

ACTU 256
Mathematics of Finance
Fall 2018

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Office Hours: Fridays, 14:45-17:45.

Text: *Mathematics of Investment and Credit*, by Broverman, S. A., 5th Edition, ACTEX 2010.

Chapter 1 (excluding 1.2.1)
Chapter 2 (excluding 2.4.2 and 2.4.3)
Chapter 3 (excluding 3.2.1, 3.2.2 and 3.4)
Chapter 4 (excluding 4.3.2)
Chapter 5 (excluding 5.1.4 & investment year method portion of 5.3.1, 5.3.2 & 5.3.3)
Chapter 6 (excluding 6.2 and 6.4)
Chapter 7 (excluding 7.1.6 and 7.3)
Chapter 8 (8.1 only)

Outline: This course is an introduction to the mathematics of compound interest. The topics covered correspond approximately to the interest theory of Exam FM of the Society of Actuaries. The topics include (but are not limited to):

- **Measurement of Interest:** simple interest, compound interest, accumulation functions, present value, effective and nominal rates, forces of interest;
- **Equations of Value:** basic problem, numerical results, unknown time, unknown rate of interest;
- **Basic Annuities:** payments at a different frequency than interest is convertible, continuous annuities, varying annuities;
- **Amortization Schedules and Sinking Funds:** outstanding loan balance, varying series of payments, continuous payments;
- **Bonds and Other Securities:** types of securities, price of a bond, premium and discount, yield rates, callable bonds, serial bonds;
- **Yield Rates:** cash flow analysis, reinvestment rates, portfolio yield rate;
- **Applications and others:** modern financial instruments, inflation, duration, immunization, asset liability management, term structure of interest rates, other topics.

CIA This course is accredited by the Canadian Institute of Actuaries (CIA).
Accreditation: A grade of B+ or better in this course is needed to apply to the CIA for the exemption of Exam FM:

<https://www.cia-ica.ca/membership/university-accreditation-program---home/accredited/concordia>

The most recent detailed syllabus and learning objectives for Exam FM can be found at:
<https://www.soa.org/education/exam-req/edu-exam-fm-detail.aspx>

Course **Assignments:** counting for 10% (students should submit their assignments before the beginning of class on the announced due date). Solutions must be written up carefully, showing all work, for full credit.
Evaluation: **NO LATE ASSIGNMENTS WILL BE ACCEPTED.**

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

Two mid-term exams: (scheduled tentatively for October 5th, 2018 and November 9th, 2018) counting for 41% (**21% and 20% respectively**), and one **final exam:** counting for the remaining 49%. There will be no make-up tests.

IMPORTANT: **THERE WILL BE NO SUPPLEMENTAL EXAM AND NO 100% OPTION FOR THE FINAL EXAM.**

Calculators: Only calculators approved by the Department or approved by the Society of Actuaries (SOA) are permitted in the class test(s) and final examination. The calculators approved by the department are the **Sharp EL 531** and the **Casio FX 300MS**, available at the Concordia Bookstore. See the current Basic Education Catalog for information on SOA approved calculators.

The list of calculators approved by the Society of Actuaries is here:
<https://www.soa.org/Education/Exam-Req/Exam-Day-Info/edu-id-calculators.aspx>

Academic Integrity and the Academic Code of Conduct

This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity." [Undergraduate Calendar, Sec 17.10.2]