# STAT 235, Fall Term 2023

UNIVERSITY OF ALBERTA

Department of Mathematical & Statistical Sciences

**STAT 235 Common Website: https://eclass.srv.ualberta.ca/portal/**

**(Note: All times in this document are Mountain Time.)**

| Instructor | Section | Class Time | Room | E-mail | Office Hours* |
|---|---|---|---|---|---|
| Paul Cartledge (CAB 409) | EA1 | TR 08:00-09:20 | ETLC 1-017 | pdc2@ualberta.ca | In Person: TR 14:00-16:00 |
| Ali Simchi (CAB 587) | EB1 | TR 08:00-09:20 | ETLC 1-007 | asimchi@ualberta.ca | In Person: MWF 11:00-12:30<br>TR 9:30:10:45<br>Online: M 18:00-20:00 |

*Students can go to either instructor's office hours; the hours are in person but online appointments might be scheduled in advance.

**Email Rules:**

1) Please put **"STAT 235"** in the subject line. Please allow for up to 48 hours for email replies.

2) Emails sent from your ualberta account are preferred (emails **not** sent using your ualberta email may not be delivered to the instructor's email inbox).

**Lecture Delivery:**

- Lecture material will be delivered primarily through class. Some pre-recorded videos may be assigned throughout the term but there should be sufficient warning before related material is covered in class.
- "Office Hours" will usually be to individually clarify material or course information.

**Course Description:** Descriptive data analysis. Calculus of Probability. Binomial, multinomial, Poisson, normal, beta, exponential, gamma, hypergeometric, and Weibull distributions. Sampling distributions. Estimation, testing hypotheses, goodness-of-fit tests, and one-way analysis of variance. Linear correlation and regression. Sampling. Quality control. Use of a microcomputer software package for statistical analyses in engineering applications.

**Prerequisite:** MATH 100. **Corequisite:** MATH 101. Credit may not be obtained in STAT 235 if credit has already been obtained in STAT 141, 151, 161, 222, 265, 266; PSYCO 211, SCI 151, or SOC 210. Intended for Engineering students.

**Course Objectives and Expected Learning Outcomes:** STAT 235 is an introductory statistics course for undergraduate engineering students. The emphasis is on data description, inference, and model building because the components are important for professional engineering practice. Students have access to a computer lab and so are able to work with a variety of data sets using the statistical features in *Excel*. The course schedule is provided in a table below. Attendance and participation are strongly recommended for greater understanding of the material.

**Textbook:** There are three textbooks used in the past 15 years (each is a recommended resource, not required):

1. *Probability and Statistics for Engineering and the Sciences*, by Devore, 9th Edition, 2015.
   ISBN: 9781305251809
   List Price: $110.98 (loose-leaf) or $181.98 (hardcover)

2. *Probability and Statistics for Engineers and Scientists*, by Anthony Hayter, 4th Edition, 2013.
   ISBN: 9781111827045
   Online notes are most closely related to this textbook, but there are still notable changes.

3. *Applied Statistics and Probability for Engineers*, by D. C. Montgomery and G. C. Runger, 3rd Edition, 2003.
   Students can have access to this textbook at this link.

**Required materials:** 1) Desktop/laptop, 2) Excel, 3) Non-programmable calculator

For students registered in the in-person lab sections (EL01-EL15), Excel will be available on desktops in the provided lab rooms. The desktop/laptop and Excel materials are also very useful for working on assignments at home.

