

ACT230H1 Mathematics of Finance for Non-Actuaries
Course Syllabus ¹
Summer 2017

General Information:

- Lectures : Tuesday and Thursday 7- 9 pm at SS (Sidney Smith Hall) 1088. ²
- Tutorials: Tuesday and Thursday 6 - 7 pm at SS 1088. (No tutorial on May 16th)
- Instructor: Alex Yang
- TA: Lin Zhang
- Email: shuai.yang@mail.utoronto.ca
- Alex's Office hours: Tuesday 2 - 4 pm or by appointment.
- Alex's Office hour location: 6027D
- Lin's Office hours: Thursday 5 - 6 pm.
- Lin's Office hour location: Stat Aid Center, SS 1091.

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.

Course Material:

Required:

- Prof. Sam Borverman's Study Guide for SOA EXAM FM/CAS EXAM 2.
- Calculator: It is **highly recommended** to use a financial calculator (e.g. Texas Instruments BA35, BA II Plus, BA II Plus Professional, TI30Xa, TI30X II, TI-30X MultiView) for this course as we will be doing calculation involving annuities, bond and internal rate of returns, etc.
Note : Both of the textbook and calculator can be purchased from the U of T actuarial science club.

Other useful references:

- *Mathematics of investment and credit* by Prof. Sam Broverman .
- Society of Actuaries (SOA) Exam FM sample questions ³ which can be found at
<https://www.soa.org/files/pdf/FM-09-05ques.pdf>

¹I would like to thank Wei (Becky) Lin for helping me preparing this syllabus.

²The first lecture is on May 16th and the last lecture is on June 22nd.

³Only those related to the material covered in this course.

Course Website:

All of the lecture notes ⁴, practise questions, announcement will be posted on portal at <https://portal.utoronto.ca>

Tentative Schedule:

- Week 1 - lecture 1: Introduction, basic math review (section 1).
- Week 1 - tutorial 1: Questions from section 1.
- Week 1 - lecture 2: nominal rates of interest and discount (section 2).
- Week 2 - tutorial 2: Questions from section 2.
- Week 2 - lecture 3: Force of interest, inflation (section 3).
- Week 2 - tutorial 3: Questions from section 3.
- Week 2 - lecture 4: Annuity immediate and annuity due (section 4).
- Week 3 - tutorial 4: Questions from section 4. Review.
- Week 3 - lecture 5: (May 30th)
 - **Midterm 1: covers material from section 1,2,3.**
 - Annuity valuation at any time-point (section 5).
- Week 3 - tutorial 5: Questions from section 4,5.
- Week 3 - lecture 6: Annuities with different interest and payment periods (section 6).
- Week 4 - tutorial 6: Questions from section 6.
- Week 4 - lecture 7: Annuities with payments follow a geometric progression (section 7).
- Week 4 - tutorial 7: Questions from section 7. Review.
- Week 4 - lecture 8: (June 8th)
 - **Midterm 2: covers material from section 4,5,6.**
 - Annuities with payments follow an arithmetic progression (section 8).
- Week 5 - tutorial 8: Questions from section 8.
- Week 5 - lecture 9: Loan amortization. (section 9).
- Week 5 - tutorial 9: Questions from section 9.
- Week 5 - lecture 10: Loan repayment, sinking fund method (section 10).
- Week 6 - tutorial 10: Questions from section 10.

⁴Some of the material from the lecture notes are supported by Prof. Sheldon Lin

- Week 6 - lecture 11: Introduction on Bond. Bond valuation (section 11).
- Week 6 - tutorial 11: Questions from section 11. Final Review.
- Week 6 - lecture 12: Bond amortization, callable bonds (section 12).

Evaluation:

There will be two in class midterms and one final exam. Your final grade will be based on the following scheme:

$$30\% \times \text{Midterm 1} + 30\% \times \text{Midterm 2} + 40\% \times \text{Final}$$

The two midterms are **NOT** cumulative. The final exam is cumulative which tests everything we learnt throughout the semester.

The two midterms and final exam are **closed book and closed notes**, an SOA-approved financial calculator (e.g. mentioned above in the course material section) or a non-programming calculator is allowed. You can bring multiple calculators to the exam if you wish. The midterm will be written in the lecture room, SS1088. Final exam location and time TBA. I will try to make **roughly 50%** of the questions in the test papers coming from the lecture examples, tutorial questions and assigned problems.

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 $30\% \times \text{Midterm 1} + 70\% \times \text{Final}$.

Academic Integrity

You should always keep the academic integrity in mind. The latest version of the student handout 'How not to Plagiarize' is available at <http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize>.

In addition, you are responsible for knowing the content of the University of Toronto's **Code of Behaviour on Academic Matters** at <http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>. If you have any questions about what is or is not permitted in this course, please do not hesitate to contact me. The bottom line: copying is strictly prohibited.