

**MFIN 703
Derivatives
Winter 2017 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

Dr. Peter Miu

Instructor

miupete@mcmaster.ca

Office: DSB 320

Office hours: TBA

Tel: (905) 525-9140 x 23981

Mr. Yuchuan Jin

Teaching assistant

jiny36@mcmaster.ca

Class location: DSB 505 (C01)
and DSB B105 (C02)

Time: Wed (C01) and Fri (C02)
14:30 - 17:20

Course Website: <http://avenue.mcmaster.ca>

COURSE ELEMENTS

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

COURSE PREREQUISITES

Students should have the academic credit of MFIN 601 (Introduction to Finance) or equivalent prior to the start of this course.

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 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.

REQUIRED COURSE MATERIALS AND READINGS

Options, Futures, and Other Derivatives, 9th edition, by John C. Hull

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

EVALUATION

All work will be evaluated on an individual basis. 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.

Components and Weights

Mid-Term Exam #1	Exam (individual)	25%
Mid-Term Exam #2	Exam (individual)	30%
Final Exam	Exam (individual)	45%
Total		100%

The use of a non-programmable calculator is allowed during examinations in this course.

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-	65 - 69
F	0 - 64

Communication and Feedback

Students who wish to correspond with the instructor or the TA 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 Administrative Assistant.

Mid-Term and Final Exams

The mid-term and final examinations are cumulative and to be completed individually.

ACADEMIC DISHONESTY

It is the student's responsibility to understand what constitutes academic dishonesty. Please refer to the University Senate Academic Integrity Policy at the following URL:

<http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf>

This policy describes the responsibilities, procedures, and guidelines for students and faculty should a case of academic dishonesty arise. Academic dishonesty is defined as to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. Please refer to the policy for a list of examples. The policy also provides faculty with procedures to follow in cases of academic dishonesty as well as general guidelines for penalties. For further information related to the policy, please refer to the Office of Academic Integrity at:

<http://www.mcmaster.ca/academicintegrity>

STUDENT ACCESSIBILITY SERVICES

Student Accessibility Services (SAS) offers various support services for students with disabilities. Students are required to inform SAS of accommodation needs for course work at the outset of term. 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>

POTENTIAL MODIFICATIONS TO THE COURSE

The instructor and university reserve the right to modify elements of the course during the term. The university may change 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.

COURSE SCHEDULE

**MFIN 703: Derivatives
Winter 2017 Tentative Course Schedule**

Week	Date	Topic	Textbook Chapter
1-3	Jan 9-27	Introduction to derivative instruments (futures and forward contracts, option contracts, swap contracts) and interest rate	Ch. 1, 2, 4, 5, 7, 10, and 11
4	Jan 30 - Feb 3	Basic binomial trees, diffusion process, and Ito's lemma	Ch. 13 and 14
5-6	Feb 6-17	Black-Scholes-Merton option pricing model Mid-term exam #1: Feb 10th (Friday) 7:00-9:30pm, Venue: TBA	Ch. 15, 17.3-6
7	Feb 20-24	No class: mid-term recess	
8	Feb 27 – Mar 3	Hedging and the Greek letters	Ch. 19
9-10	Mar 6-17	Numerical procedures: Binomial and trinomial trees, Monte Carlo simulation, finite difference methods Mid-term exam #2: Mar 17th (Friday) 7:00-9:30pm, Venue: TBA	Ch. 21
11	Mar 20-24	Volatility smiles	Ch. 20, 27.1-2
12-13	Mar 27 – Apr 7	Interest rate models and interest rate derivatives	Ch. 6, 29, and 31
14	Apr 10-13*	Review	

* There is no class on Good Friday (Friday, April 14).