

ACTU 457 (MAST 724/MAST 881), Sec. O

Risk Theory

Winter 2021

- Instructor:** Dr. M. Mailhot
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- Preface:** Due to exceptional circumstances, this course will be taught and all assessments will be done completely ONLINE. Given the subject matter and nature of this course, **the midterm and the final exams 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:** Online (Zoom link will be sent), by appointment, availabilities posted on Moodle.
- Delivery Methods:** Online delivery. A portion of the course will be pre-recorded. There will be live sessions (Zoom) which will be announced on Moodle, held during specified regular class time: Tuesdays-Thursdays, from 10:15-11:30.
- Outline:** Risk theory forms the core part of Property-Casualty Insurance mathematics. The course gives an introduction to classical models and applies them to some common problems of interest in risk theory.
- The emphasis is on the probabilistic aspects (stochastic processes) although some estimation (inference) questions will also be discussed. The topics include (**but are not limited to**) aggregate risk models, homogenous and non-homogenous discrete-time Markov chain models, Poisson processes, coinsurance, effects of inflation on losses, risk measures (VaR, TVaR), development triangles and reserving. The course prepares for the Risk Theory portion of Exams C of the Society of Actuaries and Exam 4 of the Casualty Actuarial Society. A grade of B or better is needed to apply to the Canadian Institute of Actuaries for exemption of Exams C/4. For more information click [here](#).
- Text:** "Loss Models", S.A. Klugman et al., Wiley, New York, 2012, 4th Edition.
The textbook will be available at:
<https://www.bkstr.com/concordiastore/home>
Note: Students should order textbooks as early as possible, especially for printed versions in case books are backordered or there are any shipping delays.

- Other Texts:** “Modélisation et évaluation quantitative des risques en actuariat, Modèle sur une période”, É. Marceau, Springer-Verlag, France, 2013.
- “Non-Life Insurance Mathematics”, E. Straub, Springer-Verlag, New-York, 1988 (U/G - Theoretical),
- “Practical Risk Theory for Actuaries”, C.D. Daykin et al., Chapman & Hall, 1994 (U/G - Practical),
- “Stochastic Processes for Insurance and Finance”, T. Rolski et al., Wiley, 1999 (Graduate-Theoretical).
- “Non-Life Insurance Mathematics”, T. Mikosch, 2nd Edition, Springer-Verlag, Berlin, 2009 (Graduate - Theoretical).

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.

Calculators: The only calculators allowed in tests or at the final exam for this course are those allowed at SOA/CAS exams: the Texas Instrument calculator models BA-35, BA-II Plus, BA-II Plus Professional Edition, TI-30XS MultiView, TI-30Xa, TI-30XIIS, TI-30XIIB or TI-30XM MultiView. This rule will be strictly enforced. <https://www.soa.org/education/exam-req/exam-day-info/edu-calculators.aspx> for information on SOA approved calculators.

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 10% 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.

Tests and Final: There will be one class mid-term test in the seventh week of classes counting for 40% of your final mark and a final examination counting for the remaining 50% 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.

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 completely online. A midterm and/or a final online exam will be provided through the Concordia Online Exams (COLE) platform with online proctoring (also known as auto-proctoring). 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.

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 your image, voice and screen activity will be recorded throughout the duration of the exam.
- 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 (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 or noise-cancelling headphones that are not connected to a device may also be used to allow you to focus for the duration of the exam.

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 **January 26, 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.