MFIN 703
Derivatives
Winter 2019 Course Outline

Finance & Business Economics
DeGroote School of Business
McMaster University

COURSE OBJECTIVE

This course provides an advanced analysis of the pricing of derivatives. This course covers both the analytical and numerical methods that are used to implement derivatives pricing models. Formal derivations and theoretical models are covered in this course. The objective is to equip students with the advanced analytical skills and knowledge required to price and manage complex derivatives instruments that are traded in the markets and/or underwritten by financial institutions.

INSTRUCTOR AND CONTACT INFORMATION

Instructor Name: Dr. Peter Miu
Instructor Email: miupete@mcmaster.ca
Office Address: DSB 320
Office Hours: TBA
Phone: (905) 525-9140 x 23981
Class Location: DSB 505
(Tuesday 2:30-5:30pm & Wednesday 11:30am-2:30pm)

TA Name: Mr. Fangxing Liu
TA Email: liuf16@mcmaster.ca
TA Office Hours: TBA

COURSE ELEMENTS

Credit Value:	3	Leadership:	Yes	IT skills:	No	Global view:	Yes
A2L:	Yes	Ethics:	No	Numeracy:	Yes	Written skills:	Yes
Participation:	Yes	Innovation:	Yes	Group work:	Yes	Oral skills:	Yes
Evidence-based:	Yes	Experiential:	No	Final Exam:	Yes	Guest speaker(s):	No

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COURSE DESCRIPTION

We will start the course with an introduction to standard derivative securities, such as futures and forward contracts, options contracts, and swap contracts. We will examine the mechanics of the derivative markets and how these instruments are traded in the markets. We will then study the basic continuous-time stochastic stock price process and its characteristics. We will formally derive the Black-Scholes-Merton option pricing model and critically examine the underlying no-arbitrage argument. We will introduce the concept of risk-neutral valuation emphasizing its assumptions and implications. We will examine how we can hedge the risk of the exposures to derivatives with the help of different risk measures. We will then consider different numerical procedures that are commonly used in the pricing of derivatives. Finally, we will study interest rate models and interest rate derivatives.

This course is taught primarily through lectures, readings, in-class discussions, and problem solving.

LEARNING OUTCOMES

Upon successful completion of this course, students will be able to complete the following key tasks:

➢ Understand the mechanics of the trading and management of derivatives;

➢ Conduct risk-neutral valuation for different kinds of derivatives and appreciate the underlying assumptions and economic implications;

➢ Implement various numerical procedures in the pricing of derivatives;

➢ Understand the hedging of different derivative instruments;

➢ Use interest rate models to price interest rate derivatives.

COURSE MATERIALS AND READINGS

Required: *Options, Futures, and Other Derivatives*, 10th edition, by John C. Hull.

Further reading materials may be suggested by the instructor during the lectures.

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EVALUATION

All work will be evaluated on an individual basis except for group assignments/reports where group members will share the same grade. The components of the course grade will be weighted as follows. The instructor reserves the right to modify the weightings to adjust for more or less material covered during the semester. Missed exams not approved by the MFIN Program Office will receive a grade of zero. Late assignment and case report will not be marked and will receive a grade of zero.

Components and Weights

Participation (individual)	10%
Assignment (group)	12.5%
Mid-Term Exam (individual)	25%
Case Report and Presentation (group)	12.5%
Final Exam (individual)	40%
Total	100%

Grade Conversion

At the end of the course your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme.

LETTER GRADE	PERCENT
A+	90 - 100
A	85 - 89
A-	80 - 84
B+	75 - 79
B	70 - 74
B-	60 - 69
F	00 - 59

Participation

Participation in class is worth **10%** of your final grade. Participation will be graded based on the quality of in-class contribution. You must have a name card with your **full first and last name** clearly written and displayed in front of you for every class. Instructor will feel free to **cold-call** on anyone at any time. Hence, it is imperative that you prepare for each and every class.

Assignment

There is a group assignment that is worth **12.5%** of the final grade. Each group consists of at most three students. Group members in each group will share the same grade.

Case Report and Presentation

There is a group case report (together with a presentation), that is worth **12.5%** of the final grade. Case report cannot be longer than four pages. Each group consists of at most three students. Group members in each group will share the same grade.

Mid-Term and Final Exams

Mid-term exam is worth **25%** of your final grade. Final exam is worth **40%** of your final grade. Final exam is cumulative. The use of a non-programmable calculator is allowed during examinations.

Communication and Feedback

Students who wish to correspond with instructors or TAs directly via email must send messages that originate from their official McMaster University email account. This protects the confidentiality and sensitivity of information as well as confirms the identity of the student. Emails regarding course issues should NOT be sent to the Area Administrative Assistants.

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at:
www.mcmaster.ca/academicintegrity

The following illustrates only three forms of academic dishonesty:
1. Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations

REQUESTING RELIEF FOR MISSED ACADEMIC WORK

Students may request relief from a regularly scheduled midterm, test, assignment or other course components. Please refer to the policy and procedure on the DeGroote website at the link below;

https://mfin.degroote.mcmaster.ca/current-students/missed-term-work/

STUDENT ACCESSIBILITY SERVICES

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca.

For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities: http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf

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ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request, including the dates/times needing to be accommodated and the courses which will be impacted, to their Faculty Office normally within 10 days of the beginning of term or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

POTENTIAL MODIFICATION TO THE COURSE

The instructor reserves the right to modify elements of the course during the term. There may be changes to the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

ACKNOWLEDGEMENT OF COURSE POLICIES

Your enrolment in MFIN 703 will be considered to be an implicit acknowledgement of the course policies outlined above, or of any other that may be announced during lecture and/or on Avenue to Learn. **It is your responsibility to read this course outline, to familiarize yourself with the course policies and to act accordingly.**

Lack of awareness of the course policies **cannot be invoked** at any point during this course for failure to meet them. It is your responsibility to ask for clarification on any policies that you do not understand

COURSE SCHEDULE

MFIN 703
Derivatives
Winter 2019 Course Schedule

Week	Date	Topic	Textbook Chapter	Event
1-3	Jan 7-25	Introduction to derivative instruments (futures and forward contracts, option contracts) and interest rate	Ch. 1, 2, 4, 5, 10, and 11	
4	Jan 28 - Feb 1	Basic binomial trees, diffusion process, and Ito's lemma	Ch. 13 and 14	
5-6	Feb 4-15	Black-Scholes-Merton option pricing model	Ch. 15, 17.3-6	Assignment due on Feb 15 (Friday) at 4:00pm in DSB 303
7	Feb 18-22	No class: mid-term recess		
8	Feb 25 – Mar 1	Interest rate futures and swaps	Ch. 6 and 7	**Mid-term exam**: Feb 25 (Monday) 7:00-9:30pm, Venue: MDCL 1110
9	Mar 4-8	Hedging and the Greek letters	Ch. 19	
10-11	Mar 11-22	Numerical procedures: Binomial and trinomial trees, Monte Carlo simulation, finite difference methods	Ch. 21	
12-13	Mar 25 – Apr 5	Interest rate models and interest rate derivatives	Ch. 29 and 31	
14	Apr 8-12	Case report presentations		Case report due on Apr 12 (Friday) at 4:00pm in DSB 303