

MATH 417A SHORT-TERM ACTUARIAL MATHEMATICS I
FALL 2019 (Sept 25-Dec 6)
MTWTh 12 - 12:50pm in SAMUELSON 128

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Office Hours: MTWTh 10 - 10:50am and by appointment

Required Text: *Loss Models: From Data to Decisions*, (Fifth Edition), 2019, by Klugman, S.A., Panjer, H.H. and Willmot, G.E., Wiley, ISBN: 978-1-119-52378-9. We'll be covering Chapters 2 – 6 and part of Chapter 8 this quarter. You may also use the fourth edition of *Loss Models*, but it is your sole responsibility to make sure that the corresponding chapters and homework problems are consistent with the fifth edition.

Course Description: Mathematical tools for short-term insurance, including severity models, frequency models, aggregate models, coverage modifications, and risk measures.

Course Goals: Upon successful completion of this course, the student will be able to:

- Apply techniques for creating a new family of distributions in severity models (including multiplication by a constant, raising to a power, exponentiation, and mixing).
- Compare and contrast various frequency models, including Poisson, Mixed Poisson, Binomial, Negative Binomial, Geometric, and mixture models.
- Solve for relevant parameters and statistics in collective (aggregate) risk models.
- Evaluate the impact of coverage modifications (including deductibles, limits, and coinsurance) in frequency, severity, and aggregate models.
- Evaluate projects using risk measures.
- Design an appropriate actuarial model for a given situation or application.
- Assess the appropriateness of an actuarial model for a given application.

Prerequisite: MATH 411C and MATH 418C, or permission.

Course Assessment: Your overall grade will be determined by the following:

- Two in-class exams (40% total); tentative dates: 3rd/4th week of Oct and 3rd/4th week of Nov. Exact dates will be announced at least a week ahead in class and on Canvas
- Comprehensive final exam (25%); given Fri, Dec. 13, from 12 – 2pm
- Homework (27%)
- Problem session, presentation, and participation (8%); see below for more information.

Course grades will be assigned based upon the following scale:

93-100%=A 90-92.9%=A- 87-89.9%=B+ 83-86.9%=B 80-82.9%=B- 77-79.9%=C+ 73-76.9%=C
70-72.9%=C- 67-69.9%=D+ 63-66.9%=D 60-62.9%=D- below 60%=F

The instructor reserves the right to adjust the above scale (in the student's favor) if deemed appropriate.

Required calculator: A scientific or graphing calculator is also required. If you are planning to take Exam STAM (see below), some recommended calculators are TI-30Xa, TI-30X II (IIS solar or IIB battery), or TI-30XS MultiView (or XB).

Exam STAM: The 417ABC sequence covers the SOA Exam STAM material. For more information regarding Exam STAM, see <https://www.soa.org/education/exam-req/edu-exam-stam-detail>

Homework: Weekly homework will be assigned in class. Due dates will be announced at the time of the assignment. Homework must be done neatly, stapled, and written on clean-edged paper. Your work should be clear, in a logical order, and provide sufficient explanation. Credit will not be given for late homework. Collaboration on homework is permitted, but copying is not permitted. You must write up every problem on your own, even if you worked with others to figure it out. Credit will not be given to any party for work which is identical.

Exams: Any changes to the tentative exam schedule will be announced in advance. Make-up arrangements must be made at least one day prior to an exam unless you can document an unexpected circumstance beyond your control that prevented you from taking the exam.

Problem Session, Presentation, and Participation: We will have weekly “problem sessions” throughout the quarter, where instead of covering new material in class you will be given several problems to work on. At the end of class, you will be assigned to write-up/present solutions to these problems. We will then have people present their solutions (using the doc cam) sometime in the next couple of class days. These problems must also be written up neatly and given to me either electronically or in a form suitable for scanning by class time on the third class day after the problems are distributed. The submitted solutions will be posted on Canvas. You are required to present/write-up at least TWO problems over the course of the quarter. When presenting or writing up a problem, remember that it needs to be understandable to your fellow students. You are expected to attend, fully participate, and make a sincere effort in every problem session (not making a sincere effort includes working on material for other courses, chatting, leaving early, etc. and will result in lower participation grade).

Academic Honesty: Consult university policies ([CWUP 5-90-040\(22\)](#), [CWUR 2-90-040\(22\)](#), and [WAC 106-125-020](#)) for student conduct, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

Diversity Statement: CWU expects every member of the university community to contribute to an inclusive and respectful culture for all in its classrooms, work environments, and at campus events. As a student in this course, you are expected to treat your professors, fellow students, and other people affiliated with your work at CWU with respect, regardless of their sex, race and color, religion and creed, national origin, sexual orientation, gender identify and gender expression, disability and use of assistive devices or a service animal, and veteran or military status.

Disability Support Services: CWU is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations: Hogue Hall 126, (509) 963-2214, ds@cwu.edu

Religious Holiday Absences: In compliance with RCW 28B.137.010, CWU makes every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Students must present written notice to their instructor within the first two weeks of class listing the specific dates on which accommodations are required. Contact the Dean of Student Success at (509) 963-1515 for further information or questions.

Expectations for Student Conduct: Students in this class are expected to interact with students and the professor professionally. Instances of disruptive conduct¹, obstructive conduct¹, or harassment² will be referred to the Dean of Student Success.

The instructor reserves the right to change the policies contained in this syllabus as dictated by developments during the quarter. Changes will be announced in class and on Canvas.

1. Per WAC 106-125-020, the term “disruptive” or “obstructive” conduct means conduct, not protected by law, that interferes with, impedes, or otherwise unreasonably hinders the normal teaching, learning, research, administrative, or other functions, procedures, services, programs, or activities of the university. The term includes disorderly conduct, breach of the peace, violation of local or university noise policies, lewd or obscene conduct, obstruction of pedestrian or vehicular traffic, tampering with student election processes, or interfering with the orderly conduct of university investigations or disciplinary proceedings, including interfering with or retaliating against any witness, party, or other participant.
2. The term “harassment” means unwelcome and offensive conduct, including verbal, nonverbal, or physical conduct, that is directed at a person because of such person's protected status and that is sufficiently serious as to deny or limit the ability of a student to participate in or benefit from the university's educational program, or that creates an intimidating, hostile, or offensive environment for any campus community member(s). Protected status includes a person's actual or perceived race, color, national origin, gender, disability, or other status protected by law.