Department of Mathematics & Statistics
Concordia University

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ACTU 458 (MAST 725/881), Sec. D
Credibility Theory
Fall 2020

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Preface: **Due to exceptional circumstances, this course will be taught and all assessments will be done completely online. The exams will be held online through the Moodle platform. There will be video lectures via Zoom during the scheduled course hours and the slides will be subsequently posted on Moodle.**

Instructor: Dr. I. Cojocaru
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Class Schedule: Tuesdays-Thursdays, 10:15-11:30.
Online via Zoom link (refer to the course's Moodle page).

Office Hours: Thursdays, 13:30-15:00; Fridays, 9:00-11:30 (online via Zoom).

Goal: The course presents an introduction to statistical estimation techniques for insurance data with heterogeneous risk classes. It is the natural continuation of Risk Theory, which discusses the probabilistic aspects of insurance portfolios.

Two classical 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 derived.

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 in this course and in Actu-457 and 459, to apply to the Canadian Institute of Actuaries for exemption of Exams STAM (see http://www.concordia.ca/artsci/math-stats/programs/undergraduate/accredited-programs.html).

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.

Textbook: *Loss Models, From Data to Decision,* by S.A. Klugman, H.H Panjer, and G. E. Willmot, Wiley, 4th Edition, 2012 (or the 3rd Edition, 2008).
The digital version of the textbook will be available at:
https://www.co-opbookstore.ca/service/textbooks/
The print version of the textbook will be available at:
https://www.bkstr.com/concordiastore/home
Note: Students should order textbooks as early as possible, especially for print versions in case books are backordered or there are any shipping delays.

Other References: *Modern Actuarial Theory*, by R. Kaas, M. J. Goovaerts, J. Dhaene, and M. Denuit, Kluwer, 2001 (undergraduate).

A Course in Credibility Theory and its Applications, by H. Bühlmann and A. Gisler, Springer Universitext, 2005 (graduate).

Calculators: The only calculators allowed in tests or at the final exam are those allowed at 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).

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. An announcement on how to do this will be made. 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.

There is no make-up midterm test. There is no option for a 100% final or supplemental exam.

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. If you face issues during the exam, you should inform your professor of those issues immediately.

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#b16.3.10 under article 16.3.10.

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]*

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Disclaimer: In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in the course is subject to change.