ACT 230: Mathematics of Finance for Non-Actuaries (Fall 2025)

Instructor & TA Information:

Name	Role	Contact
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Class times:

- **Lectures:** Tuesdays 11:10AM to 01:00AM, BA.
- **Tutorials:** Fridays 10:00AM to 11:00PM, online.

High level description

Interest, discount and present values, as applied to determine prices and values of annuities, mortgages, bonds, equities; loan repayment schedules and consumer finance payments in general; yield rates on investments given the costs on investments.

Course outcomes:

By the end of the course, you will be able to:

- Distinguish between various types of interest metrics.
- Calculate the present and cumulative values of various types of annuities.
- Understand and apply amortization on loans.
- Valuate and amortize bonds.
- Understand and apply various measures of rate of return of a fund.

Textbook: S. Broverman, Actuarial Science Coursebook for [ACT230 2024-2025] Edition.

Course tentative outline:

(1) Weeks 1, 2 & 3: Part 1 – Interest rate measurement (2025-08-31**sun** → 2025-09-20**sat):**

a. Foundation
b. Fundamentals of interest rate calculation.
c. Nominal rates of interest and discount.
d. Force of interest, inflation, and risk of default.

(2) Week 4: Midterm 1 (2025-09-21**sun** → 2025-9-27**sat).**

(3) Weeks 5, 6, & 7: Part 2 – Valuation of annuities (2025-09-28**sun** → 2025-10-18**sat).**

a. Annuity immediate and annuity due.
b. Annuity valuation at any time point.

c. Annuities with differing interest and payment periods.
d. Annuity whose payments follow a geometric progression.
e. Annuities whose payments follow an arithmetic progression.

(4) Week 8: Midterm 2 (2025-10-19**sun**→ 2025-10-25**sat).**

(5) Week 9: Reading Week (2025-10-26**sun** → 2025-11-01**sat).**

(6) Weeks 10, 11, & 12: Part 3 – Loans, bonds, and funds (2025-11-02**sun** → 2025-11-22**sat):**

a. Amortization of a loan
b. Bond valuation.
c. Bond amortization & callable bonds
d. Measures of the rate of return on a fund

Course Grading:

1) In-person written tests (100%):
   Standard weights:
   a. Midterm 1 [M1] (Parts 1): 25% (on 2025-09-23tue 11:15AM to 12:45PM).
   b. Midterm 2 [M2] (Parts 1 & 2): 25% (on 2025-11-21tue 11:15AM to 12:45PM).
   c. Final [F] (Parts 1, 2, & 3): 50% (date and time TBD).
   The final grade follows the following formula:
   $$\max(0.25 \times M1 + 0.25 \times M2 + 0.5 \times F, 0.25 \times M1 + 0.75 \times F, 0.25 \times M2 + 0.75 \times F, F)$$
   In the formula above, the standard weights get allocated to the final for midterms excluded.

Materials allowed:

- A4 cheat sheets (number will be based on number of parts covered in the exam).
- Calculator.

Contesting exam question marks:

For the two midterm exams, students are allowed to contest their marks (solutions for each test will be provided) within 15 days of the day the solution sheets are distributed in class (typically one day after grades are posted on Quercus). The procedure to contest marks is to email the instructor with a snapshot of the question(s) in doubt.

For the final exam, students may contest grades as described here.

Make-up exams:

There are no make up exams for midterms or the final, regardless of the reason. The only alternative option is for the student who does not attend the final exam is to apply to the department for a deferral.

Rounding final grades:

All final grades are rounded up to the nearest percentage. For grades that are within 3% short of 50%, 63%, 70%, and 80% will be rounded up to the closest grade. For grades that are within 1% of 85% will be rounded up to the closest grade. No other exceptions will be granted, and the student will need to apply to the department for a deferral.

Calculator: A calculator is essential for working exercises, tests, and the final exam. The Texas Instruments BA II PLUS calculator is one of the calculators allowed on the Society of Actuaries examinations; it has the financial functions that would be needed for this course and is recommended. All non-programmable calculators are allowed.

Academic integrity: Three key principles are held in this course: fairness and transparency from the instructor, and a solid work ethic from the student. Anyone caught cheating or complicit of cheating (e.g., solving individual-based assessment problems in groups) will have their test grade zeroed and will be reported to the department.

Textbook purchase information:

You may purchase the coursebook on the UofT Bookstore (physical copy only available).