MTH302 Applied Complex Analysis

Level: 3

Credit Units: 5 Credit Units

Language: ENGLISH

Presentation Pattern: EVERY JAN

Synopsis:

Some deep theorems of complex analysis are developed and applications to areas such as fluid mechanics and complex sets are studied. MTH302 follows on from MTH301.

Topics:

- Residue theorem.
- Improper integrals.
- Modulus of a differentiable function.
- Schwartz's lemma.
- The argument principle.
- Rouche's theorem, local mapping and the logarithmic function.
- Evaluation of real integrals.
- The probability integral.
- Analytic continuation.
- Riemann mapping theorem and Möbious transformations.
- Theorem on harmonic functions, Julia and Mandelbrot sets.
- Flows and streamlines.

Textbooks:

E.B. Saff and A.D, Snider: Fundamentals of Complex Analysis. (eTextbook) 3rd edition Pearson ISBN-13: 9781292036885

Learning Outcome:

- Show how to prove a mathematical statement in complex analysis.
- Calculate the order of zeros and poles of a meromorphic function in a region by the Argument Principle or Rouche's Theorem.
- Determine suitable linear fractional transformation mapping a region onto another region or the image of a region under a linear fractional transformation.
- Apply maximum modulus/maximum principle for analytic/harmonic functions.
- Compute certain improper integrals or the harmonic conjugate of a harmonic function.
- Demonstrate mathematical reasoning by providing proofs to mathematical statements in complex analysis.

Assessment Strategies (Evening Class):

Components	**Description**	**Weightage Allocation (%)**
Overall Continuous Assessment	COMPUTER MARKED ASSIGNMENT 1	10
	TUTOR-MARKED ASSIGNMENT 1	20
Overall Examinable Components	Written Exam	70
Total		**100**