MATH 3635
Foundations of Inference for Actuarial Modeling
MW 3:35pm–4:50pm MONT 419 Section 001
Fall 2026 Semester

Instructor

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Office hours

Mondays, 9–11am, 1–2pm or by appointment (send email)

Prerequisite

MATH 3160 and MATH 2110

Course website

http://www.huskyct.uconn.edu/

Course description

Mathematical foundations of statistical inference used in actuarial modeling. See https://math.uconn.edu/fall-2026-courses/course/MATH/3635/.

Course goals and learning outcomes

The goal for the semester is to learn, understand, and work with key ideas related to statistical inference for actuaries. This course should be a natural bridge to loss models and aims to teach students how to draw sound conclusions from data. Students are expected to learn how to estimate unknown model quantities, build confidence intervals, perform hypothesis tests, and later, assess how well a model fits given data. Most distributions we encounter in this course are particularly relevant to actuarial modeling. Along the way, students learn large-sample theory, such as the Central Limit Theorem (CLT) and Delta method, which provides the foundations for understanding why these methods work. Time permitting, we will also see how these methods apply actuarial tasks like pricing. These goals align directly with the SOA's VEE Mathematical Statistics requirements: sampling distributions, estimation, confidence interval, and hypothesis testing. See https://www.soa.org/globalassets/assets/files/edu/edu-vee-guidelines.pdf.

Some general heading of topics covered include (chapter references are from Asimow/Maxwell):

- Review of probability and special distributions (Ch 1-6)
- Multivariate distributions (Ch 7)
- Transformation and mixture distributions(Ch 8.1; 8.2; 8.4)
- Sampling distributions and asymptotic theory (Ch 9; supplements)
- Point estimation (Ch 11.1 –11.3; Ch 11.6)
- Interval estimation (see index; to be supplemented)
- Hypothesis tests (Ch 10)
- Goodness-of-fit and model selection (Ch 10.6.2; to be supplemented)
- Introduction to Bayesian inference (supplements)

Topics not covered in the main text will be supplemented with additional instructor notes, or materials from other published sources.

Required and other recommended textbooks

Lectures and exercises in the class will be heavily based on the materials covered from the following source:

Probability and Statistics with Applications: A Problem Solving Text, 2nd edition, by L.A. Asimow and M.M. Maxwell, ACTEX Publications, 2025.

Details of a tentative class lecture program are attached as appendix.

Course assessments

The following table gives the relative weights of the assessment components for the course:

Assessment	Weights	Dates
Class Recitation/Participation	10%	–
Class Test 1	20%	September 23
Class Test 2	20%	October 14
Class Test 3	20%	November 18
Final Examination	30%	to be announced
Total	100%	

- Class RecitationParticipation: This will vary from being called in class, asking questions, demonstrating curiosity, solving problems in front of the class, and possibly being assigned problems to make up for missing classes when called. When called, you will not be graded based on the accuracy of your answers, but how you reason through your answers.
- Class Tests: To give you more flexibility, I will take your TWO highest class test scores and weigh them equally at 30% each. These scores will be used to improve your final grade. There will be no make-up exams under any circumstances.
- Final Examination: The date and coverage for the finals will be announced at a later time.

For additional information on undergraduate grading policies, please visit here: https://registrar.uconn.edu/grades/

Your final grade is determined as follows:

Grade	A	A–	B+	B	B–	C+
Points	[90, 100)	[87, 90)	[84, 87)	[81, 84)	[78, 81)	[75, 78)
Grade	C	C–	D+	D	D–	F
Points	[70, 75)	[65, 70)	[60, 65)	[55, 60)	[50, 55)	[0, 50)

This grading scale may be adjusted if necessary, however, your final grade will be no worse than that determined according to the scale above.

Final examination

Final examination week for the Fall 2026 semester takes place from Monday, December 14, through Sunday, December 20. Students are required to be available for their exam during the stated time. If you have a conflict with this time, you must visit the Office of Student Services and Advocacy (OSSA) to discuss the possibility of rescheduling this exam.

Please note that vacations, previously purchased tickets, or reservations, graduations, social events, misreading the exam schedule, and oversleeping are not acceptable excuses for missing a final exam. If you think that your situation warrants permission to reschedule, please contact the OSSA with any questions. Thank you in advance for your cooperation.

