Western University
Dept. Psychology

PSYC 9040
Scientific Computing
Winter 2023

Mondays	11:30am-1:00pm	WIRB 1110
Tuesdays	12:00pm-1:30pm	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: tba
Email: tba
Office: tba
Office Hours: tba

Course Description

The goal of this one-semester graduate course is to provide you with skills in scientific computing—tools and techniques that you can use in your own research. You will learn to program using a high-level language such as Python and/or MATLAB, both of which have many add-on libraries that provide a rich ecosystem for scientific computing.

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

2. You will learn to think computationally and algorithmically about data
3. You will be better prepared 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
2. Think about your data computationally and algorithmically
3. Analyse your data using some standard analysis techniques
4. Have the skills to be able to learn more complex analysis techniques to suite 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.

Assignment	Due Date	Weighting
Assignment 1	Jan 27	10 %
Assignment 2	Feb 3	10 %
Assignment 3	Feb 10	10 %
Assignment 4	Feb 17	10 %
Assignment 5	Mar 3	10 %
Assignment 6	Mar 10	10 %
Assignment 7	Mar 17	10 %
Assignment 8	Mar 24	10 %
Assignment 9	Mar 31	10 %
Assignment 10	Apr 7	10 %
TOTAL		**100 %**

Course Schedule

Week	Date	Topic	Homework Due
1	Jan 16,17	Digital representations of data & Basic data types, operators, expressions	Jan 27
2	Jan 23,24	Control flow & Complex data types	Feb 3
3	Jan 30,31	Functions & File input / output	Feb 10
4	Feb 6,7	Graphical displays of data	Feb 17
5	Feb 13,14	Sampling & Frequency Representation of Data	Mar 3
-	Feb 20,21	Reading Week	-
6	Feb 27,28	Signal Processing & Filtering data	Mar 10
7	Mar 6,7	Null hypothesis statistical testing: parametric tests	Mar 17
8	Mar 13,14	Null hypothesis statistical testing: resampling	Mar 24
9	Mar 20,21	Fitting models to data: linear regression	Mar 31
10	Mar 27,28	Fitting models to data: maximum likelihood estimation	Apr 7
12	Apr 3,4	Simulating dynamical systems	-

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

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).

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.