher degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's equation. **08 Hrs**

3. Linear Differential Equations of Higher Orders: Second order linear differential equations with constant coefficients, method of variation of parameters, Cauchy-Euler equation; Legendre's equation. **08 Hrs**

PART B

4. Differential Calculus: Taylor's and Maclaurin theorems with remainders (without proofs), exponential, trigonometric and logarithm series, indeterminate forms and L'Hospital rule. **04 Hrs**

5. Infinite series: Introduction to sequence, convergence of infinite series, tests for convergence (comparison, ratio, root, Cauchy integral test), power series, alternating series. **06 Hrs**

6. Matrices: Inverse and rank of a matrix, row reduced echelon form, system of linear equations, linear dependence and independence of vectors, symmetric, skew-symmetric and orthogonal matrices.

determinants, eigen values and eigen vectors, similar matrices, diagonalization of matrices, Cayley Hamilton Theorem(without proof) and its applications to find inverse and calculation of powers of square matrices.

10 Hrs

Suggested Readings/Books:

1. G.B. Thomas and R.L. Finney, *Calculus and Analytic geometry*, 9th Edition, Pearson, Reprint, 2002.
2. R.K.Jain and S.R.K.Iyengar, *Advanced Engineering Mathematics*, Narosa Publications, New Delhi.

References:

1. Erwin Kreyszig, *Advanced Engineering Mathematics*, 9th Edition, John Wiley & Sons, 2006.
2. Veerarajan T., *Engineering Mathematics for first year*, Tata McGraw Hill, New Delhi, 2008.
3. Ramana B.V., *Higher Engineering Mathematics*, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
4. D. Poole, *Linear Algebra: A Modern Introduction*, 2nd Edition, Brooks/Cole, 2005.
5. N.P. Bali and Manish Goyal, *A text book of Engineering Mathematics*, Laxmi Publications, Reprint, 2008.
6. B.S. Grewal, *Higher Engineering Mathematics*, Khanna Publishers, 36th Edition, 2010.

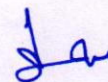
Topics for Self Learning(TSL)

1. Trigonometric formulas.
2. Methods of differentiation.
3. Methods of integration.
4. Basic properties of matrices and determinants.

27/1/20


H.O.D.,

Department of Applied Science,
Guru Nanak Dev. Engg. College,
Ludhiana (Punjab)



Assistant Registrar (Academics)
Guru Nanak Dev Engg. College,
Ludhiana-141006