COURSE OUTLINES (SYLLABI) FOR AS4824 A/B – LOSS MODELS II

1. General Course Information

theory; Simulation.
This course, together with AS3424b, forms part of the Exam C exemption under the Canadian Institute of Actuaries "University Accreditation Program".

4. Course Materials

Text Book(s)
Klugman, S.A., Panjer, H.H. and Willmot, G.E. (2012). Loss Models: From Data to Decisions, 4th edition, Wiley, Hoboken, NJ.

Chapters 10 through 20 of the "Loss Models" (4th edition) textbook will be covered. Specific topics are listed below:
A. Construction of Empirical Models
1. Estimate failure time and loss distributions using
a) Kaplan-Meier estimator
b) Nelson-Åalen estimator
c) Kernel density estimators
2. Estimate the variance of estimators and confidence intervals for failure time and loss distributions
3. Apply the following concepts in estimating failure time and loss distribution
a) Unbiasedness
b) Consistency
c) Mean squared error
B. Construction and Selection of Parametric Models
1. Estimate the parameters of failure time and loss distributions using:
a) Maximum likelihood
b) Method of moments
c) Percentile matching
d) Bayesian procedures
2. Estimate the parameters of failure time and loss distributions with censored and/or truncated data using maximum
likelihood.
3. Estimate the variance of estimators and the confidence intervals for the parameters and functions of parameters of
failure time and loss distributions.
4. Apply the following concepts in estimating failure time and loss distributions:
a) Unbiasedness
b) Asymptotic unbiasedness
c) Consistency
d) Mean squared error
e) Uniform minimum variance estimator
5. Determine the acceptability of a fitted model and/or compare models using:
a) Graphical procedures

b) Kolmogorov-Smirnov test
c) Anderson-Darling test
d) Chi-square goodness-of-fit test
e) Likelihood ratio test
f) Schwarz Bayesian Criterion
C. Credibility
1. Apply limited fluctuation (classical) credibility including criteria for both full and partial credibility
2. Perform Bayesian analysis using both discrete and continuous models
3. Apply Bühlmann and Bühlmann-Straub models and understand the relationship of these to the Bayesian model.
4. Apply conjugate priors in Bayesian analysis and in particular the Poisson-gamma model.
5. Apply empirical Bayesian methods in the nonparametric and semiparametric cases.
D. Simulation
1. Simulate both discrete and continuous random variables using the inversion method.
2. Estimate the number of simulations needed to obtain an estimate with a given error and a given degree of
confidence.
3. Use simulation to determine the p-value for a hypothesis test.
4. Use the bootstrap method to estimate the mean squared error of an estimator.
5. Apply simulation methods within the context of actuarial models.

Students should check OWL (http://owl.uwo.ca) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

5. Methods of Evaluation

Assignments
Some practice questions will be assigned in class to help students understand the material. These questions are important in the preparation for the midterms and the final exam.

Midterms or Tests
Two midterm tests will be given. The first midterm is 50 minutes and will be held on October 3 in class. The second midterm is 110 minutes and will be held on November 9 in class.

Final Exam
The date and time for the 3-hour final exam will be announced by the registrar's office, usually near the first part of November. Students are required to wait until the final exam schedule is posted before making arrangements for travel over the Christmas period. Exams will NOT be moved to accommodate students who ignore this requirement.

In order to obtain full credit or maximize partial credit on questions, students must outline clearly their approach, showing calculations when necessary.

7.2 Scholastic offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

7.3 Attendance

Classroom attendance is viewed as an important part of the learning process. Students are advised that excessive absenteeism may result in the student being disbarred from the final exam (see Western Academic Calendar).

7.4 Classroom Environment

The Department has adopted a "Mutual Expectations" policy governing the classroom environment and all work submitted by students. The full text of the policy can be found at: http://www.stats.uwo.ca/mutual_expectations.pdf.
In summary, the policy was developed under the premise that all interactions between students and faculty should be governed by the principles of courtesy, respect and honesty.

8. Support Services

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

The policy on Accommodation for Students with Disabilities can be found here: www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

The policy on Accommodation for Religious Holidays can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Learning-skills counsellors at the Student Development Centre (http://www.sdc.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for