

**University of Toronto**  
**Department of Statistical Sciences**  
**ACT230H1F**  
**Mathematics of Finance for Non-Actuaries**  
**Summer 2023**

**Course Information**

Instructor Hassan Abdelrahman  
Email hassan.abdelrahman@mail.utoronto.ca  
Lectures Mondays & Wednesdays 13:00 – 15:00; Room SS2106  
Office Hours Tuesdays & Thursdays 16:00 – 17:00; Online through Zoom

T.A. TBA  
Email TBA  
Tutorials Mondays & Wednesdays 15:00 – 16:00; Room SS2106

**Course Description**

Introduction to financial mathematics, interest measurement, present value calculation, annuity valuation, loan amortization, consumer financing arrangements, bond valuation. The course is aimed at a general audience who will not be continuing in the actuarial science program.

**Teaching Style**

My teaching strategy for this course involves closely following the coursebook. During lectures, I will provide slide shows that include only the key points of each topic. However, I will annotate on these slides during the lecture to provide additional context and elaboration. I will upload these slides before the lectures so that you can bring them to class and add your own annotations if you wish (I recommend you to do so). After each lecture, I will also upload my annotated version of the slides. It's important to note that succeeding in this course requires you to read the coursebook, complete the problem sets, and attend tutorials in addition to the lectures. The lectures are intended to help you understand the course material, but you must do independent work as well.

**Required Text**

- ACT230 Revised book 2019, Samuel A Broverman.

Navigate to the Digital Course Materials section on the University of Toronto Bookstore Website at [https://uoftbookstore.com/textbooks/access\\_codes.asp](https://uoftbookstore.com/textbooks/access_codes.asp)? From here, scroll down the list and select your course, which appears as:STG ACT 230 Coursebook. The textbook may be found also in a printed form at the U of T bookstore.

## Other Useful References

- Mathematics of Investment and Credit, 6th. Ed., Samuel A Broverman, ACTEX Publications, 2016
- Kellison, S.G., The Theory of Interest (Third Edition), 2009, Irwin/McGraw-Hill

## Course Outline

This course outline is just tentative. Some sections might go faster than others.

Class	Date	Topic
1	May 8	Section 1 – Effective Rates of Interest & Discount
2	May 10	Section 2 – Nominal Rates of Interest & Discount
3	May 15	Section 3 – Force of Interest, Inflation, Risk of Default
4	May 17	Section 4 – Annuity-Immediate & Annuity-Due
5	May 24	Section 5 – Annuity Valuation At Any Time Point
6	May 29	Section 6 – Annuities With Differing Interest and Payment Periods
7	May 31	Sections 7 & 8 – Annuities Whose Payments Follow a Geometric/ Arithmetic Progression
8	June 5*	Section 9 – Amortization of a Loan
9	June 7	Section 10 – Bond Valuation
10	June 12	Section 11 – Bond Amortization, Callable Bonds
11	June 14	Section 12 – Measures of Rates of Return on a Fund
12	June 19	Practice Exam

**\* Note that June 5 is the last day to drop the course.**

## Course Assessments

There will be six online quizzes (20 minutes each), two in-tutorial midterm tests (50 minutes each) and one final exam (2 hours). The dates and the weights of the assessments are given below:

Assessment	Date of Evaluation	Weighting
Quizzes	Fridays	15%
Midterm 1	May 24	25%
Midterm 2	June 12	25%
Final	TBA	35%
Total		100%

Each week, a quiz will be posted on Quercus no later than 9am on Fridays, and the quiz window will remain open until midnight. Once you start the quiz, you'll have 30 minutes to finish it. Each quiz will have three questions, with each question designed to take less than 10 minutes to complete. However, extra time is allotted in case of any minor technical difficulties. Your best five quiz scores will be kept at the end of the term.

For the exams, you will be permitted to bring a one-sided cheat sheet. The structure and content of the exams will be announced at least one week in advance of each exam.

## **Missed Quizzes or Tests**

There are NO make-up quizzes, and so, no marks will be given to missed quizzes. If the midterm is missed for a valid reason, you must provide appropriate documentation, such as the University of Toronto Medical Certificate, University of Toronto Health Services Form, or College Registrar's Letter. You must submit this documentation within one week of the test. If documentation is not received in time, your test mark will be zero. If midterm is missed for a valid reason, the weight of that midterm (or those midterms) will be shifted to the final. For example, if you take the first midterm and miss the second midterm for a valid reason, then your evaluation will be based on the formula  $15\% \times \text{quizzes} + 25\% \times \text{midterm 1} + 60\% \times \text{Final}$ .

**You are not allowed to miss the two midterm tests. Missing both tests would result in an automatic deduction of 25%.**

## **Accessibility Needs**

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or Accessibility Services at 416-978 8060; [studentlife.utoronto.ca/as](http://studentlife.utoronto.ca/as).

## **Academic Integrity**

At the University of Toronto, academic integrity is a vital part of the learning and academic experience. All assessments and coursework must be completed solely by the individual student, without any outside help. Receiving any form of assistance on an assessment, whether from a fellow student in the course or someone not affiliated with the course, is a severe academic offense. Additionally, providing help to another student in the course on an assessment is equally serious. Posting or sharing questions from assessments is strictly prohibited at all times.

Please further familiarize yourself with the University of Toronto's Code of Behavior on Academic Matters available at <http://academicintegrity.utoronto.ca>, or you may also look at <https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity>.