# Course Schedule

Important: **ALL TIMES EASTERN** - Please see the [University Policies](#) section of your Course Outline for details

| Week | Topics | OLI Readings | Activities and Assignments | Begin Date | End/Due Date | Weight (%) |
|---|---|---|---|---|---|---|
| Week 01 | [Introduction to Statistics, Measures of Spread, and Relationships](#) | Modules 1 -3 (optional) | [Introduce Yourself](#) | | Friday, May 6, 2022 at 11:55 PM | Ungraded |
| | | Modules 4, and 5 (until the end of C→Q) | [Graded Checkpoint 1](#) | | | 1% |
| | | | [Graded Checkpoint 2](#) | | | 1% |
| Week 02 | | | [Graded Checkpoint](#) | | | 1% |
| Week 03 | [Probability](#) | Module 6 | [Assignment 1 Part 1](#) | Monday, May 16, 2022 at 4:00 PM | Thursday, May 19, 2022 at 11:59 PM | 10% |
| | | | [Assignment 1 Part 2](#) | Monday, May 16, 2022 at 4:00 PM | Friday, May 20, 2022 at 11:59 PM | 10% |
| Week 04 | [Random Variables](#) | Module 7 | [Graded Checkpoint](#) | | | 1% |
| Week 05 | [Sampling Distributions](#) | Module 8 | [Graded Checkpoint 1](#) | | | 1% |
| | | | [Graded Checkpoint 2](#) | | | 1% |
| | | | [Graded Checkpoint](#) | | | 1% |
| Week 06 | [Introduction to Inference and Estimation](#) | Modules 9 and 10 | [Assignment 2 Part 1](#) | Monday, June 6, 2022 at 4:00 PM | Thursday, June 9, 2022 at 11:59 PM | 10% |
| | | | [Assignment 2 Part 2](#) | Monday, June 6, 2022 at 4:00 PM | Friday, June 10, 2022 at 11:59 PM | 10% |
| Week 07 | [Hypothesis Testing — One Sample Tests](#) | Module 11 (until the end of hypothesis testing) | [Graded Checkpoint 1](#) | | | 1% |
| | | | [Graded Checkpoint 2](#) | | | 1% |
| | | | [Graded Checkpoint 3](#) | | | 1% |
| | | | [Graded Checkpoint 4](#) | | | 1% |
| Week 08 | [Effect Size and Power](#) | Module 11 (to the end) | [Graded Checkpoint](#) | | | 1% |
| | | | [Graded](#) | | | |

| Week | Topic | Module | Item | Open | Due | Weight |
|---|---|---|---|---|---|---|
| | | | Checkpoint 1 | | | 1% |
| | | | Graded Checkpoint 2 | | | 1% |
| **Week 09** | Inference for Relationships Between Multiple Variables: t-tests | Module 12 (to the end of matched pairs) | Assignment 3 Part 1 | Monday, June 27, 2022 at 4:00 PM | Thursday, June 30, 2022 at 11:59 PM | 10% |
| | | | Assignment 3 Part 2 | Monday, June 27, 2022 at 4:00 PM | Friday, July 1, 2022 at 11:59 PM | 10% |
| **Week 10** | Inference for Relationships Between Multiple Variables: ANOVA and Chi-Square | Module 12 and 13 ( to the end of C→C) | Graded Checkpoint 1 | | | 1% |
| | | | Graded Checkpoint 2 | | | 1% |
| **Week 11** | Examining Relationships | Module 5 (from C→C to the end) | Graded Checkpoint 1 | | | 1% |
| | | | Graded Checkpoint 2 | | | 1% |
| | | | Graded Checkpoint 1 | | | 1% |
| | | | Graded Checkpoint 2 | | | 1% |
| **Week 12** | Inference for Relationships Between Multiple Variables: Regression | Module 13 (to the end) | All Graded Checkpoints are due | | Tuesday, July 26, 2022 at 11:59 PM | 1% |
| | | | Assignment 4 Part 1 | Monday, July 25, 2022 at 4:00 PM | Sunday, July 31, 2022 at 11:59 PM | 10% |
| | | | Assignment 4 Part 2 | Monday, July 25, 2022 at 4:00 PM | Monday, August 1, 2022 at 11:59 PM | 10% |

# Contact Information

## Announcements

Your instructor uses the **Announcements** widget on the **Course Home** page during the term to communicate new or changing information regarding due dates, instructor absence, etc. You are expected to read the announcements on a regular basis.

