UNIVERSITY OF CALGARY
FACULTY OF SCIENCE

Department of Mathematics & Statistics
MS 476
403 220-5210
math@ucalgary.ca

COURSE OUTLINE

1. **Course:** STAT 327, Statistics for the Physical and Environmental Sciences - Winter 2023

   Lecture 01 : MWF 15:00 - 15:50 in MS 527

Instructor	Email	Phone	Office	Hours
Claudia Mahler	claudia.mahler@ucalgary.ca	403 220-7717	MS 376	Fridays 16:00 - 17:00

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

In Person Delivery Details:

All lectures and quizzes will be delivered in-person. Labs will also be delivered in person but are available in a format such that students can complete them asynchronously (online) if desired.

Lectures will be held in person every Monday, Wednesday, and Friday from 15:00 - 15:50.

Labs will be held in person on most Mondays from 12:00 - 12:50.

Quizzes will be held in person during certain lab times on Mondays (12:00 - 12:50).

Please note that while labs can be completed asynchronously (online), students must attend their in-person lab sessions to complete the scheduled quizzes!

Re-Entry Protocol for Labs and Classrooms:

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found here. **Online Delivery Details:**

Some aspects of this course are being offered in real-time via scheduled meeting times. For those aspects you are required to be online at the same time.

To help ensure Zoom sessions are private, do not share the Zoom link or password with others, or on any social media platforms. Zoom links and passwords are only intended for students registered in the course. Zoom recordings and materials presented in Zoom, including any teaching materials, must not be shared, distributed or published without the instructor's permission.

Labs will be held in person on most Mondays from 12:00 - 12:50, but will be of a format that will allow students to complete the lab material asynchronously (online) if desired. asynchronously online. Lab Tasks will be available all day on the respective lab day and will be due by 11:59 PM through WeBWorK.

Course Site:

D2L: STAT 327 L01 - (Winter 2023) - Statistics for the Physical and Environmental Sciences

WeBWorK: STAT 327

Note: Students must use their U of C account for all course correspondence.

Equity Diversity & Inclusion:

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

2. **Requisites:**

See section 3.5.C in the Faculty of Science section of the online Calendar.

Prerequisite(s):
3 units from Mathematics 249, 265 or 275.

Antirequisite(s):
Credit for Statistics 327 and any one of Statistics 205, 213 or 217 will not be allowed.

Note(s):

a. Statistics 327 is not available to students who have previous credit for one of Statistics 321, Engineering 319 or Digital Engineering 319 or are concurrently enrolled in Statistics 321, Engineering 319 or Digital Engineering 319.

3. **Grading:**

The University policy on grading and related matters is described in F.1 and F.2 of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Lab Tasks	10%	Ongoing		
Assignment 1	7.5%	Feb 01 2023		
Quiz 1	10%	Feb 06 2023		
Assignment 2	7.5%	Feb 15 2023		
Quiz 2	10%	Feb 27 2023		
Assignment 3	7.5%	Mar 08 2023		
Quiz 3	10%	Mar 13 2023		
Assignment 4	7.5%	Mar 29 2023		
Quiz 4	10%	Apr 03 2023		
Group/Individual Project	20%	Apr 14 2023		

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
Minimum % Required	95 %	90 %	85 %	80%	75%	70 %	65 %	60%	55%	54 %	50 %

Assignments: Assignment questions will be posted to D2L at least a week before they are due. Assignments will be submitted through D2L's dropbox feature and can either be typed or neatly handwritten for submission. It is the responsibility of the student to ensure that the scans/pictures of the assignments are uploaded correctly.

Quizzes: Quizzes will be held **in person** during scheduled lab times on February 6, February 27, March 13, and April 13 (tentatively).

Lab Tasks: Lab Tasks are short assessments that will either provide more practice with the previous week's material or will help guide students along the process of completing your individual/group project. Lab Tasks are designed to be completed during in-person scheduled lab times but will be designed so that students can complete them asynchronously if desired. Lab Tasks will be available all day on scheduled lab days and will be due by the end of the day (11:59 PM). Lab Tasks will be submitted through WeBWorK.

Individual/Group Project: The project is designed to assess students' abilities to both produce and interpret statistical analyses involving data relevant to one's field of interest. Over the course of the semester, students will work towards completing a project that will involve a statistical analysis and interpretation of a dataset of their own choosing. Students may work individually or in a group of 2 - 4 people. Further details will be provided as the semester progresses.

