

## PSYC70: Advanced Research Methods

University of Toronto Scarborough  
Winter Term, 2021

### Introduction



Instructor: Prof. George S. Cree

email: [george.cree@utoronto.ca](mailto:george.cree@utoronto.ca)

### About Your Instructor

Dr. George Cree is an Associate Professor in the Department of Psychology at UTSC. He joined the department in 2003, and was Chair of the department from 2012-2018. He has published research papers on semantic memory and neural network models of word meaning computation. More generally, he is interested in knowledge representation, neural network modeling of cognition, cognitive science, and artificial intelligence. In line with this course, he is interested in how we can use computers to improve and enhance scientific communication and reproducibility, and how we can use what we know about human cognition to improve scientific and statistical reasoning.

### TAs:

- Amanda Brijmohan: [amanda.brijmohan@mail.utoronto.ca](mailto:amanda.brijmohan@mail.utoronto.ca)
- Vicki (Mengxi) Dong: [vicki.dong@mail.utoronto.ca](mailto:vicki.dong@mail.utoronto.ca)
- Julia Gallucci: [julia.gallucci@mail.utoronto.ca](mailto:julia.gallucci@mail.utoronto.ca)
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- Nina Wang: [szeyuhnina.wang@mail.utoronto.ca](mailto:szeyuhnina.wang@mail.utoronto.ca)

### Learning Goals

This course is designed to transition you from being a **consumer** of psychological research to a **producer** of original psychological research findings. To accomplish this you will be introduced to a number of new skills. First, you will engage with readings, lectures, and exercises designed to improve your scientific and statistical thinking. You will learn about the cognitive biases and heuristics that influence all human thinking, and how they can be best avoided when working as a scientist. You will also be introduced to R, RStudio, and R Markdown, which you will learn are excellent tools for creating reproducible workflows and outputs. By the end of this course you will be ready to undertake a lab based course in the sub-area of psychology and/or neuroscience that most interests you (e.g., PSYC70 series), will be partially prepared to conduct an independent study research course (e.g.,

PSYC90 or PSYD98), and will be well on your way to being an independent scientist who uses, and understands the importance and necessity of, modern, reproducible methods.

## Course Content

### Textbook

Kline, R. B. (2020). [Becoming a behavioral science researcher: A guide to producing research that matters](#). 2nd Ed. Guilford Press. (this reference is a clickable link – if you click it you will be taken to the publisher’s website where you can purchase the e-book).

### Topics

The lessons for each week will comprise a mixture of readings, online lectures, online screen captures, and R worksheets. You will find a full and up-to-date listing of these materials for each week in the weekly modules available on Quercus. The material listed below is to provide an outline of the topics to be covered, and is subject to change based on how the course progresses. Always check Quercus for the most up-to-date information.

#### *Week 00: Jan 4 - 8*

- Quercus Opens
- Syllabus Review
- Pre-Course Survey

#### *Week 01: Jan 11 - 15*

- Reading: Mayer (2008). Old advice for new researchers.
- Lecture: Mayer (2008) review.
- Lab: Microsoft Office: The good, the bad, and the ugly.
- Tutorial: Introduction to the Research Proposal Project
- Research Proposal Project: Choose a Research Topic

#### *Week 02: Jan 18 - 22*

- Reading: Wilson et al. (2017). Good enough practices in scientific computing.
- Reading: Rouder et al. (2019). Minimizing mistakes in psychological science.
- Lecture: Lab Methods and Reproducibility
- Lab: Intro to R, R Studio, and R Studio Cloud
- Tutorial: Improve Your Research Article Comprehension and Summarization Skills
- Research Proposal Project: Find and Summarize a Research Article

#### *Week 03: Jan 25 - 29*

- Reading: Kline (2020). Chapter 2.
- Lecture: The Research Trinity: Design, Measurement, Analysis
- Lab: R Programming Basics
- Tutorial: How to Generate a Research Question
- Research Proposal Project: Generate 3 Research Questions

