

ACTU 491 (MAST 729/881), Sec. M
Topics in Actuarial Mathematics
Fall 2021

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- Preface:** Due to exceptional circumstances, this course (teaching and assessments) will be in-person/hybrid. Given the subject matter and nature of this course, **the midterm exam will be given online through the Concordia Online Exams (COLE) platform with online proctoring.** For more details see the ADDENDUM at the end of this Course Outline.
- Office Hours:** In person and online (Zoom link will be sent), by appointment, availabilities posted on Moodle.
- Delivery Methods:** In-person/hybrid delivery. A portion of the course will be pre-recorded. There will be announced in-person and live Zoom sessions which will be announced on Moodle, held during specified regular class time: Tuesdays-Thursdays, from 8:45-10:00.
- Outline:** This course is intended to deepen statistical and probabilistic concepts, related to risk measures. The topics are:
 - (1) Definition of Distributional Univariate Risk Measures and Properties
 - (2) Risk Aggregation and Decomposition
 - (3) Optimization Based Univariate Risk Measures
 - (4) Systemic Risk
 - (5) Sensitivity Analysis
 - (6) Distorted Measures
 - (7) Backtesting, Regression, Depth Trimmed Regions
 - (8) Multivariate Framework and Extension of Univariate Risk Measures

Students are expected to have a basic knowledge of statistical programming in *R Statistical Software*
- Text:** There is no required reference textbook for this course.
- Other texts:** Shapiro, A., Dentcheva, D., & Ruszczyński, A. (2014). *Lectures on stochastic programming: modeling and theory*. Society for Industrial and Applied Mathematics.

Marceau, É. (2013). *Modélisation et évaluation quantitative des risques en actuariat, Modèle sur une période*, Springer-Verlag, France.

Hardy, M. (2006). *An Introduction to Risk Measures for Actuarial Applications*.
www.casact.org/sites/default/files/database/studynotes_hardy4.pdf

Additional material (freely available online) will be provided during the semester.

In addition to the university's internal policies on conduct, including academic misconduct, 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.

Assignments: There will be three assignments, to be handed in class at the beginning of the lectures in specific weeks (mentioned in class). These will count 20% towards your final grade. Students are encouraged to work in groups of **at most 2** members. Only one assignment is handed in per group. **Graduate students are required to complete all assignments individually.**

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

Term Project: There will be a term project, worth 40% of the final grade (oral and report).

Final Exam: There will be a final examination counting for 40% of the final grade and scheduled by the University Examinations Office during the regular examination period in April. **There is no option for a 100% final or supplemental exam.** The grading scheme used to convert percentage marks into corresponding letter grades is given at the following webpage <http://www.concordia.ca/artsci/math-stats/programs/grading.html>, then to convert letter grades to a Grade Point Average (GPA) see the formula at <http://www.concordia.ca/academics/undergraduate/calendar/current/sec16/16.html#b16.3.11> under article 16.3.11.

Academic Integrity and the Academic Code of Conduct

This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity." [Undergraduate Calendar, Sec 17.10.2]

Behaviour

All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the [Code of Rights and Responsibilities](#) which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

Use of Zoom

Note: Zoom is included as an institutionally-approved technology. This means we have been assured of the privacy protections needed to use freely within the classroom)

Zoom will be used in this course to facilitate learning at a distance. It may be used to record some or all of the lectures and/or other activities in this course. If you wish to ensure that your image is not recorded, speak to your instructor as soon as possible.

Also, please note that you may not share recordings of your classes and that the instructor will only share class recordings for the purpose of course delivery and development. Any other sharing may be in violation of the law and applicable University policies, and may be subject to penalties.

Intellectual Property

Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the [Academic Code of Conduct](#) and/or the [Code of Rights and Responsibilities](#). As specified in the [Policy on Intellectual Property](#), the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Extraordinary circumstances

In the event of extraordinary circumstances and pursuant to the [Academic Regulations](#) the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.

Addendum:

This course will be taught and all assessments will be partially online. A midterm and/or a final online exam will be provided through the Concordia Online Exams (COLE) platform. More information about the COLE system may be found at the [COLE website](#). Additionally, an online proctoring tool called Proctorio will be used to provide proctoring during the exam. This type of proctoring is known as auto-proctoring, as there is no invigilation during the exam. Instead, your professor will review the recording after the exam.

Please note the following with respect to online proctored exams:

- That the exam will take place during the exam period at the designated date and time set by the professor (midterm) or the Exams office (final). All exam times will be set to Eastern Standard/Daylight Time.
- That Proctorio is used to help uphold academic integrity. Proctorio's Terms of Service may be reviewed at <https://proctorio.com/terms>. Recordings made and information collected during the exam may be used for this purpose, in accordance with the Academic Code of Conduct.

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- That your image, voice and screen activity, including IP address, may be recorded throughout the duration of the exam.
- That you are required to turn on your webcam and it must be pointed toward your face and workspace at all times during the exam, failing which your exam may be deemed invalid.
- That you must show your Concordia University Identification card to validate your identity. Alternative government-issued photo identification will be accepted, though it is not recommended. Only identification in English or French will be accepted.
- That any recording made will only be viewed by authorized university personnel and personnel authorized pursuant to University policies (no external entity has authorization to review the recording).
- That you will be responsible for ensuring appropriate, properly functioning technology (webcam, a microphone, appropriate browser and an ability to download any necessary software, as well as a reliable internet connection with a minimum of a 3G connection).
- That you are very strongly recommended to enter the virtual test site found at the [COLE website](#) and become familiar with the software that will be used for your exam before starting the exam.
- That you will need a quiet place within which to take the exam. Earplugs may also be used to allow you to focus for the duration of the exam. Noise cancelling headphones are not allowed.

Students who are unable to write an exam because they are unable to meet the above conditions and requirements are advised that they will need to drop the course. More information can be provided on the next offering of this course by consulting the Department. Students are advised that the drop deadline (DNE) for this course is **September 20, 2021**.

Students who require additional accommodations for their exams due to a documented disability should contact the Access Centre for Students with Disabilities as soon as possible (acsinfo@concordia.ca).

If you face issues during the exam, you should inform your professor of those issues immediately. Please note that there are in-exam supports you should spend time getting to know. [Visit the COLE website](#) for more information.