**Course Schedule & Assigned Readings:** Here is the **tentative** outline with the approximate number of classes indicated for each topic. Recommended textbook chapters may contain more material than what is covered in lectures.

| Topic | Modules | Hayter | Devore | Classes |
|---|---|---|---|---|
| Descriptive Statistics | 1 | 6 | 1 | 2 |
| Probability | 2 | 1 | 2 | 3 |
| Random Variables | 3-1 | 2 | 3 – 4 | 1 |
| Discrete Probability Distributions | 3-2 | 3 | 3 | 2 |
| Continuous Probability Distributions | 3-3 | 4 | 4 | 1 |
| The Normal Distribution | 3-4 | 5 | 4.3 | 2 |
| Sampling Distributions | 4 | 7 & 5.3.2 – 5.3.3 | 5.3 – 5.5 | 2 |
| Inferences on a Population Mean | 5 | 8 | 7 – 8 | 3 |
| Comparing Two Population Means | 6 | 9 | 9 | 3 |
| Simple Linear Regression / Correlation | 7 | 12 | 12 | 3 |
| Analysis of Variance | 8 | 11 | 10.1 | 1 |
| Inferences on One and Two Proportions | 9 | 10 | 7 – 8 | 2 |

| | | | |
|---|---|---|---|
| **Grade Assessment:** | 10% | Lecture Assignments (11) | |
| | 10% | Lab Assignments (5) | |
| | 10% | Lab exam | Wednesday, December 6 at 18:00 (2 hours) |
| | 15% or 25% | Midterm exam | Friday, October 27 at 18:00 (2 hours) |
| | 55% or 45% | Final exam | Monday, December 18 at 14:00 (3 hours) |

**NOTE:** There are no classes Sep. 4, Oct. 9, and Nov. 13 – 17, 2023. The Fall 2023 term officially ends on Fri, Dec. 8, 2023.

**Marking Policy:** All sections of the course will be subjected to a common grading procedure. Your final grade will be determined based on your overall score out of 100, based on the calculations above. Your final score will be the higher of the two possible scores. Here is the tentative distribution that will be used to assign grades (depending on the actual results, the grades may be adjusted to account for unusual grade distributions):

| Score | < 50 | 50-52 | 53-55 | 56-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85-89 | 90-94 | 95-100 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade | F | D | D+ | C- | C | C+ | B- | B | B+ | A- | A | A+ |

*Grades are unofficial until approved by the Department and/or Faculty offering the course.*

**Note:**

1) The overall lecture assignment mark is calculated by dividing the sum of all marks that you earned from all 11 online assignments by the sum of all marks assigned.

2) The overall lab assignment mark is calculated by dividing the sum of all marks that you earned from all 5 lab assignments by the sum of all lab marks assigned.

3) In order to ensure the fairness of the grading process for labs across all groups marked by different graders, the total score for the five labs for each student may be adjusted by the overall average lab total for all students in the course if considerable differences among the groups are found. That means that some totals for individual students may be slightly adjusted, upwards or downwards.

**Extra Resources Through Online Learning (for all students):** Pre-recorded videos may be assigned throughout the term but there should be sufficient warning before related material is covered in class. Students are prohibited from sharing these videos with anyone not currently enrolled in STAT 235. You can also e-mail your instructor at any time if you have questions or concerns.

**Optional Online Learning Resources:** Additional learning resources aimed at facilitating student learning, and perhaps including formative assessment tools, are available from the textbook publisher and may be accessed for a fee paid by the student to the third-party provider (for example, the textbook company). Students choosing to access and use the online resources should note the following:

1. Registration in the system and any monetary transactions are of your own accord and not the responsibility of the University.
2. Students should be mindful of protecting their personal information and should be aware of how their personal information might be used and/or shared.
3. Students MUST NOT use their @ualberta email address or CCID to register into the system and instead should use a non-identifying email address or account.

**In-Person Exam Rules:**

- Detailed instructions regarding each exam will be uploaded on eClass close to the time of each exam.
- All exams are **closed book**. Formula sheets and tables will be provided by the instructor. A copy of the formula sheet and tables can be found through the available websites.
- You must bring a **NON-programmable** calculator **approved by the Faculty of Engineering.** All other electronic equipment is prohibited. Cell phones are not to be used during exams.
- Your student photo ID is required at exams to verify your identity. If you do not have your OneCard on exam day, please use another valid form of government-issued photo ID.
- Students will not be allowed to begin an examination after it has been in progress for 30 minutes. Students must remain in the exam room for at least 30 minutes from the time the exam commenced.
- Copying, revealing, taking pictures of, posting, sharing, photographing, or redistributing exam questions to any third party during or at any time after the exam is **STRICTLY PROHIBITED**.
- Communications with anyone (other than with me) during the exam is **STRICTLY PROHIBITED**.
- Violation of these rules will result in violation of the *Code of Student Behavior*.
- ***Please review section 23.5 from the University of Alberta Calendar for other details regarding examinations.***

