

STA257H1 F

Probability and Statistics I

Summer 2025 Syllabus

Course Meetings

STA257H1 F

Section	Day & Time	Delivery Mode & Location
LEC5101	Monday, 6:00 PM - 9:00 PM	In Person: MC 252
	Wednesday, 6:00 PM - 9:00 PM	In Person: MC 252

Refer to ACORN for the most up-to-date information about the location of the course meetings.

Delivery Mode: This course is to be delivered in person as specified on the [University Timetable Builder](#) website. In case there is any change in the mode of delivery, the details will be announced on the course website.

Tutorials and TA Information: All tutorial sessions will be held in person every week from Wednesday May 7th. The details are available on the Quercus page. Tutorials will be administered by the TAs to review topics, solve problems and answer questions. The TAs' contact information and office hours will be posted on Quercus.

Course Contacts

Course Website: <https://q.utoronto.ca/courses/389921>

Instructor: Omidali Aghababaei Jazi

Email: omid.jazi@utoronto.ca

Office Hours and Location: Monday & Wednesday, 11:00 AM-12:00 PM on Zoom

Link: <https://utoronto.zoom.us/j/85127435677> Passcode: STA257

Course Overview

A mathematically rigorous introduction to probability, with applications chosen to introduce concepts of statistical inference. Probability and expectation, discrete and continuous random variables and vectors, distribution and density functions, the law of large numbers. The binomial, geometric, Poisson, and normal distributions. The Central Limit Theorem. (Note: STA257H1 does not count as a distribution requirement course).

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Prerequisites: MAT137Y1/ MAT157Y1/ (MATA31H3, MATA37H3)/ MAT137Y5/ MAT157Y5
Corequisites: MAT237Y1/ MAT257Y1/ MAT257Y5; MAT223H1/ MAT224H1/ MAT240H1/ MATA22H3/ MATA23H3/ MAT223H5/ MAT240H5/ MATB24H3/ MAT224H5
Exclusions: ECO227Y1, STA237H1, STA247H1, MAT370H1, MAT377H1, STAB52H3, STA256H5, ECO227Y5
Recommended Preparation: None
Credit Value: 0.5

Course Materials

Course Learning Outcomes

1. Understand and apply fundamental concepts of probability, including sample spaces, events, and some properties of probability functions.
2. Understand discrete and continuous random variables and how to calculate probabilities, expectations, moment generating functions, and learn some important inequalities.
3. Understand and apply the concepts and methods for multivariate distributions.
4. Understand some special distributions for both discrete and continuous random variables.
5. Understand concepts of convergence in probability, limiting distribution, and the central limit theorem.

Textbook: Introduction to Mathematical Statistics (8th Edition) by Rober V. Hogg, Joseph W. McKean and Allen T. Craig, 2019.

Additional References

- Probability and Statistics: The Science of Uncertainty (2nd Edition) by Michael J. Evans and Jeffrey S. Rosenthal, 2010.
- Mathematical Statistics with Applications (7th Edition) by Wackerly, Mendenhall and Scheaffer, 2008.

Marking Scheme

Assessment	Percent	Details	Due Date
Term Test	25%	In-person. Wednesday May 28th, 2025, 6:15 PM-7:45 PM.	2025-05-28
Quizzes	20%	Weekly (except week 4), Online on Quercus.	No Specific Date
In-Person Final Exam	55%		Final Exam Period

Quizzes: There will be five quizzes in this course which will be held online and must be completed individually. They will generally consist of problems like homework problems or examples worked out in class in multiple choice format. Each quiz will be posted every week, except the 4th week, on Friday at 12:00 PM on Quercus and will be available until the following Sunday, at 12:00 PM (noon). The lowest quiz mark will be dropped, and the remaining quizzes will make up 20% of the final mark.

Term Test: The term test will be held in-person on Wednesday, May 28th, 6:15 PM-7:45 PM. Other details such as the content and the location will be announced on Quercus approximately a week before the test.

Final Exam: The final exam will be in-person, last 3 hours, and from the entire material. The exact date and time will be scheduled and announced by the Office of the Faculty Registrar (OFR).