#### *Week 04: Feb 1 - 5*

- Reading: Kline (2020). Chapter 3.
- Lecture: Crises
- Lab: Intro to R Markdown
- Tutorial: Improve Your Literature Review Skills
- Research Proposal Project: Conduct a Mini Literature Review

#### *Week 05: Feb 8 - 12*

- Reading: Kline (2020). Chapter 4.
- Lecture: Reporting Standards
- Lab: Data Wrangling
- Tutorial: How to Create an Outline for an APA Introduction
- Research Proposal Project: Write a Literature Review (Draft Intro)

#### *— Reading Week (Feb 13 - Feb 19) —*

#### *Week 06: Feb 22 - 26*

- Reading: Kline (2020). Chapter 5.
- Lecture: Open Science
- Lab: Data Visualization
- Tutorial: Improve Your Data Visualization Literacy
- Research Proposal Project: Generate a Research Hypothesis

#### *Week 07: Mar 1 - 5*

- Reading: Kline (2020). Chapter 6.
- Lecture: Statistics Reform
- Lab: T-tests in R
- Tutorial: How to Choose a Research Design
- Research Proposal Project: Specify Your Research Design

#### *Week 08: Mar 8 - 12*

- Reading: Kline (2020). Chapter 7.
- Lecture: Effect Size
- Lab: APES (Alpha, Power, Effect Size, & Sample Size)
- Tutorial: APES Practice
- Research Proposal Project: Graph Your Predictions

#### *Week 09: Mar 15 - 19*

- Reading: Kline (2020). Chapter 8.
- Lecture: Psychometrics
- Lab: R Markdown for Scientific Reports
- Tutorial: Measuring DVs
- Research Proposal Project: Draft Method Section

#### *Week 10: Mar 22 - 26*

- Reading: Chapter 10.
- Lecture: Scientific Writing
- Lab: Preparing APA Journal Articles in R
- Tutorial: Improve Your Scientific Writing Skills
- Research Proposal Project: Draft Research Proposal

#### *Week 11: Mar 29 - Apr 2*

- Reading: Kline (2020). Chapter 11.
- Lecture: Scientific Presentations
- Lab: Creating Slides in R
- Tutorial: Improve Your Scientific Presentation Skills
- Research Proposal Project: Presentation

#### *Week 12: Apr 5 - 9*

- Reading: Kline (2020). Chapter 9.
- Lecture: Practical Data Analysis
- Lab: Working with Data in R
- Tutorial: How to Be a Successful Scientist
- Research Proposal Project: Final Research Proposal

#### *— Final Exams (April 13 - 23) —*

#### **Other Important Dates**

- Family Day: Feb 15
- Last day to drop without academic penalty: March 29
- Good Friday: April 2
- Study Break: April 10 - April 11
- Last day to submit term assignments: April 12

#### **Course Requirements and Grading**

Requirement	Weight	Due
Research Proposal Project (RPP)	68%	Every Friday at 1pm
Tutorial/Discussion Board Participation	12%	Weekly
Final Exam	20%	Final Exam Period

#### **Detailed Summary of Research Proposal Project Assignments and Due Dates**

Task	Weight	Due Date
RPP Assignment 01	1%	Friday Jan 15, 1 pm
RPP Assignment 02	1%	Friday Jan 22, 1 pm
RPP Assignment 03	2%	Friday Jan 29, 1 pm
RPP Assignment 04	2%	Friday Feb 5, 1 pm

RPP Assignment 05	2%	Friday Feb 12, 1 pm
RPP Assignment 06	2%	Friday Feb 26, 1 pm
RPP Assignment 07	2%	Friday Mar 5, 1 pm
RPP Assignment 08	2%	Friday Mar 12, 1 pm
RPP Assignment 09	4%	Friday Mar 19, 1 pm
RPP Assignment 10	10%	Friday Mar 26, 1 pm
RPP Assignment 11	5%	Friday Apr 2*, 1 pm
RPP Assignment 12	35%	Friday Apr 9, 1 pm
Tutorial/Discussion Board Participation	12%	Weekly
Final Exam	20%	Final Exam Period

Note: \* April 2 is a holiday, therefore everyone receives an automatic extension on the due date for Assignment 11 to Monday, April 5th, at 1 pm.

