

ACT230H1 Mathematics of Finance for Non-Actuaries

Fall 2015 (Preliminary and to be updated)

Class Information:

- Class meetings are on Tuesday, 7:10-9:00pm in MP 102.
- Tutorials are on Tuesday, 6:10-7:00pm in MP 102, SS 2105, and SS 562
 - Allocation will be updated later.
 - Starting from the 2nd week.
- Instructor: Dameng Tang (PhD to be, ASA), dameng.tang@mail.utoronto.ca
 - Due to class size it is not feasible for me to reply every email
 - Please do either of the following
 - Talk to me during lecture time directly
 - Contact the TAs first before coming to me
- Your TAs (master candidates or PhD candidates):
 - Zhai Xing Shuo: xingshuozhai@gmail.com
 - Casgrain Philippe: pcasgrain@gamil.com
 - Yang Shuai (Alex): s235yang@uwaterloo.ca
- Office hours:
 - Me: 4:00-5:00pm Wednesday in TBA.
 - Xing Shuo: 2:00-3:00pm Friday at SS Stat Aid Center
 - Philippe: 10:00-11:00am Thursday at SS Stat Aid Center
 - Shuai: 1:00-2:00pm Tuesday at SS Stat Aid Center
 - All starting from the 2nd week

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:

- Quizzes (20%), Term Test (35%), Final Exam (45%)

- Please be advised that the quizzes will be given randomly during the lectures. It will be graded 7-10 and you will be asked to provide necessary intermediate calculations. If you miss a quiz with some legitimate reason, the credit will be shifted to final exam (but without a guarantee of minimum of 7 out of 10!).
- Both term test and final exams are multiple choice based and will be held on **Oct 27th 7:00-8:30 pm in SS 1085, SS 1087 or SS 2105**, and **Exam Period 7:00-9:00 pm (time and location will be announced beforehand)**, respectively. The final exam will be cumulative and covers all the topics of the course.

Textbook:

Professor Broverman's study guide for SOA Exam FM, 2012/2013/2014/2015 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 (they will be selling the manuals at the annual student orientation Monday, September 21st from 6-7 pm). Afterwards the availability of these single copies cannot be guaranteed except from the US at about \$200.

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 tutorials and exams**. It is their own responsibility if they cannot solve a problem in a quiz or 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 (including quiz, exam) 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.