

CGSC 6101W: Advanced statistics for Cognitive Science

Winter 2024, v1.0 (2024-01-02)

Instructor

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Office hours: Monday 10:00 - 11:30 AM

Class time

2:35-5:25 pm Tuesdays. This is an in-person course.

Prerequisites

An introductory graduate-level course in statistics (e.g., CGSC 5101) or a full-year undergraduate course in statistics.

Course Objectives

CGSC 6101 is designed to provide an introduction to statistical techniques beyond those covered in an introductory statistics course. Topics will include data wrangling, data visualization, regression, mixed effects models, and procedures for seeing structure in data (e.g., clustering, multidimensional scaling, factor analysis); we will also cover some basic Bayesian statistics. We will use the statistical software R and RStudio. You will also learn R Markdown for writing reports that contain statistical analyses and figures in an effort to move towards reproducible research.

Required Material

- Winter, B. (2020). Statistics for linguists: An introduction using R. Routledge. ISBN 9781138056091 (pbk) | ISBN 9781315165547 (ebk)
- current version of R as of January 9, 2024: <https://www.r-project.org>
- RStudio IDE for using R: <https://www.rstudio.com>

Useful books and sites:

- Poldrack, R. (2023). *Statistical Thinking: Analyzing Data in an Uncertain World*. Princeton University Press. ISBN 978-0691218441 (pdk)
- Timbers, T., Campbell, T., & Lee, M. (2022). *Data science*. CRC Press. ISBN 978-0-367-52468-5 (pbk) | ISBN 978-1-003-08097-8 (ebk)
- <https://psych252.github.io/psych252book/> for regression & linear mixed effects material; this is the online textbook for PSYC 252, an advanced course in statistics offered by the Stanford University Psychology Department, taught by Tobias Gerstenberg.

Class Internet Site

The website for CGSC 6101 is: Brightspace.carleton.ca. This will be used for a discussion group, downloading and uploading assignments, obtaining copies of slides, and where grades will be posted.

How You Will Be Evaluated

Your final grade will be based on three data analysis assignments that will be done in the form of a research report created in R Markdown.

Assignment	Type of assignment	Assignment weighting	Due date
1	individual	33.3%	Friday February 16
2	individual	33.3%	Friday March 22
3	individual	33.3%	Wednesday April 10

Class Schedule / Topic / Assignments

NOTE: this schedule may be revised depending on class interest; this will only be done via consultation with the class!

Week	Date	Topic
1	January 9	R in a nutshell: bringing you up to speed in R
2	January 16	Linear models (1): regression
3	January 23	Linear models (2): regression
4	January 30	Model comparison: what makes a good model
5	February 6	Linear mixed effects models(1): regression for comparing repeated measures data; <i>Assignment 1 due 11:59 PM February 16</i>
6	February 13	Linear mixed effects models(2)
-	February 20	- Study Break - no classes -
7	February 27	Linear mixed effects models(3)
8	March 5	Factor analysis(1): seeing underlying structure in data
9	March 12	Factor analysis(2): <i>Assignment 2 due 11:59 PM March 22</i>
10	March 19	Bayesian data analysis (1): updating your beliefs: introduction and how to do simple analyses
11	March 26	Bayesian data analysis (2)

Week	Date	Topic
12	April 2	Bayesian data analysis (3): <i>Assignment 3 due 11:59 PM April 10</i>
13	April 9	Catch-up week:

Calculation of final letter grades

Final grades will be calculated by summing your assignment grades. Letter grades will be assigned using the standard Carleton University letter grade cut-offs.

Late assignment policy

CGSC 6101 has reasonable deadlines that should be sufficient to allow you to complete assignments on time.

Extensions for assignment deadlines will be generally permitted only for illness, bereavement, or religion reasons. Other reasons will be considered on a case-by-case basis.

The Provost has directed that students seeking an academic accommodation for course work for Winter 2024 will not be required to produce a doctor's note or medical certificate. Instead, students should use the Medical Self-Declaration form at <https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>.

Academic Integrity

Carleton University expects all students to be aware of and follow its policy on academic integrity. See <https://carleton.ca/registrar/academic-integrity/> for detailed information about academic integrity. As applied to CGSC 3201, the primary issue that you must be aware of is unauthorized collaboration on tests and the final exam, and that any submitted work must be completed by you as a student in the class.

Regulations and Information Common to Cognitive Science Courses

Statement on Student Mental Health

As a University student you may experience a range of mental health challenges that significantly impact your academic success and overall well-being. If you need help, please speak to someone. There are numerous resources available both on- and off-campus to support you. Here is a list that may be helpful:

Emergency Resources (on and off campus): <https://carleton.ca/health/emergencies-and-crisis/emergency-numbers/>

Carleton Resources:

- Mental Health and Wellbeing: <https://carleton.ca/wellness/>
- Health & Counselling Services: <https://carleton.ca/health/>
- Paul Menton Centre: <https://carleton.ca/pmc/>
- Academic Advising Centre (AAC): <https://carleton.ca/academicadvising/>
- Centre for Student Academic Support (CSAS): <https://carleton.ca/csas/>

