COURSE OUTLINE

1. **Course:** ACSC 515, Models for Financial Economics - Winter 2022

   Lecture 01: MWF 12:00 - 12:50 in MS 431

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Email</th>
<th>Phone</th>
<th>Office</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Alexandru Badescu</td>
<td><a href="mailto:abadescu@ucalgary.ca">abadescu@ucalgary.ca</a></td>
<td>220-3963</td>
<td>MS 576</td>
<td>W 15:00 - 16:00</td>
</tr>
</tbody>
</table>

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.

To account for any necessary transition to remote learning in the winter 2022 semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

**In Person Delivery Details:**

When allowed by the University, this course shall use an "In Person" delivery during the allocated lecture time 12:00-12:50 in MS 431.

**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.

For the periods of "online" delivery which have been decided by the University (e.g. January 10-28, 2022), the majority of the course delivery is offered offline via a series of pdf files with the class notes with each lecture accompanied by a video in which I will go over these notes, show proofs of some of the results when necessary and solve a variety of related examples/problems. Over this period I will hold Office Hours on Zoom during the scheduled class time each Wednesday (12-1pm), instead of the 15:00-16:00 Office Hours schedule which applies only during the "In Person" teaching.

The first lecture on January 10 will be held "live" on Zoom during the allocated lecture time, 12:00-12:50. If the "online" delivery continues for a longer period, I shall run a few other lectures "live" on Zoom before the midterms and the final exam.

**Course Site:**

D2L: ACSC 515 L01-(Winter 2022)-Models for Financial Economics

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

**Equity Diversity & Inclusion:**

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of
Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

2. **Requisites:**

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

**Prerequisite(s):**
Actuarial Science 325 and Statistics 321.

**Antirequisite(s):**
Credit for Actuarial Science 515 and 539.04 will not be allowed.

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:

<table>
<thead>
<tr>
<th>Course Component</th>
<th>Weight</th>
<th>Due Date (duration for exams)</th>
<th>Modality for exams</th>
<th>Location for exams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1¹</td>
<td>10%</td>
<td>Ongoing</td>
<td></td>
<td></td>
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<tr>
<td>Assignment 2²</td>
<td>10%</td>
<td>Ongoing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midterm 1³</td>
<td>15%</td>
<td>Feb 18 2022 at 11:58 am (45min Minutes)</td>
<td>online</td>
<td>Online</td>
</tr>
<tr>
<td>Midterm 2</td>
<td>15%</td>
<td>Apr 01 2022 at 12:00 pm (50 Minutes)</td>
<td>in-person</td>
<td>In Class</td>
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<tr>
<td>Registrar Scheduled Final Exam</td>
<td>50%</td>
<td>Will be available when the final exam schedule is released by the Registrar</td>
<td>in person</td>
<td>Will be available when the final exam schedule is released by the Registrar</td>
</tr>
</tbody>
</table>

¹ This timed assessment will be available in Dropbox on D2L on February 9 at 12:00pm. The deadline for your submission in Dropbox is on February 16 at 3:00pm.
² Released March 23, 2022 - Tentative deadline is on March 30, 2022 at 3:00pm
³ This timed assessment will be available in Dropbox on D2L on February 18th at 11:58am and will be available for 1 hour. The assessment is designed to take you 45 minutes of writing time with 15 minutes of buffer time. It must be completed and submitted by February 18th at 1:00pm. As this course is accredited by the Canadian Institute of Actuaries, you get only 15 min of buffer time.

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.

<table>
<thead>
<tr>
<th></th>
<th>A+</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>D+</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minimum % Required</strong></td>
<td>95 %</td>
<td>90 %</td>
<td>85 %</td>
<td>80 %</td>
<td>75%</td>
<td>70 %</td>
<td>65%</td>
<td>60%</td>
<td>55%</td>
<td>52%</td>
<td>50%</td>
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This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. 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.

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](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:**

There are no scheduled out-of-class activities for this course.

6. **Course Materials:**

Required Textbook(s):


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](https://www.ucalgary.ca/learning) online website.

7. **Examination Policy:**

No aids are allowed on tests or examinations.

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. If this course is being offered online, 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.

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/legal-services/sites/default/files/teams/1/Policies-Sexual-and-Gender-Based-Violence-Policy.pdf](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](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](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 fulfill 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 (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: sciencerepi@su.ucalgary.ca. Student Ombudsman, Email: ombuds@ucalgary.ca.
h. **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.

i. **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:**

- Describe what is meant by a long (or short) position in an asset.
- Give the definitions of various derivative securities such as options (American and European), forwards, futures and swaps, and more complex option positions such as bull/bear spreads, butterflies, condors, naked/covered calls and puts, and describe how they are used in hedging and investment strategies.
- Use put-call parity to determine the relationship between prices of European put and call options.
- Identify arbitrage opportunities when derivatives are mispriced and describe how to exploit them.
- Write down the Black-Scholes option pricing formula, and describe the meaning of the various terms that arise in the formula and the modelling assumptions that lie behind the formula.
- Calculate values of option positions using numerical methods such as Monte Carlo simulation and binomial trees, and describe sources of error in such computations and how errors can be controlled.
- Explain the characteristics of exotic options such as Asian, barrier and compound options, etc.
- Describe and interpret option Greeks and their use in risk management contexts.
- Describe the properties of the diffusion process (i.e. simple Brownian motion), and use Itô’s Lemma to transform and solve some stochastic differential equations.