

ACT240 – Fundamentals of Investment and Credit

Vital Statistics:

Instructor: Vicki Zhang, FSA, ACIA, CERA, MStat (with completion of PhD qualification exams)

Lectures: Mondays, 10am-12pm

Lecture location: SS 2135

Tutorials: Fridays, 10-11am

Tutorial Location: TBD (will be posted on Blackboard)

Office: 6th floor, SS Room 6015

Office Hour: Mondays, 1-3 pm

Virtual office hour: TBD (announced early every week)

Blackboard: <http://portal.utoronto.ca>

Email: vickijing.zhang@utoronto.ca

Textbook and Calculator:

The main textbook we will use for this course is Sam Broverman's Study Guide for SOA EXAM FM/ CAS EXAM2. Both 2013 and 2014 editions are accepted. The Actuarial Club has made cheaper version of this study guide available. Detailed textbook purchase information from the Actuarial Club is posted in the course portal.

You need one of the following SOA-approved calculators: battery or solar-powered Texas Instruments BA-35 model calculator, the BA II Plus, the BA II Plus Professional, the TI-30Xa or TI-30X II (IIS solar or IIB battery), or TI-30X MultiView (XS Solar or XB Battery)

Key requirement to the students attending the lectures:

To encourage active learning, in this semester I will employ a pedagogical model similar to a "flipped classroom". What this means is that you are required to read certain sections of the textbook before coming to the lecture *from the second lecture of the semester*. The required reading sections will be posted on the blackboard by Tuesday. During the lecture (next Monday), we will have more time to discuss the challenging concepts and materials. There will also be various in-class activities in the form of individual quiz or small team competition. If you have read the required section before coming to class, you are more likely to do well in those in-class activities and earn bonus points (which can be applied to your final course evaluation).

Evaluation:

10% In-class activities (can earn up to 5 bonus points)

10% One take-home, team-based project (can earn up to 3 bonus points)

20% Term Test 1 (October 10th in Tutorial hour)

20% Term Test 2 (November 14th in Tutorial hour)

40% Final Exam

Examples of in-class activities:

- Think-pair-share (1 bonus point per question may be awarded for the first pair that get the answer right)

- Revised “Jeopardy” (different bonus points per question based on the level of the question. Played in pair or by individual. Only the previous winner can pick the next question)
- Peripatetic activity (various questions will be posted at the front. Students can walk to the front to post solutions on the questions they’d like to answer. 1 bonus point per question for the first student who gets the answer right. The student in this activity is expected to do a “micro-teaching”, or explain how they reach the answer)
- Individual quiz (1 point for each quiz submitted. You should have reasonable steps to reach the final answer in your submission, even if the final answer is incorrect. Please submit to the right pile under your own TA’s name – I will bring TA name tags). There may be multiple quizzes during the lecture to help combat the “wandering mind” syndrome, but only one quiz needs to be submitted.
- Other activities that the instructor sees fit
- Post your muddiest points to me on Blackboard by Friday 5pm. The points should be related to the past Monday lectures or from your readings for the next Monday lectures.
- **Note:** it is at my discretion to pick the students to answer the question. In the case that more than one student/pair volunteer for the same question, I am likely to pick the one who has not answered many questions in the past, to encourage new participants. Not all in-class questions will result in bonus points. Please listen to the instruction carefully. Activity winners will register with me at the end of each lecture. The bonus points will be tallied after each lecture and posted on blackboard by the time of next lecture. You have to check your points immediately and report any dispute by the end of day of the next lecture. We do not keep any records of in-class activities (including quiz papers) after the next lecture.

Team-based projects:

- You should pick one and only one out of the four projects to work on. You are however, encouraged to read reports and watch videos from teams who have chosen to work on other projects.
- There are maximum 40 students who can sign up for each project, and maximum 3 students per team. Sign-up for each project is on a first-come-first-serve basis.
- You can sign up with a team or as an individual. TA will arrange team for individuals who signed up on their own, or add team members to an existing team if needed.
- Final product: (1) A report of 3-4 pages detailing the project. (2) An excel worksheet showing the numerical calculation. (3) Optional: make a team video of no more than 10 minutes to present the project.
- Bonus points (maximum 3 points per person): this is adjudicated based on the following criteria: (1) whether there is a quality video presentation (2) in the case that there is not a video presentation, whether there is more extensive than usual research done on the project (as demonstrated in the report and excel worksheet).
- All projects have instructions but are also open-ended in nature. I will provide instructions on individual projects and post them on the blackboard close to the sign-up dates. However, here is an overview of the four projects:
 - Be an insurance consumer and select an equity-index-annuity (EIA) product for yourself (your team) among at least 3 EIA or benchmark products. Your

