

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, Laurent's series (without proofs) – Zeros of an analytic function – Singularities of a complex function – Isolated singularity, Removable singularity, Poles – Pole of order m – Simple pole – Essential singularity – Residues – Residue theorem – Calculation of residues – Residue at a pole of order m .

Evaluation of real definite integrals: Integration around the unit circle – Integration around a semi circle.

Sections: 20.12, 20.13, 20.14, 20.16, 20.17, 20.18, 20.19 and 20.20.

UNIT – III: NUMERICAL SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS

[12 Lectures]

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: Z - TRANSFORMS

[12 Lectures]

Introduction – Definition – Some standard Z-transforms – Linearity property – Damping rule – Some standard results – Shifting U_n to the right/left – Multiplication by n – Two basic theorems (Initial value theorem and Final value theorem) – Convolution theorem.

Evaluation of inverse Z- transforms – Applications to difference equations.

Sections: 23.1, 23.2, 23.3, 23.4, 23.5, 23.6, 23.7, 23.8, 23.9, 23.12, 23.15 and 23.16.

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) – Confidence limits for unknown mean – Small samples – Students t-distribution – Significance test of a sample mean – Significance test of difference between sample means – chi square test – Goodness of fit.

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

TEXT BOOK:

B. S. Grewal, *Higher Engineering Mathematics*, 43rd 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*, 10th edition, John Wiley & Sons, 2011.
3. **R. K. Jain and S. R. K. Iyengar**, *Advanced Engineering Mathematics*, 3rd edition, Alpha Science International Ltd., 2002.
4. **George B. Thomas, Maurice D. Weir and Joel Hass, Thomas**, *Calculus*, 13th edition, Pearson Publishers.