

MATH 417A SHORT-TERM ACTUARIAL MATHEMATICS I
FALL 2021 (Sept 22-Dec 3)
MTWTh 12 - 12:50pm in SAMUELSON 113

Instructor: Dr. Sooie-Hoe Loke
E-mail: SooieHoe.Loke@cwu.edu
Phone: (509) 963-2602

Office: Samuelson 218H
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 8 this quarter. You may 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) with tentative dates between Week 4 – Week 5 and between Week 8 – Week 9. Exact dates will be announced at least a week ahead.
- Comprehensive final exam (25%); given Fri, Dec. 10, 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 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. Your work should be clear, in a logical order, and provide sufficient explanation. Homework must be done neatly and submitted through Canvas as a single pdf file. Many smartphones have built-in functions to convert pictures to pdf files. In addition, here is a list of some apps with scanning capability: Adobe Scan, Cam Scanner, Microsoft Office Lens, Tiny Scanner.

Points will be deducted if the submission is late. You are welcome to work with other classmates and to consult books, but your solutions must be written up in your own words. All your collaborators and sources should be listed. Work copied from any sources such as books, solutions manual, another person's work, etc. is not acceptable. The submission of such copied work, under university policies CWUP 5-90-040(22), CWUR 2-90-040(22), and WAC 106-125-020), is considered plagiarism. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

Exams: Any changes to the tentative exam schedule will be announced in advance. Make-up arrangements must be made at least three days 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 several “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 conduct, obstructive conduct, or harassment will be referred to the Dean of Student Success.

Face Covering Policy 2021: Cloth face covering must be worn indoors by all CWU students, employees and visitors. The mask must cover mouth and nose, fitting as snugly as possible against the sides of the face. Students not wearing a mask will be asked to put one on, if they refuse, students will be asked to leave the classroom and building. If you do not have a face mask, Central Washington University can provide one for you. If you have not yet received your CWU-supplied mask, please go the SURC Information Desk. Some departments/programs may also provide disposable masks. Please obtain a suitable mask prior to the start of your first class. Information on appropriate masks can be found at this web site: <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html>. Standard face shields, single-layer neck gaiters, single layer masks, masks with one-way vent valves, and handkerchiefs are *not* considered appropriate masks for this course.

COVID-19 Statement and Resources: If you know, or even suspect, that you have COVID-19, please do not go to class. This applies to both faculty and students. In accordance with Proclamation 21.14.1, CWU has chosen to make vaccination a priority this fall. We believe a fully vaccinated community is the best way to protect our individual and collective health and safety. Proof of full vaccination against COVID-19 will be required by October 18, 2021 for all employees and students. Medical and/or religious requests will be considered. All employees and students are required to wear masks while indoors.

Stress and other life circumstances that may be out of your control can make learning and focusing difficult. If you find stress or other mental health concerns make academics difficult, Central has resources to support you. I encourage you to reach out to the following resources as soon as you notice you're struggling:

- CWU Counseling Center: <https://www.cwu.edu/medical-counseling/counseling-clinic>
- Mental Health Crisis Support outside normal business hours: 1-800-273-8255, Text HOME to 741741 or call 911.
- Wellness Center: <https://www.cwu.edu/wellness/> 509-963-3213
- Student Rights and Responsibilities: <https://www.cwu.edu/student-rights/office-student-rights-responsibilities>

The instructor reserves the right to change the policies contained in this syllabus as dictated by developments during the quarter. As the COVID-19 pandemic is constantly evolving, this in-person course may switch to a fully online course at any point of the quarter.