- Equity & Inclusivity Communities: <https://carleton.ca/equity/>

Off Campus Resources:

- Distress Centre of Ottawa and Region: (613) 238-3311 or TEXT: 343-306- 5550, <https://www.dcottawa.on.ca/>
- Mental Health Crisis Service: (613) 722-6914, 1-866-996-0991, <http://www.crisisline.ca/> • Empower Me: 1-844-741-6389, <https://students.carleton.ca/services/empower-me-counselling-services/>
- Good2Talk: 1-866-925-5454, <https://good2talk.ca/>
- The Walk-In Counselling Clinic: <https://walkincounselling.com>

REQUESTS FOR ACADEMIC ACCOMMODATION

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

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- Pregnancy: 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, please request your accommodations for this course through the Ventus Student Portal [<https://ventus.carleton.ca/student/>] 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). Requests made within two weeks will be reviewed on a case-by-case basis. For final exams, the deadlines to request accommodations are published in the University Academic Calendars. 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).
- Survivors of Sexual Violence: As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and its survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: <https://carleton.ca/equity/sexual-assault-support-services>
- Accommodation for Student Activities: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. 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. <https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf>

PETITIONS TO DEFER

Students unable to write a final examination because of illness or other circumstances beyond their control may apply within **three working days** to the Registrar's Office for permission to write a deferred examination. The request must be fully supported by the appropriate documentation. Only deferral petitions submitted to the Registrar's Office will be considered. See Undergraduate Calendar, Article 4.3.

ACADEMIC FREEDOM

As stated in the Collective Agreement between Carleton University and Carleton University Academic Staff Association (Article 4), "The common good of society depends upon the search for truth and its free exposition. Universities with academic freedom are essential to these purposes both in teaching and scholarship/research. Employees are entitled, therefore, to [...] freedom in carrying out teaching and in discussing their subject." Similarly, the Collective Agreement between the Canadian Union of Public Employees Local 4600 Unit 2 and Carleton University (Article 10) [...] protects each member's freedom to disseminate their opinion both inside and outside the classroom, to practice their profession as teacher and scholar, to carry out such scholarly and teaching activities as they believe will contribute to and disseminate knowledge."

WITHDRAWAL WITHOUT ACADEMIC PENALTY

The last day for a fee adjustment when withdrawing from winter term courses or the winter portion of two-term courses is January 31, 2024. **The last day for academic withdrawal from full winter, late winter, and fall/winter courses is March 15, 2024.**

WDN: For students who withdraw after the full fee adjustment date in each term the term WDN will be a permanent notation that appears on their official transcript.

OFFICIAL FINAL EXAMINATION PERIOD

Winter courses: April 13-25, 2024 (may include evenings & Saturdays or Sundays)

For more information on the important dates and deadlines of the academic year, consult the Carleton 2023-2024 Calendar.

Note that CGSC 6101 DOES NOT have a final exam in the exam period.

GRADING SYSTEM

The grading system is described in the Undergraduate Calendar section 5.4.

PLAGIARISM

The University Senate defines plagiarism as "*presenting, whether intentional or not, the ideas, expression of ideas or work of others as one's own.*" This can include reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source. Examples of sources from which the ideas, expressions of ideas or works of others may be drawn from include but are not limited to: books, articles, papers, literary compositions and phrases, performance compositions, chemical compounds, artworks, laboratory reports, research results, calculations and the results of calculations, diagrams, constructions, computer reports, computer code/software, material on the internet and/or conversations.

Examples of plagiarism include, but are not limited to:

- any submission prepared in whole or in part, by someone else, including the unauthorized use of generative AI tools (e.g., ChatGPT);
- using ideas or direct, verbatim quotations, paraphrased material, algorithms, formulae, scientific or mathematical concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another’s data or research findings without appropriate acknowledgement;
- submitting a computer program developed in whole or in part by someone else, with or without modifications, as one’s own; and -failing to acknowledge sources through the use of proper citations when using another’s work and/or failing to use quotations marks.

Plagiarism is a serious offence, which cannot be resolved directly with the course’s instructor. The Associate Deans of the Faculty conduct a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They range from a mark of zero for the plagiarized work to a final grade of “F” for the course, and even suspension from all studies or expulsion from the University.

Important Information

- Students must always retain a copy of all work that is submitted.
- All final grades are subject to the Dean’s approval.
- For us to respond to your emails, we need to see your full name, CU ID, and the email must be written from your valid CARLETON address. Therefore, in order to respond to your inquiries, please send all email from your Carleton CMail account. If you do not have or have yet to activate this account, you may wish to do so by visiting <https://carleton.ca/its/help-centre/email/#sect2>

RESOURCES (613-520-2600, phone ext.)

NOTE: some of these resources may only be accessible online

Resource	Location
Department of Cognitive Science (2522)	22nd floor Dunton Tower
Registrars Office (3500)	300 Tory
Centre for Student Academic Support (3822)	4th floor Library
Paul Menton Centre (6608)	501 Nideyinàn (formerly University Centre)

Course outline revision history

- v1.0: original version (Dec 24, 2023)