MATH 332: Introduction to Functions of a Complex Variable
Spring 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 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 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 332-002	Professor T. P. Nguyen

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

Required Textbook:

Title	*Complex Variables and Applications*
Author	Brown

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

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 7, 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 is achieved through homework assignments, 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: 20%	Quizzes: 15%	Midterm Exams: 30%	Final Exam: 35%

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 problems will be posted on the course Canvas page after each lecture. The due date for homework is specified in the assignment. Late submissions will not be accepted. Short quizzes based on the material covered in the prior week will be given at the end of class on Tuesdays.

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.

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

Student Absences for Religious Observances Policy: 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.

ADDITIONAL RESOURCES

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: Spring 2025 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 are in need of accommodations due to a disability please If you need an accommodation due to a disability please contact the Office of Accessibility Resources and Services at oars@njit.edu. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Office of Accessibility Resources and Services office authorizing your accommodations will be 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: Spring 2025 Academic Calendar, Registrar)

Date	Day	Event
January 21, 2025	Tuesday	First Day of Classes

January 27, 2025	Monday	Last Day to Add/Drop Classes
March 16, 2025	Sunday	Spring Recess Begins
March 22, 2025	Saturday	Spring Recess Ends
April 3, 2025	Thursday	Wellness day
April 7, 2025	Monday	Last Day to Withdraw
April 18, 2025	Friday	Good Friday - No Classes
April 20, 2025	Sunday	Easter Sunday - No Classes Scheduled
May 6, 2025	Tuesday	Thursday Classes Meet
May 7, 2025	Wednesday	Friday Classes Meet
May 7, 2025	Wednesday	Last Day of Classes
May 8, 2025	Thursday	Reading Day 1
May 9, 2025	Friday	Reading Day 2
May 10 - May 16, 2025	Friday to Thursday	Final Exam Period

Course Outline

Date	Lecture	Sections	Topic
Jan. 21 Jan. 24	1 2	1-6 7-11	Complex Algebra; Vectors & Moduli; Complex Conjugate Polar Representation; Products & Powers; Roots
Jan. 28 Jan. 31	3 4	12 13-14	Regions in the Complex Plane Functions of Complex Variable; Mappings
Feb. 04 Feb. 07	5 6	15-18 19-23	Limits and Continuity Derivatives; The Cauchy-Riemann Equations
Feb. 11 Feb. 14	7 8	24-26 27-29	Analyticity; Cauchy-Riemann Equations in Polar Coordinates; Harmonic Functions; Reflection Principle
Feb. 18 Feb. 21	9 10	30-36 37-39	The Exponential and Logarithm, The Power Function Trigonometric and Hyperbolic Functions
Feb. 25 Feb. 28	11 12	40 41-49	Inverse Trigonometric & Inverse Hyperbolic Functions Contour Integrals; Fundamental Theorem of Calculus

Mar. 04 Mar. 07	13 14	50-54 55-59	The Cauchy-Goursat Theorem, The Cauchy Integral Formula The Extensions of the Cauchy Integral Formula
Mar. 11 Mar. 14	15 16		*Review for midterm exam* ***MIDTERM EXAM***
Spring Break			
Mar. 25 Mar. 28	17 18	60-65 66-68	Taylor Series; Power Series Convergence Laurent Series
Apr. 01 Apr. 04	19 20	69-71 72-73	Uniform Convergence; Integration & Differentiation of Power Series Series Multiplication and Division
Apr. 08 Apr. 11	21 22	74-80 81-84	Cauchy's Residue Theorem, Zeros and Singularities The Point at Infinity
Apr. 15	24	85-87	Improper Integrals from Fourier Analysis
Good Friday			
Apr. 22 Apr. 25	25 26	88 89-90	Improper Integrals Continued: Jordan's Lemma Integrals Involving Indented Contours
Apr. 29 May 02	27 28	91 92	Integration along a Branch Cut Definite Integrals Involving Sines and Cosines
May 07	29	***REVIEW FOR FINAL EXAM***	

Updated by Professor T. P. Nguyen - 2025
Department of Mathematical Sciences Course Syllabus, Spring 2025