Multivariate Analysis 2019

Statistical Sciences 9848A

**Course Outline**

**Instructor Information**

Instructor: Serge Provost  
Office: WSC 280  
Email: provost@stats.uwo.ca  
Phone: 519-661-3624 ext 83624  
Office Hours: TBA

**Course Information**

**Course Description**

We will cover the following topics after reviewing some basic definitions and results in linear algebra: multivariate distributions including the multivariate normal distribution and its properties; linear transformations; characteristic functions; estimation of mean vectors and covariance matrices; likelihood ratio tests; principal components; quadratic forms and their properties; the Wishart distribution; Hotelling’s T2 distribution; multivariate analysis of variance; regression: multiple correlation; multivariate data visualization. Other topics may be added as time permits.

**Lecture Hours**

Wed 2:30 PM-3:30 PM WSC 248; Fri 2:30 PM-4:15 PM WSC 248;

**Book Information**

**Text Book(s)**

* An Introduction to Multivariate Statistical Inference  
  by S. B. Provost. Course notes to be posted on the course website:  
  [fisher.stats.uwo.ca/courses/SS9848](fisher.stats.uwo.ca/courses/SS9848)  
  Handouts will occasionally be distributed in class.

**Reference Books**

* Applied Multivariate Statistical Analysis  
  by R. Johnson and D. Wishern (Prentice Hall). Not required

**Library Reserved Books**

* Applied Multivariate Statistical Analysis by R. Johnson and D. Wishern (Prentice Hall).

**Course Objectives**

To become familiar with the theory and applications of multivariate statistical inference, and to acquire the necessary background to solve a variety of problems involving several variables.
Assessment

Assignments and/or Quizzes

4 assignments worth at total of 20% of the course mark

Midterms or Tests

Two term tests worth 30% each

Final Exam

No final exam but a final project worth 20%

Evaluation

As specified above

If a student legitimately misses a midterm and provides the required supporting documentation, the weight of the test will be reassigned as follows: the other test: 50%; the assignments: 25%; the final project: 25%.

Department Policy on Missed Course Requirements and Student Health and Wellness

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. A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility. The form can be found at: http://www.stats.uwo.ca/medicalform.pdf. Or, request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services.

Missed Midterm or Test: The policy of the department of Statistical and Actuarial Sciences is that there will be no make-up exams for a missed midterm. For those that do legitimately miss a midterm and provide the required supporting documentation, the standard practice will be that the weight of the midterm will be reassigned to the final exam. If your reason is not deemed valid, then you will receive a mark of 0.

Student Health and Wellness: As part of a successful student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western's Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page http://www.music.uwo.ca/, and our own McIntosh Gallery http://www.mcintoshgallery.ca. Information regarding health- and wellness-related services available to students may be found at http://www.health.uwo.ca/.

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Campus mental health resources may be found at http://www.health.uwo.ca/mental_health/resources.html.
To help you learn more about mental health, Western has developed an interactive mental health learning module, found here: http://www.health.uwo.ca/mental_health/module.html. This module is 30 minutes in length and provides participants with a basic understanding of mental health issues and of available campus and community resources. Topics include stress, anxiety, depression, suicide and eating disorders. After successful completion of the module, participants receive a certificate confirming their participation.

**Accessibility:** 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 Services for Students with Disabilities (SSD) at 661-2111 ext. 82147 if you have questions regarding accommodation.

**Support Services:** Learning-skills counsellors at the Student Development Centre (SDC) (http://www.sdc.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling. Additional student-run support services are offered by the USC, http://westernusc.ca/services. The website for Registrarial Services is http://www.registrar.uwo.ca.

**Email Communication**

You are welcome to communicate with your instructor by email, but email communication should only be used to provide them with information or to ask a question that requires a brief response. For more lengthy discussions and for discussions on lectures/course material please see your instructor during their scheduled office hours or by appointment. If you do email them, please use your UWO account, as these are often the only emails read (as emails sent from other addresses often get spammed).

**Attendance**

Classroom attendance is viewed as an important part of the learning process. Students are advised that excessive absenteeism may result in the student being disbarred from the final exam (see Western Academic Calendar).

**Classroom Environment**

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: http://www.stats.uwo.ca/mutual_expectations.pdf. 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. Students who are in emotional/mental distress should refer to Mental Health@Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.