

ACTU 458 (MAST 725/881), Sec. D
Credibility Theory
Fall 2021

- Instructor:** Dr. Y. Lu, Office: LB 921-21 (SGW), Phone: (514) 848-2424, Ext. 2948
Email: yang.lu@concordia.ca
Course webpage: on Moodle.
- Office Hours:** Tuesdays & Thursdays, 15:00-17:00 (on campus)
Wednesdays, 10:00-12:00 (via Zoom)
- Class Schedule:** Tuesdays-Thursdays, 10:15-11:30 am.
- Goal:** The course presents an introduction to statistical estimation techniques for insurance data. It is the natural continuation of Risk Theory, which discusses the probabilistic aspects of insurance portfolios.

In the first part of the course, two approaches to credibility theory are discussed: limited fluctuations and greatest accuracy. Topics covered include American, Bayesian and exact credibility. Bühlmann, Bühlmann-Straub, hierarchical and regression credibility models are also derived. The second part of the course will be focused on Generalized Linear Models and a short introduction to machine learning techniques, including regularization methods. Finally, mathematical models for loss reserving (Chain-Ladder etc.) will be introduced.

The course prepares for the Credibility part of the Society of Actuaries Exam STAM and the Casualty Actuarial Society Exam MAS II. It also covers more advanced material, as needed to use modern credibility with real insurance data. A grade of B or better is needed to apply to the Canadian Institute of Actuaries for exemption of Exam STAM (see [Accredited Programs \(concordia.ca\)](http://www.concordia.ca/actuarial/programs)).

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](#).

Text: *Loss Models, From Data to Decision*, by S.A. Klugman, H.H Panjer, and G. E. Willmot, Wiley, 5th Edition, 2019. Online version available on the University Library website (you can also use the 4th Edition, 2012).

Other References: *Effective Statistical Learning Methods for Actuaries I, GLMs and Extensions*. By M. Denuit and D. Hainaut, 1st Edition, Springer, 2019. EBook available on the University Library website.

Introduction to Ratemaking and Loss Reserving for Property and Casualty Insurance, 4th Edition, by R.L. Brown, Actex 2015. A digital version will be uploaded to the Moodle page.

Assignments: There will be 5 assignments counting for a total of 20% of the final mark. You will submit them at the beginning of the Thursday lectures in weeks 3, 5, 8, 9 and 11. Assignments should be submitted as PDF files to the Moodle site. Solutions must be written up carefully, showing all work for full credit. No late assignments will be accepted. 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 mid-term test during online lecture time in week 6 counting for 30% of the final mark and a final examination counting for the remaining 50% and scheduled by the University Examinations Office during the regular examination period in December.

Calculators: The only calculators allowed in tests or at the final exam are those allowed at SOA/CAS exams.

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.

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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.