
University of Guelph
STAT*4350 & STAT*6821
Course Outline Form
Fall 2022

1. General Information

Course Title 1: STAT*4350 Applied Multivariate Statistical Methods

Course Title 2: STAT*6821 Multivariate Analysis

Course Description: This course introduces the multivariate normal, Wishart and Hotelling's T-square distributions. Topics covered include: statistical inference on the mean vector, canonical correlation, multivariate analysis of variance and covariance, multivariate regression, principal components analysis, and factor analysis. Topics will be illustrated using examples from various disciplines. For graduate students, topics that are more current to the field will also be discussed such as: multivariate adaptive regression splines; projection pursuit regression; and wavelets.

Prerequisites: MATH*1160, STAT*3110, STAT*3240

Credit Weight: 0.5 credit

Academic Department (or campus): Mathematics & Statistics

Campus: Guelph

Semester Offering: Fall

Class Schedule: M/W 10:00 AM - 11:20 AM, MINS, Room 128.

2. Instructor Information

Instructor Name: Dr. Clémonell Bilayi-Biakana

Instructor Email: cbilayib@uoguelph.ca

Office Location: MACN 541

Office Hours: Thursday: 3:20 - 4:30 PM in my office.

3. Course Content

1. Specific Learning Outcomes:

By the end of this course, students should be able to:

- (a) Have a general knowledge and understanding of many of the key concepts, theoretical approaches and assumptions needed for dealing with multivariate problems;

- (b) Derive some fundamental classical results of multivariate analysis;
- (c) Recognize types of problems (e.g., classification versus clustering) and the appropriate method(s) of analysis;
- (d) Analyze multivariate data using statistical software (e.g. using R and related R packages);
- (e) Develop independent and critical thinking skills regarding multivariate data and data reduction;

2. Lecture Content:

Review of matrix algebra; Random vectors and matrices, Multivariate normal distribution, Inference for means; simultaneous confidence intervals; MANOVA/MANCOVA; Principal Component Analysis; Factor Analysis; Discrimination, Classification and Clustering.

- The schedule above is approximate, and subject to minor changes. Material covered in lecture will provide an overview of the course concepts, however students are expected to supplement the lectures with textbook readings.
- As the class is scheduled to be in-person, the expectation is that students will be attending the live lectures to obtain notes, listen to course announcements, and ask relevant questions.

3. Course Assignments and Tests

The final grade will be calculated as follows:

Participation:	5%
Assignment 1: Due on October 2	8%
Assignment 2: Due on October 23	9%
Assignment 3: Due on November 6	9%
Assignment 4: Due on November 27	9%
Midterm: November 2	25%
Final Exam: December 12, 8:30 AM - 10:30 AM	35%

- The midterm will be held in class during the regular lecture hours.
- Passing grade: In order to pass the course, STAT*4350 students must obtain a 50% or higher while STAT*6821 students must obtain a grade of 65% or higher on the total mark of all assessments.

4. Course Resources

- **Required Text:** Applied Multivariate Statistical Analysis, 6th Ed., Johnson and Wichern, Preston Hall, 2002.
- **Recommended Text:** Applied Multivariate Statistics with R, D. Zelterman, Springer, 2015. (online in library)

- **Other Resources:** Lecture Notes posted on Courselink.
- **Courselink:** Course information and resources will be available on Courselink. Students are encouraged to check the website regularly for updated information and announcements.

5. Course Policies

Communication Policies:

Emails must be sent from your University of Guelph email account, and include STAT*4350 or STAT*6821 in your subject line, and include your name and student ID number in all correspondence. Emails that do not include a name and ID number, or from non-uoguelph accounts, will not be answered; otherwise, I will try to respond to emails within 3 business days.

Term Tests Policies:

Term test is scheduled during class time, and therefore no student should have a conflict with a test. If a conflict does exist, it is your responsibility to resolve it. Students who miss a test for medical illness must contact me within 3 business days of the missed test. In the case of absence due to medical illness, you may be required to complete an alternative assessment in a format of my discretion. If you cannot write a test for mental health reasons or are seeking accommodation on compassionate grounds, you must speak with your Program Counsellor (and include them in all communication with me) before any accommodations will be considered.

The final exam (date, time and location) is scheduled by the Registrars Office. Students who miss the final exam due to a valid, documented reason must contact their program counsellor for advice on University regulations regarding final exams. These procedures are based on University policy, and are not under the control of the course instructor.

Students are NOT permitted to post test questions to discussion boards (including the course discussion board, the SLC discussion boards, or chat groups on Facebook, Google, etc.), nor are students allowed to post test questions to websites such as Chegg in an attempt to solicit answers. These websites will be monitored for such activities, and students who violate these permissions may face an academic integrity investigation.

Requests for accommodation due to illness, personal circumstances, etc. should be made before the assessment is due. If this is not possible, the request should be made within 3 business days of the due date / test date. Accommodation will be provided at my discretion and should not be assumed. In the event that an accommodation is not granted, students will be expected to complete the test or project.

Course Policy on Group Work: Students are encouraged to work together to discuss course content, share ideas, and ask/answer questions. However, all term tests and the final exam are to be completed independently, and without collaboration with other individuals, regardless of whether they are registered in the course. Any unauthorized collaboration, completing another student's work, or having another student complete your work, will constitute academic misconduct.

6. University Policies

Email Communication:

As per university regulations, all students are required to check their "uoguelph.ca" e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement: When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id #, and e-mail contact. See the Undergraduate Calendar for information on regulations and procedures for Academic Consideration

Drop Date:

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping courses are available in the Undergraduate Calendar.

Copies of Out-of-class Assignments: Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility: The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required, however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or

July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

More information can be found on the SAS website

Academic Misconduct: The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University’s policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is outlined in the Undergraduate Calendar.

Recording of Materials:

Presentations which are made in relation to course work including lectures cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources:

The Academic Calendars are the source of information about the University of Guelphs procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

Disclaimer: Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via Courselink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the Covid-19 website.

Illness:

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting docu-

mentation for multiple missed assessments or when involving a large part of a course (e.g., final exam or major assignment).

COVID-19 Safety Protocols:

For information on current safety protocols, follow these two links: link 1 and link 2. Please note, that these guidelines may be updated as required in response to evolving University, Public Health or government directives.

Mental Health Services:

One out of every five students in Canada experiences some sort of mental health issue at some point in their academic career. If you find yourself facing a mental health crisis, or just need to talk to someone, please consider taking advantage of one of the following resources available to University of Guelph students:

- **Counseling Services:** (x53244) is located at Health Services (J.T. Powell Building) and offers individual and group counselling sessions by appointment or walk-in.
- **Student Support Network:** is located in the Wellness & Education Promotion Centre in the J.T. Powell Building and offers confidential, peer-based, drop-in support.
- **Good2Talk:** (1-866-925-5454) is a free, 24/7 student hotline that provides professional counselling and referrals for mental health, addictions and well-being.
- **Here 24/7:** (1-844-437-3247) specializes in assessment, referral and appointment booking and is available 24/7 for crisis support.