



COURSE OUTLINE

1. **Course:** DATA 305, Computational Statistical Modelling - Winter 2021

Lecture 01: TR 14:00 - 15:15 - Online

Instructor	Email	Phone	Office	Hours
James Stallard	jbstall@ucalgary.ca	403 220-3953	MS 582	TBA

Online Delivery Details:

This course is being offered online in real-time via scheduled meeting times, 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.

This course has a registrar scheduled, synchronous final exam. The writing time is 2 hours + 50% buffer time.

Synchronous, or "live classes", will be held on the following dates. Zoom coordinates consistent for EACH live 305 session will be provided in D2L.

Schedule of Live in 305

Date	Time
Tuesday, January 12th	02:00 - 02:30pm*
Thursday, January 14th	02:15 - 03:15pm
Thursday, January 21st	02:15 - 03:15pm
Thursday, January 28th	02:15 - 03:15pm
Thursday, February 4th	02:15 - 03:15pm
Thursday, February 11th	02:15 - 03:15pm
Thursday, February 25th	02:15 - 03:15pm
Thursday, March 4th	02:15 - 03:15pm
Thursday, March 11th	02:15 - 03:15pm
Thursday, March 18th	02:15 - 03:15pm
Thursday, March 25th	02:15 - 03:15pm
Thursday, April 1st	02:15 - 03:15pm
Thursday, April 8th	02:15 - 03:15pm

* all times are Mountain Standard Time (MST)

The "Live in 305" Synchronous Schedule above is based on the TR 02:00pm - 03:15 class schedule.

Course Site:

D2L: DATA 305 L01-(Winter 2021)-Computational Statistical Modelling

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):

Data Science 201; and 3 units from Data Science 211, Computer Science 217, 231 or 235; and 3 units from Statistics 205, 217, 327, Biology 315, Economics 395, Political Science 399, Psychology 300, Sociology 311, Engineering 319 or Linguistics 560.

Antirequisite(s):

Credit for Data Science 305 and Statistics 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 %	Date
Top Hat ARS	3%	(Additional) - Daily
Assignments (9)	30%	A1: Friday, January 22nd @ 11:59PM A2: Friday, January 29th @ 11:59PM A3: Friday, February 5th @ 11:59PM A4: Friday, February 26th @ 11:59PM A5: Friday, March 5th @ 11:59PM A6: Friday, March 12th @ 11:59PM A7: Friday, March 19th @ 11:59PM A8: Friday, March 26th @ 11:59PM A9: Friday, April 9th @ 11:59PM
Midterm Exam 1	20%	Friday, February 11th. 08:30AM - 9:30AM
Midterm Exam 2	20%	Friday, March 18th. 08:30AM - 09:30AM
Final Exam	30%	Scheduled by the Registrar

Please note that both midterm exams in DATA 305 are scheduled to occur during the scheduled Friday AM 'Lab Time', from 08:00AM to 10:00AM.

Final Exam: The final exam will be online with students having two options within to complete the Final Exam. In D2L, students will be provided with both a 1. pdf-version of the Final Exam and 2. An R Markdown (.Rmd) file of the Final Exams. Students will have the choice of which file-version/platform they will complete the Final Exam within. Students will then upload their attempted Final Exam to the D2L Dropbox prior to the upper-limit of the three-hour final exam window.

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 %

In each of the above grading components, an assessment will be made producing a percentage grade earned. The final grade in the course is determined to be the weighted-average of the individualistic grade components listed above. The final percentage will then be converted to a final letter grade using the conversion scale listed on this course information sheet.

This course will have a final exam that will be scheduled by the Registrar. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 2 hours.

The final exam will be administered using an on-line platform. Per section [G.5](#) of the online Academic Calendar, timed final exams administered using an on-line platform, such as D2L, will be available on the platform. **Due to the scheduling of the final exams, the additional time will be added to the end of the registrar scheduled synchronous exam to support students. This way, your exam schedule accurately reflects the start time of the exam for any synchronous exams. E.g. If a synchronous exam is designed for 2 hours and the final exam is scheduled from 9-11am in your student centre, the additional time will be added to the end time of the synchronous exam. This means that if the exam has a 1 hour buffer time, a synchronous exam would start at 9 am and finish at 12pm. - updated April 6, 2021**

A minimum mark of 50% on the final exam is required in order to earn a minimum final letter grade of C- in this course. There are no exceptions.

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.

Missed exams are extremely rare. Any student missing an exam for reasons beyond the student's control will have a final grade assessed by re-weighting the quizzes in which the student has completed. To be consistent and fair to all, this will apply to all students in the course. **There will be no makeup exams.** Please consult the FAQ page provided on the Office of the Registrar webpage: (<https://www.ucalgary.ca/registrar/registration/appeals/student-faq>).

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

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

There will be no field trips in DATA 305.

6. **Course Materials:**

Recommended Textbook(s):

Dobrow, Chihara, and Hesterberg, *Computational Statistical Modeling*: Wiley .

1. RStudio: (rstudio.com/products/RStudio/#Desktop) Ensure you use the 'desktop/free' version in your download.
2. R-Markdown (rmarkdown.rstudio.com/). You will be required to use R-Markdown to both prepare and submit your assignments.
3. Gradescope (gradescope.ca) . **Each of your assignment submissions must be in .pdf format.** No exceptions.

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:**

All exams in this course are closed-book. At any time during an exam in this course, you are prohibited from

- viewing or retrieving any materials on your person that would be classified as course notes or course work. This include 'rough work' and 'assignments', completed in whole or in part
- communicating with a DATA 305 peer in either verbal, non-verbal, or electronic form
- posting exam questions to any electronic bulletin board (Chegg, Discord, etc)
- 'googling' answers to questions appearing on the exam
- misrepresenting your identity or having someone else complete any of your course components
- using any materials unauthorized by your instructor

You will have access to RStudio for both your midterm exams, and the final exam. If you wish, you can also use a basic, scientific calculator. Programming or graphical calculators are prohibited from the midterm/final exam environments.

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 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 (syasa@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 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](tel:403-220-3911) Email: suvpaca@ucalgary.ca. SU Faculty Rep., Phone: [403-220-3913](tel:403-220-3913) Email: sciencerep@su.ucalgary.ca. [Student Ombudsman](#), Email: 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.

Learning Outcomes of DATA 305

- Recognition of quantification of random events through the creation of a random variable; employment of probability foundations to design a probability model of a random variable.
- Differentiate between when to apply the various probability models covered in the course (Bernoulli, Binomial, Negative Binomial, Geometric, Hypergeometric, Poisson, Normal, Gamma and its special cases (Chi-square and Exponential)). In addition, demonstrate application of such probability models to compute probabilities with R.
- Statement and application of the Central Limit Theorem to both the sample mean and the sample proportion in order to consider the probable (and improbable) values of these statistics.
- Derive the probability distribution of a statistic via computational simulation and compute both its mean, its variance/standard deviation, and its bias.
- Distinction between a parameter and a statistic. Use simulation based methods as a basis for parameter estimation. Employment of pivotal quantities and their distributions as a parallel means for parameter estimation.
- 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 and the computation and interpretation of a P-value.
- Derivation of maximum likelihood estimators through simulation and computation.
- Model the existing synergy between two variables that are either numerical or categorical, through the employment of (i) least-squares estimation, resulting in the creation of a statistical model that predicts one variable based on the value of another or (ii) test of independence. Distinguish between numerical and categorical variables.
- Conduct a statistical hypothesis on the appropriateness 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 - Apr 08 2021 09:34

Department Approval