

MATH 645: Analysis I

Fall 2022 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.

COURSE INFORMATION

Course Description: This is the first part of the two-semester course that introduces an application-minded student to foundations and modern techniques of real analysis. Topics covered in this course include measure and integration theory, L_p spaces, integral inequalities, topological and metric spaces, Banach and Hilbert spaces, contraction mapping, duality, weak convergence, compactness.

Number of Credits: 3

Prerequisites: MATH 546 or departmental approval.

Course-Section and Instructors:

Course-Section	Instructor
Math 645-001	Professor A. Bose

Office Hours for All Math Instructors: [Fall 2022 Office Hours and Emails](#)

Required Textbook:

Title	<i>Real Analysis</i>
Author	H. L. Royden and P. M. Fitzpatrick
Edition	4th
Publisher	Pearson
ISBN #	978-8120342804

University-wide Withdrawal Date: The last day to withdraw with a M is **Monday, November 14, 2022**. It will be strictly enforced.

COURSE TEXTS

- J. K. Hunter and B. Nachtergaele, Applied Analysis, World Scientific
- N. V. Kolmogorov and S. V. Fomin, Introductory Real Analysis, Dover
- W. Rudin, Real and Complex Analysis, 3rd edition, McGraw-Hill

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	35%
Midterm Exam I	30%
Final Exam	35%

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: Assignments will be regularly assigned and must be submitted electronically as a single scanned pdf in Canvas.

Exams: There will be one midterm exam with dates to be agreed upon by students. If not present while taking the exam, the student will have to upload a scanned pdf of their exam into Canvas. Further details will be provided.

Midterm Exam I	TBA
Final Exam Period	December 16 - 22, 2022

The final exam will test your knowledge of all the course material taught in the entire course. Make sure you read and fully understand the [Math Department's Examination Policy](#). This policy will be strictly enforced.

Makeup Exam Policy: There will be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event 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

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 contact Scott Janz, Associate Director of Disability Support Services at [973-596-5417](tel:973-596-5417) or via email at scott.p.janz@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.

Important Dates (See: [Fall 2022 Academic Calendar, Registrar](#))

Date	Day	Event
September 5, 2022	Monday	Labor Day
September 6, 2022	Tuesday	First Day of Classes
September 12, 2022	Monday	Last Day to Add/Drop Classes
November 14, 2022	Monday	Last Day to Withdraw
November 22, 2022	Tuesday	Thursday Classes Meet
November 23, 2022	Wednesday	Friday Classes Meet
November 24 to November 25, 2022	Thursday and Friday	Thanksgiving Recess - Closed
November 26, 2022	Saturday	Saturday Classes Meet
December 14, 2022	Wednesday	Last Day of Classes
December 15, 2022	Thursday	Reading Day
December 16 to December 22, 2022	Friday to Thursday	Final Exam Period

Course Outline

Week	Topics
1	The Real Numbers: Sets, Sequences, and Functions
2	Lebesgue Measure
3	Lebesgue Measurable Functions
4	Lebesgue Integration
5	Lebesgue Integration: Further Topics

6	Differentiation and Integration
7	The L^p Spaces: Completeness and Approximation
8	The L^p Spaces: Duality and Weak Convergence
	FINAL EXAM WEEK: December 16 - 22, 2022

Updated by Professor A. Bose - 7/12/2022
Department of Mathematical Sciences Course Syllabus, Fall 2022