Information of the course on **Topics in Complex Analysis (MA421)** at IIT Ropar, India (Second semester, A.Y.: 2024-2025)

Course instructor

- Dr. Manmohan Vashisth (Course coordinator)
- Mr. Mandeep Kumar (Teaching assistant)

Course contents:

- The complex number system. Extended complex plane. Analytic functions. Cauchy-Riemann conditions. Mappings by elementary functions. Conformal mappings and Mobius Transformation.
- Complex integration. Cauchy-Goursat theorem. Cauchy integral formula. The Homotopic version of Cauchy's theorem and simple connectivity. Morera's and Liouvile's theorems.
- Uniform convergence of sequences and series. Taylor's and Laurent's series. Singularities, zeros and Poles. Isolated singularities and residues.
- Cauchy residue theorem. Evaluation of real integrals. The Argument Principle and Rouche's theorem. Maximum Modulus Theorem.

Class and tutorial timings for the course:

- Monday, 9:00 AM to 10:00 AM
- Tuesday, 9:00 AM to 10:00 AM
- Wednesday, 9:00 AM to 10:00 AM

Credit system for the course:

- 10% weightage for homework assignments.
- 20% weightage for class tests. There will be two class tests. First class test will be on January 30, 2025 and 2nd class test will be on April 3, 2025.
- 30% weightage for mid-sem exam. Mid sem exam will be as per the institute schedule.
- 40% weightage for end-sem exam. End-sem exam will be as per institute schedule. End-sem exam will contain the whole syllabus, taught during the course.

Grading and attendance policy:

1. There will be relative grading with a minimum threshold for A (Outstanding), D(Marginal) and NP (the Audit pass) grades as per the criteria given below.
   a) The minimum percentage for the award of an "A"grade is 85%.
   b) The minimum percentage for the award of "D"grade is 35%.
   c) The Audit Pass "NP"is awarded if the student's attendance is above 75% in the class and he/she has obtained at least a "C-"grade.
2. Attendance policy is as per institute rules.

Note: Based on circumstances above evaluation scheme may change.

References for the course:

1. Donald Sarason; Complex Function Theory, 2nd Edition, TRIM, Hindustan Book Agency, 2010.
2. Joseph L. Taylor; Complex Variables, American Mathematical Society, 2010.
3. Theodore W. Gamelin; Complex Analysis, Undergraduate Texts in Mathematics, Springer, 2001.
4. Elias M. Stein and Rami Shakarchi; Complex Analysis, Princeton Lectures in Analysis II, 2003.