



COURSE OUTLINE

1. **Course:** STAT 531, Monte Carlo Methods and Statistical Computing - Fall 2020

Lecture 01: TR 11:00 - 12:15 - Online

Instructor	Email	Phone	Office	Hours
Dr Xuewen Lu	xlu@ucalgary.ca	403 220-6620	MS 540	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.

1. Lectures and Labs are synchronous. Students are expected to attend all the synchronous lectures and labs.
2. The lecture will be recorded and posted.
3. Students are expected to be complete their assignments and prepare for the exams outside of lecture times. The assignments must be made or scanned into pdf and uploaded to D2L. The required computer programs must be written in R or R Markdown and uploaded to D2L. There will be no makeup assignments.
4. The midterm has two (2) components, the part I is administered through the course D2L website during Lab time, and part II is during the class time. They will be completed during two of the regularly scheduled lab and class periods (i.e. synchronous) and you will be expected to be available to write the exams during these times. The part I exam will be 40 minutes plus 20 minutes of technical time (60 minutes total), and the part II exam will be 50 minutes plus 25 minutes of technical time (75 minutes total). Time will be adjusted for SAS students according to their accommodation letter and will be done on a case-by-case basis.
5. Due to the design of the course, a student is not expected to miss the singular midterm without good reasons. If a student has to miss the midterm, the student must notify the instructor by email in a sufficient time period before the exam starts and get the approval of the instructor. In the message, the student needs to explain why it has to be missed and request a make-up midterm. Otherwise, a make-up midterm will not be granted and the student will get zero credit for the midterm. A make-up midterm will be made on a case-by-case basis. It will be scheduled within the final examination week between Dec. 14 -23, 2020. Both part I and part II of the midterm will be written at one time. The marks gained in the make-up midterm cannot exceed the maximum marks gained by the students who write the midterm at the formally scheduled synchronous time.

Course Site:

D2L: STAT 531 L01-(Fall 2020)-Monte Carlo Methods and Statistical Computing

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 323; and Mathematics 267 or 277.

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
Assignment (3)	45	A1 due Thursday Oct. 8 , 11:59 pm; A2 due Thursday Nov. 5 , 11:59 pm; A3 due Thursday Dec. 10 , 11:59 pm
Midterm (1)	25	Thursday Nov. 19 Synchronous online, Part I in the lab, and Part II in-class time.
Final	30	Asynchronous online, within a 24-hour time period. Dates TBD - Registrar Scheduled

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%	76%	72 %	68 %	64%	60%	55 %	50 %

This course has an asynchronous online final exam.

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.

5. Scheduled Out-of-Class Activities:

The following out of class activities are scheduled for this course.

Activity	Location	Date and Time	Duration
Midterm	Web-Based	Thursday, November 19, 2020 at 9:00 am	1 Hours

REGULARLY SCHEDULED CLASSES HAVE PRECEDENCE OVER ANY OUT-OF-CLASS-TIME-ACTIVITY. If you have a conflict with the out-of-class-time-activity, please contact your course coordinator/instructor no later than **14 days prior** to the date of the out-of-class activity so that alternative arrangements may be made.

The midterm has two (2) components, the part I is administered through the course D2L website during Lab time, and part II is during the class time. They will be completed during two of the regularly scheduled lab and class periods (i.e. synchronous) and you will be expected to be available to write the exams during these times. The part I exam will be 40 minutes plus 20 minutes of technical time (60 minutes total), and the part II exam will be 50 minutes plus 25 minutes of technical time (75 minutes total). Time will be adjusted for SAS students according to their accommodation letter and will be done on a case-by-case basis.

6. Course Materials:

Required Textbook(s):

Christian Robert and George Casella, 2010., *Introducing Monte Carlo Methods With R* : Springer.

Recommended Textbook(s):

Maria L. Rizzo, *Statistical computing with R, 2nd Edition, 2019*: Chapman & Hall/CRC.

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:

The midterm and final are open-book exam. Calculators, computers, and lecture notes are allowed.

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.

- 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
- 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:

- 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](#)).
- SU Wellness Center:** For more information, see www.ucalgary.ca/wellnesscentre or call [403-210-9355](tel:403-210-9355).
- 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](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>)
- Misconduct:** Academic misconduct (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions,

processes and penalties. Examples of academic misconduct may include: submitting or presenting work as if it were the student's own work when it is not; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; collaborating in whole or in part without prior agreement of the instructor; borrowing experimental values from others without the instructor's approval; falsification/ fabrication of experimental values in a report. **These are only examples.**

- 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 (FOIP). 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.

Course Outcomes:

- formulate and implement the methods for generating random numbers using R or other statistical programs
- obtain skills in making numerical calculations and solving nonlinear equations
- explain the Bayes Theorem and derive it in correct mathematical steps
- carry out the EM algorithm and other methods for optimization problems
- describe Markov chain theory and verify conditions for a Markov chain
- identify the strength and weakness of different simulation methods
- apply Monte Carlo and other types of numerical methods for analyzing complex models where the simple numerical methods can not be applied

Electronically Approved - Sep 04 2020 10:21

Department Approval

Electronically Approved - Sep 05 2020 12:37

Associate Dean's Approval