

Complex Variables (3)

(Effective Spring 2016)

Prerequisite: Math 320.

Catalog Description: Algebraic operations and geometry of complex numbers, definitions of limit, continuity, and analytic functions, differentiation, mapping of simple functions, line integrals, Cauchy integral formula, Laurent series, evaluation of real integrals using residue theorem.

Learning Outcomes for Major: This course addresses one or more of the student learning outcomes for the major. Upon completion of his/her degree from the University of Tennessee at Martin with a major in mathematics, the graduate will be able to:

- i. apply mathematical concepts and principles to perform numerical and symbolic computations.
- ii. use technology appropriately to investigate and solve mathematical and statistical problems.
- iii. write clear and precise proofs.
- iv. communicate effectively in both written and oral form.
- v. demonstrate the ability to read and learn mathematics and/or statistics independently.

Teaching Objectives: The student will:

1. Understand Euler's formula, the polar representations of complex numbers and the Riemann surface
2. Determine if functions are analytic using the definition of the derivative, the Cauchy Riemann Equations and sufficient conditions for analyticity.
3. Define and use the elementary functions: exponential, logarithmic, trigonometric and hyperbolic.
4. Find and use the Taylor and Laurent series expansions of functions.
5. Integrate and apply complex valued functions on regions and curves using Cauchy's theorems, the residue theorem.
6. Understand conformal mappings, especially the linear fractional transformations.

Text(s): Complex Variables and Applications, James W. Brown and Ruel V. Churchill, 9th edition, McGraw-Hill, 2013. ISBN: 978-0-07-338317-0.

Chapter	Title (Sections)	Days
1	Complex Numbers (1–11)	5
2	Analytic Functions (12–28)	7
3	Elementary Functions (29–36)	3
4	Integrals (37–54)	9
5	Series (55–68)	4
6	Residues and Poles (68–77)	3
7	Applications of Residues (selected sections)	6
	One period tests	4
	Total days	41

**Disability
Services:**

The University of Tennessee provides reasonable accommodations (academic adjustments and auxiliary aids) to ensure equal access to educational content and university programs for students with disabilities. Any student eligible for and requesting accommodations due to a disability must provide instructors with a letter of accommodation from Disability Services. For additional information, please contact the Disability Services office at 209 Clement Hall, (731) 881-7605.