Western University
Dept. Psychology
Scientific Computing
Winter 2025
Mondays & Thursdays 9:30am-11:00am in WIRB 1110

Enrollment Restrictions

Enrollment in this course is restricted to graduate students in Psychology, as well as any student that has obtained special permission to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent) from the student's home program.

Instructor and Teaching Assistant Information

Instructor: Paul Gribble
Office: WIRB 4122
Office Phone: 82237
Office Hours: by appointment
Email: pgribble@uwo.ca

Teaching Assistant	Anthony Cruz
Email	Acruz27@uwo.ca
Office Hours	by appointment

Course Description

In this one-semester graduate course you will learn skills in scientific computing—tools and techniques that you can use in your own research. You will learn to program using Python, which is a high-level programming language with many libraries that provide a rich ecosystem for scientific computing. If you want to use a different language in the course you are welcome to but I will focus on Python in class. Having said that, as much as I can I will teach concepts in a way that are language-agnostic.

Course website: https://www.gribblelab.org/9040

Course Format

Face-to-face in person classes

Course Learning Outcomes/Objectives

The course is designed to achieve three goals:

1. You will learn to program in a high-level language (Python)
2. You will learn to think computationally and algorithmically about data
3. You will learn some common data analysis techniques, which will give you a foundation from which to learn more complex scientific computing skills to suit your own research goals

Upon completion of this course, students should be able to:

1. Write programs in a high-level language to analyse data (Python)
2. Think about your data computationally and algorithmically
3. Analyse your data using some standard analysis techniques
4. Self-learn more complex analysis techniques to suit your research goals

Course Materials

We will draw from freely available textbooks, resources, and tutorials on the web.

Methods of Evaluation

Grades will be based on weekly programming assignments in which you will apply the knowledge we cover that week to write code that analyses sample data in specific ways. Tentative schedule:

Assignment	Date of Evaluation (if known)	Weighting
HW01	Jan 9	8.3%
HW02	Jan 16	8.3%
HW03	Jan 23	8.3%
HW04	Jan 30	8.3%
HW05	Feb 6	8.3%
HW06	Feb 13	8.3%
HW07	Feb 27	8.3%
HW08	Mar 6	8.3%
HW09	Mar 14	8.3%
HW10	Mar 20	8.3%
HW11	Mar 27	8.3%
HW12	Apr 3	8.3%
Total		100%

Course Timeline

This is where you will enter an anticipated timeline of the content areas, or topics and/or other learning activities, covered over the course duration. Instructors should make every effort to follow the stated timeline.

Week	Date	Topics/Content Areas/ Learning Activities	Readings Due
1	Jan 6/9	Fundamentals of Coding	Week 1 readings
2	Jan 13/16	Fundamentals of Coding	Week 2 readings
3	Jan 20/23	Fundamentals of Coding	Week 3 readings
4	Jan 27/30	Fundamentals of Coding	Week 4 readings
5	Feb 3/6	Object Oriented Programming (OOP)	Week 5 readings
6	Feb 10/13	Graphical Displays of Data	Week 6 readings

Week	Date	Topics/Content Areas/ Learning Activities	Readings Due
7	Feb 17/20	Reading week – no class	Week 7 readings
8	Feb 24/27	Reproducability & Replicability	Week 8 readings
9	Mar 3/6	Reproducability & Replicability	Week 9 readings
10	Mar 10/13	Sampling, Signal Processing, & Filtering Data	Week 10 readings
11	Mar 17/20	Sampling, Signal Processing, & Filtering Data	Week 11 readings
12	Mar 24/27	Statistical Tests	Week 12 readings
13	Mar 31/Apr 3	Fitting Models to Data	Week 12 readings

Statement on Academic Offences

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

Additionally, if written work will be assigned in the course and plagiarism-checking software might be used, the following statement to this effect must be included in the course outline:

All required papers may be subject to submission for textual similarity review to the commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

If computer-marked multiple-choice tests and/or exams will be given, and software might be used to check for unusual coincidences in answer patterns that may indicate cheating, the following statement must be added to course outlines:

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

Health/Wellness Services

Students who are in emotional/mental distress should refer to Mental Health@Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help.

Accessible Education Western (AEW)

Western is committed to achieving barrier-free accessibility for all its members, including graduate students. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective graduate program.

Graduate students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW), a

confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their graduate programs (normally their Graduate Chair and/or Course instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.