UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

Department of Mathematics & Statistics
MS 476
403 220-5210
mathinfo@ucalgary.ca

COURSE OUTLINE

1. **Course:** ACSC 325, Theory of Interest/Mathematics of Finance - Fall 2020

   Lecture 01: MWF 09:00 - 09:50 - Online

Instructor	Email	Phone	Office	Hours
Dr. Sang Kang	sangjin.kang@ucalgary.ca	N/A	VIA ZOOM	ACSC 325, ACSC 425: After Zoom meeting on respective days / STAT 213: 9:30 am-11:00 am on Tuesday and Thursday

   This course is accredited under the Canadian Institute of Actuaries (CIA) University Accreditation Program (UAP). Achievement of the minimum required grades in accredited courses may provide credit for preliminary exams. Please note that a combination of courses may be required to achieve exam credit.

   Online Delivery Details:

   Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

   Students are encouraged to join the first day course orientation meeting at 9:00 - 9:50 a.m. on September 09 (Wed). Be aware that only this first meeting will not be recorded due to the challenges of managing Q&A through chatting on Zoom.

   Expectation for students: Weekly portion of course materials are available week by week. Students are encouraged to meet the Checklist to enhance your learning process.

   Live Zoom meeting: The regular Zoom meeting is held onevery Monday and Friday. Make sure that the live Zoom meeting does not cover the pre-recorded video contents. Rather, this session is purposed for the example practice and spreadsheet illustration through Microsoft Excel. Although students are not required to be online simultaneously (synchronously), recorded live lecture will be included as the components of weekly Checklist.

   Quizzes and regular term exams: Those are administered through Gradescope. Students are required to upload the scanned hand-written answer through Gradescope. The exam hours are discussed during the first day course orientation meeting.

   Academic Integrity: Due to the unique remote learning environment, we find the possibilities of cheating is a large concern of instructors and students alike. Basic mind-set is on **trust** between instructor and student and **honesty** to follow the common sense as students. Please refer toAcademic integrity for students by Taylor Institute for Teaching and Learning.

   Course Site:

   D2L: ACSC 325 L01-(Fall 2020)-Theory of Interest/Mathematics of Finance

   Note: Students must use their U of C account for all course correspondence.

2. **Requisites:**

   See section 3.5.C in the Faculty of Science section of the online Calendar.

   Prerequisite(s):
   One of Mathematics 249, 265 or 275.

3. **Grading:**

   The University policy on grading and related matters is described in F.1 and F.2 of the online University Calendar.

   In determining the overall grade in the course the following weights will be used:

Component(s)	Weighting %	Date
Discussion Board participation	4%	To be discussed on the first course introduction day
Excel Assignments	6%	To be discussed on the first course introduction day
Three quizzes	10%	Sep, 29 (Tue) / Oct, 20 (Tue) / Dec, 1(Tue) 40 minute-quiz (+15 minutes) [Starting at 7:00 pm]
Mid-term Exam	30%	Nov, 3 (Tue) 2-hour exam (+15 minutes) [Starting at 7:00 pm]
Final Exam	50%	To be scheduled by the Registrar 3-hour exam (+15 minutes)

Note: Because of accreditation, the Canadian Institute of Actuaries has prescribed that only 15 minutes of additional time is allowed for the uploading/downloading requirements for each exam in CIA-UAP courses.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	88 %	84 %	80%	76%	72 %	68 %	64%	60%	50 %	45 %

This course has a registrar scheduled final exam.

4. **Missed Components Of Term Work:**

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, then the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course.

5. **Scheduled Out-of-Class Activities:**

The following out of class activities are scheduled for this course.

Activity	Location	Date and Time	Duration
Quiz 1	Web-Based	Tuesday, September 29, 2020 at 7:00 pm	55 Minutes
Quiz 2	Web-Based	Tuesday, October 20, 2020 at 7:00 pm	55 Minutes
Mid-term Exam	Web-Based	Tuesday, November 3, 2020 at 7:00 pm	135 Minutes
Quiz 3	Web-Based	Tuesday, December 1, 2020 at 7:00 am	55 Minutes

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

6. **Course Materials:**

Required Textbook(s):

Broverman, S.A., *Mathematics of Investment and Credit (Seventh Edition), 2017*. ACTEX Publications.

Textbook is required to understand the contents covered in this course and the FM exam administrated by Society of Actuaries (SOA). PPT slides, pre-recorded videos, live Zoom meeting records, and some supplemental notes are included through the D2L course website.

With college bookstores often unavailable to students' remote learning environment, ACTEX Learning created a temporary *College eBookstore* on its site and offer 20% college bookstore discount to your students. Please refer to the following website: ACTEX Learning College Book discount

The supplementary notes for FM Exams

- FM-24-17 Using Duration and Convexity to Approximate Change in Present Value
- FM-25-17 Interest Rate Swaps
- FM-26-17 Determinants of Interest Rates

In addition, as this course is tied to FM exam provided by SOA (Society of Actuaries), the following link is useful to prepare this course:

- Exam FM: Financial Mathematics

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC ELearning online website.

