

# Complex Analysis

MTH 403

July-Dec, 2025

- Instructor Parasar Mohanty
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- Pre-requisite: MTH 301
- Course Contents: Basic properties: convergence, compactness, connectedness; continuous functions, Holomorphic functions, power series, integration along curves and properties. Cauchy's theorem and its application: Goursat's theorem, local existence of primitives and Cauchy's theorem in a disc, evaluation of some integrals, Cauchy's integral formulas, Morera's theorem, sequence of holomorphic functions. Meromorphic functions and the Logarithm: Zeros and poles, the residue formula, singularities and meromorphic functions, the argument principle and applications, open mapping theorem, maximum modulus principle, Picard's little theorem, the complex logarithms, harmonic functions. Conformal mappings: Conformal equivalence: the disc and the upper half-plane; The Dirichlet problem in a strip, Schwarz lemma, automorphism of disc, automorphism of the upper half-plane, Montel Theorem, Riemann mapping theorem.

## Books

1. Complex Analysis; E.M. Stein, R. Shakarchi, Princeton Lecture in Analysis
2. Complex Analysis; T.W. Gamelin, Springer Verlag

- Lectures: MF 8-8.50 am (L 3) T 9-9.50 am (L 3) Tutorial: W 11-11.50 am (L 3)
- Grading Policies: Final grades will be determined based on your performance in the following components.

Two quizzes - 10%

Mid-Semester Examination - 30%

End Semester Examination - 50%

Homework Assignments/Routine Quiz - 5%

Attendance - 5%