**Midterm Exam:** The midterm will be held on **Friday, October 27, 2023**. See common course website for practice midterms. There will be **no make-up exam** for students who are absent on this day. Unless a legitimate excuse is provided, a grade of 0% will be given for the missed exam. If there is just cause for being absent, that portion of the final grade reserved for the missed exam will be added to the portion reserved for the final exam. See course website for practice exams.

**Lab Exam:** This will be a two-hour multiple-choice exam on Wednesday, December 6 from 18:00 – 20:00. See course website for more information and practice exams.

**Final Exam:** The final exam is cumulative. The Registrar sets the time, date, and place of the final exam. The Final Exam schedule can be found on BearTracks or here. See course website for practice exams.

**NOTE: If there is any chance that you cannot write an exam due to religious conflict or any other school-related conflict, you should notify your instructor in writing within two weeks of the start of Fall classes (on or before Tuesday, September 19, 2023). If you fail to notify us of a religious conflict or any other school-related conflict on or before Thursday, September 19, 2023, alternate exam accommodations may not be possible.**

**For students who cannot write the midterm exam due to Non-medical Protected Grounds,** please read the section 'Missed Term Work or Final Exam Due to Non-medical Protected Grounds' further below for more information.

**STATEMENT OF EXPECTATIONS: No AI Use Allowed**

In this course, our primary focus is to cultivate an equitable, inclusive, and accessible learning community that emphasizes individual critical thinking and problem-solving skills. To ensure a fair and consistent learning experience for all students, the use of advanced AI tools such as ChatGPT or Dall-E 2 is strictly prohibited for all academic (written/coding/creative/etc.) work, assignments, and assessments in this course. Each student is expected to complete all tasks without substantive assistance from others, including AI tools.

Any use of AI tool in your academic work may result in academic penalties and be considered an act of cheating and a violation as outlined in the relevant sections of University of Alberta Code of Student Behaviour.

**Labs and Lab Assignments:** There are 80-minute lab sessions scheduled each week. The lab has two purposes: 1) simulate real-life statistical analysis; 2) reinforce statistical concepts by manipulating data sets and observing the changes in the appropriate statistics. The labs start on **Tuesday, September 12.** There are NO labs during **November 13-17 (Fall Term Break)**. Microsoft Excel will be used in the labs. No previous experience with Excel is required. If you don't have access to the software, you may download it (free of charge) from the U of A OnTheHub website.

https://ualberta.onthehub.com

In the first lab session (see "Introductory Lab" on eClass), you will learn the basic features of Excel that are essential for the labs. Students are not required to submit any work in the lab session. More detailed information about labs in the course is posted in the Labs section on eClass.

There will be 5 lab assignments (due at **9:59 PM**). You will be required to generate your own output and then answer the questions from the output using your knowledge from class. Assignments are to be typed up in Microsoft Word and the corresponding PDF or JPG file(s) should be uploaded to Assign2 on eClass. **Do not write your name or ID number on your Lab**. ALWAYS keep a back-up! Completed assignments will be submitted, graded, and returned using Assign2. Please see the instructions posted on eClass for details on this process. Lab assignments are not weighted equally. The overall lab mark is calculated by dividing the sum of all marks that you earned from all 5 lab assignments by the sum of all marks assigned. **No late assignments will be accepted. Failure to submit an assignment on time for any reason will result in a mark of zero!**
**NOTE: Some assignments use Random Number Generation. Different systems (MAC OS) can produce different numbers.**

**Lab Due dates:** October 2, October 16, October 30, November 20, and December 4.

**Homework Assignments:** Online homework is a required component of the course. Completing the online homework helps students self-assess their progress in the course and prepare for exams. Online homework will be administered through eClass. Once you are in *a specific eClass homework assignment*, you will be able to see when that homework assignment is available and due.