Late Assessment Submissions Policy

Late submissions will NOT be accepted.

Course Schedule

Weeks	Topics (textbook sections)	Assessments
Week 1 (May 05 - May 09)	1.1, 1.2, 1.3, 1.4	Quiz 1
Week 2 (May 12 - May 16)	1.5, 1.6, 1.7, 1.8, 1.9	Quiz 2
Week 3 (May 19 - May 23)	1.10, 2.1, 2.2	Quiz 3
Week 4 (May 26 - May 30)	2.3, 2.4, 2.5	Term Test
Week 5 (June 02 - June 06)	2.8, Theorem 2.6.1, 3.1	Quiz 4
Week 6 (June 09 - June 13)	3.2, 3.3, 3.4	Quiz 5
Week 7 (June 16-17)	5.1, 5.2, 5.3	-

Policies & Statements

Missed Term Work

Missed Quizzes will earn a mark of zero, without exception. Reasons/justification for missing the assignments will not be accepted.

For missed term test, students must provide valid documentation, that is the [Verification of Illness or Injury](#). The documentation must be sent to the course instructor (omid.jazi@utoronto.ca) within seven days of the missed term test.

Once per semester, each student is allowed to miss work without any documentation. In that case you must fill out the ACORN absence declaration form. The form can be used at most ONCE per semester (once in total for all your courses, not once per course). The absence you declare can be for a maximum of 7 consecutive days. If you use the ACORN absence declaration form, you do not need to submit any documentation for missed work during that absence.

There is NO make-up test in this course. For missed term test with valid documentation or absence declaration, the weight will be shifted to the final exam's weight.

Academic Integrity

All suspected cases of academic dishonesty will be investigated following procedures outlined in the [Code of Behaviour on Academic Matters \(https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019\)](https://governingcouncil.utoronto.ca/secretariat/policies/code-behaviour-academic-matters-july-1-2019). If you have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, please reach out to me. Note that you are expected to seek out additional information on academic integrity from me or from other institutional resources. For example, to learn more about how to cite and use source material appropriately and for other writing support, see the U of T writing support website at <http://www.writing.utoronto.ca>. Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see [A&S Student Academic Integrity \(https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity\)](https://www.artsci.utoronto.ca/current/academic-advising-and-support/student-academic-integrity) and the [University of Toronto Website on Academic Integrity \(https://www.academicintegrity.utoronto.ca\)](https://www.academicintegrity.utoronto.ca).

Re-marking Policy - Timeline and Protocol

The course re-mark policy exists to correct mistakes, and any request should clearly identify the error (for example, a question that was not marked, or a total incorrectly calculated). Requests to correct such mistakes must be sent by email to the instructor. Before you request for a re-mark, please make sure you know the correct solutions posted in Quercus. To be considered for a re-mark,

- students should make such requests within two weeks after their mark were returned.
- the email should include student's full name and ID number and give a specific and concise

reason for each request, referring to a possible error or omission by the marker. Remarking requests without a specific reason will not be accepted.

Note that if a student requests for a re-mark, the entire term test may be re-marked. So, the new grade may go up or down or remain the same.

Students with Disabilities or Accommodation Requirements

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, you should register with Accessibility Services (AS) at the beginning of the academic year by visiting <https://studentlife.utoronto.ca/departments/accessibility-services/>. Without registration, you will not be able to verify your situation with your instructor, and instructor will not be advised about your accommodation needs. AS will assess your situation, develop an accommodation plan with you, and support you in requesting accommodation for your course work. Remember that the process of accommodation is private: AS will not share details of your needs or condition with any instructor, and your instructor will not reveal that you are registered with AS.

Religious Accommodations

As a student at the University of Toronto, you are part of a diverse community that welcomes and includes students and faculty from a wide range of cultural and religious traditions. For my part, I will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. Further to University Policy, if you anticipate being absent from class or missing a major course activity (such as a test or in-class assignment) due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

Additional Content

Piazza: Piazza will be used for discussions. This is for student-led discussion. The instructor and the TAs will check Piazza posts on a regular basis and might participate in discussions. Please do not email questions about course content to the instructor or the TAs. Instead, post your question on Piazza. Volume of messages increases one or two days before the test. It will not be possible for the instructor and/or the TAs to answer the questions.

