

BUSINESS F714
Options and Futures: Theory and Applications
Winter 2020 Course Outline

Finance and Business Economics Area
DeGroote School of Business
McMaster University

COURSE DESCRIPTION

This course surveys modern developments in the theory of the pricing of options, futures, swaps, and forward contracts, and the application of the theory to a variety of instruments currently traded in financial markets. This course is strongly recommended for any student considering a career in either corporate finance or the financial services industry, as well as students considering further studies in Finance.

INSTRUCTOR AND CONTACT INFORMATION

Class Timing: **Wednesdays at 2:30 PM**
All times referenced in this document are Eastern.

Adeel Mahmood
Instructor
Tel: 905-525-9140 Ext 20559
Office Hours: After class or by appointment

COURSE ELEMENTS

Credit Value: 3	Leadership: Yes	IT skills: Yes	Global view: Yes
Avenue: Yes	Ethics: No	Numeracy: Yes	Written skills: Yes
Participation: Yes	Innovation: Yes	Group Work: Yes	Oral skills: Yes

COURSE PREREQUISITES AND COMPLEMENTS

Students should have the academic credit of F600 or equivalent prior to the start of this course.

COURSE OVERVIEW AND OBJECTIVE

During the past three decades, we have seen tremendous growth in the use of derivative securities such as futures, forwards, swaps and options for managing risk. Such securities are commonly referred to as "derivatives" because their values depend upon the values of other assets. This course presents a conceptual framework for understanding how to price derivatives and design appropriate investment and risk management strategies.

The course is highly analytical and involves the use of the available financial data to solve derivatives pricing problems, devise risk-adjusted investment strategies, and apply analytical methods to a range of practical applications. Students will be introduced to spreadsheet-based derivative pricing and will also get to work with a range of financial data sources (such as Bloomberg and Thomson Reuters).

Students will also gain a deeper understanding of several key derivatives topics covered on professional finance exams, including:

- *CFA Institute*: Chartered Financial Analyst (CFA) – all levels
- *Global Association of Risk Professionals*: Financial Risk Manager (FRM) exams
- *Society of Actuaries*: Finance/ERM and Investment tracks

LEARNING OUTCOMES

Upon completion of this course, students will be able to identify, assess, measure, and manage:

- Identify and distinguish between the various forms of derivatives instruments.
- Apply futures and option strategies for portfolio management and hedging purposes.
- Price futures and options logically and systematically.
- Use options Greeks for financial engineering and risk management purposes.
- Use swaps and other derivatives for risk management purposes.

In aggregate, students will develop a sound understanding of the following topics:

- Pricing and managing risk with futures contracts;
- Pricing and managing risk with interest rate derivatives;
- Pricing and managing risks with swaps;
- Pricing and managing risks with standard as well as advanced options contracts;
- Options Greeks and the Black-Scholes-Merton Model; and
- Trading and risk management strategies using derivatives.

REQUIRED COURSE MATERIALS AND READINGS

Course content and class communication available on Avenue:

- <http://avenue.mcmaster.ca>

Hull, Options, Futures, and Other Derivatives, *Tenth (10th) Edition*; Pearson Higher Education, 2018:

- ISBN: 9780134472089

OPTIONAL COURSE MATERIALS AND READINGS

Hull, Student Solutions Manual for Options, Futures, and Other Derivatives, *Tenth (10th) Edition*; Pearson Higher Education, 2018:

- ISBN: 9780134629995

EVALUATION

Individual learning in this course results primarily from in-class discussions based on thorough preparation in advance of the assigned homework problems. The balance of the individual learning results from lectures on specific topics, student research, and industry speakers.

Team learning focus of this course is on an applied group project centred on derivatives. Working in teams, students will select, price, and analyze a derivatives pricing and risk management strategy using available financial data and the techniques covered in the course.

The final grade will be calculated as follows:

Components and Weights

Participation	In-class contribution (individual)	10%
Futures Test	Written in class (individual)	30%
Options Test	Written in class (individual)	30%
Derivatives Project	Due at the end of the term (group)	30%
Total		100%

Class Participation

Name cards are used to help give credit for class participation and contribution to in-class problem-solving. Students must have name cards with their full first and last names clearly written and displayed in front of them for every class. It is imperative that students prepare for every class. **Class participation marks are primarily based on the quality of contribution.** No class attendance results in zero mark.

