Department of Mathematics and Statistics
University of Guelph

STAT*2120: Probability and Statistics for Engineers - Course Syllabus Fall 2022

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

DISCLAIMER:

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, classroom schedules, 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.

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1. **Instructional Support:**

   1.1. **Instructors:**

   Geordie Richards, Ph.D.

Office:	MacN 547, ext. 53033
Email:	grichards@uoguelph.ca
Office hours:	Tuesdays and Thursdays 11AM-12PM in SSC 1504

   1.2. **Teaching Assistants:**

   Matthew Baxter

   Moksh Trivedi

   Ahmed Naser

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2. **Learning Resources:**

   2.1. **Course Website:**
   Course material, news, announcements, and grades will be regularly posted to the STAT*2120 Courselink website. You are responsible for keeping up-to-date on this site.

   2.2. **Required Resources:**

   1. The course manual **STAT*2120 - Probability & Statistics For Engineers - Course Manual** (9th Edition), is available at the MacNaughton Bookstore. This is the primary resource for the course and will be completed in class as the course progresses. Please be sure that you have the current version – the 9th edition - only available in the MacNaughton bookstore.

2. The **STAT*2120 For You to Try Manual** (6th Edition) is also available at the MacNaughton Bookstore. This is a manual of questions (with final answers) that will help you study for quizzes and exams. Note that some course concepts will be taught through these exercises, so it is important that you complete them, plus they will help you to practice.

2.3. **Recommended Resources:** You should have more than enough to practice with between the FYTT manual, past tests/quizzes and online quizzes. If you still want more, virtually any entry level probability and statistics textbook will do just fine.

2.4. **Additional Resources:**

Lecture Information: All lectures will be delivered entirely face-to-face, in person. Lectures will not be recorded or streamed. Completed lecture notes will be uploaded to the course website at the end of every week. It is, however, strongly recommended that you attend every class.

Other: Past tests, supplementary questions, and other resources may be posted to the Course website as needed. Again, it is important that you check regularly to keep up-to-date.

2.5. **Communication Email Policy:** Major announcements will be posted to the course website. It is your responsibility to check the course website regularly. 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 student.

Disclaimer: Student Identity Disclosure in Recordings

The university has requested that I include the following disclaimer regarding recorded materials. While I don't anticipate the use of any videos or recordings as our class will be run entirely face-to-face, I want to ensure that we are prepared in the case that the pandemic pushes us in this direction.

By enrolling in a course, unless explicitly stated and brought forward to their instructor, it is assumed that students agree to the possibility of being recorded during lecture, seminar or other "live" course activities, whether delivery is in-class or online/remote.

If a student prefers not to be distinguishable during a recording, they may

1. turn off their camera
2. mute their microphone
3. edit their name (e.g., initials only) upon entry to each session
4. use the chat function to pose questions.

Students who express to their instructor that they, or a reference to their name or person, do not wish to be recorded may discuss possible alternatives or accommodations with their instructor.

2.6. **Getting Help:**

My number one priority is to ensure that you are supported and have lots of opportunities to ask questions and get help! Here are some options for getting help in this course:

- Ask questions during our lectures, Tuesday/Thursday 8:30am-9:50am.
- Come to office hours. Don't ever hesitate to drop in, even if you think you are behind in your studying. Getting you caught up is **exactly** what those opportunities are there for!
- Post to the discussion board on Courselink. This is a great place to post your questions. I will check this often and respond as soon as I am able. It is also a great way for you to help others if you see a question that someone else posts that you can help out with. This is one of the best ways to master a concept: by explaining it to someone else!
- Send me an email (grichards@uoguelph.ca). Since there are over 100 of you and only one of me, I would prefer to answer questions in a group forum (so that I can help more of you at once), but certainly for more personal queries, this is a great option. If you ask questions by email (or even in Courselink), it would be extremely helpful for you to attach a picture of your work, so I can easily see where you might be stuck and be able to help you more quickly. I usually try to respond within a few hours. However, I get a lot of email from students and I need to make sure that I have the chance to help as many people as I can in the time I have! So be warned that if you send me many emails with various questions, it may take a day or two to get back to you.

3. **Assessment:**

3.1. **Dates and Distribution**

	Scheme
4 in-class Quizzes	20%
3 Assignments	10%
Midterm Exam	30%
Final Exam	40%

In-class Quizzes: Quizzes will be worth 5% each and will cover approximately 2-3 weeks of lecture material. Quizzes will be short, independent, 20 minute assessments that will test your understanding of current topics in the course. To help you to practice and prepare, consult the "For You to Try Manual" with similar-spirited questions. Here is the schedule of dates:

- Quiz 1: Thursday, September 22nd, 2022 (Week 2).
- Quiz 2: Thursday, October 6th, 2022 (Week 4).
- Quiz 3: Thursday, November 10, 2022 (Week 9).
- Quiz 4: Thursday, November 24, 2022 (Week 11).