- product selection decision should be based on your needs, parameters gathered from research on the products and some numerical calculations.
- Understand a real variable annuity product in the market with life income benefits (GLIB) guarantee, compare that with a traditional annuity product in the market.
 - Research on a green mortgage product from a bank or other mortgage issuing entities. Compare that with a regular mortgage in terms of the economic and non-economic benefits.
 - Research and present a green bond or socially-beneficial community bond, issued by an NGO, an international organization or others.
- Each team has about 3 weeks from the time of sign-up to submit their final products. Specific deadlines will be posted on the Blackboard around the time of sign-up.

Schedule of Topics:

Lecture - September 8:

- Overview of the course
- Simple and compound interest, effective rate of interest (Section 1)

Tutorial – September 12 (EXTRA 1-HOUR LECTURE)

- Present value of cashflow (Section 1)
- Rate of discount d (Section 1)

Lecture - September 15:

- Nominal rates of interest (Section 2)
- Nominal rate of discount (Section 2)

Tutorial September 19 – in-class with TA

Lecture - September 22:

- Force of interest (Section 3)

Tutorial September 26 – in-class with TA

Lecture - September 29:

- Annuity products in the market
- Annuity Immediate and Annuity Due (Section 4)

Tutorial October 3 – in-class with TA

Lecture - October 6:

- Annuity valuation (Section 5)
- Sign up for EIA project

Tutorial October 10– Term Test 1 (50 mins)

October 13: Thanksgiving, no class

Tutorial October 17 – in class with TA

Lecture - October 20:

- Annuity with different interest and payment period (Section 6)
- Sign up for VA project

Tutorial October 24 – Term test 1 review with TA

Lecture - October 27:

- Valuation of annuities following a geometric and arithmetic progression (Section 7&8)

Tutorial October 31 – in class with TA

Lecture - November 3: (last day to drop class)

- Amortization of a loan (Section 9)
- Sign up for green mortgage project

Tutorial November 7– in class with TA

Lecture - November 10:

- Sinking fund method of loan repayment (Section 10)

Tutorial November 14 - Term Test 2 (50 mins)

November 17: Fall break, no class, but sign up for green bond project

Tutorial November 21 – in- class with TA

Lecture - November 24:

- Bond valuation (Section 11)

Tutorial November 28 – Term Test 2 Review with TA

Lecture - December 1:

- Bond amortization (Section 12)

Tutorial – NO tutorial in the last week

Lecture - December 3 (makeup fall break class)

- Continuous annuity (Section 6)
- Callable bond (Section 12)
- Other loose ends

Final Exam – Date TBA

- Covers all the materials we covered in the course
- Team Project materials are not tested

Missed Assignments or Exams

- There is **NO** make-up project assignment
- There is **NO** make-up term test
- There will be **ONE** make-up final exam arranged by Faculty of Arts and Science directly.

A Word on Tutorials:

In the past one of the common feedbacks from students is that they do not find tutorials with TAs particularly useful. There are 10 tutorials with TAs this semester (there is no tutorial in the first and last week). Four of them will be used for term tests and term test reviews. The remaining 6 will be used as a type of group office hour with your TA. There will be no assigned questions for tutorials. Instead, students in this course are expected to work on all the end-of-section practice questions. They should post their “muddiest points” – concepts they do not quite understand from the lectures, end-of-section questions they deem challenging, or question solutions in the textbook they do not fully understand – to their own TA *by noon on Thursday before your tutorial on Friday*. The concepts and questions can be related to any section we have covered in lectures so far – they do not have to be from the most recent lecture/sections. TAs will then strive to address as many of these muddiest points as possible in the tutorials. You are welcome to walk in with your questions as well. However, please respect the fact that TAs usually need some time to think through the questions themselves. So to not waste TA’s and your fellow students’ time, it is best to post the questions the day before so TAs can come to the tutorial prepared.