

SPRING 2017 - ACMA 490 D300

**SELECTED TOPICS IN ACTUARIAL SCIENCE (3)**  
**Loss Models II***Class Number: 9159 Delivery Method: In Person***COURSE TIMES + LOCATION:**

Mo 10:30 AM – 12:20 PM

AQ 5005, Burnaby

We 10:30 AM – 11:20 AM

AQ 5005, Burnaby

**EXAM TIMES + LOCATION:**

Apr 11, 2017

3:30 PM – 6:30 PM

AQ 5005, Burnaby

**INSTRUCTOR:**

Cary Tsai

cltsai@sfu.ca

1 778 782-7044

Office: SC-K10563

**PREREQUISITES:**

Dependent on the topic covered.

## Description

**CALENDAR DESCRIPTION:**

The topics included in this course will vary from term to term depending on faculty availability and student interest.

**COURSE DETAILS:****Pre-requisites: ACMA 320 and STAT 330****Course Description:**

Frequency and severity with coverage modifications: deductibles, policy limit, coinsurance. Aggregate loss models. Conjugate priors, linear exponential family. Credibility models. Estimation: empirical Bayes, nonparametric, semiparametric. Simulations. Stochastic processes: Poisson and compound Poisson processes. Covers part of the syllabus for Exam C of the Society of Actuaries and Exam 4 of the Casualty Actuarial Society.

**Course Outline:**

This course covers the fundamentals of actuarial loss models. The topics covered correspond to Chapters 8, 9, Section 15.3 and Chapters 17-20 of the 'Loss Models' textbook and the study notes. They include the following:

1. Frequency and severity with coverage modifications: deductibles, policy limit, coinsurance; the loss elimination ratio, the effect of inflation.
2. Aggregate loss models: compound model for aggregate claims, the recursive method, the impact of individual policy modifications on aggregate payments, individual risk model.
3. Bayes' theorem, prior distribution, posterior distribution, predictive distribution, conjugate prior distributions and the linear exponential family.
4. Limited fluctuation credibility: limited fluctuation credibility theory, full credibility, partial credibility.

5. Greatest accuracy credibility: conditional distributions and expectation, credibility premium, Buhlmann model, Buhlmann-Straub model, exact credibility.
6. Empirical Bayes parameter estimation: nonparametric estimation, semiparametric estimation.
7. Simulation: the inversion method, determining the sample size, simulations in actuarial modeling.
8. Stochastic processes: homogeneous and nonhomogeneous Poisson processes, compound Poisson process.

This course is accredited under the Canadian Institute of Actuaries (CIA) University Accreditation Program (UAP) for the 2016-2017 academic year. Achievement of the established exemption grade in this course may qualify a student for exemptions from writing certain preliminary exams. Please note, a combination of courses may be required to achieve a single exemption. Please see <http://www.cia-ica.ca/membership/uap> for full details.

## Grading

Assignments	10%
Midterm	40%
Final	50%

### NOTES:

***All grading is subject to change.***

## Materials

### REQUIRED READING:

**Loss Models: From Data to Decisions, 4th ed.** Authors: S.A. Klugman and H.H. Panjer. Publisher: Wiley

### RECOMMENDED READING:

**Foundations of Casualty Actuarial Science (4th Edition)**, 2001, H.C. Mahler and C.G. Dean (Study Note C-21-01)

**Topics in Credibility, C.G. Dean** (Study Note C-24-051)

**ACTEX study manual for SOA Exam C and CAS Exam 4**, S.A. Broverman, Publisher: ACTEX

### DEPARTMENT UNDERGRADUATE NOTES:

#### Students with Disabilities:

Students requiring accommodations as a result of disability must contact the Centre for Students with Disabilities 778-782-3112 or [csdo@sfu.ca](mailto:csdo@sfu.ca)

#### Tutor Requests:

Students looking for a Tutor should visit <http://www.stat.sfu.ca/teaching/need-a-tutor-.html>. We accept no responsibility for the consequences of any actions taken related to tutors.

### REGISTRAR NOTES:

SFU's Academic Integrity web site <http://students.sfu.ca/academicintegrity.html> is filled with information on what is meant by academic dishonesty, where you can find resources to help with your studies and the consequences of cheating. Check out the site for more information and videos that help explain the issues in plain English.

Each student is responsible for his or her conduct as it affects the University community. Academic dishonesty, in whatever form, is ultimately destructive of the values of the University. Furthermore, it is unfair and discouraging to the majority of students who pursue their studies honestly. Scholarly integrity is required of all members of the University. <http://www.sfu.ca/policies/gazette/student/s10-01.html>

ACADEMIC INTEGRITY: YOUR WORK, YOUR SUCCESS