To ensure you are viewing the complete list of announcements, you may need to click **Show All Announcements**.

## Discussions

A General Discussion topic* has also been made available to allow students to communicate with peers in the course. Your instructor may drop in at this discussion topic.

## Contact Us

| Who and Why | Contact Details |
|---|---|
| | **Post your course-related questions** to the Ask the Instructor discussion topic*. This allows other students to benefit from your question as well.<br><br>**Questions of a personal nature** can be directed to your instructor or your TA. |
| **Instructor**<br><br>• Course-related questions (e.g., course content, deadlines, assignments, etc.)<br>• Questions of a personal nature<br>• Questions about R or Excel | Instructor: Ethan Meyers<br>emeyers@uwaterloo.ca<br><br>TA: Peter Diberardino<br>pavdiberardino@uwaterloo.ca<br><br>TA: Zora Chen<br>z439chen@uwaterloo.ca<br><br>Your instructor checks email and the Ask the Instructor discussion topic* frequently and will make every effort to reply to your questions within 24–48 hours, every day of the week. |
| **Open Learning Initiative (OLI) Support**,<br>Carnegie Mellon University<br><br>• Technical problems with the OLI | Open Learning Intiative: Contact Us<br><br>Please contact **Open Learning Initiative (OLI) Support** for any technical problems with the OLI. Fill out the form at the link above and they will respond to you as soon as possible.<br><br>learnhelp@uwaterloo.ca |
| **Technical Support**,<br>Centre for Extended Learning<br><br>• Technical problems with | Include your full name, WatIAM user ID, student number, and course name and number. |

Waterloo LEARN

Technical support is available during regular business hours, Monday to Friday, 8:30 AM to 4:30 PM (Eastern Time).

[IST Knowledge Base: For Students](#)

[Student Resources](#)

**Learner Support Services**,
Centre for Extended Learning

- General inquiries
- Examination information

[extendedlearning@uwaterloo.ca](mailto:extendedlearning@uwaterloo.ca)
+1 519-888-4002

Include your full name, WatIAM user ID, student number, and course name and number.

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**\*** Discussion topics can be accessed by clicking **Connect** and then **Discussions** on the course navigation bar above.

# Course Description and Learning Outcomes

## Description

In this course, you will learn the basics of using descriptive and inferential statistics in the analysis of psychological data. This course emphasizes an understanding of fundamental statistical principles rather than "cookbook" application of statistical formulas. The principles provided in this course will serve as a foundation for more advanced statistical techniques that you may study in later courses. An appreciation of basic statistical principles, furthermore, can help you to be a more critical "consumer" of reported research findings.

## Learning Outcomes

By the end of the course, you should be able to do the following:

- Examine and describe distributions
- Estimate measures of of central tendency and spread
- Test statistical hypotheses for independent samples and matched pairs
- Calculate probability
- Understand and apply the basic principles of chi-square, t-tests, ANOVA and Regression
- Develop a basic intuition for, and be able to describe, power analysis and effect size

## Strategies for Success

1. Start each week by going through the content presented. This will provide the best guide regarding what you need to know for the course (in addition to the practice questions, see item below). It is critical to read the accompanying online textbook chapters.

2. Do the practice exercises in the online textbook and the practice questions that appear under each week's lessons. Practice questions are not evaluated for your course mark, however, statistical reasoning and any related math is learned with practice, and so the questions are provided for this reason.

3. Make sure you know how to solve the problem in full, showing all of your steps. Not all assessments test this, but you will be required to show all work for the exam and some assignments, which are written. The best way to practice this is through practicing this when solving any of the practice problems.

4. Use the Discussion Forums — your fellow students and the teaching assistant(s) can help you

online if you are stumped on a problem. Note that you cannot use discussion forums to get help on assessments. These should be done on your own.

5.  Practice, practice, practice. When studying, it is not enough to go through an example and understand the steps. You have to be able to repeat the process on your own for different examples as well. Just because you can understand all the examples when they are presented to you does not mean you could carry out the same steps in an assessment situation.

6.  Statistical computation needs to be internalized through **continuous training** and it will not work as effectively if you try to cram everything in the night before assessments. If you cram, you will forget the material the day you wrote the exam, and will need to repeat this course before you can take on more advanced courses in the future. Slow and steady wins the race — try to work on the material throughout the week instead of just before due dates.

