

**ACTU 458 (MAST 725/881), Sec. D**  
Credibility Theory  
*Fall 2019*

**Instructor:** Dr. J. Garrido, Office: LB 921.21 (SGW), Phone: 514-848-2424, Ext. 3252  
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Course webpage: on Moodle.

**Office Hours:** Tuesdays-Thursdays, 14:00-16:30 or by appointment.

**Class Schedule:** Tuesdays-Thursdays, 10:15-11:30 in FG B060 (SGW Campus).

**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. Generalized linear models, statistical learning algorithms and the issue of robustness will also be discussed.

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>).

**Text:** *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).

**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). This rule will be strictly enforced.

**Internet:** Course materials will be posted on the *Moodle* website.

**Assignments:** There will be 4 assignments counting for a total of 10% of the final mark. You will hand them in at the beginning of the Thursday lectures in weeks 3, 5, 9 and 11. Undergraduate, students are encouraged to work in teams of **at most 2** members. Only one assignment per team needs to be handed in. 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 week 6 counting for 40% 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 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#b16.3.10> 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](http://concordia.ca/students/academic-integrity)." [*Undergraduate Calendar, Sec 17.10.2*]