



## COURSE OUTLINE

### 1. **Course:** STAT 323, Introduction to Theoretical Statistics - Winter 2021

Lecture 01: MWF 10:00 - 10:50 - Online

Instructor	Email	Phone	Office	Hours
Claudia Mahler	claudia.mahler@ucalgary.ca	403 220-7717	VIA ZOOM	Mondays and Wednesdays 9:00 - 9:50

#### 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.

- **Lectures** will take place via Zoom meetings during our regularly scheduled lecture times. **All Zoom lectures will be recorded and posted to D2L within 24 hours of being held.**
- **Labs** will involve no scheduled Zoom meetings. It is expected that you complete the lab worksheets on your own time when it is convenient for you.
- **Office hours** with TAs and/or your instructor will be held via scheduled Zoom meetings.

While students will not be required to be online simultaneously (synchronously), **it will be required that students complete scheduled graded course components (quizzes, assignments) within the time period they are available.** Please refer to the schedule posted on D2L for further details.

#### Course Site:

**D2L:** STAT 323 L01 - (Winter 2021) - Introduction to Theoretical Statistics

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

### 2. **Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

#### Prerequisite(s):

Statistics 321.

#### Antirequisite(s):

Credit for Statistics 323 and either Data Science 305 or Mathematics 323 will not be allowed.

### 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:

Component(s)	Weighting %	Dates
Assignments (4)	40%	Assignment 1: January 22 Assignment 2: March 12 Assignment 3: March 26 Assignment 4: April 14 (All dates tentative)
Quizzes (4)	60%	Quiz 1: February 3 Quiz 2: March 3 Quiz 3: March 17 Quiz 4: April 7 (All dates tentative)

Assignments and quizzes will be submitted for grading through D2L's dropbox feature.

**For assignments:**

Assignment questions will be posted to D2L at least two weeks before they are due. Assignments can either be typed or neatly handwritten for submission. To submit handwritten assignments to the D2L dropbox, students can do one of the following:

- Scan the pages containing their written work and upload the scans as one document/image or upload each page as its own document/image
- Take pictures of the pages containing their written work and upload the pictures as one set of images or upload each picture as its own image

**It is the responsibility of the student to ensure that the scans/pictures are uploaded correctly.** That is, the students must ensure the scans/pictures are **readable** and are **uploaded in the correct orientation** (so that the scans/pictures do not need to be rotated in order to be read and graded).

**For quizzes:**

**The relevant quiz document will be emailed to the students at midnight on the day of the quiz. Students will then have until 11:59 PM on the day of the quiz to upload the completed quiz questions to the relevant D2L dropbox.** For example, the Quiz 1 questions will be emailed to students at midnight (12:00 AM or 0:00) on February 3. Students will then have until 11:59 PM (or 23:59) to upload the completed quiz to the D2L dropbox.

The quiz document will have space for students to fill in their answers. If a student wishes to do so, they can fill out the quiz on the quiz paper or they can complete the quiz questions on blank pieces of paper, provided that the questions and question parts are clearly labeled on the pieces of paper.

Quizzes can either be typed up (or filled in using something like OneNote) or handwritten for submission. **The same guidelines stated above for handwritten assignment submissions apply for handwritten quiz submissions.**

Students with SAS accommodations are asked to contact their instructor as soon as possible to discuss their needed accommodations. All other accommodations for students will be made on a case-by-case basis.

**A passing mark (at least 50%) on at least three of the four quizzes is required to earn a minimum grade of C- in the course.**

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
<b>Minimum % Required</b>	95 %	88 %	84 %	80%	76%	72 %	68 %	64%	60%	55 %	50 %

Course components that are missing or late will be given a score of 0%.

Any requests to have alternate grade weightings or assessments will be denied.

#### 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, then the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course.

It is the responsibility of the student to clearly communicate with the instructor **before** (if possible) or **directly after** (within 48 hours) any crises or extenuating circumstances have occurred so that proper arrangements can be made for missed work.

