

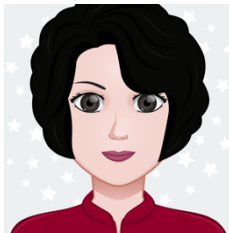
**MFIN 703
Derivatives
Winter 2020 Course Outline**

**Finance
DeGroot 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. 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



Alicia Damley, CFA, CPA, CA, MBA

adamley@mcmaster.ca

Office Hours: by appointment

Lecture: Tues 1430 – 1720, PGCLL M22

Wed 1130 – 1420, PGCLL M22

Lulu Zhang

zhangl40@mcmaster.ca

TA Office: TSH 602

TA Office Hours: Mon, 1100 - 1200

Course website: Avenue 2 Learn (A2L)

Course resources and announcements will be communicated via A2L. This should be your first stop for course related information.

We are here to help you succeed!

Both our course TA, Lulu Zhang, and I are here to help you navigate this course successfully.

Outside of class, it is easiest to connect via email. We can address a question quickly via email or setup a time to speak directly. I endeavor to respond to emails within 48 hours. For our mutual benefit and protection, please send all emails from your Mac id. If I have not responded to your inquiry within 48 hours, please re-send it in case it has been lost between our in-boxes.

Please always remember to:

- be courteous and respectful in all communication
- not send emails within 48 hours of a mid-term, exam or assignment due date. We are all busy. And it is important to plan accordingly!

COURSE ELEMENTS

| | | | |
|---------------------|------------------|-----------------|----------------------|
| Credit Value: 3 | Leadership: Yes | IT skills: Yes | 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 |

COURSE DESCRIPTION

This course provides an advanced analysis of the pricing of derivatives and the numerical methods that are used to implement derivatives pricing models. Formal derivations and theoretical models are covered in this course. Topics include stochastic calculus, the Black-Scholes model and its variations, exotic options, and interest rate derivatives.

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.

REQUIRED 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.

EVALUATION

| | |
|--------------------------------------|------|
| Assignment (group) | 15% |
| Mid-Term Exam (individual) | 30% |
| Case Report and Presentation (group) | 15% |
| Final Exam (individual) | 40% |
| Total | 100% |

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 |

Assignment #1

This assignment is worth **15%** of your final grade. Students are encouraged to work in groups of up to 4 students.

Case Report and Presentation

The group case report and presentation is worth **15%** of your final grade. Each group can consist of up to 4 students. The case report should be no longer than five pages.

Mid-Term and Final Exams

The Mid-term exam is worth 30% of your final grade. The Final exam is worth 40% of your final grade. The Final exam is cumulative. The use of a non-programmable calculator is allowed during examinations.

Please review the Graduate Examinations Policy (if applicable):

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

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.

ACADEMIC DISHONESTY

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

Use of Turnitin

In this course we will be using a web-based service (Turnitin.com) to reveal plagiarism. Students will be expected to submit their work electronically to Turnitin.com and in hard copy so that it can be checked for academic dishonesty. Students who do not wish to submit their work to Turnitin.com

must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to; <http://www.mcmaster.ca/academicintegrity/turnitin/students/>

MISSED EXAMINATIONS/TESTS/CLASS PARTICIPATION

Where students miss a regularly scheduled mid-term or class participation for legitimate reasons as determined by the MFIN Program Office, the weight for that test/participation will be distributed across other evaluative components of the course at the discretion of the instructor.

Documentation explaining such an absence must be provided to the MFIN Program Office within five (5) working days upon returning to school.

To document absences for health-related reasons, please provide the Petition for Relief for MFIN Missed Term Work and the McMaster University Student Health Certificate which can be found on the DeGroot website at <https://mfin.degroot.mcmaster.ca/current-students/forms/>.

Please do not use the online McMaster Student Absence Form as this is for Undergraduate students only.

University policy states that a student may submit a maximum of three (3) Medical certificates per year after which the student must meet with the Program Director.

To document absences for reasons other than health related, please provide the Petition for Relief for MFIN Missed Term Work which can be found on the DeGroot website at <https://mfin.degroot.mcmaster.ca/current-students/forms/> and documentation supporting the reason for the absence.

Students unable to write a mid-term at the posted exam time due to the following reasons: religious; representing university at an academic event; conflicts between two overlapping scheduled mid-term exams; or other extenuating circumstances have the option of applying for special exam arrangements. Such requests must be made to the MFIN Program Office at least ten (10) working days before the scheduled exam along with acceptable documentation. Instructors cannot themselves allow students to unofficially write make-up exams/tests.

