

STAT 2660 A : Mathematics for Finance

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Office Hours: will be posted on cuLearn. Class Hours: Mon. & Wed. 4:05 pm-5:25 pm

Office: 4220 Herzberg Laboratories

Classroom: Southam Hall 515

Lab Room: Southam Hall 406

Lab Hours: Wed. 5:35 pm-6:25 pm

Course Description and Objectives

This course represents an active and practical use of mathematics. It covers topics such as Interest rates, growth of money, discount functions, yield rates, time value of money, annuities, cash flows and portfolios, loans, mortgages, bonds, immunization, swaps, hedging and investment strategies, stocks and financial markets, arbitrage.

This course attempts to cover portions of the syllabus for the second exam given by the Society of Actuaries (Exam FM: Financial Mathematics). Syllabus and details for Exam FM may be found at <https://www.soa.org/education/exam-req/edu-exam-fm-detail/>.

Timetable

The course involves 3 hours of lectures and one-hour tutorial per week. Lectures begin on January 6, 2019, and end on April 6, 2019; location is Southam Hall 515. Tutorials will be held on Wednesdays, 5:35 pm - 6:25 pm, and start on January 15, 2019. Tutorial locations: Southam Hall 406.

Required Materials

- Textbook: "Mathematical Interest Theory" By Vaaler and Daniel, 2nd edition.
- Announcements, assignment solutions and problem sets will be posted on culearn.

Prerequisites

Prerequisites: One of MATH 2002, MATH 2007, or MATH 1005 with grade of C or higher; and one of MATH 1102, MATH 1107, or MATH 1104 with grade of C or higher; or permission of the school.

Grading Policy

I reserve the right to adjust a student's final mark by up to 3% based on participation. The grade will count the assessments using the following proportions:

- Assignments: 10%.
- 4 tests: 40%.
- Final exam: 50%.

Exams and Assignments

Assignments

Two assignments that count towards the term mark. All assignments will be posted on culearn with specific due dates. Late assignments will not be accepted. Tentative due dates: March 2, April 6.

In-tutorial test

Four in-tutorial is a 45 minutes exam written in class. These exams are scheduled for Wed. Jan 29, Feb 12, Mar 4, Mar 25, 2020. There are no make-up tests. The weight of a test will be shifted to the final exam for all students who miss the test because of a legitimate and documented reason. The same rule applies to each assignment.

Final exam

The final exam is a 3-hour exam. The time, date, and place TBA by Carleton University.

Calculators

During tests and final exam, only calculator such as solar powered Texas Instrument calculators, models BA-II Plus*, BA-II Plus, TI-30X, TI-30Xa or TI-30X II* are permitted. Programmable calculators are not permitted.

Tentative Course Schedule

Week	Section	Topics
1-2	1.1-1.11	Growth of money, interest, accumulation, amount function.
3-5	2.1-2.7, 3.1-3.13	Equations of value, yield rates, investment returns.
6-7	4.1-4.7	Annuities with different payments, level with less frequent, more frequent
8	5.1-5.5	Loan repayment, amortization schedules, replacement of capital.
9-10	6.1-6.9	Bonds, basic price formula, premium-discount, valuing, selling a bond
11-12	7.1,8.3,9.1-9.4	Stock and financial markets, Arbitrage, term structure, interest rate sensitivity.

Course Policies

Academic integrity

The University Senate defines plagiarism as "presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own." This can include:

- reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;
- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings;
- failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;
- handing in "substantially the same piece of work for academic credit more than once without prior written permission of the course instructor in which the submission occurs.

Plagiarism is a serious offence that cannot be resolved directly by the course's instructor. The Associate Dean of Science and/or the Associate Dean of Business conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of "F" for the course. For more details, see the Academic Regulations of Carleton University at <http://calendar.carleton.ca/undergrad/regulations/academicregulationsoftheuniversity>.

Accommodations

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Accommodation for students with disabilities: Students with disabilities are responsible for identifying their needs for accommodation to the Paul Menton Centre (see below) and providing appropriate disability documentation. A PMC coordinator will review the documentation and establish an accommodation protocol for the student. PMC will email the course instructor and the student a formal Letter of Accommodation (LoA), which outlines classroom and/or test/exam accommodations. The student is responsible for contacting the course instructor soon after the LoA is issued to discuss accommodation arrangements.

Accommodation for submission of work deadlines: Accommodation of deadlines is at the discretion of the instructor. Normally a few days should be sufficient. All work should be submitted by the end of the exam period at the very latest.

Accommodation for formally scheduled exams: is administered by Scheduling and Examination Services.

Accommodation for religious observation: Carleton University accommodates students who, by reason of religious obligations, must miss a compulsory academic event, such as test, examination, assignment deadline, etc. Students are required to bring you a formal written request for alternate date and/or means of satisfying academic requirements at least two weeks prior to the event. Please refer to Equity Services for a list of recognized holidays and for more detail on religious accommodation. carleton.ca/equity/accommodation/religious-observances/.

Accommodation for pregnancy: A pregnant student should seek advice from Equity Services and arrange a letter of accommodation. She should contact the course instructor to discuss her needs at least 2 weeks prior to the academic event requiring accommodation.

For more details, see Carleton University Academic Accommodation Policy: carleton.ca/equity/accommodation/academic/.

Final grades

Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

Course copyright

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