

**STA 247 - Probability with Computer Applications L0101**  
**M 3-5, F 3-4 (OI G162) & Tutorials F 4-5**

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**Instructor:** Karen H. Wong - karen.huynhwong@utoronto.ca

**Office Hours:** Stewart Building 103C (149 College St.) - ~~TIME TBD~~ W-2-4PM  
F-5-6PM

**Textbook:** Scheaffer & Young: *Introduction to Probability and Its Applications*, 3rd ed., 2010

**Course Website:** All lecture slides, problem sets, course information will be posted on Quercus.

**Course Description:** Introduction to the theory of probability, with emphasis on applications in computer science. The topics covered include random variables, discrete and continuous probability distributions, expectation and variance, independence, conditional probability, normal, exponential, binomial, and Poisson distributions, the central limit theorem, sampling distributions, estimation and testing, applications to the analysis of algorithms, and simulating systems such as queues (Note: STA247H1 does not count as a distribution requirement course).

**Prerequisites:** MAT135H1 & MAT136H1/MAT137H1/MAT157Y1; CSC108H1/CSC148H1

**Exclusions:** ECO227Y1/STA255H1/STA257H1

**Grading:** There will be multiple evaluations in form of assignments and midterms. The grade breakdown is

Syllabus Hunt	1.5%	Sept. 20
Individual Assignments (2)	10% each	Oct. 15, Dec. 3
Tutorial Activities (9)	1.5% each	Weekly
Midterm	25%	Oct. 26 3:10-5 PM, Location TBD
Final Exam	40%	TBD

**Assignments:** Due to available TA resources, only select problems on the assignments will be evaluated. **Assignments will be submitted through Crowdmark on Quercus.** Official due dates will be posted on the assignment PDF. Late assignments will receive a penalty of 5% for every hour interval that the assignment is late. For example, if an assignment is submitted 10 minutes after the due date, there would be a penalty of 5% on the assignment grade (i.e. 90%  $\rightarrow$  85%).

**Tutorials:** Tutorials begin on **September 14** and will consist of short learning and problem solving activities that will be graded. The purpose of the activities is to help you deepen your understanding of the concepts covered during lecture, and to develop and apply problem solving skills.

This will be an opportunity to learn how to write a clear solution that demonstrates that you understand the ideas presented and communicate them to your peers. You will also see how your work will be evaluated to make appropriate improvements for your assignments and tests.

**Grading Policy:** Any answers on assignments, midterms, and final exam without justification and showing your work **will not receive any credit**, regardless of the “correctness” of the answer. It is your responsibility as a student to show with utmost clarity that you have learned the course concepts sufficiently. This includes **defining variables/random variables, distributions, relevant parameters, interpreting calculations, etc.** as necessary.

All assignments, midterms, and final exam will be graded according to a strict marking scheme. If after reviewing posted marking schemes you believe you have earned more credit than what was awarded, send me an email with a brief explanation **no later than 1 week after the solutions have been released**. **If you require an extension for an assignment with valid reasons and documentation, please notify me prior to the due date** to have something arranged.

**Homework:** Suggested practice problems from the textbook and exercises will be provided in the lecture slides for each chapter section covered. I strongly recommend that you attempt as many as possible with and without notes to assess your own understanding of concepts.

**Extra Help:** I will be holding regular office hours, with extra hours before the midterm and final exam. If you are experiencing difficulty with course content, or have questions related to course material, please come by during the available office hours. TA office hours are located on **Level G** of Sidney Smith Hall in SS 623B.

This term we will be using Piazza for class discussion. The system is highly tailored to getting you help quickly and efficiently from classmates, the TAs, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. If you have any problems or feedback for the developers, email [team@piazza.com](mailto:team@piazza.com). Find our class page [here](#). Use of Piazza is **entirely optional** and students who choose to use it should read the Privacy Policy agreement and post only what they are comfortable sharing as stated in the agreement.