Note 2: The schedule, due dates, and nature of assignments are subject to change due to extenuating circumstances beyond our control. I would normally say that this is extremely unlikely, but given what we've all been living through the last year, it is now entirely possible. The University could, for example, mandate that changes are made. Any other changes will be subject to a class vote, where a simple majority of those enrolled in the course must vote in favour of the change.

Note 3: It is critical that you abide by the submission policies for homework and assignments. Failure to follow submission requirements will likely result in a grade of 0, unless there are documented extenuating circumstances. Submission requirements include file naming conventions and file format requests. These will all be clearly explained in assignment descriptions and course materials.

## Course Policies

### Late Assignments Policy

A penalty of 5% will be deducted from the final grade for the assignment for every 24 hour period that an assignment is late.

#### **NOTE: Assignments due at end of term**

Instructors cannot accept term work any later than five business days after the last day of class. Beyond this date, you would need to file a petition with the [Registrar's Office](#).

#### **NOTE: Final Exams**

This policy applies only to missed assignments and term tests. Missed final exams are handled by the [Registrar's Office](#).

### Accommodation for Personal Reasons

There may be times when you are unable to complete coursework, including completing readings, viewing lectures, or completing worksheets, due to non-medical reasons. If this occurs during the term you should contact the course instructor as soon as possible to discuss a strategy for completing or dropping the course. It is also a very good idea to speak to an academic advisor.

### Religious Accommodations

The University has a commitment concerning accommodation for religious observances. We will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. According to University Policy, if you anticipate being absent from class or missing a major course activity due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two weeks), so that we can work together to make alternate arrangements.

### Academic Integrity

The University treats cases of cheating and plagiarism very seriously. The [University of Toronto's Code of Behaviour on Academic Matters](#) outlines the behaviours that constitute academic dishonesty and the processes for addressing academic offences. Potential offences in papers and assignments include using someone else's ideas or words without appropriate acknowledgement, submitting your own work in more than one course without the permission of the instructor, making up sources or facts, and obtaining or providing unauthorized assistance on any assignment. On tests and exams cheating includes using or possessing unauthorized aids, looking at someone else's answers during an exam or test, misrepresenting your identity, or falsifying or altering any documentation required by the University, including (but not limited to) doctor's notes.

### Disability-Related Accommodation Request

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodations, please feel free to approach me and/or the [AccessAbility Services Office](#) as soon as possible. AccessAbility Services staff (located in Rm SW302, Science Wing) are available by appointment to assess specific needs, provide referrals and arrange appropriate accommodations. Please contact 416-287-7560 (tel/TTY) or email: [ability@utsc.utoronto.ca](mailto:ability@utsc.utoronto.ca) for more information. The sooner you let us know your needs the quicker we can assist you in achieving your learning goals in this course.

### Course Management System Information: Quercus

This course uses the University of Toronto's learning management system, Quercus, to post information about the course. This includes readings, recorded lectures, worksheets, assignment rubrics, access to tests and exams, and other materials required to complete class activities and course assignments, as well as sharing important announcements and

updates. The site is dynamic and new information and resources will be posted regularly as we move through the term, so please make it a habit to log in to the site on a regular, even daily, basis. To access the course website, go to the U of T Quercus log-in page at [q.utoronto.ca](http://q.utoronto.ca). Once you have logged in to Quercus using your UTORid and password, you should see the link or “card” for PSYC70. You may need to scroll through other cards to find this. Click on the PSYC70 link to open our course area, view the latest announcements, and access your course resources. There are Quercus help guides for students that you can access by clicking on the “?” icon in the left side column.