Although class participation in this course will primarily be a function of solving the assigned problems and questions in class, participation in discussions and other class aspects will also be considered. **The determination of a student's level of participation in a class will be in the Instructor's sole discretion.** The students are, however, provided the guidelines below.

The grading for participation in each class generally follows a scheme on a scale of 0 to 3:

<i>Grade</i>	<i>Student Contribution</i>
0	Does not attend class
1	Attends class but makes no contribution during that class
2	Attends class and makes one average contribution during that class
3	Attends class and makes a significant contribution to the class by making important points with elements of originality or mastery of relevant issues or concepts – as demonstrated, during that class, by: <ul style="list-style-type: none"> • Making one or more excellent contributions; • Making two or more average contributions; • Solving one or more problems for the class in class; or • Providing other satisfactory evidence of significant contribution.

Note that there is no partial (non-integer) participation grade awarded for a class.

Students may be asked to share their analysis with, or otherwise present their arguments to, the class in order for their contribution to be qualified as significant.

A student **missing a class** during the term, excluding a class where a test or an exam is held, is required to contact the 'Student Experience – Academic (MBA) office' and obtain an official approval of relief if he or she wishes to avoid getting a zero (0) participation grade for that class.

If the 'Student Experience – Academic (MBA) office' adjudicates that relief be provided, the student's participation grade for the classes with relief requests will be re-assigned to the graded classes. See the section *Missed Academic Work* below for more details.

Notwithstanding the above, of the eight classes graded for participation, **students' participation will be based on the best six out of eight classes**. That is, each student will be assigned a total participation grade using the six highest (out of eight total) individual class participation scores. Note that these participation marks are normally reserved for class participation during the section of the class without any tests, quizzes, or presentations.

Futures and Options Tests

The Futures Test and the Options Test – *open-book, open-notes* tests – will be written in class during the term. More details of the format, structure, and content coverage will be provided during the course of the term. See the ***Course Schedule*** below for more details.

A student *missing a Term Test* is required to contact the 'Student Experience – Academic (MBA) office' and obtain an official approval of relief if he or she wishes to avoid getting a zero (0) grade for the test. If the 'Student Experience – Academic (MBA) office' adjudicates that relief be provided, the student's grade for the test will be calculated based on the scheme outlined in the ***Missed Tests*** document available online.

Derivatives Project

Students will form groups of their choice. *The group members will be assigned individual grades relative to the group grade based on the peer assessments completed towards the end of the course.*

Each group will complete the ***Derivatives Project, due at the end of the term***. The project will entail selecting, pricing, and analyzing a derivatives pricing and risk management strategy using available financial data and the techniques covered in the course.

More details of the format, structure, and length of the project will be provided during the course of the term.

COMMUNICATION AND FEEDBACK

Students that are uncomfortable in directly approaching an instructor regarding a course concern may send a confidential and anonymous email to the respective Area Chair or Associate Dean:

<http://mbastudent.degroote.mcmaster.ca/contact/anonymous/>

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 Administrative Assistant.

Instructors should conduct an informal course review with students to allow time for modifications in curriculum delivery. Instructors should provide evaluation feedback for at least 10% of the final grade to students prior to Week #8 in the term.

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 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

MISSED ACADEMIC WORK

Missed Mid-Term Examinations / Tests / Class Participation

Where students miss a regularly scheduled mid-term or class participation for legitimate reasons as determined by the Student Experience – Academic (MBA) 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 Student Experience – Academic (MBA) office within five (5) working days upon returning to school.

To document absences for health related reasons, please provide to Student Experience – Academic (MBA) office the Petition for Relief for MBA Missed Term Work and the McMaster University Student Health Certificate which can be found on the DeGroote website at <http://mbastudent.degroote.mcmaster.ca/forms-and-applications/>. 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 Director of the program.

To document absences for reasons other than health related, please provide Student Experience – Academic (MBA) office the Petition for Relief for MBA Missed Term Work 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; work-related (for part-time students only); representing university at an academic or varsity athletic 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 Student Experience – Academic (MBA) 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 Student Experience – Academic (MBA).

