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## Functions of a Complex Variable

MATH-326\*

Functions of a complex variable are interesting and remarkably versatile objects. On the one hand, their use in number theory and geometry is crucial for the proofs of some of the deepest results in these areas. On the other hand, their relation to harmonic functions make them rich in applications to engineering and physics.

The audience, then, is comprised of both Mathematics Honours and Mathematics and Engineering students.

**Textbook:** *Fundamentals of Complex Analysis for Mathematics, Science and Engineering*, 2nd Edition  
by Saff and Snider (Prentice Hall)

**Prerequisite:** MATH-280\* and 281\*.

**Instructor:** O. Bogoyavlenskij

<b>Evaluation:</b>	Assignments	20%
	Midterm Test	30%
	Final Examination	50%

**Outline:**

1. Complex numbers, their arithmetic and the complex exponential.
2. Analytic functions, Cauchy-Riemann equations, harmonic functions.
3. Examples of analytic functions.
4. Integrals, the theorems and formulas of Cauchy. Applications.
5. Series representations; Taylor and Laurent series.
6. Zeroes and poles; the Residue Theorem.
7. Conformal mappings of the complex plane.