Spring 2016 Course Syllabus: Math 332-002

Course Objectives

- Gain deep understanding of the relevance and broad importance of the theory of analytic functions.
- Learn the meaning of theorems describing important properties of analytic functions, and understand their corollaries.
- Learn the deep connection between the series representations and integration properties of analytic functions.
- Learn applications of the Cauchy Residue Theorem, in particular its use in calculating certain definite integrals.
- Learn how to apply the knowledge of analytic functions to problems in applied mathematics, science and engineering.

Course Outcomes

- Students gain deeper knowledge of the theory of analytic functions of a complex variable, and its broad applicability.
- Students gain deeper understanding of common elementary transcendental functions through the knowledge of their properties in the complex plane.
- Students are prepared for further study in more advanced mathematics, science and engineering courses.
- Students can apply their knowledge of the theory of analytic functions to solve problems in applied mathematics, fluid dynamics, electrodynamics, and other areas of science and engineering.

Course Assessment

- The assessment of objectives is achieved through homework assignments and quizzes, and the in-class midterm and final examinations.

Course Title:	Introduction to Functions of a Complex Variable
Textbook:	Complex Variables and Applications, by J.W. Brown and R.V. Churchill, 9th Edition, McGraw-Hill, 2013, ISBN: 978-0073383170
Prerequisites:	Math 211 or Math 213, and Math 222, both with a grade of C or better.
Website:	http://web.njit.edu/~matveev/Courses/M332_S16/

Course Outline

Date	Lecture	Sections	Topic
Jan 21	1	1-.5	Complex Algebra; Vectors & Moduli; Complex Conjugate
Jan 25	2	6-11	Polar Representation; Products & Powers in Exponential Form; Roots
Jan 28	3	12	Regions in the Complex Plane
Feb 1	4	13-14	Functions of Complex Variable; Mappings
Feb 4	5	15-18	Limits and Continuity
Feb 8	6	19-23	Derivatives & Analyticity; The Cauchy-Riemann Equations
Feb 11	7	24-26	Analyticity; Cauchy-Riemann Equations in Polar Coordinates
Feb 15	8	27-29	Harmonic Functions; Uniquely Determined Functions; Reflection Principle
Feb 18	9	30-36	The Exponential and Logarithm, The Power Function
Feb 22	10	37-39	Trigonometric and Hyperbolic Functions
Feb 25	11	40	Inverse Trigonometric & Inverse Hyperbolic Functions
Feb 29	12	41-49	Contour Integrals; Fundamental Theorem of Calculus
Mar 3	13	50-54	The Cauchy-Goursat Theorem & The Cauchy Integral Formula
Mar 7	14	**Review for the Midterm Exam**	
Mar 10	15	**Midterm Exam**	
Mar 14-19		**Spring Break**	

Mar 21	16	55-59	The Extensions of the Cauchy Integral Formula
Mar 24	17	60-65	Taylor Series; Power Series Convergence
Mar 28	18	66-68	Laurent Series
Mar 31	19	69-72	Uniform Convergence; Integration & Differentiation of Power Series
Apr 4	20	73	Series Multiplication, Division, Composition
Apr 7	21	74-76	Cauchy's Residue Theorem
Apr 11	22	77-84	Zeros and Singularities; The Point at Infinity
Apr 14	23	85-87	Improper Integrals from Fourier Analysis
Apr 18	24	88	Improper Integrals Continued: Jordan's Lemma
Apr 21	25	89-90	Integrals Involving Indented Contours
Apr 25	26	91	Integration along a Branch Cut
Apr 28	27	92	Definite Integrals Involving Sines and Cosines
May 2	28	**Review for Final Exam**	

IMPORTANT DATES	
First Day of Semester	January 19, 2016
Midterm Exam	March 10, 2016
Last Day to Withdraw	March 28, 2016
Last Day of Classes	May 3, 2016 (Friday Schedule)
Final Exam Period	May 6 – 12, 2016

Grading Policy

Assignment Weighting	
Homework & Quizzes	**26%**
Attendance	**4%**
Common Exam I	**32 %**
Final Exam	**38 %**

Tentative Grading Scale	
A	**87 -- 100**
B+	**81 -- 86**
B	**75 -- 80**
C+	**68 – 74**
C	**62 – 67**
D	**55 -- 61**
F	**0 -- 54**

Course Policies

Homework problem sets will be emailed at the end of each week, and will be based on the material covered that week. Late homework will not be accepted. A short quiz based on the homework problems will be given about every other week, and will be announced at least one day in advance.

Important Departmental and University Policies

- Academic Integrity Code is Strictly Enforced
- Prerequisites Requirements are Enforced
- Attendance is Required in Lower-Division Courses
- Exam Policies (No Make Up Exams and More)
- Cell Phone and Pager Use Prohibited in Class
- Drop Date (March 29, 2009) is Strictly Observed
- Complete DMS Course Policies (math.njit.edu/students/undergraduate/policies_math)