

Engineering Maths IV

(MT410401)

Program: B.Tech.	Branch: Metallurgical Engineering
Subject: Engineering Maths IV Subject Code: MT410401	Semester: IV

1. Contents

Unit-1

Complex Analytic Functions: Complex planes, Curves in complex planes, Concept of neighborhood in the complex plane, Analytic function, Cauchy- Riemann equations (Cartesian and polar forms – without proof), Harmonic functions, Conformal mappings, some standard conformal transformations.

Unit-2

Complex Integration: Complex integration, Cauchy's integral theorem and Cauchy's integral formula (without proof), Singularities, Taylor's and Laurent's series, Cauchy-Residue theorem, Residues & Contour integration. Applications of residue to evaluate real integrals.

Unit-3

Probability and Statistics:

Introduction to Probability: Theorem of Total Probability, Bayes' Theorem, Probability Distributions: Binomial Distribution, Poisson Distribution, Normal Distribution.

Estimation and Test of Hypothesis: Test of Hypothesis, Test of Hypothesis Concerning Single Population mean, Test of Hypothesis Concerning Two Means, Test for one mean, Small-sample Test Concerning Difference between Two Means, Paired-sample t-test.

Unit-4

Numerical Methods: Concept of Errors.

Solution of Algebraic and Transcendental Equations: Bisection method, Regula-Falsi method, Newton-Raphson method.

Finite differences and Interpolation: Finite differences Forward, Backward & Central difference operators and difference tables. Interpolation, Interpolation Formulae with equal intervals: Newton's forward, Newton's backward, Central difference interpolation by Stirling's formulae, Interpolation Formulae with unequal intervals: Lagrange's & Newton's divided difference interpolation.

Numerical Integration: Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.

Numerical differentiation: Using Newton's forward and backward interpolation formula, Numerical Solutions of ordinary differential equations: Taylor's Method, Euler's Method, Improved Euler Method (Heun's Method), Runge-Kutta method of order four.

2. Text books

1. Erwin Kreyszig: Advanced Engineering Mathematics (8th Edition) Wiley Eastern Ltd., New Delhi (1999).
2. R. V. Churchill and J. W. Brown: Complex variables and applications (7th Edition), mcgraw-Hill (2003).

3. Reference Books

1. B. V. Ramana : Higher Engineering Mathematics, Mc Graww Hill, New Delhi (2008).
2. Merel C Potter, J L Goldberg: Advanced Engineering Mathematics (3rd Edition) OxfordIndia Publication (2005).
3. Dr. B.S. Grewal : Higher Engineering Mathematics, Khanna Publishers, New Delhi (2000).
4. R K Jain, S R K Iyengar: Advanced Engineering Mathematics. Third Edition, Narosa Publishing House (Reprint 2014).
5. Murray Spiegel: Advanced Mathematics for Engineering & Science: (Schaum's Outline Series) ,Tata Mcgraw Hill Publication (2009).
6. M. K. Jain, S.R.K. Iyenger and R.K. Jain: Numerical methods for scientific and Engineering computation, New age Publication (2007).