

Syllabus Psychology 363 Spring 2023

Computing and Psychological Research

Britt Anderson

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1 Instructor and TA Information

Role	Name	Office	Email	Phone	Hours
Instructor	Britt Anderson	PAS 4039	britt@uwaterloo.ca	x33056	By Arrangement
TA	Hanbin Go	PAS			TBD

1.1 Office Hours

This will usually be by arrangement. If you contact me or the TA we might be able to arrange an additional session, but most of the support will happen during our three hours course time on Mondays. In addition, depending on the problem and how many people are interested we might be able to make a small screen cast to demonstrate a problem solution. **Write** us and we will help.

1.2 Course Hours

Tuesday's from 14:30-17:30 in Phy 150

2 Course Description

2.1 Course Goal:

Improve your ability to use your computer as a tool for academic activities.

This leads to the following learning objectives

2.2 Learning Objectives:

- Learn how to install software.
- Learn how to work from the command line.
- Learn the rudiments of programming sufficient to allow further progress through self study.

- Learn about the use of libraries to enable programming psychological experiments.
- Learn how to use version control
- Learn how to write papers that blend code and analyses to generate reproducible research reports. This includes learning
 - how to use citation databases
 - generate graphics of analyses
 - conduct statistical analyses
 - generate multiple output formats from a single source file.

2.3 Course Mechanics

To meet the learning objectives you will need to be **doing** much more than listening or observing. You will also need to break old habits. That means in the beginning it will be harder to do simple things. It also means that in the future things that used to be impossible for you to do will now be possible (but they may still not be easy). Combining computer skills with your psychology content knowledge makes you more attractive to employers and on a graduate school application.

Thus, this course will require you to use the Linux operating system (the XUbuntu flavor is recommended) and tools available within that space. Later on, after this course, if you wish to return to the world of OSX and Windows10/11 you will know what you are looking for, and you will have the skills necessary to make it available.

For our remote offering I will provide you with a series of activities on approximately a weekly basis, but sometimes more often. Many are very easy, and others will require more time. The assessments are exercises that individually are worth only a small number of points. That should take some of the pressure off. My prediction is that by the end of the course you will have amazed yourself by how much you have learned and how much you can now do. You will have the confidence and the basic skills to grow your capabilities through independent study.

2.4 Required Text

None

I will provide you with tasks and online resources, tutorials, and guides that contain the information you need to complete those task. You will then collaborate with me, your TA, and your classmates to accomplish those task. Expect to spend a lot of hours on some of these assessments. If you make a sincere effort to do the assessments your grade will be fine.

2.5 Course Outline

The feedback I had on offering the course remotely during the pandemic was that students preferred it to the live offering with one exception. The videos allowed me to demonstrate a skill that students could watch at their own speed and as many times as they wanted. They could skim or slow down depending on what was working. What did not work better with the video approach was offering support. It was harder to get quick and immediate feedback when we were stuck with zoom rooms and ms teams chats. This offering gives us the best of both methods. The *lecture* material is something you will watch on your own, and progress at your own speed. You can reach out to us for help of course, but the main time to get help is during the weekly three hour meeting. That is our own course hackathon where you can work alone or with your classmates and get feedback and help from me and the TA. This freedom can cause problems though if you procrastinate. Things start slow and get harder quickly. Follow a consistent pace and not end up at the end of term overwhelmed and unable to complete things successfully. This course is a marathon not a sprint. Look at Learn to see what assignments are due when. Some assessments are elementary. Others will be quite challenging and time consuming. Some assessments require only uploading a screen shot. Others require you to write some computer code. Keep making progress. Don't let yourself get stalled. What follows is general advice for how to regulate your pace. It omits considerations of holidays and breaks. You can do things early or delay things as your schedule permits, but if you follow the guidance below you will have plenty of time for all the content, and you should have the final period left over for your other more traditionally structured classes.

Week	Date	Topic
0	May	Course Introduction
1	May	Rstudio (intro)
2	May	Installing OS and Software - Linux
2	May	More time for installation and command line basics/Emacs
3	May	Python
4	June	R
5	June	Data Handling in R and Python
6	June	Introduction to Plotting
7	June	Programing Psychology Experiments in Python
8	July	Writing Research Reports
9	July	Final Proj Session 1: Programming your Experiment
10	July	Final Proj Session 2: Data Collection
11	July	Final Proj Session 3: Analysis and Start of Report Drafting
12	Aug	Final Projects Due and Presentations

2.6 Grades

Your grade in this course will be made up of participation, assignment, and final project components. In addition, there is the option to earn extra credit

for research participation.

Component	Proportion
Research	+ 3%
Assignments	50%
Final Paper/Project	30%
Participation	20%

Participation can be hard to judge in a course like this. How will I evaluate this?

- are your assignments coming in a timely fashion?
- are you responding to my comments?
- are you a participant in the class and coming for help and also helping your classmates who are having problems?
- are you posting **and** responding to issues on the course Github page?
- have you ever sent me or the TA an email and discussed anything at all with us?

