

Fall 2024

MATH 332-001: Intro Complex Variables

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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	<i>Fundamentals of Complex Analysis</i>
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%
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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
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Course Outline

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