STAT 4503A/5509F: Multivariate Analysis, Fall 2022

Instructor: Song Cai
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Hours, Locations and Webiste:

Lectures (online):

Time: Tue. and Thu. 13:05–14:25 at Southam Hall (SA) 314

Office hours (online):

Time: Tue. 15:00–16:00 at 5215 HP

Course website:

http://people.math.carleton.ca/~scai/teaching/stat5509-f22/

Brightspace (for grades only): https://brightspace.carleton.ca

Important Dates:

First day of classes: Sep. 7, 2022

Last day of classes: Dec. 9, 2022

Oct. 24–28, 2022: Fall break; no classes

Important Dates and Deadlines, 2022–2023:

https://calendar.carleton.ca/academicyear/

Dates of Religious Observances (Holy days), 2022–2023:

http://carleton.ca/equity/accommodation/religious-observances/

Textbook:

Johnson, R.A. and Wichern, D.W., *Applied Multivariate Statistical Analysis*, 6th ed., Pearson Education, Upper Saddle River, 2007.

Reference book:

Dalgaard, P., *Introductory Statistics with R*, 2nd ed., Springer, New York, 2008. (Freely available online for Carleton students through Carleton library website)

Prerequisites:

STAT 3553, or STAT 3509 and STAT 3503, or permission of the School.

Assessment Rules:

- Five assignments: 50%
- A final exam: 50% (To pass the course, undergraduate students need to get at least 50/100 and graduate students need to get at least 70/100 in the final exam.)

Topics (provisional):

1. Review of matrix algebra
2. Fundamentals of random matrices/vectors
3. Multivariate normal distributions
4. Properties of random samples from a multivariate normal distribution
5. Statistical inference on the mean of a multivariate normal distribution
6. Principle component analysis and canonical correlation analysis

7. Clustering
8. Other topics if time permits: classification, factor analysis, etc.

Important Notes:

- Lab exercises will be assigned occasionally. These exercises are not to be handed in and will not be graded. They help you learn to use R to carry out multivariate statistical analysis.
- Asking content-related questions by emails is not encouraged. You should always come to my office hour for such questions to avoid unnecessary confusions.
- When asking schedule-related or clarification questions by emails, you should expect a waiting time of 24 to 48 hours for me to process.
- If you want to make an appointment other than the regular office hours, you should expect a meeting at least one week after the date you ask for the appointment.
- All due dates and deadlines are non-negotiable.
- Late submissions of assignments will not be accepted and a zero mark will be given in that case unless you can provide a documented reason (e.g medical), in which case the weight of those assignments will be shifted half to the final exam.
- If you do not pass the final exam (50/100 or more for undergraduate students and 70/100 or more for graduate students), you fail regardless your term marks.
- If you want to see your final exam paper, you have to make an appointment within two weeks of the final exam.
- Your grade will not be changed in any case according to your special needs (such as scholarship, etc).
- Students from the University of Ottawa should gain access to Brightspace at Carleton University. To do this, follow the instruction given at https://gradstudents.carleton.ca/faculty-of-graduate-and-postdoctoral-affairs-access-to-brightspace/.

Academic Integrity Policy:

https://carleton.ca/registrar/academic-integrity/
https://science.carleton.ca/academic-integrity/

Academic Accommodation:

You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide.

Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details see the Student Guide.

Academic Accommodations for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally–scheduled exam (if applicable).