### Course Conduct:

- **Email:** Any administrative questions regarding the course can be addressed by me via email. Questions regarding course material and concepts should be addressed in office hours/Piazza. If those times do not work for you, please arrange an appointment to see me.
- **During Lecture:** Please practice classroom etiquette – arrive on time, devices on silent, save your conversations for later, and most of all, be respectful of your peers. If you anticipate that you will have to leave early for any reason, please seat yourself so that you may do so without disrupting your fellow peers.
- **Programming Languages:** In this course, we will occasionally be using R statistical software which is available for free download. Any code required for assignments will be provided either in lecture or easily found using a search engine. **You will not be tested on coding**

however you will be expected to read and understand R output during midterms and/or the final exam.

- **Missed Tests:** There are no make-up tests. Any missed tests that are a result of illness requires a **U of T Student Medical Certificate** to be completed by you and your doctor within one week of the test. This can be obtained [here](#).

**Accessibility Services::** The University of Toronto provides accommodations through accessibility services to students with diverse learning styles and needs. If you have a disability or health consideration that may require accommodations, please feel free to reach out to me and/or Accessibility Services at 416-978-8060 or through email [accessibility.services@utoronto.ca](mailto:accessibility.services@utoronto.ca). You can find out more information [here](#).

**Important Dates:**

First Day of Classes .....	Sept. 6
Last Day to Drop .....	Nov. 5
Fall Break .....	Nov. 5-9
Last Day of Classes .....	Dec. 5
Make-Up Class .....	Dec. 6
Exam Period .....	Dec. 8-21

**Academic Integrity:** Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that the U of T degree that you earn will be valued as a true indication of your individual academic achievement, and will continue to receive the respect and recognition it deserves. Familiarize yourself with the University of Toronto's Code of Behaviour on Academic Matter. You are expected to know the rules of conduct outlined within. Potential offences include, but are not limited to:

Assignments:

- Using someone else's ideas or words without appropriate acknowledgement.
- Copying material word-for-word from a source (including lecture and study group notes)
- Obtaining or providing unauthorized assistance on any assignment including
  - working in groups on individual assignments – this includes giving hints to help them get to the answer!
  - having someone rewrite, edit, or add material to your work while editing.
  - researching for inspiration, hints, or answers to any graded problem
- Lending your work to a classmate who submits it as his/her own with or without your permission

On tests and exams:

- Using or possessing any unauthorized aids, including a cell phone, smart watch, programmable calculators.

- Looking at someone else's answers or allowing someone to look at yours
- Misrepresenting your identity.
- Falsifying or altering any documentation required by the University, including doctor's notes

The University of Toronto treats cases of academic misconduct very seriously. All suspected cases of academic dishonesty will be investigated following the procedures outlined in the Code. The consequences for academic misconduct can be severe, including a failure in the course and a notation on your transcript. **If you have any questions about what is or is not permitted in this course, please do not hesitate to contact the instructor.** If you are experiencing personal challenges that are having an impact on your academic work, please speak to the instructor or seek the advice of your college registrar.

**Tentative Schedule:**

Week	Topics
1: Sept. 7	Introduction to the course, mutual expectations. Recurring definitions,
2: Sept. 10-14	Probability: Axioms, Events ( $\cup, \cap, ^c$ ), Independence vs. Mutually Exclusive, Counting
3: Sept. 17-21	Counting, Conditional Probability
4: Sept. 24-28	Law of Total Probability, Discrete Random Variables
5: Oct. 1-5	Common Discrete Distributions: Bernoulli, Indicator Variables, Binomial, Poisson
6: Oct. 8-12	THANKSGIVING HOLIDAY Continuous Random Variables
7: Oct. 15-19	Common Continuous RV: Uniform, Exponential, Gamma and connection to Exponential, Normal Distribution and Properties
8: Oct. 22-26	Normal Distribution, MIDTERM
9: Oct. 29-Nov. 2	Moment Generating Functions, Discrete Joint Random Variables
10: Nov. 5-9	READING WEEK
11: Nov. 12-16	Discrete and Continuous Joint Random Variables
12: Nov. 19-23	Continuous Joint RV, Transformations
13: Nov. 26-30	Transformations - <b>2 HR LECTURE (NO TUTORIAL)</b>
14: Dec. 3	Central Limit Theorem