Requests for grade rounding or alterations to grade component weighting will not be considered. Also note that **all letter grade cutoffs are fixed and will not be adjusted on an individual basis** (e.g., 90.0% is a cutoff for an A, not 89.9% or 89.8%!).

The University of Calgary offers a flexible grade option, Credit Granted (CG) to support student's breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade

4. **Missed Components Of Term Work:**

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

Assignments and labs submitted past the posted due dates will be docked 10% each day they are late.

5. **Scheduled Out-of-Class Activities:**

There are no scheduled out of class activities for this course.

6. **Course Materials:**

R Software: students will make use of R statistical software throughout the course. R is free and can be downloaded at: https://www.r-project.org/.

RStudio: RStudio is an integrated development environment (IDE) for R. It allows you to run R but displays it in a slightly different way than R looks by default. RStudio is free and can be downloaded at: https://www.rstudio.com

Online R Textbook: Learning Statistics with R (Daniel Navarro). This textbook can be accessed at the following link: http://www.fon.hum.uva.nl/paul/lot2015/Navarro2014.pdf

Any material posted to the D2L website is under copyright protection. Students are not permitted to redistribute any of the material they find there to anyone who is not registered in the Winter 2023 STAT 327 course. This includes (but is not limited to) distributing course notes, videos, practice problems, and quiz questions.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC ELearning online website.

7. **Examination Policy:**

Unless otherwise stated, quizzes are to be considered "closed book." Students will be allowed to use R/RStudio, a non-programmable calculator, and any provided formula sheets/tables.

Students should also read the Calendar, Section G, on Examinations.

8. **Approved Mandatory And Optional Course Supplemental Fees:**

There are no mandatory or optional course supplemental fees for this course.

9. **Writing Across The Curriculum Statement:**

   For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section E.2 of the University Calendar.

10. **Human Studies Statement:**

    Students will not participate as subjects or researchers in human studies.

    See also Section E.5 of the University Calendar.

11. **Reappraisal Of Grades:**

    A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See Section I.3 of the University Calendar.

    a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work form to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections I.1 and I.2 of the University Calendar

    b. **Final Exam:**The student shall submit the request to Enrolment Services. See Section I.3 of the University Calendar.

12. **Other Important Information For Students:**

    a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, Mental Health Services Website) and the Campus Mental Health Strategy website (Mental Health).

    b. **SU Wellness Services:** For more information, see their website or call 403-210-9355.

    c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email (svsa@ucalgary.ca) or phone at 403-220-2208. The complete University of Calgary policy on sexual violence can be viewed here.

    d. **Student Ombuds Office:** A safe place for all students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.

    e. **Student Union Information:** SU contact, Email your SU Science Reps: science1@su.ucalgary.ca, science2@su.ucalgary.ca, science3@su.ucalgary.ca,

    f. **Academic Accommodation Policy:**

       It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at: https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf

       Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf.

       Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the Request for Academic Accommodation Form and sending it to Mark Bauer by email bauerm@ucalgary.ca preferably 10 business days before the due date of an assessment or scheduled absence.

g. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional Code of Conduct and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

   Student Handbook on Academic Integrity
   Student Academic Misconduct Policy and Procedure
   Faculty of Science Academic Misconduct Process
   Research Integrity Policy

   Additional information is available on the Student Success Centre Academic Integrity page

h. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or non-academic misconduct, in addition to any other remedies available at law.

i. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see Legal Services website.

j. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction (USRI) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.

Course Outcomes:

- explain data collection procedures, use descriptive statistics to summarize data, and construct and interpret graphical representations of data.
- describe basic probability rules and probability models, define random variables in probability models, and calculate mean, variance, standard deviation, covariance, and correlation.
- define and contrast several discrete and continuous distributions, such as Bernoulli, binomial, Poisson, uniform, exponential, normal, t, and chi-squared distributions.
- define study population, population parameters, random samples, statistics, sampling distributions, and identify them in simple real world problems
- construct and contrast basic statistical hypothesis testing methods, such as z tests and t tests for population mean, population proportion, and population difference.
- calculate and interpret level of significance, critical value, p-value, decision rules, type I error, type II error, power, and confidence intervals.
- apply and interpret ANOVA models and linear regression models in simple real world problems.
- construct some nonparametric tests, such as Mann-Whitney test.
- use a standard statistical software, such as R or Minitab, to implement the statistical methods in this course.

Electronically Approved - Jan 04 2023 13:17

Department Approval