

MATHEMATICS – IV

(Common to MECHANICAL & CHEMICAL)

Credits	Periods			Exam Hrs.	Sessional Marks	Exam Marks	Total Marks
	Theory	Tutorial	Lab				
3	3	1	-	3	40	60	100

COURSE OUTCOMES

At the end of the course student will be able to :

1. Understand , interpret and use the basic concepts : analytic function, harmonic function , Taylor and Laurent Series , singularity.
2. Familiarize the concepts of Finite Differences interpolation techniques.
3. Familiarize the concept of differentiation and integration by numerical methods.
4. Examine, analyze, and compare Probability distributions.
5. Analyze the Statistical data by using statistical tests and to draw valid inferences about the population parameters.

UNIT-I : FUNCTIONS OF A COMPLEX VARIABLE (12 Periods)

Introduction –Limit of a Complex function- Derivative of $f(z)$ – Analytic functions-Harmonic functions - Applications to Flow problems. Complex Integration- Cauchy's Theorem- Cauchy's Integral Formula –Series of Complex terms (Statements of Taylor's and Laurent's Series without proof) - Zeros of an Analytic function .

UNIT-II : FINITE DIFFERENCES & INTERPOLATION (12 Periods)

Finite Differences – Forward differences – Backward differences – Central differences – Differences of a Polynomial – Factorial Notation – Other difference operators – To find one or more missing terms – Newton's Interpolation Formulae – Central Difference Interpolation Formulae - Interpolation with Unequal Intervals – Lagrange's interpolation formula – Inverse Interpolation.

UNIT-III: NUMERICAL DIFFERENTIATION AND INTEGRATION (12 Periods)

Numerical Differentiation – Formulae for derivatives – Maxima and Minima of a Tabulated Function – Numerical Integration – Newton-Cotes Quadrature Formula – Trapezoidal rule – Simpson's One-Third rule , Simpson's Three-Eighth rule.

UNIT-IV: PROBABILITY AND DISTRIBUTIONS (12 Periods)

Introduction – Basic Terminology – Probability and set notations – Addition Law of Probability – Independent events – Baye's Theorem – Random variable – Discrete Probability Distribution – Continuous Probability Distribution – Binomial Distribution - Poisson distribution - Normal Distribution. (Mean , Variance , Standard Deviation and their properties without proofs).

UNIT-V: SAMPLING THEORY (12 Periods)

Introduction – Sampling Distribution – Testing a hypothesis – Level of Significance – Confidence Limits – Test of Significance of Large samples (Test of significance of single mean, difference of means) – Confidence limits

for unknown – Small samples – Students t-distribution – Significance test of a sample mean – Significance test of difference between sample means – Chi-Square (χ^2) Test – Goodness of fit.

Text Books:

1. Dr. B.S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers, New Delhi, 2014.

Reference books:

1. A Text book on Engineering Mathematics by N.P. Bali Etal, Laxmi pub.(p)Ltd , 2011.
2. Advanced Engineering Mathematics by H.K.Dass , S.Chand Publications, 2007.
3. Advanced Engineering Mathematics by Erwin kreyszig, John Wiley Publications, 1999.