**Special note about grades posted online:** Please note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ACORN at the end of the course. Please contact me as soon as possible if you think there is an error in any grade posted on Quercus.

### Online Communication Policy

You are required to use your utoronto email address for all course-related communications with the instructor and/or TA, and are expected to check this email address regularly throughout the course to ensure timely access to important information. I will only respond to emails received from a utoronto account, as this is the only way I can verify who I am talking with.

I reserve the right to remove Discussion Board posts that do not remain on topic. Harrassment and bullying will not be tolerated, and will be dealt with swiftly.

### Harassment/Discrimination Policy

The University of Toronto is a richly diverse community and as such is committed to providing an environment free of any form of harassment, misconduct, or discrimination. In this course, I seek to foster a civil, respectful, and open-minded climate in which we can all work together to develop a better understanding of key questions and debates through meaningful dialogue. As such, I expect all involved with this course to refrain from actions or behaviours that intimidate, humiliate, or demean persons or groups or that undermine their security or self-esteem based on traits related to race, religion, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, gender identity, gender expression, age, marital status, family status, disability, receipt of public assistance or record of offences.

### Privacy/FIPPA Statement

Personal information is collected pursuant to section 2(14) of the University of Toronto Act, 1971 and at all times it will be protected in accordance with the Freedom of Information and Protection of Privacy Act. Please note that this course requires presentations of one’s work to the group. For more information, please refer to [www.utoronto.ca/privacy](http://www.utoronto.ca/privacy).

## Copyright of Course Materials

Course materials are provided for the exclusive use of enrolled students. You do not have permission to share them or sell them to anyone outside of the course. The materials should not be posted on websites, uploaded to social media sites, printed and distributed or sold to others, nor sold to companies that intend to package them to sell or distribute to other people in print or via the internet. The University will support me in asserting and pursuing my rights, and my copyrights, in such matters.

You do have my permission to make your own recordings of any lectures for your own personal use. These may not be distributed, shared, sold, or posted on the internet without my permission.

## Psychology Department Missed Term Work Policy, WINTER 2021

For missed term work (assignments and term tests) due to illness, emergency, or other mitigating circumstances, please follow the procedures outlined below.

Notes:

- The following reasons are not considered sufficient for missed term work: travel for leisure, weddings, personal commitments, work commitments, human error.
- Missed Final Exams are handled by the Registrar's Office and should be declared on eService: <http://www.utsc.utoronto.ca/registrar/missing-examination>
- Instructors cannot accept term work any later than five business days after the last day of class. Beyond this date, you would need to file a petition with the Registrar's Office: <https://www.utsc.utoronto.ca/registrar/term-work>

### Accommodations for Illness or Emergency:

For missed work due to ILLNESS OR EMERGENCY, please complete the following **two-step** process:

1. Complete the **Request for Missed Term Work Accommodations Form** (<http://uoft.me/PSY-MTW>) and email it to Keely Hicks at [keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca) ,  
**\*and\***
2. **Declare your absence** on ACORN (Profile & Settings > Absence Declaration)

**Deadline:** You must complete the above steps **within 3 business days** of the missed work.

*Note: For this semester, we do not require any additional supporting documentation (ex. medical notes) to support your missed term work accommodation request.*

### Accommodations for Academic Conflicts:

For missed term work due to an ACADEMIC CONFLICT (i.e. two quizzes or tests scheduled at the same time), please complete the following process:

1. Complete the **Request for Missed Term Work Accommodations Form** (<http://uoft.me/PSY-MTW>), choosing "Other" as your reason for missed work and explaining the conflict in the space provided.



2. Take screenshots of your course homepages that demonstrate the conflict.
3. Email the form and screenshots to Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)).

**Deadline:** You should report the conflict to Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) **at least two weeks (10 business days) before the date of the activity**, or as soon as possible if it was not possible to identify the conflict earlier.

