

MFIN 708
Fixed Income Analysis
Winter 2017 Course Outline

Finance and Business Economics Area
DeGroote School of Business
McMaster University

COURSE OBJECTIVE

This course provides students an understanding of the methods and models used by the financial services and investment industry (e.g. commercial and investment banks, insurance companies, investment companies, hedge funds) to price interest-rate products and derivatives and perform risk management. This includes models based on the spot and forward rates. Students will also gain an understanding of the quantitative tools and no-arbitrage valuation theory used in interest-rate models and analysis (e.g. equivalent Martingale measures, change of measure, forward measure).

INSTRUCTOR AND CONTACT INFORMATION

Section 1: Friday 12:30 – 3:20 pm
Class Location: T13 107
Instructor: Dr. G.S. Pandher
Email: Gurupdes.Pandher@outlook.com
Office Location: TBA
Office Hours: Friday 11:45 am – 12:30 pm

Section 2: Monday 3:30 – 6:30 pm
Class Location: ABB 162
Instructor: Dr. G.S. Pandher
Email: Gurupdes.Pandher@outlook.com
Office Location: TBA
Office Hours: Friday 11:45 am – 12:30 pm

COURSE ELEMENTS

Credit Value:	3	Leadership:	Yes	IT skills:	No	Global view:	Yes
Avenue:	Yes	Ethics:	No	Numeracy:	Yes	Written skills:	No
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 will provide students with an understanding of the methods and models used to value, analyze and hedge interest-rate products and derivatives by participants in the financial services and investment industry (e.g. commercial and investment banks, insurance companies, investment companies, hedge funds). This includes spot rate models (e.g. Hull-White) and Libor Market Models (LMM). The course integrates theory and practice and focuses on the implementation and calibration of these model using market data, as well as their derivation. An understanding of quantitative tools needed to understand, apply and extend interest rate models using no-arbitrage valuation theory will also be developed (e.g. equivalent Martingale measures, change of measure, forward measure). While some of the material is quantitative and technical by nature, it will be presented in a heuristics and intuitive fashion.

LEARNING OUTCOMES

By the end of the course, students should be able to:

- explain the primary characteristics of different types of interest rate securities
 - explain the central concepts and theory behind valuing interest rate products and derivatives
 - implement and calibrate spot-rate models and libor market models to price interest rate products and derivatives
 - explain principles of no-arbitrage interest-rate valuation theory and apply it to solve nonstandard problems
 - understand and discuss cases & journal articles related to quantitative finance ➤ interact effectively as a team
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REQUIRED COURSE MATERIALS AND READINGS

Avenue registration for course content, readings and case materials

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

Text

A detailed set of course notes will be handed out for each topic. In addition, material from the following texts will be used.

- *Options, Futures, and Other Derivatives*, 9th Edition, by John Hull

Cases

- Case 1: “Wal-Mart's Use of Interest Rate Swaps”, Michael Kimbrough, Michael Faulkender, Nicole Jenkins, Rachel Gordon, 2008 (Ivey Product: 108038)
- Case 2: “Credit Default Swaps on AMR Corporation: Cash or Credit?”, Pedro Matos, 2016

(Ivey Product: UVAF1745)

- Case 3: Yield Curve Shifts Create Trading Opportunities Strategy Paper, CME Group, 2013
https://www.cmegroup.com/trading/interestrates/files/Yield_Curve_Strategy_Paper.pdf
- Case 4: “Columbia River Pulp Company Inc. - Interest Rate Hedging Strategy”, Robert W. White, Graham Carter, 2002
(Ivey Product: 9A90B037) **DerivaGEM Software**
- <http://www-2.rotman.utoronto.ca/~hull/software/>

EVALUATION

The method of instruction in this course will be lecture, discussion and problem-solving. Since the subject matter of this course tends to be analytical and quantitative, a proper understanding of this material will require an appropriate commitment of time and effort on your part. The subject matter knowledge is also cumulative and interconnected, therefore, it is imperative that you keep up and fill any gaps in your understanding as early as possible.

Components & Weights

Group Assignments & Cases (A1, A2)	25%
Class Participation (A3)	5%
Midterm (A4)	25%
Final Exam (A4)	45%

A1: Group Assignments & Cases

Assignments, cases and article presentation are meant to be done in groups of 3-4 students. Some of these tasks put students in project-type work settings where they need to discuss the issues involved in solving the problem and arrive at a consensus on the best approach and solution. You are expected to work on the assigned problems before the scheduled date and should be ready to discuss these problems in-class. Exams will be heavily weighted towards material covered in the lectures.