Please note that final examinations this semester will fall during the religious holiday, Ramadan. As outlined in the University's Religious Accommodation Policy, "The University of Connecticut is committed to providing welcoming and inclusive learning and workplace environments. As part of this commitment, the University will make good faith efforts to provide reasonable religious accommodations to faculty, staff and students whose sincerely held religious practices or beliefs conflict with a University policy, procedure, or other academic or employment requirement, unless such an accommodation would create an undue hardship." Instructors are strongly encouraged to make reasonable accommodations in response to a student request to make-up a final examination missed by absence resulting from observance of Ramadan. An example of a religious accommodation may include the rescheduling of an evening exam to earlier that same day. Please note that instructors should not ask a student for proof that their religious practices or believes are sincerely held or for determining a religious accommodation. Answers to frequently asked questions about the Religious Accommodation Policy can be found here.

How to succeed in this course

My teaching philosophy is that we will all learn the materials together. Everyone can do well in this course, and I am always here to help. Please do not hesitate to ask questions or attend office hours. All questions are important.

Your success in the course depends a lot on your personal health and well-being. Stress is a normal part of the college experience, and it can become more difficult with unexpected challenges. I encourage you to see these challenges as steps to success. Take care of yourself throughout the semester, especially before the demands of exams reach their peak. Please feel free to reach out as soon as possible about any difficulty you may be having that could affect your performance in your courses or campus life, before it becomes too overwhelming. In addition to your academic advisor, I also recommend using the many support services available on campus.

If you feel necessary and your needs arise, please consider seeking help from these various departments and offices of the university: Dean of Students Office, Academic Achievement Center, Writing Center, Quantitative Learning Center, Center for Students with Disabilities, Title IX Office, Student Health and Wellness – Mental Health

Husky study groups

Are you interested in forming a study group with other students in the class? There is a study group application in Nexus that can help you get started. Watch this video and click here for more information.

Resources for students experiencing distress

The University of Connecticut is committed to supporting students in their mental health, their psychological and social well-being, and their connection to their academic experience and overall wellness. The university believes that academic, personal, and professional development can flourish only when each member of our community is assured equitable access to mental health services. The university aims to make access to mental health attainable while fostering a community reflecting equity and diversity and understands that good mental health may lead to personal and professional growth, greater self-awareness, increased social engagement, enhanced academic success, and campus and community involvement.

Students who feel they may benefit from speaking with a mental health professional can find support and resources through the Student Health and Wellness-Mental Health (SHaW-MH) office. Through SHaW-MH, students can make an appointment with a mental health professional and engage in confidential conversations or seek recommendations or referrals for any mental health or psychological concern.

Mental health services are included as part of the university's student health insurance plan and also partially funded through university fees. If you do not have UConn's student health insurance plan, most major insurance plans are also accepted. Students can visit the Student Health and Wellness-Mental Health located in Storrs on the main campus in the Arjona Building, 4th Floor, or contact the office at (860) 486-4705, or https://studenthealth.uconn.edu/ for services or questions.

Accommodations for illness or extended absences

Please stay home if you are feeling ill and please go home if you are in class and start to feel ill. If illness prevents you from attending class, it is your responsibility to notify me as soon as possible. You do not need to disclose the nature of your illness, however, you will need to work with me to determine how you will complete coursework during your absence.

If life circumstances are affecting your ability to focus on courses and your UConn experience, students can email the Dean of Students at dos@uconn.edu to request support. Regional campus students should email the Student Services staff at their home campus to request support and faculty notification.

Student responsibilities and resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important standards, policies and resources, which include:

- The Student Code
- Academic Integrity
- Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Credit Hours and Workload
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

Students with disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or https://csd.uconn.edu/.

Privacy Statement: For information on managing your privacy at the University of Connecticut, visit the University's Privacy page. NOTE: This course has NOT been designed for use with mobile devices.

Help

Technical and Academic Help provides a guide to technical and academic assistance.

This course uses the learning management platform, HuskyCT. If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through the Help Center. You also have 24/7 Course Support including access to live chat, phone, and support documents.

Student technology training

Student technology training is now available in a new HuskyCT short course created by students for students. It will prepare you to use the IT systems and services that you will use throughout your time at UConn, whether learning online or on-campus. It is available at `https://lms.uconn.edu/ultra/courses/_80016_1/cl/outline`.

