NEW YORK CITY COLLEGE OF TECHNOLOGY
The City University of New York

DEPARTMENT:	Mathematics
COURSE:	MAT 2588
TITLE:	The Mathematics of Finance
DESCRIPTION:	The study of financial derivatives including options, futures and forward contracts and the mathematical models used to price them.
TEXT:	An Elementary Introduction to Mathematical Finance Sheldon M. Ross 2nd edition
CREDITS:	3
PREREQUISITES:	ECON 1101, MAT 1475; pre-/co-requisites: ECON 2301, MAT 2572 or prerequisite MAT 1372

Prepared by Professors Neil Katz and Urmi Ghosh-Dastidar (Spring 2009)

A. Testing Guidelines:
The following exams should be scheduled:
1. Four one-session exams.
2. A one session Final Examination.

B. Students are expected to use a computer equipped with spreadsheet software to complete some assignments. A calculator is required and its use will be permitted during all tests and examinations.

Course Intended Learning Outcomes/Assessment Methods

Learning Outcomes	Assessment Methods
1. Acquire an insight into basics and advanced topics of mathematical finance.	Classroom activities and discussion, homework, exams.
2. Learn about option pricing.	Classroom activities and discussion, homework, exams.
3. Learn about the Black-Scholes formula and its properties.	Classroom activities and discussion, homework, exams.
4. Translate ideas into mathematical statements and check their validity in a computational environment.	Classroom activities and discussion, homework, exams.
5. Use the terminology of the financial industry.	Classroom activities and discussion, homework, exams.

General Education Learning Outcomes/Assessment Methods

Learning Outcomes	Assessment Methods
1. Gather, interpret, evaluate, and apply information discerningly from a variety of sources.	Classroom activities and discussion, homework, exams.
2. Understand and employ both quantitative and qualitative analysis to solve problems.	Classroom activities and discussion, homework, exams.
3. Employ scientific reasoning and logical thinking.	Classroom activities and discussion, homework, exams.
4. Communicate effectively using written and oral means.	Classroom activities and discussion, homework, exams.
5. Acquire tools for lifelong learning.	Classroom activities and discussion, homework, exams.
6. Utilize computer based technology in accessing information, solving problems and communicating.	Classroom activities and discussion, homework.

New York City College of Technology Policy on Academic Integrity

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

MAT 2588 The Mathematics of Finance **Text**: An Elementary Introduction to Mathematical Finance by Sheldon M. Ross, 2nd edition

Session	The Mathematics of Finance	Homework
1	Introduction to Options	supplementary problems
2	**4.1** Interest Rates	**P.57:** 4.1, 4.2, 4.3, 4.4, 4.16
3	**4.2** Present Value Analysis	**P.58:** 4.5–4.7, 4.10–4.11, 4.17, 4.18, 4.20
4	**4.2** Present Value Analysis	**P.58:** 4.5–4.7, 4.10–4.11, 4.17, 4.18, 4.20
5	**4.3** Rate of Return	**P.59:** 4.9, 4.13, 4.19, 4.23, 4.26, 4.27
6	**4.3** Rate of Return	**P.59:** 4.9, 4.13, 4.19, 4.23, 4.26, 4.27
7	Bonds	**P.58:** 4.8, 4.14, 4.25
8	Exotic Options	supplementary problems
9	**First Examination**	
10	**5.1** An Example in Options Pricing	**P.77:** 5.16–5.18, 5.6–5.7, 5.9, 5.12 5.1–5.3, 5.8, 5.10, 5.14, 5.19
11	**5.1** An Example in Options Pricing	**P.77:** 5.16–5.18, 5.6–5.7, 5.9, 5.12 5.1–5.3, 5.8, 5.10, 5.14, 5.19
12	**5.2** Other Examples of Pricing Via Arbitrage	**P.77:** 5.22, 5.23, 5.4, 5.5, 5.11, 5.25
13	**5.2** Other Examples of Pricing Via Arbitrage	**P.77:** 5.22, 5.23, 5.4, 5.5, 5.11, 5.25
14	**6.1** The Arbitrage Theorem	**P.91:** 6.1, 6.2, 6.3, 6.4, 6.6
15	**6.2** The Multi-Period Binomial Model	**P.92:** 6.7, 6.10, 6.11
16	**Second Examination**	
17	**3.1–3.2** Geometric Brownian Motion	**P.36:** 3.1, 3.2, 3.3
18	**8.5** Estimating the Volatility Parameter	**P.149:** 8.17
19	**8.5** Estimating the Volatility Parameter	**P.149:** 8.17
20	**7.1–7.2** The Black–Scholes Formula	**P.115:** 7.2–7.8
21	**7.3** Properties of the Black–Scholes Option Cost	**P.117:** 7.9, 7.10, 7.11, 7.12
22	**7.3** Properties of the Black–Scholes Option Cost	**P.117:** 7.9, 7.10, 7.11, 7.12
23	**Third Examination**	

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Session	The Mathematics of Finance	Homework
24	**7.5.2** The Partial Derivatives [the "Greek letters"]	supplementary problems
25	**9.4** Value at Risk and Conditional Value at Risk	supplementary problems
26	**8.2** Call Options on Dividend-Paying Securities	**P.146:** 8.1, 8.3, 8.4
27	**8.3** Pricing American Put Options	**P.149:** 8.11, 8.13, 8.14, 8.16
28	**8.4** Adding Jumps to Geometric Brownian Motion	in class assignment
29	**Review**	
30	**Final Exam**	

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6.1 The Arbitrage Theorem	**P.91:** 6.1, 6.2, 6.3, 6.4, 6.6
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