

Applied Mathematics – III

S.E. Sem. III [EXTC]

EVALUATION SYSTEM

	Time	Marks
Theory Exam	3 Hrs	100

SYLLABUS

1. Laplace Transforms :

1. Definition, linearity property, Laplace transform of standard functions $\sin at$, $\cos at$, $\sinh at$, $\cosh at$.
2. First shifting theorem, Second shifting theorem, $L\{t^n f(t)\}$, $L\left\{\frac{f(t)}{t}\right\}$, $L\left\{\int_0^t f(u)du\right\}$, $L\{f^n(t)\}$,
Change of scale property (All theorems with proof).
Convolution theorem (without proof)
3. Laplace transform of Periodic functions, Error Function, Heaviside Unit Step function and Dirac-delta function.

2. Laplace Transforms & Matrices :

1. Inverse Laplace transforms, Solution of Ordinary differential equations using the Laplace transform method.
2. Types of Matrices-Symmetric, Skew-symmetric, Hamilton, Skew-Hamilton, Orthogonal and Unitary Matrices.
3. Inverse of a Matrix using Adjoint of a Matrix.

3. Matrices :

1. Echelon form, Rank of a Matrix, Normal Form. PAQ in the Normal form
2. System of Homogeneous and Non homogeneous equations, their consistency and solution using rank of a Matrix
3. Linear Dependence and independence of vectors.
4. Solution of a system of simultaneous linear equations using Gauss elimination method. Gauss-Jordan reduction method. Gauss-Seidel iterative method.

4. Fourier Series :

1. Definition, Dirichlet's conditions (statement only). Fourier series of functions with period. Euler's formulae (with proof).
Fourier series of functions having Arbitrary period $2L$. Fourier series of odd and even functions.
2. Half range Fourier series, Parseval's identity (without proof),
Complex form of Fourier Series, Orthogonal and Orthonormal functions.

5. Fourier Transforms :

1. Idea of Fourier Integral representation, Fourier sine and cosine integral representation. Fourier Sine and Cosine Transforms. Linearity property. Change of Scale property, Shifting property.
2. Convolution theorem (Statement only) and related problems.

6. Z-Transforms :

1. Sequence, Representation of a sequence, Basic operations on sequences, Definition of Z transforms, Linearity property (without proof). Z transforms of standard sequences – $\sin k$, $\cos k$, $\cosh k$, $\sinh k$, $\sin k$, $\cos k$
 2. Change of scale property, Shifting property. Inverse Z transforms, Convolution theorem (statement only).
 3. Inverse transform by Direct division, Binomial expansion and partial fraction method.
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Reference :

1. A Text Book of Applied Mathematics Vol. I & II (*P. N. Wartikatr & J. N. Wartikar*) – Pune Vidyarthi Griha Prakashan.
2. Higher Engg. Mathematics (*Dr. B. S. Grewal*) Khanna Publication.
3. Higher Engg. Mathematics (*B. V. Ramana*) Tata McGraw-Hill Publication.
4. Advanced Engg. Mathematics (*Wylie & Barret*), – 6th Edition.
5. Advanced Engg. Mathematics (*Erwin Kreysizg*) – John Wiley & Sons. Inc.
6. Linear Algebra and Applications (*Gilbert Strang*) – 4th Edition, Thompson Books/Cole.
7. Matrices (*Shantinakaran*) S. Chand Publications.