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 Student Experience – Academic (MBA) 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 MBA Final Examination and a statement from a doctor certifying illness on the date of the examination. The Application for Deferred MBA Final Examination and the McMaster University Student Health Certificate can be found on the DeGroote website at <http://mbastudent.degroote.mcmaster.ca/forms-and-applications/> Please do not use the online McMaster Student Absence Form as this is for Undergraduate students only. 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 Student Experience – Academic (MBA) 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 (for example religious, or for part-time students only, work-related reasons):

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.

Part-time students who have business commitments which make it impossible to write examinations at the times posted are required to produce a letter on company letterhead from the student's immediate supervisor stating that they are unable to be present owing to a specific job commitment.

In such cases, applications must be made in writing to the Student Experience – Academic (MBA) office at least ten business days before the scheduled examination date and acceptable documentation must be supplied.

If a student is representing the University at an academic or athletic 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 Student Experience – Academic (MBA) office.

In such cases, the request for a deferred examination privilege must be made in writing to the Student Experience – Academic (MBA) 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 Graduate Admissions and Study Committee 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

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 must forward a copy of such SAS accommodation to the instructor normally, within the first three (3) weeks of classes by setting up an appointment with the instructor. If a student with a disability chooses NOT to take advantage of an SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. The SAS website is:

<http://sas.mcmaster.ca>

ACKNOWLEDGEMENT OF COURSE POLICIES

Your registration and continuous participation (e.g. on A2L, in the classroom, etc.) to the various learning activities of this course 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.

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

CL.	DATE	CONTENT	HOMEWORK PROBLEMS
1	Online	Introduction <i>Ch. 1:</i> Introduction <i>Ch. 2:</i> Futures markets and central counterparties	-
2	Wed. Jan 15	Futures and Forwards <i>Ch. 3:</i> Hedging Strategies Using Futures	3.24, 3.26, 3.28, 3.29, 3.30
3	Wed. Jan 22	Pricing the Contracts <i>Ch. 5:</i> Determination of Forward and Futures Prices <i>Ch. 4:</i> Interest Rates	5.24, 5.27, 5.28, 5.30 4.26, 4.28, 4.30
4	Wed. Jan 29	Interest Rate Derivatives <i>Ch. 4:</i> Interest Rates (<i>Contd.</i>) <i>Ch. 6:</i> Interest Rate Futures	4.31, 4.32 6.23, 6.25, 6.26, 6.28, 6.29
5	Wed. Feb 5	Swaps <i>Ch. 7:</i> Swaps	7.21, 7.22, 7.23, 7.24, 7.25
6	Wed. Feb 12	<i>Futures Test – To Be Written in Class</i>	
-	Feb 17 to 21	<i>Midterm Recess – No Class</i>	
7	Wed. Feb 26	Options Markets <i>Ch. 10:</i> Mechanics of Options Markets <i>Ch. 11:</i> Properties of Stock Options	10.23, 10.26, 11.22
8	Wed. Mar 4	Options: Trading Strategies <i>Ch. 12:</i> Trading Strategies Involving Options	12.20, In-Class Examples
9	Wed. Mar 11	Options: Binomial Trees <i>Ch. 13:</i> Binomial Trees	13.16, 13.17, 13.19, 13.20, 13.21

CL.	DATE	CONTENT	HOMEWORK PROBLEMS
10	Wed. Mar 18	Options: Black-Scholes-Merton Model <i>Ch. 15: The Black-Scholes-Merton Model</i> <i>Ch. 16: Employee Stock Options</i>	15.26, 15.29, 15.30, 15.31 16.15
11	Wed. Mar 25	Options: The Greeks <i>Ch. 19: The Greek Letters</i>	19.25, 19.26, 19.27
12	Wed. Apr 1	<i>Options Test – To Be Written in Class</i>	
13	Wed. Apr 8	<i>Review + Project Questions</i>	-
-	Mon. Apr 13	Derivatives Project – Due Online by 11.00 AM	

* Available on Avenue to Learn

RESEARCH DATA

Any research data obtained by a student from publicly available sources for the purposes of completing term work (including data used in assignments, projects, and tests) can be used by the student, the instructor, and the university. All parties are free to use the research data subject to the original copyright of such data. Students hereby agree not to use in their term work any proprietary data or data subject to copyright protection without the prior written approvals of the instructor and the owner of any such copyright.