*This online course was developed by Igor Grossmann, with instructional design and multimedia development support provided by the Centre for Extended Learning. Further media production was provided by Instructional Technologies and Multimedia Services.*

# About the Course Author and Instructor

## Course Instructor — Ethan Meyers



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Ethan Meyers is a graduate student at the University of Waterloo exploring the beliefs we hold and how we revise them. In particular, his work focuses on how we update our existing beliefs when we're presented with opinions held by experts versus members of the public. In addition, he explores other concepts under the broad field of judgment and decision making including cognitive debiasing, moral decision making, and psychometrics. He is currently supervised by professors Jonathan Fugelsang and Derek Koehler.

## Course Author — Igor Grossmann

Igor Grossmann is a behavioural scientist exploring the interplay of sociocultural factors for wisdom in the face of daily stressors. His interdisciplinary work uses innovative methods, including big data analytics, psychophysiology, diary surveys, and behavioural experiments. Igor Grossmann studied at the University of Freiburg, Germany, and at the University of Michigan, where he received his Ph.D. in Social Psychology in 2012. He is currently an Associate Professor of Psychology at the University of Waterloo.



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# Materials and Resources

## Textbook(s)

**Required**

Your textbook for this course is an online, interactive resource created by the **Open Learning Initiative (OLI)**, and customized for this course. You will access the OLI textbook each week for content, practice and regular assessments.

**Course Code:** PSYCH292S22

**Course Name:** Basic Data Analysis

**For textbook ordering information, please contact the [W Store | Course Materials + Supplies](#).**

For your convenience, you can compile a list of required and optional course materials through [BookLook](#) using your Quest userID and password. If you are having difficulties ordering online and wish to call the Waterloo Bookstore, their phone number is +1 519-888-4673 or toll-free at +1 866-330-7933. Please be aware that textbook orders **CANNOT** be taken over the phone.

### Choosing Software in the OLI

Throughout the course we will engage in several interactive activities, some of which will use the online textbook. The online textbook provides instructions for each activity. Note that the default instructions for these activities are provided in R, which is a powerful statistical language used by the majority of statisticians and an increasing number of psychologists around the world.

All instructions for R are provided in the interactive activities and R can itself be downloaded free of charge to your personal computer at the [comprehensive R archive network](#) and selecting your operating system. Though R is a powerful and useful tool, some people report a steep learning curve. In case you don't feel comfortable using it, the on-line textbook also provides an opportunity to use an alternate version in Excel, with detailed instructions. To switch to Excel instructions, click on the "R instructions" and click enter. See the following screenshot.



Open Learning Initiative, Carnegie Mellon University (2015). Boxplot. Retrieved from https://oli.cmu.edu/jcourse/workbook/activity/page?context=f4869b790a0001dc25036e45235cf53e and licensed under CC BY-NC-SA 3.0

## Resources

- Library services for [Co-op students on work term and students taking online courses](#)

# Grade Breakdown

The following table represents the grade breakdown of this course.

| Activities and Assignments | Weight (%) |
| --- | --- |
| Introduce Yourself | Ungraded |
| Discussions/Tutorials | Ungraded |
| OLI Graded Checkpoints (20 x 1% each) | 20% |
| Assignments (4 x 20% each) | 80% |
| BONUS: SONA participation | up to 4% |

## Official Grades

Official Grades and Academic Standings are available through Quest.

# Course and Department Policies

## Course Policies

### Late Assessments

Assessments that are automatically graded will close on the due date specified in the Course Schedule. Late access must be requested from your instructor. Late assessments without proper documentation will be penalized a 10% deduction per day up to 5 days. Submissions beyond 5 days late will be awarded a grade of 0%.

### Remarking Assessments

Some assessments are marked automatically. To get credit, your answer must be both correct and accurate. No part marks are given for these questions. Students who have an inquiry regarding the marking of an assessment should carefully look at the solutions for clarification. If, after checking the solutions, you feel that it was marked incorrectly, then you should email the instructor, include your student ID and which question you would like rechecked. Remember that for automatically graded assessment, no part marks will be given and no marks will be given for interpreting the question incorrectly. All appeals must be received within 7 days of the date the graded item was returned.

