MATH 332: Introduction to Functions of a Complex Variable
Fall 2024 Course Syllabus

NJIT Academic Integrity Code: All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

Please be sure you read and fully understand our DMS Online Exam Policy.

COURSE INFORMATION

Course Description: Functions of a complex variable: Cauchy-Riemann equations, Cauchy-Goursat theorem, integration, series, residues, poles, geometrical aspects. Emphasis on techniques. Effective From: Fall 2010.

Number of Credits: 3

Prerequisites: MATH 211 or MATH 213 and MATH 222 all with a grade of C or better

Course-Section and Instructors:

Course-Section	Instructor
Math 332-001	Professor -

Office Hours for All Math Instructors: Fall 2024 Office Hours and Emails

Required Textbook:

Title	*Fundamentals of Complex Analysis*
Author	Saff & Snider
Edition	3rd
Publisher	Pearson
ISBN #	0-13-907874-6

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, November 11, 2024**. It will be strictly enforced.

COURSE GOALS

Course Objectives

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

Course Outcomes

- Students gain knowledge of the theory of analytic functions of a complex variable and its broad applicability.
- Students gain a 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 in-class quizzes, midterm and final examinations.

POLICIES

DMS Course Policies: All DMS students must familiarize themselves with, and adhere to, the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. DMS takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

Homework and Quizzes: 20%	Midterm Exam: 30%	Final Exam: 50%

A **passing final letter grade** will be based on the following tentative cutoffs:

A	90 - 100	**C+**	66 - 75
B+	82 - 89	**C**	58 - 65
B	74 - 81	**D**	50 - 57

Attendance Policy: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the Math Department's Attendance Policy. This policy will be strictly enforced.

Homework and Quiz Policy: Homework problem sets will be posted on the course canvas page at the end of each week, based on the material covered that week. Late homework will not be accepted. Short quizzes will be given at the end of the class on Tuesdays based on the material covered in the previous week.

Exams: There will be one midterm exam and one comprehensive final exam. The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and understand the Math Department's Examination Policy. This policy will be strictly enforced.

Makeup Exam Policy: There will be **NO MAKE-UP EXAMS** during the semester. If an exam is not taken under rare circumstances where the student has a legitimate reason for missing the exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor's note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the Math Department Office/Instructor that the exam will be missed.

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times.

ADDITIONAL RESOURCES

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: Fall 2024 Hours)

Further Assistance: For further questions, students should contact their instructor. All instructors have regular office hours during the week. These office hours are listed on the Math Department's webpage for Instructor Office Hours and Emails.

Accommodation of Disabilities: The Office of Accessibility Resources and Services (OARS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you need an accommodation due to a disability, please contact the Office of Accessibility Resources and Services at oars@njit.edu, or visit Kupfrian Hall 201 to discuss your specific needs. A Letter of Accommodation Eligibility from the office authorizing student accommodations is required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Office of Accessibility Resources and Services (OARS) website at:

https://www.njit.edu/accessibility/

Important Dates (See: Fall 2024 Academic Calendar, Registrar)

Date	Day	Event
September 2, 2024	Monday	Labor Day
September 3, 2024	Tuesday	First Day of Classes
September 9, 2024	Monday	Last Day to Add/Drop Classes
November 11, 2024	Monday	Last Day to Withdraw
November 26, 2024	Tuesday	Thursday Classes Meet
November 27, 2024	Wednesday	Friday Classes Meet
November 28 to December 1, 2024	Thursday and Sunday	Thanksgiving Recess - Closed
December 11, 2024	Wednesday	Last Day of Classes
December 12, 2024	Thursday	Reading Day 1
December 13, 2024	Friday	Reading Day 2

December 15 to December 21, 2024	Sunday to Saturday	Final Exam Period

Course Outline

Date		Sections	Topic
Sept 05 Sept 07	1 2	1.1-1.3 1.4-1.5	Complex Algebra; Vectors & Moduli; Complex Conjugate Polar Representation; Products & Powers in Exponential Form; Roots
Sept 12 Sept 14	3 4	1.6-1.7 2.1	Regions in the Complex Plane Functions of Complex Variable; Mappings
Sept 19 Sept 21	5 6	2.2 2.3-2.4	Limits and Continuity Derivatives & Analyticity; The Cauchy-Riemann Equations
Sept 26 Sept 28	7 8	2.5 2.6	Analyticity; Cauchy-Riemann Equations in Polar Coordinates, Harmonic Functions; simple solutions of Laplace's equation
Oct 03 Oct 05	9 10	3.1-3.2 3.3-3.4	Polynomial and rational functions, the Exponential and Logarithm, Trigonometric and Hyperbolic Functions
Oct 10 Oct 12	11 12	3.5 4.1-4.2	Inverse Trigonometric & Inverse Hyperbolic Functions Contours and Contour Integrals; Fundamental Theorem of Calculus
Oct 17 Oct 19	13 14	4.3 4.4	The Cauchy-Goursat Theorem The Cauchy Integral Formula
Oct 24 Oct 26	15 16	 4.5	***MIDTERM*** Extensions of the Cauchy Integral Formula
Oct 31 Nov 02	17 18	5.1-5.2 5.3-5.4	Series; Taylor Series; Power Series Convergence
Nov 07 Nov 09	19 20	5.4 5.5-5.6	Uniform Convergence Laurent Series; zeros and singularities
Nov 14 Nov 16	21 22	5.7 6.1	The Point at Infinity; Cauchy's Residue Theorem
Nov 21 Nov 23	23 -	6.2-6.3 -	Improper Integrals from Fourier Analysis ***No class - Thanksgiving Break***
Nov 28 Nov 30	24 25	6.4 6.5	Improper Integrals Continued, Jordan's Lemma Integrals Involving Indented Contours
Dec 05 Dec 07	26 27	6.6	Integration along a Branch Cut Definite Integrals Involving Sines and Cosines
Dec 12	28	***REVIEW FOR FINAL EXAM***	

Updated by Professor L. Cummings - 8/2024
Department of Mathematical Sciences Course Syllabus, Fall 2024