Evaluation of course experience

Students will be given an opportunity to provide feedback on their course experience and instruction using the University's standard procedures, which are administered by the Office of Institutional Research and Effectiveness (OIRE).

The University of Connecticut is dedicated to supporting and enhancing teaching effectiveness and student learning using a variety of methods. The Student Evaluation of Teaching (SET) is just one tool used to help faculty enhance their teaching. The SET is used for both formative (self-improvement) and summative (evaluation) purposes.

Additional informal formative surveys and other feedback instruments may be administered within the course.

Academic integrity

A fundamental tenet of all educational institutions is academic honesty; academic work depends upon respect for and acknowledgement of the research and ideas of others. Misrepresenting some- one else's work as one's own is a serious offense in any academic setting and it will not be condoned.

Academic misconduct includes, but is not limited to, providing or receiving assistance in a manner not authorized by the instructor in the creation of work to be submitted for academic evaluation (e.g. papers, projects, and examinations); any attempt to influence improperly (e.g. bribery, threats) any member of the faculty, staff, or administration of the University in any matter pertaining to academics or research; presenting, as one's own, the ideas or words of another for academic evaluation; doing unauthorized academic work for which another person will receive credit or be evaluated; and presenting the same or substantially the same papers or projects in two or more courses without the explicit permission of the instructors involved.

A student who knowingly assists another student in committing an act of academic misconduct shall be equally accountable for the violation, and shall be subject to the sanctions and other remedies described in *The Student Code*.

Here are some university guidelines on the use of Generative AI in Teaching and Learning.

Tentative class schedule [1]

Review materials on Probability covered in the prerequisites. Supplements, like extra reading notes, will be provided for any topics not covered in the book.

Week Number	Week Beginning	Topics Covered	Assessment
1	Aug 31	**Review: probability and special distributions** Asimow/Maxwell (Chapters 1-6)	
2	Sep 7	**Multivariate distributions** Asimow/Maxwell (Chapter 7)	
3	Sep 14	**Transformation and mixture distributions** Asimow/Maxwell (Chapters 8.1, 8.2, 8.4)	
4	Sep 21	- continued	Class Test 1 (details to be announced)
5	Sep 28	**Sampling distributions and asymptotic theory** Asimow/Maxwell (Chapter 9), supplements	
6	Oct 5	- continued	
7	Oct 12	**Point estimation** Asimow/Maxwell (Chapter 11.1-11.3, 11.6), supplements	Class Test 2 (details to be announced)
8	Oct 19	- continued	
9	Oct 26	**Interval estimation** Supplements	
10	Nov 2	**Hypothesis tests** Asimow/Maxwell (Chapter 10)	
11	Nov 9	- continued	
12	Nov 16	**Goodness-of-fit and model selection** Asimow/Maxwell (Chapter 10.6.2), spplements	Class Test 3 (details to be announced)
Thanksgiving Recess - Nov 22-29			
13	Nov 30	**Introduction to Bayesian inference** Supplements	
14	Dec 7	- continued	
Final Examination Period: Dec 14-20			

[1] any changes will be announced in class or on website

Code of Conduct for Candidates

Effective December 1, 2008, revised June 2023

The purpose of the Society of Actuaries (SOA) *Code of Conduct for Candidates* ("Candidate Code") is to require Actuarial Candidates to adhere to the high standards of conduct, practice, and qualifications of the actuarial profession, thereby supporting the actuarial profession in fulfilling its responsibility to the public. An Actuarial Candidate must comply with both the letter and spirit of the Candidate Code. An Actuarial Candidate who commits a material violation of the provisions of the Candidate Code shall be subject to the discipline procedures of the SOA.

An "Actuarial Candidate" is a person who has contacted the SOA with an intent to register for, has registered for, or completed any SOA educational or evaluative activity (e.g., exams, modules, exercises, assessments, validations or courses), but is not a member of the SOA as an Associate (ASA), Chartered Enterprise Risk Analyst (CERA) or Fellow (FSA).

In situations where an Actuarial Candidate performs actuarial work, the candidate's client or employer is defined as the "Principal." "Actuarial Services" are professional services provided to a Principal by an individual acting in the capacity of an actuary. Such services include the rendering of advice, recommendations, findings, or opinions based upon actuarial considerations.