Adjudication of the request must be handled by the MFIN Program Office.

If a mid-term exam is missed without a valid reason, students will receive a grade of zero (0) for that component.

Missed Final Examinations

A student who misses a final examination without good reason will receive a mark of 0 on the Examination.

All applications for deferred and special examination arrangements must be made to the MFIN Program Office. Failure to meet the stated deadlines may result in the denial of these arrangements. Deferred examination privileges, if granted, must be satisfied during the examination period at the end of the following term. There will be one common sitting for all deferred exams.

Failure to write an approved deferred examination at the pre-scheduled time will result in a failure for that examination, except in the case of exceptional circumstances where documentation has been provided and approved. Upon approval, no credit will be given for the course, and the notation N.C. (no credit) will be placed on the student's transcript. Students receiving no credit for a required

course must repeat the course. Optional or elective courses for which no credit is given may be repeated or replaced with another course of equal credit value.

Requests for a second deferral or rescheduling of a deferred examination will not be considered.

Any student who is unable to write a final examination because of illness is required to submit the Application for Deferred MFIN Final Examination and a statement from a doctor certifying illness on the date of the examination. The Application for Deferred MFIN Final Examination and the McMaster University Student Health Certificate can be found on the DeGroot website at <https://mfin.degroot.mcmaster.ca/current-students/forms/>

Students who write examinations while ill will not be given special consideration after the fact. In such cases, the request for a deferred examination privilege must be made in writing to the MFIN Program Office within five business days of the missed examination.

Special examination arrangements may be made for students unable to write at the posted exam time due to compelling reasons such as religious or representing the University at an academic event.

Students who have religious obligations which make it impossible to write examinations at the times posted are required to produce a letter from their religious leader stating that they are unable to be present owing to a religious obligation.

If a student is representing the University at an academic event and is available at an overlapping scheduled time of the test/examination, the student may write the test/examination at an approved location with an approved invigilator, as determined by the MFIN Program Office. In such cases, the request for a deferred examination privilege must be made in writing to the MFIN Program Office within ten business days of the end of the examination period.

Note: A fee of \$50 will be charged for a deferred exam written on campus and a fee of \$100 for deferred exams written elsewhere.

In cases where the student's standing is in doubt, the MFIN Program Office may require that the student with one or more deferred examination privileges refrain from re-registering until the examination(s) have been cleared.

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>

POTENTIAL MODIFICATION 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.

ACKNOWLEDGEMENT OF COURSE POLICIES

Your enrolment in COURSE 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 A2L. **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

| WEEK | DATE | TOPIC & CHAPTER(S) |
|------|----------------|--|
| 1 | Jan 7 & 8 | Introduction (Chp 1) Futures markets and central counterparties (Chp 2) |
| 2 | Jan 14 & 15 | Interest rates (Chp 4) Determination of forward & futures prices (Chp 5) |
| 3 | Jan 21 & 22 | Mechanics of options markets (Chp 10) Properties of stock options (Chp 11) |
| 4 | Jan 28 & 29 | Hedging strategies using futures (Chp 3) Trading strategies involving options (Chp 12) |
| 5 | Feb 4 & 5 | Binomial trees (Chp 13) |
| 6 | Feb 11 & 12 | The Black-Scholes-Merton model (Chp 15) Options on stock indices and currencies (Chp 17.3 – 6) Assignment #1 due on Fri, Feb 14 @5pm via Avenue |
| 7 | Feb 18 & 19 | Winter Recess – no class |
| 8 | Week of Feb 24 | Mid-Term Examination Date, Time & Location: TBA |
| 9 | Mar 3 & 4 | Interest rate futures (Chp 6) Swaps (Chp 7) |
| 10 | Mar 10 & 11 | The Greek letters (Chp 19) |
| 11 | Mar 17 & 18 | The Greek letters (Chp 19) cont'd |
| 12 | Mar 24 & 25 | Options on stock indices and currencies (Chp 17) |
| 13 | Mar 31 & Apr 1 | Volatility smiles (Chp 20) Basic numerical procedures (Chp 21) |
| 14 | Apr 7 & 8 | Case report presentations Case reports due at the beginning of class via Avenue |