Written Assignments: There will be 3 written assignments due throughout the term (see schedule below). Your top two assignment scores will each be worth 4%, and your lowest assignment score will be worth 2%. Assignments will cover 3-4 weeks worth of course content. You may use your course notes and work together with your peers to figure things out, but you must write up your own individual solutions for submission. This includes the use of any online resource or calculator, app, etc. Copying another person's answers (or obtaining your answer from another source) is academic misconduct and will not be tolerated.

- Assignment 1: Thursday, September 29, 2022 (Week 3) Upload by 11:59PM to Gradescope
- Assignment 2: Thursday, November 3, 2022 (Week 8) Upload by 11:59PM to Gradescope
- Assignment 3: Thursday, November 17, 2022 (Week 10) Upload by 11:59PM to Gradescope

Midterm Exam: Friday, October 21st, 2022 (Week 6) 6:00pm-7:30pm (90 minutes to write). Location: TBA. Closed-book, closed resource, independent. Exact topics TBA.

Final Exam: Friday, December 16th, 2022 7:00pm-9:00pm (120 minutes to write). Location: TBA. Closed-book, closed resource, independent. Cumulative.

*Should face-to-face instruction be shut down at any point by the administration, any assessments completed during such a shutdown will be proctored via Zoom according to the schedule above. Please ensure that you have a working web camera should we need to run assessments in this way.

3.2. **Course Grading Policies**

Academic Consideration: When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, ID number, and e-mail contact. See the academic calendar for information on regulations and procedures for Academic Consideration: `http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml`

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).

Accommodation of Religious Obligations: If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor at the start of the semester to make

alternate arrangements. See the undergraduate calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations: `http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml`

Missed term tests, assignments, or quizzes: Missed quizzes and tests will receive a grade of 0

Passing grade: In order to pass the course, you must receive a final grade of at least 50%. Additionally, in order to pass this course, you must receive at least 50% of the marks available collectively, on the term tests and final exam that are used to calculate your final grade. If you do not achieve this, your maximum possible final grade will be 48%.

Group Work: You are encouraged to work together to learn the course material and complete For You to Try exercises. All quizzes, term tests and the final exam are individual assessments and must be completed independently.

Copies of out-of-class assignments: Keep paper and/or other reliable back-up copies of assignments, homework, and your midterm. You may be asked to submit this work at any time.

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4. Aims, Objectives Graduate Attributes:

4.1. Calendar 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.Eng program.

Credit Weight: 0.5, **Department:** Mathematics Statistics, **College:** CEPS, **Campus:** Guelph

Prerequisite: 1 of IPS*1510, MATH*1210, MATH*2080

Restrictions: STAT*2040, STAT*2060, STAT*2080, STAT*2100

4.2. Course Aims

This course is an introductory course in probability and Statistics. The objective of the course is to give you a strong statistical background that you will require as you progress through your degree and beyond. The main goals of the course are (1) to teach students the concepts listed in section 4.1 at a level that promotes a deep understanding and (2) to explain how such concepts are applicable in their various degrees by exploring real-world problems.

4.3. Learning Objectives

At the successful completion of this course, the student will have demonstrated the ability to:

- Calculate and analyze basic descriptive statistics.
- Compute the probability of simple and compound events.
- Comprehend the notions of random variables, probability distributions, expected value and variance and use them to develop statistical methods.
- Be comfortable with well-known discrete probability distributions and calculating associated probabilities.
- Master the normal and t-distributions, be aware of their shapes and properties and how to calculate associated probabilities.
- Comprehend the notion of a sampling distribution and know the sampling distribution of the sample mean, and sample variance under various circumstances.
- Construct a confidence interval and carry out a hypothesis test on a mean, proportion, variance (or differences of two populations of these).
- Interpret confidence intervals and hypothesis tests and use them to make statistical decisions.
- Be able to conduct a hypothesis test for count data.

- Compare multiple means using an ANOVA table.
- Conduct hypothesis tests and build confidence intervals concerning the slope of a regression line.
- Have a basic understanding of how statistics can be used in risk and reliability assessment.