Practice Problems: A list of practice problems will be posted on Quercus. They will form the basis for the term test and the final exam and will be essential to your understanding of the topics covered in class. You are encouraged to work together in groups on practice problems to solidify your knowledge of the material. You are also encouraged to ask your questions during the instructor/TAs' office hours and Piazza.

Email Policy: Email is most appropriate for personal questions. Before you send an e-mail, make sure that you are not asking for information that is already on the course outline/website/announcements, or questions about the course material that are more appropriately discussed during office hours. If you do not get a response, this may be why. If your question is conceptual and does not require calculations or an elaborate answer, you can ask by email. Any

questions regarding the tutorials should be addressed to the TAs. For all other matters, contact the instructor. Please email the instructor and the TAs using your U of T email address. The subject line should contain the course number, lecture section number, and a relevant subject (indicating what the email is about). Be sure to include your full name and student number in the body of the message. You will not get a response if you email from other email addresses or do not follow the email policy.

Privacy and Use of Course Materials Notifications: Course materials belong to your instructor, the University, and/or other source depending on the specific facts of each situation and are protected by copyright. In this course, you are permitted to download session materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor. For questions about recording and use of videos in which you appear please contact your instructor.

Use of Generative AI: Students may use artificial intelligence tools, including generative AI, in this course as learning aids. However, students are ultimately accountable for the work they submit.

Students Responsibilities:

- It is up to students to know all course policies and important dates. It is also up to them to know about any important announcements; Check the Quercus page regularly!
- Students are responsible for their own learning. The instructor/TAs are happy to help them learn, but in the end, it is up to them! Use office hours and Piazza often. Make an appointment with the instructor. Keep asking questions until you are satisfied. Ask about big concepts or small details there is no such thing as a stupid question. Always take advantage of extra help and don't wait until it is too late!
- Students must follow the U of T code of Behaviour this means that cheaters will be prosecuted. The Academic Regulations of the University are outlined in the Code of Behaviour on Academic Matters. You are expected to be familiar with, and to abide by, all components of the [Code of Behaviour on Academic Matters](#).

Instructor/TAs Responsibilities:

- Lectures will be clearly presented, organized, and have plenty of examples. Tutorials, office hours, and Piazza can help you solve problems and solidify your learning.
- Extra help, remedial and acceleration, is always available, during office hours, by appointment, and on Piazza.
- Students' emails will be answered in a timely fashion, typically within 48 weekday (business) hours.
- Every student in the class will be treated with fairness and respect. Students who wish to excel are encouraged to consult regularly with the instructor. Students who abuse the U of T code of behavior will be dealt with appropriately.

Course Topics: This course plans to cover the following topics from the textbook.

Chapter 1: Probability and Distributions

1.1 - Introduction

1.2 - Sets

1.3 - The Probability Set Function

1.4 - Conditional Probability and Independence

1.5 - Random Variables

1.6 - Discrete Random Variables

1.7 - Continuous Random Variables

1.8 - Expectation of a Random Variable

1.9 - Some Special Expectations

1.10 - Important Inequalities

Chapter 2: Multivariate Distributions

2.1 - Distribution of Two Random Variables

2.2 - Transformations: Bivariate Random Variables

2.3 - Conditional Distributions and Expectations

2.4 - Independent Random Variables

2.5 - The Correlation Coefficient

2.8 - Linear Combinations of Random Variables

- Theorem 2.6.1: Moment Generating Function of a Linear Combination of Mutually Independent Random Variables

Chapter 3: Some Special Distributions

3.1 - The Binomial and Related Distributions

3.2 - The Poisson Distribution

3.3 - The Gamma, Chi-squared, and Beta Distributions

3.4 - The Normal Distribution

Chapter 5: Consistency and Limiting Distributions

5.1 - Convergence in Probability

5.2 - Convergence in Distribution

5.3 - Central Limit Theorem