

Applied Mathematics – III

S.E. Sem. III [INFT]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs.	100
Practical Exam	–	–
Oral Exam	–	–
Term Work	–	25

SYLLABUS

1. Complex Variable

- Functions of complex variables : Continuity and derivability of a function, Analytic functions, Necessary condition for $f(z)$ to be analytic, sufficient conditions (without proof); Cauchy–Riemann equations in polar form, Harmonic functions, Orthogonal trajectories; Analytical and Milne–Thomson method to find $f(z)$ from its real or imaginary parts.
- Complex Integration, Taylor’s and Laurent’s series (without proof), Cauchy’s residue theorem (statement & application)

2. Fourier Series

- Orthogonal and orthonormal functions, Sine and cosine function and their orthogonal properties, Expression for a function in a series of orthogonal functions.
- Fourier series, Dirichlet’s conditions, Fourier series of periodic function, Even and Odd functions, Half range sine and cosine series, Parseval’s relations.

3. Laplace Transform

- Laplace Transform of constant, trigonometric, exponential functions, shifting properties, Expressions (with proofs) for

$$(i) \quad L\{t^n f(t)\} \qquad (ii) \quad L\left\{\frac{f(t)}{t}\right\}$$

$$(iii) \quad L\left\{\int f(u)du\right\} \qquad (iv) \quad L\{f^n(t)\}$$

Heaviside unit step functions, Dirac delta functions and their Laplace transforms, Laplace transform of periodic function.

- Evaluation of inverse Laplace transforms, Partial fraction method, Convolution theorem.
- Application to solve initial and boundary value problems involving ordinary differential equation with one dependent variable.

4. Matrices

- Types of matrices, Adjoint of a matrix, Elementary transformations of a matrix, Inverse of a Matrix using Elementary transformations, Reduction to normal form, rank using normal form Systems of homogeneous and non homogeneous equations, their consistency and solution.

5. Scilab

- Introduction to Scilab : Mathematical Functions, Tools, Arrays & their applications.
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Reference :

1. Matrices – (*Shantinarayan*), S. Chand Publication House, Delhi.
2. Theory of function of Complex Variable – (*Shantinarayan*), S. Chand Publication House, Delhi.
3. Laplace Transforms – (*Schaum's Outline Series*), McGraw Hill.
4. Engineering Mathematics – (*T.Veerarajan*), TMH.
5. Higher Engineering Mathematics – (*Dr. B.S. Grawal*), Khanna Publications
6. Advanced Engineering Mathematics – (*Erwin Kreyszing*), Wiley India, 8th Edition.