4.4. Instructor's Role and Responsibility to Students

As your instructor, I must:

1. Develop and deliver course material in a professional way that facilitates learning for a variety of students and learning styles.
2. Attend all lectures, filling in the Course Manual as we proceed in each lecture. I will provide completed course notes online regularly, but I strongly urge you to come to class. Bear in mind that most Tutorials will not use the Course Manual and these completed notes might not be provided to you.
3. Respond to you. This includes, as time permits, questions in lectures and lab tutorials, after classes, during office hours, or through email (where I reserve the right to reply within a timeframe of 1-2 days). You are more than welcome to contact me at any time through these means if you have questions or concerns about the course or the course material.
4. Evaluate you fairly, and fairly as compared to your peers, providing prompt feedback on your performance and justification for your grade. I must provide academic consideration, where appropriate, as described in Section 3.

4.5. Students' Learning Responsibilities

As a member of this class, you are expected to:

1. Take advantage of the learning opportunities provided during lectures.
2. Treat others with respect and dignity whenever you address them, in-class or online.
3. Genuinely try "For You To Try" problems in a timely manner, on your own time.
4. Seek help if you have tried the homework and are still having difficulty with the course content. This means contacting me (not just at the last minute!) and possibly considering other resources as I recommend them to you.
5. Check all grades against tests that have been returned to you, once they are posted to the Course website, to verify that the correct mark has been recorded.
6. Notify me, as described in Section 3, in the case that there are missed tests/quizzes or academic conflicts that are known in advance. If illness, work, or extra-curricular activities are causing you to struggle, you are advised to keep me up-to-date on your progress, so that I can be more helpful to you.

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5. Teaching and Learning Activities:

5.1. Timetable

Lectures (in-person): Tuesdays and Thursdays, 8:30-9:50AM, in MacN 113

5.2. Lecture Schedule

(schedule is approximate and subject to change depending on time constraints)

Lectures (Week)	Lecture Topics	References
Self-study	Introduction and Descriptive Statistics	Chapters 1 & 2
0-1	Probability	Chapter 3
2	Discrete Probability Distributions	Chapter 4
3	Continuous Probability Distributions	Chapter 5
4-5	Sampling Distributions	Chapter 6
5-6	Inferences Concerning a Mean	Chapter 7
6-7	Two-Sample Inference Procedures for Means	Chapter 8
7-8	Inference Procedures for Proportion(s)	Chapter 9
8-9	Inference Procedures for Variance(s)	Chapter 10
9-10	Inference Procedures for Variance(s)/ANOVA	Chapter 10 & 11
10-11	Analysis of Variance	Chapter 11
12	Introduction to Linear Regression	Chapter 12

5.3. **Lab Schedule:** Not applicable.

5.4. **Other Important Dates**

First day of classes: Thursday, September 8th, 2022.

Thanksgiving: Monday, October 10th, 2022 (no classes; rescheduled to Friday, December 2nd)

Fall Study Day: Tuesday, October 11th, 2022 (no classes; rescheduled to Thursday, December 1st)

Last day of classes: Friday, December 2nd, 2022.

Drop Date: Courses that are one semester long must be dropped by the end of the last day of classes (**Friday, December 2nd, 2022**). The regulations and procedures for Dropping Courses are available in the Undergraduate Calendar. `https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml`

Course Evaluation Information: Near the end of the term, you will be given the opportunity to evaluate your instructor and provide comments regarding your experience. The evaluations for this class will be done in-class. Your instructor will inform you of when these are to take place.

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6. **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.

6.1. **Resources**

The Academic Misconduct Policy is detailed in the Undergraduate Calendar: `http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml`

A tutorial on Academic Misconduct produced by the Learning Commons can be found at: `http://www.academicintegrity.uoguelph.ca/`

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7. **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 book their exams **at least 14 days in advance, and no later than November 1**. 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`

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8. **Recording of Materials :**

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

Posted online videos and course notes are the property of the instructor and are not to be otherwise disseminated beyond this course.

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9. **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.

`http://www.uoguelph.ca/registrar/calendars/index.cfm?index`

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10. **Mental Health Resources:**

One out of every five students in Canada experiences some sort of mental health issue at some point in their academic career. If you find yourself facing a mental health crisis, or just need to talk to someone, please consider taking advantage of one of the following resources available to University of Guelph students:

Counselling Services: Visit the Counselling Services website (https://wellness.uoguelph.ca/counselling) to get information on resources available to you, both online and in-person. You can also visit them at Health Services (J.T. Powell Building, ext 53244) where they offer individual and group counselling sessions by appointment or walk-in.

Student Support Network: is located in the Wellness Education Promotion Centre in the J.T. Powell Building and offers confidential, peer-based, drop-in support.

Good2Talk: (1-866-925-5454) is a free, 24/7 student hotline that provides professional counselling and referrals for mental health, addictions and well-being.

Here 24/7: (1-844-437-3247) specializes in assessment, referral and appointment booking and is available 24/7 for crisis support.

You are not alone and you will not be judged for asking for help.