MATH 432H: Mathematics and Financial Derivatives I - Honors
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.

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

COURSE INFORMATION

Course Description: Mathematical analysis of models encountered in the area of financial derivatives. Topics include modeling and analysis of futures markets, determination of future prices, hedging strategies, swaps, option markets, stock options and their trading strategies.

Number of Credits: 3

Prerequisites: MATH 222 with a grade of C or better and MATH 346 with a grade of C or better.

Course-Section and Instructors:

Course-Section	Instructor
Math 432-H01	Professor T. Bui

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

Required Textbook:

Title	*Derivatives Markets*
Author	McDonald
Edition	3rd
Publisher	Addison Wesley

ISBN #	9780321543080

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

This course will teach students the mathematical analysis of financial derivative contracts: What instruments exist, how they are used, and how they are priced.

Course Outcomes

On successful completion of this course, the student will be able to:

- Explain basic financial derivative contracts: forwards, futures, options and swaps.
- Perform payoff and profit calculations for financial derivatives.
- Demonstrate hedging strategies using financial derivatives.
- Apply the techniques to practical problems.

Course Assessment: Assessment of objectives is achieved through homework assignments, projects, and a comprehensive final exam.

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	10%
Quizzes	15%
Mini projects	15%
Research Projects	20%
Midterm Exam	20%
Final Exam	20%

Attendance Policy: Attendance at and participation in all lectures are expected. Tardiness or leaving class early is disruptive to the classroom environment and should be avoided. If you know in advance that you will be absent from class for a legitimate reason, please tell me prior to your absence so that appropriate arrangements (if any) can be made. Attendance is recorded but does not count toward your final grade.
Attendance and participation are used for consideration in case your grades are on the borderline.

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: Homework will be assigned every week and due at 11:59 pm on Sunday. Help from tutors, classmates, the internet, etc, is encouraged, but you are responsible for mastering the material. You should turn in the homework **on time** to keep up with the course progress. The lowest score on the homework will be dropped from the grade.

Quizzes: From time to time, quizzes may be given. Make-up quizzes are NOT given. The lowest quiz score will be dropped from your grade. Periodic quizzes help to keep track of your progress and understanding in class. Questions in quizzes will be similar to homework problems.

Projects: There will be 3 mini projects and 2 research projects for your selected companies. You need to work in a group of 2-3 to complete these projects. The rubric to grade projects will be posted on Canvas.

Bloomberg terminal: If you are on campus and can access the Bloomberg terminals you can take five modules on the terminal and become Bloomberg certified. This is encouraged if you are able, but it is not required for the class. Extra points for completion of these modules can be given if you do not do well on the midterm exam.

Exams: There will be one midterm exam and a cumulative final exam during the final exam week:

Midterm Exam	October 20, 2025
Final Exam Period	December 14 - December 20, 2025

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

Math Tutoring Center: Located in the Central King Building, Lower Level, Rm. G11 (See: Fall 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 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 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
October 2, 2025	Thursday	Wellness Day - No class
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	Chapter	Topic	Assignments
1	Chapter 1	*Introduction to Derivatives*	*1-8*
2	Chapter 2	*Forwards & Options*	*1, 4a - c, 5b, b, 6 - 8*
3	Chapter 2	*Forwards & Options, Quiz 1, and Mini Project 1*	*13, 14, 16*
4	Chapters 2 & 9	*Forwards & Options And Parity*	*1, 2, 3b (chapter 9)*
5	Chapter 3	*Collars & Other Strategies and Mini Project 2*	*1-5*
6	Chapter 3	*Collars & Other Strategies*	*9-12*
7	Chapter 3	*Collars & Other Strategies, Quiz 2, and Review*	*13-15, 18, 20*
8	Midterm exam and Mini Project 3		
9	Chapter 4	*Introduction to Risk Management*	*1-9*
10	Chapter 4	*Introduction to Risk Management and Quiz 3*	*10-12, 15-17*
11	Chapter 5	*Forwards & Futures and Quiz 4*	*1-3*
12	Chapter 5	*Forwards & Futures and Research Project 1*	*4-8, 10*
13	Chapter 5	*Forwards & Futures*	*11-14, 16*
14	Chapter 8	*Swaps and Quiz 5*	*2-5, 8-10*
15	Chapter 8, Research Project 2 and Review		

Updated by Professor T. Bui - 2025
Department of Mathematical Sciences Course Syllabus, Fall 2025