A2: Case Discussion

An additional objective of the course is to help students develop skills related to analyzing problems in a business setting and communicate their solution and results to co-workers and their managers. Students groups will fully analyze some risk management cases and discuss their recommendations in class. Other cases and articles will be covered in class by the instructor, however, it is expected that students have read these cases before class and are prepared to discussion relevant questions.

A3: Class Attendance & Participation

You are encouraged to actively participate in class activities and discussions. Class participation enhances the learning process and makes the lectures more engaging. Exams and assignments are heavily based on material covered and discussed in class.

If you miss a class, it is completely your responsibility to obtain class notes and assigned questions. You are expected to come to class on a regular basis and class attendance will contribute to your class participation score (5%).

A4: Midterm & Final Exam

The exams will consist of multiple choice and written questions. For both the midterm and final exams, you are allowed to bring one sheet of notes. It is advisable to use only one side for the midterm, so that you have space for additional material

for the final exam. The final exam will be cumulative but with greater emphasis on material after the midterm (approximately 60-65%).

During exams, electronic devices such as cell phones must be turned off.

Grade Conversion

I do not use a fixed percentage grading scale. That is, there is no fixed schedule that I use to map marks to letter grades. This means that raw marks are not in themselves very meaningful. Rather, your final grade will depend on how well you do relative to other people in your class. Once raw course grades have been modified to a relative scale, your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme:

Letter Grade	Percent	Points
A+	90-100	12
A	85-89	11
A-	80-84	10
B+	75-79	9
B	70-74	8
B-	60-69	7
F	00-59	0

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 are encouraged to conduct an informal course review with students by Week #4 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 INTEGRITY

You are expected to exhibit honesty and use ethical behavior 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

Language for Use in Courses with an On-Line Element

In this course we will be using X*. Students should be aware that when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure.

If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

X* = e-mail, LearnLink, WebCT, web pages, capa, Moodle, ThinkingCap, etc

REQUESTING RELIEF FOR 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 DeGroot website at <http://mbastudent.degroot.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>

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.

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.

ACKNOWLEDGEMENT OF COURSE POLICIES

Your registration and continuous participation (e.g. on A2L, in the classroom, etc.) to the various learning activities of MBA F723 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

**MFIN F708
Fixed Income Analysis Fall
2018 Course Schedule**

Topics	Week	Description	Readings
1	1-2	Interest Rate Basics <ul style="list-style-type: none"> Fixed-Income Markets & Securities Interest Rates & Bonds: Spot, Forward rates, YTM, Par Yield Interest Rate Swaps Assignment #1 Case 1 (Ivey): <i>Wal-Mart's Use of Interest Rate Swaps</i> 	Note 1 (4, 7)
2	3-4	Credit Risk & Credit Derivatives <ul style="list-style-type: none"> Credit Risk & Firm Value Assignment #2 Credit Derivatives Assignment #3 Case 2 (Ivey): <i>Credit Default Swaps on AMR Corporation: Cash or Credit?</i> 	24.1-24.7 25.1-25.9
3	5-7	Interest Rate Futures & Options <ul style="list-style-type: none"> Interest Rate Futures and Risk Management Case 3: Yield Curve Shifts Create Trading Opportunities Interest Rate Options – the Standard Model Assignment #4 Assignment #5: Case 4 (Ivey): <i>Columbia River Pulp Company Inc. - Interest Rate Hedging Strategy</i> 	Note 2 (6, 29)
	7	Midterm (Oct 26)	
4	9-10	Spot Rate Models & Interest Rate Lattices <ul style="list-style-type: none"> Spot Interest Rate Models The Hull-White Trinomial Interest Rate Lattice Extension to Other Models Bond Pricing: Ho-Lee & Hull-White Models Affine Term Structure Models Assignment #7 	Note 3 (31)

5	11	Theoretical Foundations - Fixed Income Derivatives <ul style="list-style-type: none"> • Probability Space & Brownian Motion Properties • Change of Measure; Cameron-Martin-Girsanov Theorem • Stochastic Integrals & Ito Calculus 	Note 4
		<ul style="list-style-type: none"> • Assignment #6 	
6	12	Equivalent Martingale Measures & No-Arbitrage Pricing <ul style="list-style-type: none"> • EMM & Derivatives Pricing • Valuation by Change of Measure • Pricing Application – Caplets 	Note 5
7	12-13	The Libor Market Model <ul style="list-style-type: none"> • HJM & Market Models • The LMM State Process & the T-forward Measure • LMM & Interest Rate Options • Black's Volatilities • Forward Rates under the T-forward measure • LMM Volatility Calibration • Swaptions • Extensions of LMM 	Note 6 (32)
		Final Exam	