

## Advanced Probability

### Course Outline

#### 1. Course Information



***Statistical Sciences 9657***

**Fall term 2025**

**Lecture Hours:** M,W,F, 12:30 – 1:20 PM,

Western Science Centre, Room 248

**From Monday September 8<sup>th</sup> till Monday December 7<sup>th</sup>**

**Fall Reading Week: November 3<sup>rd</sup> – November 7<sup>th</sup>**

#### 2. Instructor Information

***Instructor*** : Serge Provost, *Ph.D. (McGill)*



*Office:* WSC 223

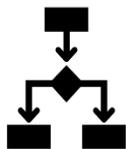
*Email:* [sp@uwo.ca](mailto:sp@uwo.ca)

*Phone:* 519-661-3624

*Office hours:* As specified on OWL

**Teaching Assistant:** TBA

#### 3. Course Syllabus, Schedule, Delivery Mode



##### Course Description

This graduate-level course explores advanced topics in probability. The following topics will be covered among others: Random variables; Expected values; Conditioning expectations; Transformation of variables; Stochastic independence; Characteristic functions; Modes of convergence; Limit theorems. An intermediate-level background in Probability and Statistics is assumed.

## Course Objectives



Students ought to be able to analyze and apply key probabilistic concepts such as independence, expectation and convergence and to communicate probabilistic reasoning clearly in both research and professional settings.

## 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 be adapted accordingly. The grading scheme will **not** change. Any assessment affected will be conducted online as determined by the course instructor.

## 4. Course Materials

Textbook: None in particular

Relevant materials will be posted on OWL-Brightspace and/or presented in class.

Some references:

*Probability and Random Processes* by G.R. Grimmett and D.R. Stirzaker.

Oxford Press. (\$125)

*Introduction to Mathematical Statistics* by R.V. Hogg, J. W. McKean and A.T. Craig.

Pearson/Prentice Hall (\$324.99)

*A Course in Probability Theory* by Kai Lai Chung

Academic Press (\$99.77)

*Probability: Theory and Examples* by Rick Durrett

Cambridge University Press (\$102.55)

*Real Analysis and Probability* by R.M. Dudley

Cambridge University Press (\$90.95)



***Students are responsible for checking the OWL-Brightspace course website for announcements and updates on a regular basis. This is the primary method by which information will be disseminated to all students in the class. If students need assistance, they can seek support on the [OWL Help page](#). Alternatively, they can contact the [Western Technology Services Helpdesk](#). They can be reached by phone at 519-661-3800 or ext. 83800.***

### **Use of Generative AI Tools**

There is no university-wide policy governing the use of generative AI tools in coursework or assessments. Utilization of generative AI tools (e.g., ChatGPT, Copilot, Gemini) is permitted to solve suggested problems.

## **5. Methods of Evaluation**

The overall course grade will be calculated as follows:

### **Presentation**

Students will be required to give an oral presentation - worth 20% of the course mark.

No assignments.

Problems will be suggested and solutions, later provided.

### **Tests**

Two *in-class* tests, each worth 15%, the first one to take place on Monday September 29th and the second one, on Monday, October 27<sup>th</sup>. As per departmental policy, no make-up exam will be administered. The tests are 'closed book' and a nonprogrammable calculator might be required.

### **Final Exam**

A three-hour final exam worth 50% of the course mark.

Date and time to be determined.

In the event that one misses one of the tests and provides the required supporting documentation, the other test will be worth 20%, the oral presentation 25% and the final exam 55%.

## Academic Policies

If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to your Dean's office as soon as possible, and contact your instructor immediately. If accommodation is approved by your Dean's office, your instructor will be notified, then it is your responsibility to make alternative arrangements with your instructor. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see: [http://www.stats.uwo.ca/accommodation\\_medical.pdf](http://www.stats.uwo.ca/accommodation_medical.pdf) . A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility. Or, request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at this website: [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf) .

Please note that unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites. In accordance with policy, <http://www.uwo.ca/its/identity/activatenonstudent.html> the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that email received from the University at his/her official university address is attended to in a timely manner. The website for Registrarial Services is <http://www.registrar.uwo.ca> . The Department has adopted a "Mutual Expectations" policy governing the classroom environment and all work submitted by students. The full text of the policy can be found at <https://www.uwo.ca/stats/undergraduate/mutual-expectations.html>. In summary, the policy was developed under the premise that all interactions between students and faculty should be governed by the principles of courtesy, respect and honesty.

The department adopted a policy whereby there will be no make-up exams for missed tests. *If a student legitimately misses a midterm test and provides the required supporting documentation, the evaluation components will be reweighted as previously specified.*

Click

[https://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#SubHeading\\_73](https://www.westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=5&SelectedCalendar=Live&ArchiveID=#SubHeading_73) for a detailed and comprehensive set of policies and regulations concerning examinations and grading.

## 6. Student Absences

Please consult the University's medical illness policy at

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_medical.pdf](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](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf).

### 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>.

### Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam). You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details ([Special Examinations](#)).

## 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 work with Accessible Education (formerly SSD), 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 found at: [https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic\\_Accommodation\\_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf)

## 8. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy,

[https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf),

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

**Scholastic offences** are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

## 9. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at (519) 661-2147 if you have any questions regarding accommodations.

Students who are in emotional/mental distress should refer to Mental Health@Western (<http://www.health.uwo.ca/mentalhealth>) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.