### Calculators

For the exercises, assessments, and final exam, you will need to have a calculator with basic statistical functions (e.g., standard deviation). We strongly advise you not to use your smartphone or browser-based calculators, as it will take longer and will not help you learn much in this course.

## Department Policies

### Avoiding Academic Offences

For information on commonly misunderstood academic offences and how to avoid them, students should refer to the Faculty of Arts' Ethical Behaviour page.

# University Policies

## Submission Times

Please be aware that the University of Waterloo is located in the **Eastern Time Zone** (GMT or UTC-5 during standard time and UTC-4 during daylight saving time) and, as such, the time that your activities and/or assignments are due is based on this zone. If you are outside the Eastern Time Zone and require assistance with converting your time, please try the [Ontario, Canada Time Converter](#).

## Accommodation Due to Illness

**If your instructor has provided specific procedures for you to follow if you miss assignment due dates, term tests, or a final examination, adhere to those instructions.** Otherwise:

### Missed Assignments/Tests/Quizzes

Contact the instructor as soon as you realize there will be a problem, and preferably within 48 hours, but no more than 72 hours, have a medical practitioner complete a [Verification of Illness Form](#).

**Email** a scanned copy of the Verification of Illness Form to your instructor. In your email to the instructor, provide your name, student ID number, and exactly what course activity you missed.

Further information regarding Management of Requests for Accommodation Due to Illness can be found on the [Accommodation due to illness](#) page.

### Missed Final Examinations

Contact your instructor as soon as possible if you are unable to fulfill academic requirements due to illness or other extenuating circumstances.

Further information about Examination [Accommodations](#) is available in the Undergraduate Calendar.

## Academic Integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect, and responsibility. **If you have not already completed the online tutorial regarding academic integrity you should do so as soon as possible.** Undergraduate students should see the [Academic Integrity Tutorial](#) and graduate students should see the [Graduate Students and Academic Integrity](#) website.

Proper citations are part of academic integrity. Citations in CEL course materials usually follow CEL style, which is based on APA style. Your course may follow a different style. If you are uncertain which style to use for an assignment, please confirm with your instructor or TA.

For further information on academic integrity, please visit the [Office of Academic Integrity](#).

## Turnitin

**Turnitin.com**: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used

to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin® in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit the alternate assignment.

Turnitin® at Waterloo

# Discipline

A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration, should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71 - Student Discipline. For typical penalties, check Guidelines for the Assessment of Penalties.

# Appeals

A decision made or penalty imposed under Policy 70 - Student Petitions and Grievances, (other than a petition) or Policy 71 - Student Discipline, may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 - Student Appeals.

# Grievance

A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70 - Student Petitions and Grievances, Section 4. When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.

# Final Grades

In accordance with Policy 46 - Information Management, Appendix A - Access to and Release of Student Information, the Centre for Extended Learning does not release final examination grades or final course grades to students. Students must go to Quest to see all final grades. Any grades posted in Waterloo LEARN are unofficial.

# AccessAbility Services

AccessAbility Services, located in Needles Hall, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodation to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term and for each course.

# Accessibility Statement

The Centre for Extended Learning strives to meet the needs of all our online learners. Our ongoing efforts to become aligned with the Accessibility for Ontarians with Disabilities Act (AODA) are guided by University of Waterloo accessibility Legislation and policy and the World Wide Web Consortium's (W3C) Web Content Accessibility Guidelines (WCAG) 2.0. The majority of our online courses are currently delivered via the Desire2Learn Learning

Environment. Learn more about [Desire2Learn's Accessibility Standards Compliance](#).

# Use of Computing and Network Resources

Please see the [Guidelines on Use of Waterloo Computing and Network Resources](#).

# Copyright Information

**UWaterloo's Web Pages**

All rights, including copyright, images, slides, audio, and video components, of the content of this course are owned by the course author and the University of Waterloo, unless otherwise stated. By accessing this course, you agree that you may only download the content for your own personal, non-commercial use. You are not permitted to copy, broadcast, download, store (in any medium), transmit, show or play in public, adapt, or change in any way the content of these web pages for any other purpose whatsoever without the prior written permission of the course author and the University of Waterloo, Centre for Extended Learning.

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If there are any questions about this notice, please contact the University of Waterloo, Centre for Extended Learning, Waterloo, Ontario, Canada, N2L 3G1 or [extendedlearning@uwaterloo.ca](mailto:extendedlearning@uwaterloo.ca).