

University of Guelph
Department of Mathematics and Statistics
Course Outline: Stat*2120 Winter 2023
Probability and Statistics for Engineers

General Information

Course Title: Stat*2120: Probability and Statistics for Engineers

Course Description: The topics covered in this course include: Sample spaces; probability, conditional probability and independence; Bayes' theorem; probability distributions; probability densities; algebra of expected values; descriptive statistics; inferences concerning means, variances, and proportions; curve fitting, the method of least squares and correlation. An introduction to quality control and reliability is provided. This course is recommended for students in the B.Sc.(Eng.) program.

The above is the official description in the course calendar.

Credit Weight: 0.5

Prerequisite(s): 1 of IPS*1510, MATH*1210, MATH*2080

Restriction(s): STAT*2040, STAT*2060, STAT*2080, STAT*2230

Academic Department (or campus): Mathematics & Statistics

Campus: University of Guelph

Semester Offering: Winter 2023

Class Schedule and Location: Lectures are scheduled on Monday, Wednesday and Friday from 10:30AM to 11:20AM, in RICH 2520. Lectures will primarily be delivered as “face-to-face” lectures. Face-to-face lectures will not be recorded.

The lecture on Friday February 17 will be held remotely, via Zoom. This is the Friday prior to the winter break. The reason for doing this lecture via Zoom is so that it can be recorded and thus provide greater flexibility for student travel plans near the break.

Other remote lectures (either synchronously or asynchronously) are possible, but it is expected that these will only constitute a minor proportion of the total lecture content.

Note that the lecture on Monday April 10 is a “makeup” lecture for the missed lecture on Friday April 7.

Instructor Information

Name: Gary J. Umphrey

Email: umphrey@uoguelph.ca

Office Phone: (519) 824-4120 x53288 (voice mail here)

Office location and office hours: Office hours will usually be on Wednesday & Friday, 1:00PM–3:00PM. My office is in MacNaughton 551. Whenever possible I will meet with students after our face-to-face classes to answer questions. There may be times when I need to reschedule office hours, I will notify the class of any such changes ASAP.

GTA Information

Name: Patrick McMillan (Head TA)

Instructor Email: stat2120@uoguelph.ca

Course Content

Specific Learning Outcomes:

I try to optimize the educational outcomes for each student in the course. Specifically some of the outcomes I consider desirable are:

- ▶ Strengthen your problem-solving skills, particularly for problems that are quantitative or quantitative-verbal in nature.
- ▶ Build your understanding of basic statistical language.
- ▶ Learn core statistical methodologies that are employed in almost every field that requires quantitative data analysis, but with particular emphasis on engineering applications.
- ▶ Gain a basic understanding of the logic of statistical inference, including its roots in elementary probability.
- ▶ Improve your capabilities to critically interpret results in research papers or other reports that include statistical analysis and reasoning.
- ▶ Develop key skills for communicating statistical results to others.

Lecture Content:

Lectures vary a fair bit in style and content, you need to keep on top of the lectures and other course materials.

Note that this face-to-face course is not designed as a distance education, remote or “hybrid” course; you must be able to attend all on-campus components.

Labs:

This course does not have a formal lab, but you will be working with hands-on statistical analyses using R statistical software during at least some of the classes. You will install the latest version of R or R-Studio on your computer (details to come in class). There will be TA support to assist you with difficulties you encounter with R at the drop-in R lab, which is held Monday to Friday, 2:30PM–4:30PM, in SSC 1305.

Support for other facets of the course is available through the TAs in the Math & Stats Learning Centre.

Course Assignments and Tests:

This course will have both graded and ungraded assignments, and the assignments may have individual or group work components (or both). There will be four Graded Assignments. Assignment questions will be posted on Courselink and some assignments may be released in parts. At least part of each Graded Assignment will be posted at least one week before the assignment is due, but questions can be added to any Graded Assignment up to 72 hours before the assignment is due.

Details of the submission process will be explained for each Graded Assignment in class and on CourseLink.

A midterm test is planned for Friday March 3; this date is tentative and is subject to change. I hope we can get rooms in the evening, as this allows more time and space than if the test is held in class, but an in-class test may be necessary.

- ▶ Your final grade will be determined as follows:
- ▶ the four Graded Assignments will be worth 7.5% each, for a total of 30%;
- ▶ the midterm test will be worth 30%;
- ▶ the final exam will be worth 40%.

Assignments which are not graded are also an essential component of the course, and I expect you to work through all of the ungraded questions as well as those that are graded. The midterm test and final exam will focus on assignment and lecture content.

The test date, time and location will be announced ASAP. Details of the format will be given in class. The test date is tentative and subject to change, in part because it is uncertain whether we can get rooms. I hope we can get rooms in the evening, as this allows more time and space than if the test is held in class, but in-class testing may be necessary.

Graded Assignment due dates: Thursday January 26 for Graded Assignment #1
Thursday February 16 for Graded Assignment #2
Thursday March 16 for Graded Assignment #3
Tuesday April 4 for Graded Assignment #4

Final examination date and time:

Friday, April 21, 2023, 11:30AM-1:30PM

The exam will be held on-campus, with the location to be announced later by the Registrar.

Course Resources

(Strongly) Recommended Text:

Applied Statistics and Probability for Engineers & Scientists, Seventh Edition, by D.C. Montgomery and G. C. Runger (2018, published by Wiley).

This text is available in various hard copy and digital versions, and some of the versions include access to WileyPLUS. I will not be using WileyPLUS as any component of the Graded Assignments, but the text contains many good problems that could be used as part of the ungraded assignments. To keep costs low, the University Bookstore will only be selling the digital version as a “150-Day Rental Enhanced E-text”. I would recommend attending the first lecture prior to purchasing the text. I will be posting a “Permalink” for purchasing the access code through the University Bookstore on CourseLink.

We will cover material in all chapters except 12 and 14. In some chapters we will cover the entire chapter, but in other chapters we will cover a subset of the text material. Further details will be provided in class.

Other Resources:

I will be providing other materials as we move through the course. I rarely provide prepared notes, as I consider learning how to make your own notes an important educational objective.

Course Policies

Grading Policies

Details on submitting Graded Assignments will be given in class and posted on CourseLink. Deadlines are strictly enforced, unless I decide otherwise. A penalty of 10% per day can be imposed for late assignments. An assignment cannot be submitted after graded assignments are returned to the class. An unsubmitted assignment without an approved request for academic accommodation will receive a grade of 0.

If you miss the midterm test, at my discretion I will either provide a makeup or I will transfer the weight of the test to the final exam.

Course Policy on Group Work:

Some assignments may allow or even require group work on one or more components. Explicit rules for such components can vary, and will be detailed with the assignment guidelines.

University Policies

Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration.

Drop Date

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar.

Copies of Out-Of-Class Assignments

Not applicable.

Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway. Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

More information: www.uoguelph.ca/sas

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor. The Academic Misconduct Policy is outlined in the Undergraduate Calendar.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via Courselink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

COVID-19 Safety Protocols

For information on current safety protocols, follow these links:

<https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/>

<https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces>

Please note, that these guidelines may be updated as required in response to evolving University, Public Health or government directives.