

The University of Iowa  
College of Liberal Arts and Sciences  
**Department of Statistics and Actuarial Science**  
**ACTS:3110 Actuarial Exam P Preparation (Fall 2025)**

## General information

**Instructor:** Tianrun Wang; 350 SH, [tianrun-wang@uiowa.edu](mailto:tianrun-wang@uiowa.edu)

**Class:** 5:30 - 6:20PM, Mondays, S108 LC

**Office hours:** T 12:00 - 1:30PM on Zoom (link TBD) or by appointment

**Course supervisor:** N. D. Shyamalkumar; 233 SH, [shyamal-kumar@uiowa.edu](mailto:shyamal-kumar@uiowa.edu)

**DEO:** Kung-Sik Chan; 241 SH, [kung-sik-chan@uiowa.edu](mailto:kung-sik-chan@uiowa.edu)

## Course description

This short course is designed to aid students in their preparation for Exam P of the Society of Actuaries. For each subject tested on exam P, relevant formulas and problem-solving skills will be briefly introduced after which students will be given selected past exam problems to work on. There are no official prerequisites for this course, **but it is assumed that students have already studied (or are in the process of studying) the subjects tested on Exam P.**

## What is Exam P?

Exam P is a 3-hour multiple-choice exam on probability. It tests students' knowledge of the fundamental probability tools for quantitatively assessing risk. **The application of these tools to problems encountered in actuarial science is emphasized.** A thorough command of probability topics and the **supporting calculus is assumed.** Additionally, a very basic **knowledge of insurance and risk management** is assumed.

## Learning Objectives of Exam P

1. General probability: Set functions, independent and mutually exclusive events, addition and multiplication laws, combinatorial and conditional probability and Bayes' theorem
2. Univariate probability distributions (including binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, gamma, normal, beta, lognormal and mixed): Probability mass function / density function, distribution function, percentiles and moments, mode and median, standard deviation and variance, coefficient of variation, sum of independent random variables (Poisson, and normal)
3. Multivariate probability distributions (including the bivariate normal): Joint pmf, joint distribution, conditional and marginal distribution function, covariance and correlation, variance and moments for conditional and marginal probability distribution, order statistics, sum of independent random variables, Central Limit Theorem

## Textbook

There is no required textbook for the course. Brief notes will be posted on ICON. Please print them before class.

## Calculator

Candidates may use the battery- or solar-powered Texas Instruments BA-35 model calculator, the BA II Plus\*, the BA II Plus Professional<sup>1</sup>, the TI-30Xa, TI-30X II (IIS solar or IIB battery)<sup>1</sup> or TI-30XS MultiView (or XB battery)<sup>1</sup>. Candidates may use more than one of the approved calculators.

## Structure of the preparation course

1. General probability:
  - (a) Sets; mutually exclusive events, addition laws
  - (b) Combinatorics and probability
  - (c) Conditional probability and independence; Bayes' theorem
2. Univariate probability distributions
  - (a) Probability mass function / density function, cumulative distribution function
  - (b) Moments, standard deviation and variance; coefficient of variation
  - (c) Percentiles, median, mode
  - (d) Distributional families: binomial, negative binomial, geometric, hypergeometric, Poisson, uniform, exponential, gamma, normal
  - (e) Sum/linear combinations of independent random variables (Poisson and normal)
3. Risk and insurance
  - (a) Risk pooling
  - (b) Mixed distributions
  - (c) Deductibles, policy limits, inflation
4. Multivariate probability distributions:
  - (a) Joint pmf, joint cdf, conditional and marginal distribution function
  - (b) Product moments and independence; covariance and correlation
  - (c) Variance and moments for conditional and marginal probability distribution
  - (d) Law of total expectation/variance
  - (e) Bivariate normal
  - (f) Central Limit Theorem
  - (g) Order statistics

## Assessment

This class is graded PASS/FAIL. You will receive a passing grade if you have a 60% or above. Attendance will be worth 100%.

**Attendance:** Attendance is required and will be checked each class. Lateness will result in 50% deduction of the points.

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<sup>1</sup> The memory of TI-30X II (IIS solar or IIB battery), TI-30XS MultiView (or XB battery), BA II Plus and BA II Plus Professional will need to be cleared by the examination supervisor upon the candidates' entrance to the examination room. For the BA II Plus and BA II Plus Professional, clearing will reset the calculator to the factory default settings.

## Resources

Exam P Sample Questions are a good source of questions. P-21-05 (Risk and Insurance) is a required reading for Exam P. The SOA online practice exams (<https://www.soa.org/education/exam-req/syllabus-study-materials/edu-exam-p-online-sample/>) are also a good way to reflect the conditions of the exam. If more practice questions are desired, please get the study manuals (ACTEX or ASM). Useful links are posted on the ICON homepage.