After you finish a particular question, you can check your answer. You are allowed **unlimited tries** for each question, so if students are not happy about their mark after each question, students are welcome to redo the question again (with different values) before the due date. Please complete your homework before the due date. Students are expected to do their homework assignment for a particular chapter once the instructor has finished that chapter. Please plan to do your assignments ahead of time. It is your responsibility for completing the assigned homework in a timely fashion. If you have an isolated issue, you therefore have plenty of time to resolve it and/or access another computer.

There will be 11 assignments (due at **9:59 PM**). The overall homework assignment mark is calculated by dividing the sum of all marks that you earned from all 11 online assignments by the sum of all marks assigned.
**No late assignments will be accepted! Failure to submit an assignment on time for any reason will result in a mark of zero!**

**Homework Due dates:** Sep. 20, Sep. 27, Oct. 4, Oct. 11, Oct. 18, **Oct. 24**, Nov. 1, Nov. 8, Nov. 22, Nov. 29, **Dec. 8**.

**Missed Term Exams and Assignments:** There are no deferred midterm exams or deferred homework or lab assignments. A student who cannot write a term examination or complete a term assignment because of an incapacitating illness, severe domestic affliction, or other compelling reasons **may** have the weight of the missed component transferred to the final. In the case of a missed assignment, the student must apply for transferring the weight to their instructor in writing within **two working days** of the missed assignment due date. Excuses such as internet connection problems are not acceptable. **In the case of a missed term exam, the student must present significant documentation, such as** a medical statement or Statutory Declaration, or other suitable documentation, to justify absence from the component. The student **must** be ill on the day of the missed exam and the form needs to be submitted to their instructor within **two working days** of the missed event. The instructor **may not accept** your excuse and give **zero** for the missed term exam. But "**should a student write an exam, hand in the paper for marking, and later report extenuating circumstances to support a request for cancellation of the paper and for another exam, such a request will not be entertained**". To know what a student should do when they are sick, please go to

**http://www.registrar.ualberta.ca/files/What_to_do_when_you_are_sick%5B1%5D.pdf**

**Missed Term Work or Final Exam Due to Non-Medical Protected Grounds (e.g., religious beliefs):**
When a term assessment or final exam presents a conflict based on non-medical protected grounds, students must apply to the Academic Success Centre for accommodations via their Register for Accommodations website. Students can review their eligibility and choose the application process specific for *Accommodations Based on Non-medical Protected Grounds*.

It is imperative that students review the dates of all course assessments upon receipt of the course syllabus, and apply ***AS SOON AS POSSIBLE*** to ensure the timely application of the accommodation. Students who apply later in the term may experience unavoidable delays in the processing of the application, which can impact the accommodation.

**Students missing a substantial amount of time in a course:** Students who are absent for an extended period of time (such as three weeks or more) for whatever reason (medical or other) should communicate with their instructor as soon as possible. If such a situation arises, you are strongly encouraged to reach out to an academic advisor in your faculty to discuss options that may be appropriate in situations of extended absence (such as withdrawing from the course).

**Deferred Exam:** A student who cannot write the final examination because of an incapacitating illness, severe domestic affliction, or other compelling reasons can **apply** for a deferred final examination. Students who failed at the start of term to request exam accommodations for religious beliefs are expected to follow the normal deferred final examination process. Such an application must be made to the student's Faculty office within two working days of the missed examination and must be supported by a completed University of Alberta Medical Statement Form or other appropriate documentation (Calendar section 23.5.6). The deferred final exam is scheduled **Saturday, January 13, 2024 starting at 9:00 a.m**. Location and further details are to be determined.

**Re-examination:** A student who writes the final examination and fails the course may apply for a re-examination. Re-examinations are rarely granted in the Faculty of Science. Re-examinations are governed by university-wide Academic Regulations and Faculty of Science Academic Regulations. Misrepresentation of Facts to gain a re-examination is a serious breach of the *Code of Student Behaviour*.

