Department of Mathematics and Statistics
Concordia University

ACTU 459 (MAST 726/MAST 881), Sec. E

Loss Distributions

Winter 2026

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Class Schedule: Fridays, 8:45-11:30 AM.
Note: There will be a mid-term break from March 2 to March 8.

Office Hours: TBA.

Goal: The problem of fitting probability distributions to loss data is studied. In practice, heavy tailed distributions are used (i.e. skewed to the right) which require some special inferential methods. The problems of point and interval estimation, test of hypotheses and goodness of fit are studied in detail under a variety of inferential procedures (empirical, maximum likelihood) and of sampling designs (individual/grouped data, truncation and censoring). Loss data sets serve as illustration of the methods.

The statistical package S-Plus or the (shareware) statistical software R or the spreadsheet EXCEL application will be used for data analysis.

Text: Klugman, S.A., Panjer, H.H. and G.E. Willmot (2012) "*Loss Models*", 5th Edition, Wiley, New York; you can also use the 4th (or 3rd) Edition, if you already own a copy.
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: Klugman, S.A., Panjer, H.H. and G.E. Willmot (2008) "*Loss Models*", 3rd Edition, Wiley, New York.

Hogg, R.V., McKean, J.W. and A.T. Craig (2005) "*Introduction to Mathematical Statistics*", 6th Edition, Pearson, Upper Saddle River, NJ.

Lawless, J.F. (2003) "*Statistical Models and Methods for Lifetime Data*", 2nd Edition, Wiley, Hoboken, NJ.

Calculators: The only calculators allowed in exams for this course are the ones approved by the SOA/CAS exams: the Texas Instrument calculator models BA-35, BA-II Plus*, BA-II Plus Professional, TI-30Xa, TI-30XII (IIS solar or IIB battery), TI-

30XS MultiView (or XB battery). This rule will be strictly enforced.

* The memory of TI–30X II (IIS solar or IIB battery), TI-30X MultiView (XS Solar or XB Battery), BA II Plus, and BA II Plus Professional will need to be cleared by the examination supervisor upon the candidates' entrance to the examination room. For the BA II Plus and BA II Plus Professional, clearing will reset the calculator to the factory default settings.

For a list of Department Approved calculators see
www.concordia.ca/artsci/math-stats/services.html

Assignments: There will not be graded assignments.
The evaluation is based on three tests and the modeling project (oral presentation and report). There will be no make-up exams.

Final Grade: The final grade will be determined as follows:

a) 3 Exams: 80% (that is 30%, 25% and 25%, respectively)
b) Project Oral: 5%
c) Project Report: 15%

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.

CIA Accreditation: This course is a mandatory component of the Canadian Institute of Actuaries (CIA) University Accreditation Program at Concordia University. Successful completion of this course is required for students pursuing the Associate of the CIA (ACIA) designation through Pathway 1. Students must successfully complete all *CIA-mandatory courses* within their actuarial degree to be eligible to register to the ACIA Capstone Exam.

Participants to CIA educational activities must act in a professional manner to uphold the reputation of the profession and specifically must act in accordance with the *CIA's Code of Conduct and Ethics for Participants in the CIA Education System*. In addition, Students and Candidate members of the CIA are subject to the *CIA Rules of Professional Conduct*.

Student Services

You may wish to access the many services available to you as a Concordia student. An overview of these resources can be found here: https://www.concordia.ca/students/services.html

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: https://www.concordia.ca/conduct/academic-integrity.html" *[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.