# ACT230H1 Mathematics of Finance for Non-Actuaries

**Class Information:**

- Class meetings are on Tuesday and Thursday, 7:10-9:00pm in SS 1088.
- Tutorials are on Tuesday, 6:10-7:00pm in SS1088.
- Instructor: Stephen Szaura, **stephen@utstat.toronto.edu**
- Office hour: 6:00-7:00pm every Thursday in SS6026.

**Course Description:** This course will cover various topics in introductory mathematical finance. We will first deepen the understanding of interest rate by dealing with several different measurements, then head for some important and common applications: annuity valuation, loan amortization, consumer financing arrangements, and bond valuation. This course is aimed at a general audience who will not be continuing in the actuarial science program.

**Topics:** Effective rates of interest, compound interest & simple interest, accumulated amount function & present value, equation of value, nominal rates of interest, effective & nominal rates of discount, the force of interest, inflation & real rate of interest, present value and accumulated value of annuities (level payment, non-constant payment, with an emphasis on geometric progression pattern), level payment annuities with differing interest and payment period, m-thly payable annuities & continuous annuities, the amortization method of loan repayment (especially loans with level payments), the sinking-fund method of loan repayment, internal rate of return (IRR) & net present value (NPV), comparison of investments, dollar-weighted and time-weighted rate of return, the portfolio method and the investment year method, determination of bond prices ( including bond prices between coupon dates), book value of a bond.

**Prerequisites:** First-year Calculus

**Grading Policy:**

Term Test 1 (25%), Term Test 2 (30%), Final Exam (45%)

Term test 1 will be held on **May 28th 7:00-8:30 pm**, and Term test 2 will be held on **June 11th 7:00-8:30 pm**, respectively. The final exam will be cumulative and covers all the topics of the course. The time and date of the final exam will be announced in class and it will be 2 hours in length.

**Textbook:**

Professor Broverman's study guide for SOA Exam FM, 2012/2013 edition. Students are expected to read and understand the descriptive parts of the study guide themselves. Also, the study guide provides many problems that are similar to the ones you will see in exams of this course. This guide can be bought at a pre-notified lecture from the Actuarial Science Club personnel at a

relatively low price ($30). Afterwards the availability of these single copies cannot be guaranteed except from the US at about $200. Please make sure you bring the exact cash on that day.

**Recommended (not required) Reference:**
*Mathematics of Investment and Credit*, 5th Edition, S.A.Broverman, ACTEX Publications, Inc., 2010, plus its accompanying *Solution Manual*, both available from the U of T bookstore.

**Calculator:**
Students should bring a non-programmable calculator with y^x key to **all lectures and exams**. It is their own responsibility if they cannot solve a problem in a test because they do not have a calculator. Most scientific calculators will do the job. The TI BAII Plus financial calculator mentioned in the study manual is also an optional choice. All the questions in this course can be solved without the special features of a financial calculator (e.g., calculating the interest rate).

**About Medical certificates:**
- University policy has it that students who are unable to take exams should show medical certificates that are signed by an Ontario-registered MD, with registration number and phone number for verification if needed.
- The doctor should clearly indicate there is a disabling health problem on the day of the test. Certificates saying "Needs rest" or "injured foot" or similar types will not be accepted.
- If documentation is rejected or not provided, the test mark for the missed test will be zero.
- Students with accepted medical certificate will be asked to take a rigorous make-up test of the same format.