ROWAN UNIVERSITY
Department of Mathematics

Syllabus
1701.512 - Complex Analysis I

CATALOG DESCRIPTION:

1701.512 Introduction to Complex Analysis I 3 s.h.

The elementary theory of the functions of a complex variable covering operations with complex numbers, graphing on the Argand-Gauss-Wessel plane, analytic functions, complex integration. Cauchy's theorem and its applications, poles and residues, power series and conformal mapping.

OBJECTIVES:

This course is intended to provide an opportunity to obtain some background in complex analysis for in-service mathematics teachers who did not, as undergraduates, become acquainted with this area of mathematics. This course should not only strengthen the teachers' general mathematics background, but also exhibit the relations between its content and certain areas of high school mathematics.

CONTENT:

1. Introduction

    1.1 The complex numbers as a non-ordered field
    1.2 Elementary algebraic and geometric properties
    1.3 Complex sequences

2. Functions

    2.1 Functions and continuous functions
    2.2 Limits
    2.3 Uniformly continuous functions
    2.4 Exp(s), Sin(s), Cos(s), Log(s)

3. Analytic Functions

    3.1 Derivatives and elementary properties
    3.2 Cauchy-Riemann partial differential equations
    3.3 Theorems concerning analytical functions

4. Integrals

    4.1 Curves and parametrization of curves
    4.2 Properties of integrals
    4.3 Basic integral theorems, including Cauchy's theorem and Morera's theorem

5. The Cauchy Integral Formula

- 5.1 Derivative formula
- 5.2 Liouville theorem
- 5.3 Fundamental theorem of algebra
- 5.4 Maximum modulus theorem

TEXTS:

Boas, R.P., INVITATION TO COMPLEX ANALYSIS, Random House, New York, 1987.

Churchill, Brown and Verhy, COMPLEX VARIABLES AND APPLICATIONS, 5th ed., McGraw-Hill Book Company, New York, 1990.

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