RULE 1: An Actuarial Candidate shall act honestly, with courtesy, integrity, and competence, to uphold the reputation of the actuarial profession.

RULE 2: An Actuarial Candidate shall not engage in any professional conduct involving dishonesty, fraud, deceit, or misrepresentation or commit any act that reflects adversely on the actuarial profession.

RULE 3: An Actuarial Candidate shall act with professional courtesy and respect in all interactions with the SOA.

RULE 4: An Actuarial Candidate shall perform Actuarial Services with professional courtesy and respect and shall cooperate with others in the Principal's interest.

RULE 5: An Actuarial Candidate shall strictly comply with the letter and spirit of all rules and regulations associated with any component of the SOA Education system for which the SOA awards credit. These include but are not limited to the SOA Rules and Regulations for Examinations SOA Terms and Conditions Agreement for e-Learning Candidates.

RULE 6: Actuarial Candidates are not authorized to use, and therefore must never use membership designations of the SOA until they are admitted to membership by the SOA Board of Directors. Actuarial Candidates shall not claim credit for any SOA credentials or micro-credentials that have not been awarded to them.

RULE 7: An Actuarial Candidate shall not disclose to another party any confidential information unless authorized to do so by the Principal or required to do so by law, statute, or regulation. Confidential information includes information of a proprietary nature and information that is legally restricted from circulation.

RULE 8: An Actuarial Candidate shall respond promptly, truthfully, and fully to any request for information by, and cooperate fully with, the appropriate disciplinary body of the SOA in connection with any disciplinary or other proceeding relating to the Candidate Code. The Actuarial Candidate's responsibility to respond shall be subject to applicable restrictions listed in Rule 7 and those imposed by law, statute, or regulation.

Casualty Actuarial Society
Code of Professional Ethics for Candidates
(As Introduced January 1, 2008)

The purpose of the Casualty Actuarial Society (CAS) Code of Professional Ethics for Candidates (Candidate Code) is to require actuarial candidates to adhere to the high standards of conduct, practice, and qualifications of the actuarial profession, thereby supporting the actuarial profession in fulfilling its responsibility to the public. An actuarial candidate shall comply with the Candidate Code. An actuarial candidate who commits a material violation of the provisions of the Candidate Code shall be subject to the counseling and discipline procedures of the CAS.

"Actuarial candidates" are those persons who have registered for a CAS specific exam but have yet to fulfill all of the requirements for admission into the CAS. In situations where actuarial candidates perform actuarial work, their "principal" is defined as their client or employer. "Actuarial services" are professional services provided to a principal by an individual acting in the capacity of an actuary. Such services include the rendering of advice, recommendations, findings, or opinions based upon actuarial considerations.

Rule 1: An actuarial candidate shall act honestly, with integrity and competence, to uphold the reputation of the actuarial profession.

Rule 2: An actuarial candidate shall not engage in any professional conduct involving dishonesty, fraud, deceit, or misrepresentation or commit any act that reflects adversely on the actuarial profession.

Rule 3: An actuarial candidate shall perform actuarial services with courtesy and professional respect and shall cooperate with others in the principal's interest.

Rule 4: An actuarial candidate shall adhere to the CAS Policy on Examination Discipline.

Rule 5: Actuarial candidates are not authorized to use membership designations of the CAS until they are admitted to membership by the CAS Executive Council.

Rule 6: An actuarial candidate shall not disclose to another party any confidential information unless authorized to do so by the principal or required to do so by law, statute, or regulation. Confidential information includes information of a proprietary nature and information that is legally restricted from circulation.

Rule 7: An actuarial candidate shall respond promptly, truthfully, and fully to any request for information by, and cooperate fully with, appropriate counseling and disciplinary body of the CAS in connection with any disciplinary, counseling or other proceeding of such body relating to the Candidate Code. The actuarial candidate's responsibility to respond shall be subject to applicable restrictions listed in Rule 6 and those imposed by law, statute, or regulation.

(The CAS Board of Directors approved the code above on November 12, 2006, effective with the Spring 2008 exam sitting.)

A copy of the Casualty Actuarial Society Rules of Procedure for Disciplinary Actions Involving Candidates is available in the Exams & Admissions section of the CAS website under "Candidate's Code of Ethics."