**II Year – I SEMESTER**

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## COMPLEX VARIABLE AND STATISTICAL METHODS

**UNIT-I Functions of a complex variable:**

Introduction – Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne – Thompson method.

Subject Category

ABET Learning Objectives a e

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**UNIT-II Integration and Series Expansions**

Complex integration: Line integral – Cauchy's integral theorem , Cauchy's integral formula, Generalized integral formula (all without proofs)-

Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series.

Subject Category

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**UNIT III Integration using Residues:**

Types of Singularities: Isolated, pole of order m, essential - Residues – Residue theorem( without proof) - Evaluation of real integrals of type (a)

(b) (c)

Subject Category

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**UNIT IV Conformal Mapping:**

Transformation by exp z, lnz, z^2, z^n(n positive integer), Sin z, cos z, z + a/z- Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – properties – invariance of circles.

Subject Category
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**UNIT V Sampling Distributions:**

Review of Normal distribution - Population and samples - Sampling distribution of mean (with known and unknown variance), proportion, variances - Sampling distribution of sums and differences -Point and interval estimators for means, variances, proportions.

Subject Category
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**UNIT VI Tests of Hypothesis**

Type I and Type II errors -Maximum error- One tail, two-tail tests - Tests concerning one mean and proportion, two means- Proportions and their differences using Z-test, Student's t-test - F-test and Chi -square test.

Subject Category
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ABET internal assessments 1 2 6 7 10
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**Books:**

1. Advanced Engineering Mathematics: Erwin Kreyszig, Wiley India Edition.
2. Advanced Engineering Mathematics: Michael Greenberg, Pearson.
3. Advanced Engineering Mathematics: BS Grewal , Khanna Publishers (42nd Ed).
4. Probability and Statistics for Engineers: Miller and John E. Freund, Prentice Hall of India.
5. Probability and Statistics for Engineers and Scientists: Ronald E. Walpole, Sharon L. Mayers and Keying Ye: Pearson.

| Subject Category | ABET Learning Objectives | ABET Internal Assessments | JNTUK External Evaluation | Rem a-rks |
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| Theory<br>Design<br>Analysis<br>Algorithms<br>Drawing<br>Others | a) Apply knowledge of math, science, & engineering<br>b) Design & conduct experiments, analyze & interpret data<br>c) Design a system/process to meet desired needs within economic, social, political, ethical, health/safety, manufacturability, & sustainability constraints<br>d) Function on multidisciplinary teams<br>e) Identify, formulate, & solve engineering problems<br>f) Understand professional & ethical responsibilities<br>g) Communicate effectively<br>h) Understand impact of engineering solutions in global, economic, environmental, & societal context<br>i) Recognize need for & be able to engage in lifelong learning<br>j) Know contemporary issues<br>k) Use techniques, skills, modern tools for engineering practices | 1. Objective tests<br>2. Essay questions tests<br>3. Peer tutoring based<br>4. Simulation based<br>5. Design oriented<br>6. Problem based<br>7. Experiential (project based) based<br>8. Lab work or field work based<br>9. Presentation based<br>10. Case Studies based<br>11. Role-play based<br>12. Portfolio based | A. Questions should have:<br>B. Definitions, Principle of operation or philosophy of concept.<br>C. Mathematical treatment, derivations, analysis, synthesis, numerical problems with inference.<br>D. Design oriented problems<br>E. Trouble shooting type of questions<br>F. Applications related questions<br>G. Brain storming questions | |