**NOTE:** These options are each considered a privilege and not a right; there is no guarantee that it will be granted. Misrepresentation of Facts to gain a deferral is a serious breach of the *Code of Student Behaviour*.

## REMOTE DELIVERY CONSIDERATIONS

**Technology for Remote Learning:** To successfully participate in remote learning in this course, it is recommended that students have access to a computer with an internet connection that can support the tools and technologies the University uses to deliver content, engage with instructors, TAs, and fellow students, and facilitate assessment and examinations. Please refer to Technology for Remote Learning - For Students for details. If you encounter difficulty meeting the technology recommendations, please email the Dean of Students Office (dosdean@ualberta.ca) directly to explore options and support.

Please contact the instructor by the add/drop deadline if you do not have access to the minimum technology recommended. The instructor will make arrangements for accommodating students who contact the instructor before this date. Failure to do so may result in a zero in any assessment that depends on the minimum technology.

**Students Eligible for Accessibility-Related Accommodations:**
In accordance with the University of Alberta's Discrimination, Harassment, and Duty to Accommodate policy, accommodation support is available to eligible students who encounter limitations or restrictions to their ability to perform the daily activities necessary to pursue studies at a post-secondary level due to medical conditions and/or non-medical protected grounds. Accommodations are coordinated through the Academic Success Centre, and students can learn more about eligibility on the Register for Accommodations website.

It is recommended that students apply as early as possible in order to ensure sufficient time to complete accommodation registration and coordination. Students are advised to review and adhere to published deadlines for accommodation approval and for specific accommodation requests (e.g., exam registration submission deadlines). Students who request accommodations less than a month in advance of the academic term for which they require

accommodations may experience unavoidable delays or consequences in their academic programs, and may need to consider alternative academic schedules.

**Academic Success Centre:** The Academic Success Centre provides professional academic support to help students strengthen their academic skills and achieve their academic goals. Individual advising, appointments, and group workshops are available year-round in the areas of Accessibility, Communication, Learning, and Writing Resources. Modest fees apply for some services.

**Student Responsibilities:**

**ACADEMIC INTEGRITY:** The University of Alberta is committed to the highest standards of academic integrity and honesty, as well as maintaining a learning environment that fosters the safety, security, and the inherent dignity of each member of the community, ensuring students conduct themselves accordingly. Students are expected to be familiar with the standards of academic honesty and appropriate student conduct, and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour and the Student Conduct Policy, and avoid any behaviour that could potentially result in suspicions of academic misconduct (e.g., cheating, plagiarism, misrepresentation of facts) and non-academic misconduct (e.g., discrimination, harassment, physical assault). Academic and non-academic misconduct are taken very seriously and can result in suspension or expulsion from the University.

All students are expected to consult the Academic Integrity website for clarification on the various academic offences. All forms of academic dishonesty are unacceptable at the University. Any suspected offence on a Minor Formative Assessment (worth no more than 5%) will be investigated by the instructor in a process outlined by the Faculty of Science. Successive suspected offenses on a Minor Formative Assessment, or any suspected offence on a Major Formative Assessment (worth more than 5%), will be reported to the Faculty of Science as a possible breach of the Code of Student Behaviour. Anyone who is found in violation of the Code of Student Behaviour may receive a sanction. Typical sanctions include conduct probation, a mark reduction or a mark of 0 on an assessment, a grade reduction or a grade of F in a course, a remark on the transcript, and a recommendation for suspension or expulsion.