## **UI and the College of Liberal Arts and Sciences Information for Undergraduates**

### **Absences and Attendance**

Students are responsible for attending class and for contributing to the learning environment of a course. Students are also responsible for knowing their course absence policies, which will vary by instructor. All absence policies, however, must uphold the UI policy related to student illness, mandatory religious obligations, including Holy Day obligations, military service obligations, unavoidable circumstances, or University authorized activities. Students may use the CLAS absence form to aid communication with the instructor who will decide if the absence is excused or unexcused. The form is on ICON in the top banner under “Student Tools.” More information is at <https://clas.uiowa.edu/students/handbook/attendance-absences>.

### **Academic Integrity**

All undergraduates enrolled in courses offered by CLAS have, in essence, agreed to the College’s Code of Academic Honesty. Misconduct is reported to the College, resulting in suspension or other sanctions, with sanctions communicated with the student through UI email. Visit this page for information: <https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code>.

### **Accommodations for Disabilities**

UI is committed to an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as mental health, attention, learning, vision, and physical or health-related condition) by registering with Student Disability Services (SDS). The student is then responsible for discussing specific accommodations with the instructor. More information is at <https://sds.studentlife.uiowa.edu/>.

### **Administrative Home of the Course**

The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs its add/drop deadlines, the second-grade-only option, and related policies. Other colleges may have different policies. CLAS policies may be found here: <https://clas.uiowa.edu/students/handbook>.

### **Class Behavioral Expectations**

Students are expected to comply with University policies regarding appropriate classroom behavior as outlined in the Code of Student Life. This includes the policies and procedures that all students have agreed to regarding the Steps Forward for Fall 2020 in response to the COVID-19 pandemic. Particularly, all students are required to wear a face covering when in a UI building, including a classroom. In addition, the density of seats in classrooms has been reduced; in some instances, this will allow 6 feet or more between students while other cases, it may be less. Regardless, wearing a face covering and maintaining as much distance as possible are vital to slowing the spread of COVID19. In the event that a student disrupts the classroom environment through their failure to comply with the reasonable directive of an instructor or the University, the instructor has the authority to ask that the student immediately leave the space for the remainder of the class period. Additionally, the instructor is asked to report the incident to the Office of Student Accountability for the possibility of additional follow-up. Students who need a temporary alternative learning arrangement related to COVID-19 expectations should contact Student Disability Services (<https://sds.studentlife.uiowa.edu/fall-2020/covid-19-temporary-learning-arrangements/>; +1 319 335-1462)

### **Class Recordings: Privacy and Sharing**

Some sessions of a course could be recorded or live-streamed. Such a recording or streaming will only be available to students registered for the course. These recordings are the intellectual property of the faculty, and they may not be shared or reproduced without the explicit **written** consent of the faculty member. Students may not share these sessions with those not in the class; likewise, students may not upload recordings to any other online environment.

Doing so is a breach of the Code of Student Conduct and, in some cases, a violation of the Federal Education Rights and Privacy Act (FERPA).

### **Communication and the Required Use of UI Email**

Students are responsible for official correspondences sent to their UI email address (uiowa.edu) and must use this address for all communication within UI (Operations Manual, III.15.2).

### **Complaints**

Students with a complaint about an academic issue should first visit with the instructor or course supervisor and then with the Chair of the department or program offering the course; students may next bring the issue to the College of Liberal Arts and Sciences; see this page for more information: <https://clas.uiowa.edu/students/handbook/student-rights-responsibilities>.

### **Final Examination Policies**

The final exam schedule is announced around the fifth week of classes; students are responsible for knowing the date, time, and place of a final exam. Students should not make travel plans until knowing this information. No exams of any kind are allowed the week before finals with very few exceptions made (for labs, ESL and some world language courses, and off-cycle courses): <https://registrar.uiowa.edu/final-examination-scheduling-policies>.

### **Nondiscrimination in the Classroom**

The University of Iowa is committed to making the classroom a respectful and inclusive space for people of all gender, sexual, racial, religious, and other identities. Toward this goal, students are invited in MyUI to optionally share the names and pronouns they would like their instructors and advisors to use to address them. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University's Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity (<https://diversity.uiowa.edu/eod>; +1 319 335-0705).

### **Sexual Harassment**

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community must uphold the UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must be reported immediately. For assistance, please see <https://osmrc.uiowa.edu/>.

### **Artificial Intelligence (AI) Policy**

Artificial Intelligence (AI) tools may be used in this class as a resource to support and enhance learning. There is no prohibited use of AI in this class.