



COURSE OUTLINE

1. **Course:** ACSC 325, Theory of Interest/Mathematics of Finance - Fall 2021

Lecture 01: F 09:00 - 09:50 in ST 139

Instructor	Email	Phone	Office	Hours
Dr. Sang Kang	sangjin.kang@ucalgary.ca	403 210-8697	MS 364/VIA ZOOM	ACSC 325: 3:30 pm~5 pm (Wed, Fri) / ACSC 425: 11 am~12:30 pm (Mon, Wed) / STAT 213: 12:30 pm~2 pm (Tue, Thu)

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.

Remark: The first orientation class meeting will be held with live Zoom session at 9:00 am - 9:50 am on September 8 (Wed).

In Person Delivery Details:

In this fall term, ACSC 325 is offered as a blended course. On every Friday, starting from September 17, the in-person class mainly covers the problem-solving session using the TopHat participation. The following table provides the schedule of the in-person class meeting.

Date	Time
September 10 (Fri)	No in-person class (Pre-record video lecture will be provided.)
September 17 (Fri)	9:00 am - 9:50 am (ST 139)
September 24 (Fri)	9:00 am - 9:50 am (ST 139)
October 1 (Fri)	9:00 am - 9:50 am (ST 139)
October 8 (Fri)	9:00 am - 9:50 am (ST 139)
October 15 (Fri)	9:00 am - 9:50 am (ST 139)
October 22 (Fri)	9:00 am - 9:50 am (ST 139)
October 29 (Fri)	9:00 am - 9:50 am (ST 139)
November 5 (Fri)	9:00 am - 9:50 am (ST 139)
November 12 (Fri)	No in-person class (Reading week)
November 19 (Fri)	9:00 am - 9:50 am (ST 139)
November 26 (Fri)	9:00 am - 9:50 am (ST 139)
December 3 (Fri)	9:00 am - 9:50 am (ST 139) [The last in-person class]

The tutorial session also runs as an in-person base. During the tutorial session, three quizzes will be administrated. In addition, the problem-solving session from the Sample FM exam questions will be covered. The following table provides the schedule of the in-person tutorial session.

Date	Time for Tutorial 1	Time for Tutorial 2
September 14 (Tue)	No tutorial	No tutorial
September 21 (Tue)	9:00 am - 9:50 am (MS 325)	10:00 am - 10:50 am (MS 325)
September 28 (Tue)	9:00 am - 9:50 am (MS 325)	10:00 am - 10:50 am (MS 325)
	Quiz 1	Quiz 1
October 5 (Tue)	9:00 am - 9:50 am (MS 325)	10:00 am - 10:50 am (MS 325)
October 12 (Tue)	9:00 am - 9:50 am (MS 325)	10:00 am - 10:50 am (MS 325)
October 19 (Tue)	9:00 am - 9:50 am (MS 325)	10:00 am - 10:50 am (MS 325)
October 26 (Tue)	9:00 am - 9:50 am (MS 325)	10:00 am - 10:50 am (MS 325)
	Quiz 2	Quiz 2
November 2 (Tue)	9:00 am - 9:50 am (MS 325)	10:00 am - 10:50 am (MS 325)
November 9 (Tue)	No tutorial (Reading week)	No tutorial (Reading week)
November 16 (Tue)	9:00 am - 9:50 am (MS 325)	10:00 am - 10:50 am (MS 325)
November 23 (Tue)	9:00 am - 9:50 am (MS 325)	10:00 am - 10:50 am (MS 325)

Date	Time for Tutorial 1	Time for Tutorial 2
November 30 (Tue)	9:00 am - 9:50 am (MS 325) Quiz 3	10:00 am - 10:50 am (MS 325) Quiz 3
December 7 (Tue)	No tutorial	No tutorial

Re-Entry Protocol for Labs and Classrooms:

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#). **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.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

There are two main online-learning components.

1. Weekly pre-recorded lecture videos as an asynchronous component
2. As a synchronous component, the live Zoom session will be held on every Monday, 9:00 a.m. - 9:50 a.m. This live Zoom session is to cover either the live lecture or the spreadsheet practice associated with the Excel assignment or the practice of sample FM exam questions. The tentative schedule of live Zoom session will be subsequently announced week by week during the semester. In addition, the synchronous online meeting on Monday will be recorded.

The following table provides the schedule of the live Zoom session.

Date	Time
September 13 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
September 20 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
September 27 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
October 4 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
October 11 (Mon)	No live Zoom session (Thanksgiving Day)
October 18 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
October 25 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
November 1 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
November 8 (Mon)	No live Zoom session (Reading week)
November 15 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
November 22 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
November 29 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L)
December 6 (Mon)	9:00 am - 9:50 am (Refer to Zoom link in D2L) [The last Zoom meeting]

Course Site:

D2L: ACSC 325 L01-(Fall 2021)-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
TopHat participation	4%	Every Friday in-person class
Excel assignment	4%	To be introduced on the first course orientation day
3 quizzes	12%	30-minute quiz for each tutorial session (September 28, October 26, and November 30)
Mid-term exam 1	20%	7:00 pm - 8:30 pm on October 12 (Exam place will be announced.)
Mid-term exam 2	20%	7:00 pm - 8:30 pm on November 16 (Exam place will be announced.)
Final exam	40%	To be scheduled by Registrar * Duration of the final exam: 2 hours

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 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	52 %	50 %

This course will have a final exam that will be scheduled by the Registrar. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

For timed evaluation components, including three quizzes, two mid-term exams, and final exams, the bottom line of assessment is to present yourself on the place where students need to take the exam. If, however, students may not come to the place having timed evaluation components for inevitable circumstances (e.g., different time zones, inability to come to Calgary due to the study permit issue or the flight issue and so on), please e-mail the instructor, John Sang Jin Kang (sangjin.kang@ucalgary.ca), to arrange accommodations. Please note that only valid reasons will be accommodated.

The University of Calgary offers a [flexible grade option](#), Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

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, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

5. Scheduled Out-of-Class Activities:

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

Activity	Location	Date and Time	Duration
Midterm - 1	On-Campus, room to be announced	Tuesday, October 12, 2021 at 7:00 pm	1.5 Hours
Midterm - 2	On-Campus, room to be announced	Tuesday, November 16, 2021 at 7:00 pm	1.5 Hours

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):

Stephen G. Kellison, *Theory of Interest, 3rd Edition*: McGraw Hil.

The Solution Manual is available online:

http://highered.mheducation.com/sites/0073382442/information_center_view0/solutions_manual.html

The supplementary notes for FM Exam

- [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](#)

The following materials will also cover during the live Zoom session and the in-class tutorial:

- [The sample FM exam questions](#)
- [The solution of the sample FM exam questions](#)

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:

Only non-programmable calculators may be used for the quizzes, midterm exams and final exam.

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

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

Students should also read the Calendar, [Section G](#), on Examinations.

As this course is a CIA accredited course, we need to follow two of the preferred practices given in the [CIA UAP](#).

1. 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.
2. 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."

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](tel: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](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf>).
- d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)
[Student Academic Misconduct Policy](#) and [Procedure](#)
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

e. **Academic Accommodation Policy:**

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Mark Bauer by email bauerm@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

- f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIP). 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](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel: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 07 2021 11:20

Department Approval

Electronically Approved - Sep 07 2021 16:27

Associate Dean's Approval