



# SYLLABUS

## UNIT – I: FUNCTIONS OF A COMPLEX VARIABLE

[12 Lectures]

Complex function – Real and Imaginary parts of complex function – Limit – Continuity and derivative of a complex function – Cauchy-Riemann equations – Analytic function – Entire function – Singular point – Conjugate function – Cauchy-Riemann equations in polar form – Harmonic functions – Milne-Thomson method – Simple applications to flow problems – Applications to flow problems – Some standard transformations (Translation, Inversion and reflection, Bilinear transformations and its fixed points).

Sections: 20.1, 20.2, 20.3, 20.4, 20.5, 20.6 and 20.8.

## UNIT – II: COMPLEX INTEGRATION & SERIES OF COMPLEX TERMS

[12 Lectures]

Complex integration – Cauchy's theorem – Cauchy's integral formula – Series of complex terms: Taylor's series – Maclaurin's series expansion and Laurent's series (without proofs).

Sections: 20.12, 20.13, 20.14 and 20.16.

## UNIT – III: NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL

### EQUATIONS

[12 Lectures]

Numerical solution of ordinary differential equations: Picard's Method – Taylor's series method – Euler's Method – Runge-Kutta Method – Predictor-Corrector methods – Milne's method.

Sections: 32.1, 32.2, 32.3, 32.4, 32.7, 32.8 and 32.9

## UNIT – IV: PROBABILITY AND DISTRIBUTIONS

[12 Lectures]

Introduction – Basic Terminology – Probability and set notations – Addition Law of probability – Independent events – Baye's theorem – Random variable – Discrete probability distribution: Binomial distribution – Continuous probability distributions: Poisson distribution and Normal distribution (mean, variance, standard deviation and their properties without proofs).

Sections: 26.1, 26.2, 26.3, 26.4, 26.5, 26.6, 26.7, 26.8, 26.9, 26.14, 26.15 and 26.16.

## UNIT – V: SAMPLING THEORY

[12 Lectures]

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 ,single proportion, ) – Confidence limits for unknown mean – Small samples – Students t-distribution – Significance test of a sample mean – Significance test of difference between sample means –  $\chi^2$  – test – Goodness of fit.

Sections: 27.1, 27.2, 27.3, 27.4, 27.5, 27.7,27.8, 27.11, 27.12,27.13, 27.14, 27.15, 26.16, 27.17 and 27.18.

### TEXT BOOK

1. **B. S. Grewal**, “*Higher Engineering Mathematics*”, 43<sup>rd</sup> edition, Khanna publishers, 2017.

### REFERENCE BOOKS

1. **N P. Bali and Manish Goyal**, "A text book of Engineering mathematics", Laxmi publications, latest edition.
2. **Erwin Kreyszig**, “*Advanced Engineering Mathematics*”, 10<sup>th</sup> edition, John Wiley & Sons,2011.
3. **R. K. Jain and S. R. K. Iyengar**, “*Advanced Engineering Mathematics*”, 3<sup>rd</sup>edition, Alpha Science International Ltd., 2002.
4. **George B. Thomas, Maurice D. Weir and Joel Hass**, “*Thomas Calculus*”, 13<sup>th</sup>edition, Pearson Publishers.