7. **Examination Policy:**

1. Only non-programmable calculators may be used for the midterm and final exam.

The following (SOA exam) models of Texas Instruments are strongly recommended:

- BA-35
- BA II Plus
- BA II Plus Professional
- TI-30Xa
- TI-30X II
- TI-30XS Multiview

2. Make sure that memories should be cleared prior to the exam. Exams will be published online at the same time for all candidates, with a total publication and completion time limit corresponding to **the exam duration plus a limited period of about 15 minutes for upload** if paper answers are to be uploaded. Exceptions will be made only to students who have SAS accommodations and/or students who are living in different time zones; these will be handled on a case by case basis.

3. **You will be required to sign the following statement** based on honor on each assessment "I understand that this assessment is part of an accredited course under the University Accreditation Program of the Canadian Institute of Actuaries (CIA). In addition to the University rules governing academic integrity, I understand that I am subject to the Code of Conduct and Ethics for Candidates in the CIA Education System and related policy. I swear on my honor to have completed the work on my own and in accordance with the assessment's rules and instructions."

4. The issues #2 & #3 follow the CIA University Accreditation Program Preferred Practices. The related issues will be discussed during the first day of class meeting. (Sep, 9, Wed)

Students should also read the Calendar, Section G, on Examinations.

8. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

9. **Writing Across The Curriculum Statement:**

   For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section E.2 of the University Calendar.

10. **Human Studies Statement:**

    Students will not participate as subjects or researchers in human studies.

    See also Section E.5 of the University Calendar.

11. **Reappraisal Of Grades:**

    A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See Section I.3 of the University Calendar.

    a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections I.1 and I.2 of the University Calendar

    b. **Final Exam:**The student shall submit the request to Enrolment Services. See Section I.3 of the University Calendar.

12. **Other Important Information For Students:**

    a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, Mental Health Services Website) and the Campus Mental Health Strategy website (Mental Health).

    b. **SU Wellness Services:** For more information, see www.ucalgary.ca/wellnesscentre or call 403-210-9355.

    c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (svsa@ucalgary.ca) or phone at 403-220-2208. The complete University of Calgary policy on sexual violence can be viewed at (https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf)

    d. **Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under Section K. Student Misconduct to inform yourself of definitions, processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples**.

    e. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at procedure-for-accommodations-for-students-with-disabilities.pdf.

       Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Mathematics & Statistics, Mark Bauer by email bauerm@ucalgary.ca or phone 403-220-4189. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See Section E.4 of the University Calendar.

f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see Legal Services website.

g. **Student Union Information:** VP Academic, Phone: 403-220-3911 Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: 403-220-3913 Email: sciencerep@su.ucalgary.ca. Student Ombudsman, Email: ombuds@ucalgary.ca.

h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction (USRI) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or non-academic misconduct, in addition to any other remedies available at law.

j. **Canadian Institute of Actuaries Ethics:** In addition to the university's internal policies on conduct, including academic misconduct (Section K of the online calendar), candidates pursuing credits for writing professional examinations shall also be subject to the Code of Conduct and Ethics for Candidates in the CIA Education System and the associated Policy on Conduct and Ethics for Candidates in the CIA Education System. For more information, please visit Obtaining UAP Credits and the CIA FAQ

Course Outcomes:

- By the end of the course, students will be expected to be able to define and recognize the definitions of the following terms: interest rate (rate of interest), simple interest, compound interest, accumulation function, future value, current value, present value, net present value, discount factor, discount rate (rate of discount), convertible m-thly, nominal rate, effective rate, inflation and real rate of interest, force of interest, equation of value
- By the end of the course, students will be expected to be able to write and solve time value of money equations
- By the end of the course, students will be expected to be able to define and recognize the definitions of the following terms: annuity-immediate, annuity due, perpetuity, payable m-thly or payable continuously, level payment annuity, arithmetic increasing/decreasing annuity, geometric increasing/decreasing annuity, term of annuity
- By the end of the course, and given sufficient information of immediate or due, present value, future value, current value, Interest rate/yield rate, payment amount, and term of annuity, students will be expected to be able to calculate any remaining item
- By the end of the course, students will be expected to be able to define and recognize the definitions of the following terms: principal, interest, term of loan, outstanding balance, final payment (drop payment, balloon payment), amortization, sinking fund.
- By the end of the course, given sufficient information of loan amount, payment stream, interest rates, etc., students will be expected to be able to calculate the outstanding balance at any point in time, the amount of principal and interest in a given payment, and complete an amortization and / or sinking fund schedule.
- By the end of the course, students will be expected to be able to define and recognize the definitions of the following terms: price, book value, amortization of premium, accumulation of discount, redemption value, par value/face value, yield rate, coupon, coupon rate, term of bond.
- By the end of the course, and given sufficient information of price, book value, redemption value, face value, yield rate, coupon amount, coupon rate, and term of bond, students will be expected to be able to calculate any remaining item.
- By the end of the course, students will be expected to be able to define, recognize, and (where appropriate) calculate the following: yield rate/rate of return, dollar-weighted rate of return, time-weighted rate of return, current value, duration (Macaulay and modified), convexity (Macaulay and modified), portfolio, spot rate, forward rate, yield curve.

Electronically Approved - Sep 10 2020 16:58

Department Approval

Electronically Approved - Sep 11 2020 12:55

Associate Dean's Approval