

Title: Mathematical Techniques in Engineering advanced studies

Subject code: 09CMA01

Total hours: 52 hrs

Common to all.

Unit1: Linear algebra and Fourier transforms

15 hrs

Linear algebra. Linear and orthogonal transformations, Eigen values and Eigen vectors, Reduction to diagonal form, Reduction of quadratic and canonical forms. Hermitian matrix, Unitary matrix.

Fourier transform. Infinite Fourier transform, Fourier sine and cosine transforms, fast Fourier transform.

Unit 2: Statistics & Probability.

15 hrs

Statistics. Curve fitting by the method of least squares, $y=a+bx$, $y=a+bx+cx^2$, $y=ax^b$, $y=ab^x$, $y=ae^{bx}$ Correlations and regression.

Probability. Random variables, Binomial, Poisson, Uniform, exponential, normal distribution and Chi-square distribution.

Unit 3: Partial differential equations

7hrs

Formation of PDE, solution of non-homogenous, method of separation of variables. Solutions of Lagrange's linear PDE of the type $Pp+Qq=R$

Unit 4:Optimization and MATLAB

15hrs

Optimization. Optimization problem, Linear programming problem, mathematical formulation, Graphical method and Simplex method, Degeneracy and difficulties in starting.

An introduction to MATLAB. Programming in MATLAB. Polynomials, curve fitting and interpolation. Applications in Numerical Analysis. Verification of the results for solving the examples using Numerical methods and using MATLAB.

Text Books:

1. Higher Engineering Mathematics , B.S.Grewal 39th edition kanna publications,2005.
(Unit 1- chapters-2.13 to 2.20.
Unit 2-Chapters – 23.4, 23.5, 23.6, 23.8, 24.12 to 4.14,25.7,24.8,25.9,25.10,25.12 to 25.17.25.19 26.17.
Unit 3- Chapters- 17.1 to 17.6, 18.2.
Unit 4- Chapters – 32.2, 32.32, 32.5 to 32.8)
2. MATLAB An introduction with applications, Amos Gilat.
(Unit 4- Chapters-7, 8 and 10)

References:

1. Advanced Engineering mathematics Erwin Kreyszig
2. David C Lay, Linear algebra and its applications , 3rd edition, Pearson Education, (Asia) Pte, Ltd 2005.
3. Applied numerical methods with MATLAB, 2 e, Steven Chapra, McGraw- Hill company Ltd, New Delhi.