*Note: Multiple assignments due on the same day are not considered conflicts. Accommodations may only be possible in the case of quizzes and tests that are both scheduled during the same discrete period. Back-to-back tests/quizzes are not considered conflicts.*

*Note: Students are responsible for keeping their course timetables conflict-free. Students who choose to register in two synchronous courses with overlapping lecture/tutorial/lab schedules may not necessarily be accommodated.*

### **Accommodations for Religious Conflicts:**

For missed term work due to a RELIGIOUS CONFLICT, please complete the following process:

1. Complete the **Request for Missed Term Work Accommodations Form** (<http://uoft.me/PSY-MTW>), choosing “Other” as your reason for missed work and noting “Religious conflict” in the space provided.
2. Email the form to Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)).

**Deadline:** You should report the conflict to Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) **at least two weeks (10 business days) before the date of the activity**, or as soon as possible if it was not possible to identify the conflict earlier.

### **Accommodations for Time Zone Conflicts:**

**If** you are physically in a different time zone and a quiz or midterm is scheduled outside of 7:00am to midnight in your local time, please complete the following process:

1. Complete the **Time Zone Conflict Form** (<https://uoft.me/PSY-TimeZone>), and
2. Email the form to Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca))

**Deadline:** You should report the conflict to Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) **at least two weeks (10 business days) before the date of the activity**, or as soon as possible, if it was not possible to identify the conflict earlier.

### **Accommodations for Students Registered with AccessAbility Services:**

For missed **TERM TESTS** due to ACCESSABILITY REASONS:

- **Contact your AccessAbility consultant** and have them email Keely ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) detailing accommodations required.

For missed **ASSIGNMENTS** due to ACCESSABILITY REASONS:

- If your desired accommodation is **within the scope** of your Accommodation Letter (ex. your letter includes “extensions of up to 7 days” and you need 3 days):
  1. Complete the **Request for Missed Term Work Accommodations Form** (<http://uoft.me/PSY-MTW>).
  2. Email the form and your **Accommodation Letter** to Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)).

- If your desired accommodation is **outside the scope** of your Accommodation Letter (ex. your letter includes “extensions of up to 7 days” but you need more time than that):
  1. **Contact your AccessAbility consultant** and have them email Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) detailing the accommodations required.

#### **After submitting your documentation:**

Within approximately one to five business days, you will receive a response from your instructor detailing the accommodations to be made (if any).

**You are responsible for checking your official U of T email and Quercus course announcements daily, as accommodations may be time-critical.**

You should continue to work on your assignments to the best of your ability, as extension accommodations may be as short as one business day, depending on the nature of the illness/emergency.

If an accommodation has been granted but you are unable to meet the conditions of the accommodation (ex. you need a longer extension, or you missed a make-up test), you will need to repeat the missed term work procedure and submit additional forms to request further accommodation. Note that in the case of a missed make-up test, an opportunity to write a second make-up test may not be provided.

Completion of this form does not guarantee that accommodations will be made. The course instructor reserves the right to decide what accommodations (if any) will be made. Failure to adhere to any aspect of this policy may result in a denial of your request for accommodation.

#### **Missed Accommodations**

If an accommodation is granted but a continued illness/emergency prevents you from meeting the requirements of your accommodation, you must repeat the missed term work procedure to request additional accommodations.

(E.g.) If you miss a make-up midterm, you would need to submit another Request for Missed Term Work Accommodations form and declare your extended absence on ACORN.

#### **Importance of Three Business Day window:**

If you are unable to submit your documents within the three business day window, **you must email Keely ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) within the three business day window** to explain the nature of the delay, and when you will be able to provide your documents. Exceptions to the documentation deadline will only be made under **exceptional circumstances**.

#### **Questions?**

If you have any questions about this Missed Term Work policy, please contact Keely Hicks ([keely.hicks@utoronto.ca](mailto:keely.hicks@utoronto.ca)) **well before** the date of the test / assignment deadline to describe your circumstances and inquire about procedures.