Western University
Dept. Psychology
PSYC 9040B
Scientific Computing
Winter 2026

1. Course Information

Course name: Scientific Computing
Course number: Psychology 9040B
Location: ███████████
Days/Hours: Mondays & Thursdays, 9:30 am – 11:30 am

2. 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. For the policy on undergraduate students taking graduate courses, please see the policy on "Undergraduate Course Credit".

3. Instructor Information

Instructor: Dr. Paul Gribble   TA: Anthony Cruz
email: pgribble@uwo.ca   email: acruz27@uwo.ca
office: WIRB 4122   office hours: by appointment
Office hours: by appointment

4. Course Description and Graduate Course Level Learning Outcomes/Objectives

In this one-semester graduate course you will learn skills in scientific computing. You will learn 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, we will cover concepts in a way that are language-agnostic as much as possible. Students will be expected to complete weekly coding assignments based on the material we cover each week.

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

The course is designed to achieve these goals:

- You will learn to program in a high-level language (Python)

- You will learn to use the command line to interact with your file system and with Python
- You will learn to think computationally and algorithmically about data
- You will learn some common data analysis techniques, giving you a foundation from which to learn more complex scientific computing skills to suit your own research goals
- You will learn how to organize your code and data so that your computational work is reproducible for yourself and others in the future

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

- Write programs in a high-level language to analyse data (Python)
- Analyse your data using some standard analysis techniques
- Self-learn more complex analysis techniques to suit your research goals

5. Course Timeline and Format

This is a preliminary timeline for the topics we will cover in the course. The amount of time spent on a given topic may vary from year to year based on the background and interest of the students in the class. The course format is in-person face-to-face. Students are expected to attend every class.

week 1:   Setting up your computing environment & learning the command line
week 2:   Python basics
week 3:   Fundamental principles of programming I
week 4:   Fundamental principles of programming II
week 5:   Object-oriented programming (OOP)
week 6:   Python libraries for scientific computing
week 7:   Graphical displays of data
week 8:   Principles of organizing data and code for scientific computing
week 9:   Sampling, signal processing, & filtering data
week 10:   Fundamental principles of statistical inference
week 11:   Fitting models to data
week 12:   Simulating dynamical systems I
week 13:   Simulating dynamical systems II

6. Course Materials

We will draw from freely available textbooks and software tools. Students are expected to attend class with a laptop that has enough disk space to install Python and associated tools. Laptops can be running MacOS, or Windows, or Linux. The tools we will be using are compatible with all.

7. Methods of Evaluation

The final course grade will be based on weekly programming assignments that require students to apply the knowledge that we cover in class each week. Typically, there are 12 assignments equally weighted for the final course grade (8.33 % each assignment). Each assignment will be made available on Monday of each week, and will be due 7 days later, on Sunday at 11:59:59 pm eastern standard time. Failure to submit assignments by the due date will result in a grade of zero for that assignment. Assignments must be produced by the student and not by artificial intelligence tools (see section 12 below).

8. 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 website: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_offences.pdf.

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 Western University and Turnitin.com (http://www.turnitin.com).

9. Health/Wellness Services

Students who are in emotional/mental distress should refer to Mental Health Support at https://www.uwo.ca/health/psych/index.html for a complete list of options about how to obtain help.

10. Accessible Education (AE)

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 (AE), a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AE 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 may include individual counselling, alternative formatted literature, accessible

campus transportation, learning strategy instruction, writing exams and assistive technology instruction.

11. Statement on Gender-Based and Sexual Violence

Western is committed to reducing incidents of gender-based and sexual violence (GBSV) and providing compassionate support to anyone who is going through or has gone through these traumatic events. If you are experiencing or have experienced GBSV (either recently or in the past), you will find information about support services for survivors, including emergency contacts at the following website:
https://www.uwo.ca/health/student_support/survivor_support/get-help.html. To connect with a case manager or set up an appointment, please contact support@uwo.ca.

12. Statement on the Use of Generative Artificial Intelligence (AI)

The use of generative artificial intelligence (AI) tools/software/apps to complete the weekly homework assignments is not acceptable.