**Collaboration on Assignments:** http://www.osja.ualberta.ca/Students/AppropriateCollaboration.aspx
Every term there are several students who receive academic penalties for copying assignments. Here are some tips to avoid copying on assignments:

1) Do not write down something that you cannot explain to your TA or instructor.
2) When you are helping other students, avoid showing them your work directly. Instead, explain your solution verbally. Students whose work is copied also receive academic sanctions.
3) If you find yourself reading another student's solution, do not write anything down. Once you understand how to solve the problem, remove the other person's work from your sight and then write up the solution to the question yourself. Looking back and forth between someone else's paper and your own paper is almost certainly copying and will result in academic sanctions for both you and your fellow student.
4) If the instructor or TA writes down part of a solution in order to help explain it to you or the class, you cannot copy it and hand it in for credit. Treat it the same way you would treat another student's work with respect to copying, that is, remove the explanation from your sight and then write up the solution yourself.
5) There is often more than one way to solve a problem. Choose the method that makes the most sense to you rather than the method that other students happen to use. If none of the ideas in your solution are your own, there is a good chance it will be flagged as copying.

**Statistics Help:**

**Internet resources**: See links available on eClass (such as the Decima Robinson Support Centre (DRSC)).

**Learning and Working Environment:**
The Faculty of Science is committed to ensuring that all students, faculty and staff are able to work and study in an environment that is safe and free from discrimination and harassment. It does not tolerate behaviour that undermines that environment.

If you are experiencing harassment, discrimination, fraud, theft or any other issue and would like to get confidential advice, please contact any of these campus services:

- Office of Safe Disclosure & Human Rights*: A safe, neutral and confidential space to disclose concerns about how the University of Alberta policies, procedures or ethical standards are being applied. They provide strategic advice and referral on matters such as discrimination, harassment, duty to accommodate and wrong-doings. Disclosures can be made in person or online using the Online Reporting Tool*.
- University of Alberta Protective Services: *Peace officers dedicated to ensuring the safety and security of U of A campuses and community. Staff or students can contact UAPS to make a report if they feel unsafe, threatened, or targeted on campus or by another member of the university community.*
- Office of the Student Ombuds*: A confidential and free service that strives to ensure that university processes related to students operate as fairly as possible. They offer information, advice, and support to students, faculty, and staff as they deal with academic, discipline, interpersonal, and financial issues related to student programs.*
- Office of the Dean of Students*: They can assist students in navigating services to ensure they receive appropriate and timely resources. For students who are unsure of the support they may need, are concerned about how to access services on campus, or feel like they may need interim support while you wait to access a service, the Dean of Students office is here to help.*

**Feeling Stressed, Anxious, or Upset?**
It's normal for us to have different mental health experiences throughout the year, particularly as we adjust to returning to campus as we move through a pandemic. Know that there are people who want to help. You can reach out to your friends and access a variety of supports available on and off campus at the Need Help Now webpage or by calling the 24-hour Distress Line: 780-482-4357 (HELP).

**Student Self-Care Guide:** This Self-Care Guide, originally designed by the Faculty of Native Studies, has broader application for use during students' learning. It provides some ideas and strategies to consider that can help navigate emotionally challenging or triggering material.

**Cell Phones:** Cell phones are to be silenced or turned off during lectures and labs. Cell phones are not to be used during exams (you cannot use your cell phone as a calculator).

**Land Acknowledgement:**
The University of Alberta respectfully acknowledges that we are situated on Treaty 6 territory, traditional lands of First Nations and Métis people. To learn more about the significance of this land acknowledgement, please read this useful article and associated links to more information.

**Recording and/or Distribution of Course Materials:** Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s). Students are prohibited from sharing these videos with anyone not currently enrolled in STAT 235.

**Policy/Disclaimer:** Policy about course outlines can be found in Course Requirements, Evaluations Procedures and Grading of the University Calendar. Any typographical errors in this Course Outline are subject to change and will be announced in class. The date of the final examination is set by the Registrar and takes precedence over the final examination date reported in this course outline.

**Communication Response Time:** "Respectfully, we ask all students to honour the work-life balance of instructors. For example, it is unfair to expect prompt responses to emails sent outside of normal business hours. One sent out on the weekend say may not be read until Monday. Different instructors have different pressures in their personal lives, and different levels of availability after hours, but in no way should this reflect on their commitment level."
-- Chair of the Mathematical & Statistical Sciences Department