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

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

#### 6. **Course Materials:**

Required Textbook(s):

Wackerly, Dennis, Mendenhall, William, Scheaffer, Richard L. , *Mathematical Statistics with Applications, 7th Edition*: Duxbury Pr..

**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/>.

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 2021 STAT 323 course.** This includes (but is not limited to) posting material/questions to Chegg, StuDocu, Course Hero, etc.

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:**

Students are expected to work **independently** on all quizzes but can consider the quizzes "open book" (that is, students can use their notes, lecture videos, other online resources and calculators, etc.).

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 [www.ucalgary.ca/wellnesscentre](http://www.ucalgary.ca/wellnesscentre) or call [403-210-9355](tel: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 ([syva@ucalgary.ca](mailto:syva@ucalgary.ca)) or phone at [403-220-2208](tel:403-220-2208). The complete University of Calgary policy on sexual violence can be viewed at (<https://www.ucalgary.ca/policies/files/policies/sexual-violence-policy.pdf>)
- d. **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](#)  
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

- e. **Academic Accommodation Policy:** Students needing an accommodation because of a disability or medical condition should contact Student Accessibility Services in accordance with the procedure for accommodations for students with disabilities available at [procedure-for-accommodations-for-students-with-disabilities.pdf](#).

Students needing an accommodation in relation to their coursework or to fulfill requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Associate Head of the Department of Mathematics & Statistics, Mark Bauer by email [bauerm@ucalgary.ca](mailto:bauerm@ucalgary.ca) or phone 403-220-4189. Religious accommodation requests relating to class, test or

exam scheduling or absences must be submitted no later than **14 days** prior to the date in question. See [Section E.4](#) of the University Calendar.

- f. **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.
- g. **Student Union Information:** [VP Academic](#), Phone: [403-220-3911](#) Email: [suvpaca@ucalgary.ca](mailto:suvpaca@ucalgary.ca). SU Faculty Rep., Phone: [403-220-3913](#) Email: [sciencerep@su.ucalgary.ca](mailto:sciencerep@su.ucalgary.ca). [Student Ombudsman](#), Email: [ombuds@ucalgary.ca](mailto:ombuds@ucalgary.ca).
- h. **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.
- i. **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.

#### Course Outcomes:

- Identify a target population and its corresponding target parameter
- Apply the method of moments and maximum likelihood estimation to derive a statistic to estimate a target parameter
- Derive the probability distribution of a statistic and compute both its mean, its variance or standard deviation, and its bias.
- Evaluate the large -sample merits of a statistic based on its (i) biased/unbiasedness and (ii) its consistency/lack of consistency, to determine its usefulness
- Read, replicate, and create mathematical proofs of statistical theorems covered in the course
- Recognize parameter estimation through the application of the pivotal quantity method to create a confidence interval for the unknown value of a population parameter. This is to include parametric estimation of the mean, proportion, variance, difference of two means, difference of two proportions, and ratio of variances.
- Comprehend the scientific method of statistical hypothesis testing. This is to include the derivation of a statistical hypotheses, identification and subsequent application of a statistical test, to be encapsulated with the computation and interpretation of a P - value.
- Conduct dual population comparisons through the application of both confidence intervals and hypothesis testing to compare (i) two population means and (ii) two population proportions. Such applications are expected to be done manually and with the assistance of R.
- Model the existing synergy between two quantitative variables through the employment of least- squares estimation , resulting in the creation of a statistical model that predicts one variable based on the value of another
- Conduct a statistical hypothesis on the appropriate of the simple linear model with both the t -test and F-test. Awareness of the conditions of the linear model as well as diagnosis of their satisfaction. Confidence interval estimation of both the mean and an individual value of the response variable.

Electronically Approved - Dec 19 2020 13:40

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**Department Approval**

Electronically Approved - Jan 04 2021 12:21

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**Associate Dean's Approval**