MATH 332: Introduction to Functions of a Complex Variable
Fall 2025 Course Syllabus

NJIT Academic Integrity Code: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: NJIT Academic Integrity Code. This means that any form of plagiarism, such as copying homework, class projects, or lab assignments, as well as cheating on quizzes or exams, is strictly prohibited. According to the University Code on Academic Integrity, students are required to report any such activities to the instructor.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

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 T.P. Nguyen

Office Hours for All Math Instructors: Fall 2025 Office Hours and Emails

Required Textbook:

Title	*Complex Variables and Applications*
Author	Brown

Edition	9th
Publisher	McGraw-Hill
ISBN #	978-0073383170
Website	Canvas

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, November 10, 2025**. 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, midterms 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	20%
Midterm 1	20%
Midterm 2	25%
Final Exam	35%

Some bonus points on homework assignments can be awarded based on the in-class learning spirit and diligence, as follows: Students earn one star for each correct answer to a question in class or for a correct solution on a think-pair-share activity. They will lose one star for each absence. At the end of the semester, students can exchange each remaining star to replace a low homework score with the highest score possible for that assignment, with up to five exchanges allowed per student. Students with negative stars will not have their points deducted. The exchange is

applied only to homework assignments, excluding exams.

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

A	90 - 100	C	68 - 74
B+	85 - 89	D	55 - 67
B	80 - 84	F	0 - 54
C+	75 - 79		

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.

Religious Observance: NJIT is committed to supporting students observing religious holidays. Students must notify their instructors in writing of any conflicts between course requirements and religious observances, ideally by the end of the second week of classes and no later than two weeks before the anticipated absence.

Homework Policy: Homework problem sets will be posted on the course canvas page, along with the due date, at the end of each lecture, based on the material covered that lecture. Late homework will not be accepted. You are encouraged to discuss with your classmates about the homework, but you can not copy any part of it from each other, as well as from other resources, such as online forums or websites. Each student must submit their homework as a PDF file through Canvas using their own wording and formatting. Students are encouraged to complete all problems in the set; however, only a subset will be chosen for grading and need to be submitted. The lowest score will be dropped.

Exams: There will be two midterm exams 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.

If a student misses a single midterm exam with an excuse verified by the Office of the Dean of Students, the final exam grade will be used for the missed exam. N.B. Math Department's Examination Policy: "Students missing TWO OR MORE exams cannot demonstrate mastery of the course material and, therefore, cannot complete the course successfully within a given semester."

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times unless required by the instructor to use them.

AI-Specific Policy: This course requires students to work without artificial intelligence (AI) assistance in order to develop their skills in this content area more effectively. As such, AI usage is not permitted throughout this course under any circumstances

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

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 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 2025 Academic Calendar, Registrar)

Date	Day	Event
September 1, 2025	Monday	Labor Day
September 2, 2025	Tuesday	First Day of Classes
September 8, 2025	Monday	Last Day to Add/Drop Classes
November 10, 2025	Monday	Last Day to Withdraw
November 25, 2025	Tuesday	Thursday Classes Meet
November 26, 2025	Wednesday	Friday Classes Meet
November 27 to November 30, 2025	Thursday to Sunday	Thanksgiving Recess - Closed
December 11, 2025	Thursday	Last Day of Classes
December 12, 2025	Friday	Reading Day 1
December 13, 2025	Saturday	Saturday Classes Meet
December 14 to December 20, 2025	Sunday to Saturday	Final Exam Period

Course Outline

Week	Date		Sections	Topic
1	Sept 02 Sept 04	1 2	1-6 7-11	Complex Algebra; Vectors & Moduli; Complex Conjugate. Polar Representation; Products & Powers; Roots.

2	Sept 9 Sept 11	3 4	12 13-14	Curves, Sets, and Regions in the Complex Plane. Functions of Complex Variable; Mappings.
3	Sept 16 Sept 18	5 6	15-18 19-24	Limits and Continuity. Derivatives; The Cauchy-Riemann Equations.
4	Sept 23 Sept 25	7 8	25-29 30-36	Analyticity; Harmonic Functions; Reflection Principle. Multivalued functions, branches, branch points, and branch cuts
5	Sep 30 Oct 02	9 —	37 - 40 — —	Trigonometric and Hyperbolic Functions, and their inverses **Wellness day - No class**
6	Oct 07 Oct 09	10 11		*Review for Midterm 1* *Midterm 1 on Oct. 9*
7	Oct 14 Oct 16	12 13	41-49 50-54	Contour Integrals; Fundamental Theorem of Calculus The Cauchy-Goursat Theorem, The Cauchy Integral Formula
8	Oct 21 Oct 23	14 15	55-59 60-61	The Extensions of the Cauchy Integral Formula Sequences, series, and convergence of power series
9	Oct 28 Nov 30	16 17	62-65 66-68	Taylor series and uniform convergence Laurent series
10	Nov 04 Nov 06	18 19	69-71 72-73	Integration & Differentiation of Power Series Series Multiplication and Division
11	Nov 11 Nov 13	20 21		*Review for Midterm 2* *Midterm 2 on Nov. 13*
12	Nov 18 Nov 20	22 23	74-79 80-84	Isolated singular points; Residues; Cauchy's Residue Theorem More about singularities; Zeros and Poles
13	Nov 25 Nov 27	24 —	85-88 —	Improper Integrals, Jordan's Lemma *Thanksgiving break*
14	Dec 02 Dec 04	25 26	89-90 91	Integrals Involving Indented Contours Integration along a Branch Cut
15	Dec 09 Dec 11	27 28	92	Definite Integrals Involving Sines and Cosines *REVIEW FOR THE FINAL EXAM*