

FM9593B Course Outline 2024

1. Course Information

Course Information

Course Name: Monte Carlo Methods and Financial Applications

Course Number: FM9593B

Academic Term: Winter, 2024

Lecture Hours: MWF 1:30 – 2:30 PM

Lecture Room: WSC 248

List of Prerequisites

A third-year undergraduate understanding of probability and statistics is required for this course.

3. Course Syllabus, Schedule, Delivery Mode

This course is intended to be an introduction to Monte Carlo simulation methods. Topics to be covered include:

1. Random number generation (RNG) for uniform, non-uniform, discrete and continuous Distributions. How to check RNG quality.
2. Simulation of stochastic processes. Introduce some R packages to simulate SDE.
3. Variance reduction techniques. Many techniques are introduced.
4. Special topics as time allows.

Learning Outcomes

Upon successful completion of this course, students will be able to use R to design and conduct Monte Carlo simulation properly.

Choose a proper random number generator (RNG) and seed.

Deploy many Monte Carlo techniques such as variance reduction method.

Classes begin: January 8, 2024

Winter Reading Week: February 17 – 25, 2024

Classes end: April 8, 2024

Exam period: April 11 – 30, 2024

Contingency plan

Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructor.

4. Course Materials

Reference Book: D.L. McLeish. Monte Carlo Simulation & Finance. HG6024.3.M357 2005

Software needed: A personal computer/laptop that has R and RStudio installed (Windows, Mac, Linux)

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Assignments (5)	30%
Midterm	30%
Oral Presentation	10%
Final Project	30%

There are about 5 assignments, given out roughly one every two weeks. All assignments must be done electronically (all assignments must be prepared using RStudio Markdown/Notebook (PDF)) and be submitted to owl before deadline.

Late Submissions

There will be a 2-hour closed book and in-person midterm, tentatively setting on February 28, 7:00 pm to 9:00pm. It will be booked and confirmed through the Exam Central. Exam room info will be posted once it is available.

There will be a course project with oral presentation involved. The maximum number of students in each group will be 2 and it might change later depending on the number of students enrolled in this course. The oral presentation will contribute 10% toward the final grade. 30% will be graded based on your written project. Be aware that each member in a group must contribute equally to your project in terms of preparation, coding, debugging, running, writing slide/project (so that you will be given the same grade). Otherwise, different grade is given based on the amount of work you contribute to.

Presentation Slides Due: March 25, 11:55 pm. To be submitted through OWL (pdf or PowerPoint).

Last three or four lectures are reserved for your oral presentations. Each group will have about 15 minutes to present including Q & A.

Written Project Due: April 28 11:55 pm. To be submitted through OWL with dataset if applicable.

Accommodated Evaluations: No makeup midterm is given. The weight may be redistributed to other categories by the instructor.

Final grades on this course, irrespective of the number of decimal places used in marking individual assignments and tests, will be calculated to one decimal place and rounded to the nearest integer, e.g., 74.4 becomes 74, and 74.5 becomes 75. Marks WILL NOT be bumped to the next grade or GPA, e.g. a 79 will NOT be bumped up to an 80, an 84 WILL NOT be bumped up to an 85, etc. The mark attained is the mark

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

Note that in all cases, students are required to contact their instructors within 24 hours of the end of the period covered to get approved, unless otherwise instructed in the course outline.

For further information, please consult the U

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

7. Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>.

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be 3482.02 29t09.17 Tm0 g0 0

