MATH 433 HONORS: Mathematics of Financial Derivatives II (Capstone II)
Spring 2021 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: Mathematical analysis of models encountered in the area of financial derivatives with emphasis on numerical methods. Topics include: Binomial Trees, Black Scholes Models, Brownian Motion and Ito's Lemma.

Number of Credits: 3

Prerequisites: Math 432. Corequisite: Math 340 with a grade of C or better. Math 432 with a grade of C or better.

Course-Section and Instructors

Course-Section	Instructor
Math 433-H02	Professor K. Rappaport

Office Hours for All Math Instructors: Spring 2021 Office Hours and Emails

Required Textbook:

Title	*Derivatives Markets*
Author	McDonald
Edition	3rd
Publisher	Addison Wesley
ISBN #	978-0321543080

University-wide Withdrawal Date: The last day to withdraw with a **W** is **Monday, April 5, 2021**. It will be strictly enforced.

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	12%
Research Projects 1@15%,2@25%	40%
Projects 3 & 4 chapters 10% each	20%
Mini projects 2@4% each	8%
Final Exam	20%

Your final letter grade will be based on the following tentative curve.

A	90 - 100	C	65 - 76
B+	87 - 89	D	55 - 64
B	80 - 86	F	0 - 54
C+	77 - 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.

Homework Policy: Integrity – Your work is expected to be your own. Help from tutors, classmates etc is encouraged but you are responsible for mastering the material. Homework will be assigned at all classes. Homework will be collected. Late homework will not receive full credit and homework will not be accepted after the class review of homework. There will be no makeup tests, quizzes or homework.

Quiz Policy: There will be announced quizzes periodically.

Exams: There will be one comprehensive final exam. The final exam will be held during the following week:

Final Exam Period	May 7 - 13, 2021

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.

Exams will be proctored by using both Respondus Lockdown Browser+Monitor and Webex. Students will be required to join a Webex meeting from their phone with their cameras on, and to access the exam through Lockdown Browser on a Mac or Windows PC with webcam. Students must follow all instructions related to environment checks and camera positioning. After the exam is submitted the student will log out of Respondus and will be required to submit their work within 15 minutes of submitting their exam.

Projects: There will be two research projects for your selected companies. Project 1 is 15%, Project 2 is 25%. There will be 2 chapter projects. They will be worth 10% each. You will be required to take the Bloomberg module on options and derivatives. This is worth 4%. The Bloomberg login information will be posted for the class. There will be one other mini-project using the company data that is worth 4%.

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: Spring 2021 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.

All students must familiarize themselves with and adhere to the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. The Department of Mathematical Sciences takes these policies very seriously and enforces them strictly.

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 Chantonette Lyles, Associate Director of the Office of Accessibility Resources and Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Kupfrian Hall, Room 201. A Letter of Accommodation Eligibility from the Office of Accessibilty Resources and Services 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/studentsuccess/accessibility/

Important Dates (See: Spring 2021 Academic Calendar, Registrar)

Date	Day	Event
January 19, 2021	T	First Day of Classes
January 23, 2021	S	Saturday Classes Begin
January 25, 2021	M	Last Day to Add/Drop Classes
March 14 - March 21, 2021	Su - Su	Spring Recess - No Classes
April, 2, 2021	F	Good Friday - No Classes
April 5, 2021	M	Last Day to Witdraw
May 4, 2021	T	Friday Classes Meet
May 4, 2021	T	Last Day of Classes
May 5 & May 6, 2021	W & R	Reading Days
May 7 - May 13, 2021	F - R	Final Exam Period

Course Outline

Lecture	Section	Topic	Assignment
1	Chap 9.3	Put/Call Parity	13-16
2	Chap 9.3	Put/Call Parity	13-16

3	10.1-10.3	Binomial Option Pricing	1-8, 10-13
4	10.1-10.3	Binomial Option Pricing	1-8, 10-13
5	10.4,11.1-2	Binomial Option Pricing	14-20, 1-5
6	10.4,11.1-2	Binomial Option Pricing	14-20, 1-5
7	11.3-11.5	Binomial Option Pricing	14,16,17,20
8	11.3-11.5	Binomial Option Pricing	14,16,17,20
9		**EXAM**	
10	20.1-20.4	Brownian Motion	1,2
11	20.4 -20.6	Ito's Lemma	3,4
12	20.4 -20.6	Ito's Lemma	3,4
13	20.4 -20.6	Ito's Lemma	3,4
14	20.4 -20.6	Ito's Lemma	3,4
15	12.1-12.3	Black Scholes	1-7
16		Spring Recess	
17		Spring Recess	
18	12.1-12.3	Black Scholes	1-7
19		**EXAM**	
20	12.4-12.6	Black Scholes	9,14ab,15ab,16ab
21	13.1-13.3	Delta Hedging	1,2,3
22	13.4-13.6	Delta Hedging	4,13,14
23	13.4-13.6	Delta Hedging	4,13,14
24	14.1-14.3	Exotic Options	1-8
25	14.1-14.3	Exotic Options	1-8
26	14.4-14.6	Exotic Options	9-12,16,18,20,21abc
27	14.4-14.6	Exotic Options	9-12,16,18,20,21abc
28	24.1-24.5	Interest Rate Models	1abc,2abc,9,12
29	24.1-24.5	Interest Rate Models	1abc,2abc,9,12
30		**REVIEW**	