



THE UNIVERSITY OF IOWA  
DEPARTMENT OF STATISTICS & ACTUARIAL SCIENCE

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ACTS:4150 Fundamentals of Short-Term Actuarial Math  
Spring 2023  
1:30–2:20 PM, MWF, E205 AJB

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## Course Syllabus

### Contact Information

#### Instructor: Dr. Zhiwei (Josh) Tong

- *Email:* zhiwei-tong@uiowa.edu

This is the best way to contact me! Please include “ACTS:4150” in your email subject.

- *Phone:* 1(319)467-0160
- *Office:* 374 SH
- *Office hours:* 3:00–4:00 PM, MWF

Held in person unless otherwise announced. Also available by appointment.

- *Personal homepage:* <https://sites.google.com/view/ztong1997/home>

#### Grader: Tianrun Wang

- *Email:* tianrun-wang@uiowa.edu

#### Department Executive Officer: Professor Kung-Sik Chan

- *Office:* 241 SH
- *Email:* kung-sik-chan@uiowa.edu

## Course Description and Objectives

This course covers the actuarial mathematics, statistics and models used in non-life insurance practice. Topics covered in this course include: severity, frequency, and aggregate models; parametric estimation; introduction to credibility; pricing and reserving for short-term insurance coverages; survival estimation; option pricing fundamentals. The assumed knowledge for this course is a good understanding of mathematical statistics, calculus, and linear algebra.

This course is part of the SOA University-Earned Credit (UEC) program at the University of Iowa. See [this website](#) for more information on the UEC program.

## Course Materials

Lecture notes containing the most important materials will be posted on **ICON** (<http://icon.uiowa.edu>). Please print out and bring a copy of the lecture notes for each class meeting. Keep an eye on ICON also for announcements, homework assignments, exam schedules, etc.

Some study manuals can greatly help to deepen your understanding. SOA sample questions are useful for preparing for the exams of this course. For further reading, see

1. Loss Models: From Data to Decisions, (Fifth Edition), 2019, by Klugman, S.A., Panjer, H.H. and Willmot, G.E., Wiley.
2. Introduction to Ratemaking and Loss Reserving for Property and Casualty Insurance (Fourth Edition), 2015, by Brown, R.L. and Lennox, L.R., ACTEX.

## The University Evaluation System

Assessment for the university grade comprises the following items:

| Item        | Weight | Schedule  |
|-------------|--------|---|
| Attendance  | 5%     | Attendance and active engagement are required   |
| Assignments | 15%    | In total 6 assignments spread over the semester |
| Quizzes     | 20%    | In total 5 quizzes spread over the semester     |
| Midterm     | 20%    | TBD   |
| Final       | 40%    | TBD   |

- **Attendance: 5%**

Your attendance and engagement may affect your final grade (positively or negatively).

- **Assignments: 15%**

There will be 6 assignments, each of which roughly consists of 10 questions. The lowest assignment score will be dropped towards determining the final grade. Your solutions must

be scanned and submitted on ICON. Late submission will not be accepted, unless there is a valid reason, notified to the instructor before the submission deadline. Discussion with peer students is encouraged. However, what you hand in must ultimately **be your own work**.

- **Short Quizzes: 20%**

There will be 5 15-minute quizzes spread over the semester, held in class. The lowest quiz score will not be dropped towards calculating the final grade. Makeups are not allowed unless for exceptional reasons. These quizzes are intended to motivate you to study regularly (instead of cramming just before the midterm and final exams!) and will consist of relatively straightforward questions.

- **Midterm Examination: 20%**

There will be a closed-book 50-minute midterm exam consisting of around 7 written-answer questions. Partial credit will be given for incorrect answers if quality work is shown. The exam schedule will be announced at the beginning of the semester.

- **Final Examination: 40%**

There will be a closed-book 2-hour final examination consisting of around 15 written-answer questions. It will be scheduled during the university final exam week. The exact schedule will be announced once it is fixed by the Registrar.

Never ask me what will be tested and what will not! Everything we learn is important.

Plus/minus grades will be given in this course, and undergraduate and graduate students will be treated as two separate groups when it comes to assigning final grades. An *approximate* guide is as follows:

| Undergraduate students |            |              |
|------------------------|------------|--------------|
| A- [85, 90)            | A [90, 95) | A+ [95, 100] |
| B- [70, 75)            | B [75, 80) | B+ [80, 85)  |
| C- [55, 60)            | C [60, 65) | C+ [65, 70)  |
| D- [40, 45)            | D [45, 50) | D+ [50, 55)  |
| F [0, 40)              |            |              |

| Graduate students |              |                |
|-------------------|--------------|----------------|
| A- [86.5, 91)     | A [91, 95.5) | A+ [95.5, 100] |
| B- [73, 77.5)     | B [77.5, 82) | B+ [82, 86.5)  |
| C- [59.5, 64)     | C [64, 68.5) | C+ [68.5, 73)  |
| D- [46, 50.5)     | D [50.5, 55) | D+ [55, 59.5)  |
| F [0, 46)         |              |                |

These are not completely absolute scales and the instructor reserves the right to adjust the cutoffs, depending on the difficulty of the exams.

## The UEC System

A different system will be adopted for calculating the UEC scores. In this system the assignments are worth 20% and the final examination is worth 80%. A minimum UEC score of 85% is required to obtain the UEC credit.

## **Academic Honesty and Misconduct**

All students in CLAS courses are expected to abide by the CLAS Code of Academic Honesty. Undergraduate academic misconduct must be reported by instructors to CLAS according to these procedures. Graduate academic misconduct must be reported to the Graduate College according to Section F of the Graduate College Manual.

## **Student Complaints**

Students with a complaint about a grade or a related matter should first discuss the situation with the instructor, and finally with the Director or Chair of the school, department, or program offering the course.

Undergraduate students should contact CLAS Undergraduate Programs for support when the matter is not resolved at the previous level. Graduate students should contact the CLAS Associate Dean for Graduate Education and Outreach and Engagement when additional support is needed.

## **Drop Deadline for this Course**

You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the drop deadline for this course here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other registration changes can be found on the Registrar’s website. Undergraduate students can find policies on dropping and withdrawing here. Graduate students should adhere to the academic deadlines and policies set by the Graduate College.

## **College of Liberal Arts and Sciences (CLAS) Course Policies**

### **Attendance and Absences**

University regulations require that students be allowed to make up examinations which have been missed due to illness or other unavoidable circumstances. Students with mandatory religious obligations or UI authorized activities must discuss their absences with me as soon as possible. Religious obligations must be communicated within the first three weeks of classes.

### **Exam Policies**

### **Communication: UI Email**

Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community.

## **Where to Get Help**

Instructors: Note any department or university resources helpful for this course, such as Tutor Iowa: <https://tutor.uiowa.edu/>

## **University Policies**

Accommodations for Students with Disabilities

Basic Needs and Support for Students

Classroom Expectations

Exam Make-up Owing to Absence

Free Speech and Expression

Mental Health

Military Service Obligations

Non-discrimination

Religious Holy Days

Sexual Harassment/Misconduct and Supportive Measures

Sharing of Class Recordings