2.6.1 Components Further Explained

Research As this course is devoted to learning research relevant skills participating in research studies can be a useful way to better understand the participant's perspective when you design your studies. This is especially true for on-line work. I encourage you, even if you do not need the credits, to consider research participation for the perspective it will give you on the tools and techniques you learn in this course. I will provide extra credit of up to 3% in value for research participation. Half of these credits can be for Online studies and students may complete Mass Testing. If you are taking multiple psychology courses do be careful about assigning your credits to eligible courses. If you are unfamiliar with the system this 14 minute video prepared by the Research Experience Group may be useful.

Assignments I have created many assessments. This is so that as you go along you will have the chance to get frequent feedback on your work and since the weight of any one assignment is small you don't need to obsess over them. If you don't get something right away: Move on. These assignments are described as text files that initially will be placed on learn, but for later assessments will be available via the github course page. Submissions will be via Learn. for you to use to signal to me that you have completed the assignment. In many cases the actual work will not be something that you can submit in Dropbox. The grades will be recorded in Learn so that you can track your performance.

Participation see above.

Final Project This will be the most challenging component. Group work is basically the norm in professional and academic life. Learning how to collaborate with group members is an extremely valuable skill. You will submit for your final project a collection of files. The group will program an experiment, collect some toy data, analyze that data, and report it as a reproducible research report. The paper will outline the motivations for a simple experiment with appropriate APA style citations (at least five (5)) cited in the text and included in a bibliography at the end. It will describe the method of the experiment that you will program in Python using the Psychopy library. Source code should be included as an appendix or as a separately uploaded file. Data will be collected from classmates or group mates or friends and family. This will not be real research data, but will just provide the substrate for analysis and plotting. The final report will include simple summary statistics and at least two plots visualizing pertinent aspects of the data. This report must be reproducible. This means that from your files and the collected data I can recompile the report getting all the stats and figures that you did. The `.org` format is recommended.

3 Late Work Policy

For full credit work should be turned in on time as specified in the Learn Dropboxes. However, as this is a class dedicated to doing, and our remote delivery leaves less opportunities for interaction I will grade all assignments no matter how late they are turned in.

4 Plagiarism

Don't use other peoples work, and don't steal other people's code (though do reuse other people's code liberally - just give them credit).

5 Attendance

Not applicable.

6 Boiler Plate

6.1 Academic Integrity

In order to maintain a culture of academic integrity, members of the University of Waterloo are expected to promote honesty, trust, fairness, respect and responsibility. See the Office of Academic Integrity webpage for more information.

6.2 Discipline

A student is expected to know what constitutes academic integrity, to avoid committing academic offences, and to take responsibility for his/her actions. Check the Office of Academic Integrity for more information. 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 professor, academic advisor, or the Undergraduate Associate Dean. When misconduct has been found to have occurred, disciplinary penalties will be imposed under Policy 71 – Student Discipline. For information on categories of offenses and types of penalties, students should refer to Policy 71 - Student Discipline. For typical penalties check Guidelines for the Assessment of Penalties.

6.3 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.

6.4 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. Note for Students with Disabilities The AccessAbility Services office, located on the first floor of the Needles Hall extension (NH 1401), 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 accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.

6.5 Sona Participation and Research Experience Marks

6.5.1 Information and Guidelines

Experiential learning is considered an integral part of the undergraduate program in Psychology. Research participation is one example of this, article review is another. A number of undergraduate courses have been expanded to include opportunities for Psychology students to earn grades while gaining research experience. Since experiential learning is highly valued in the Department of Psychology, students may earn a "bonus" grade of up to 3% in this course through research experience. Course work will make up 100% of the final mark

and a "bonus" of up to 3% may be earned and will be added to the final grade if/as needed to bring your final grade up to 100%.

The two options for earning research experience grades; participation in research through online remotely operated and In Lab studies, as well as article review; are described below. Students may complete any combination of these options to earn research experience grades. For Winter 2023, credits will be permitted to be earned through any combination due to the online nature of this class.

1. Option 1: Participation in Psychology Research Research participation is coordinated by the Research Experiences Group (REG). Psychology students may volunteer as research participants in remotely operated, In Lab and/or online (web-based) studies conducted by students and faculty in the Department of Psychology. Participation enables students to learn first-hand about psychology research and related concepts. Many students report that participation in research is both an educational and interesting experience. Please be assured that all Psychology studies have been reviewed and received ethics clearance through a University of Waterloo Research Ethics Board. How to earn extra marks for your Psychology course(s) this term by participating in studies ...

- You will earn "credits" which will be converted to "marks" (1 credit = 1%)
- You can schedule your studies using the "Sona" website.

Educational focus of participation in research To maximize the educational benefits of participating in research, students will receive feedback information following their participation in each study detailing the following elements:

- Purpose or objectives of the study
- Dependent and independent variables
- Expected results
- References for at least two related research articles
- Provisions to ensure confidentiality of data
- Contact information of the researcher should the student have further questions about the study
- Contact information for the Director of the Office of Research Ethics should the student wish to learn more about the general ethical issues surrounding research with human participants, or specific questions or concerns about the study in which s/he participated.

Participation in remotely operated (counts as the same as in-lab) studies has increment values of 0.5 participation credits (grade percentage points) for each 30-minutes of participation. Participation in ONLINE studies

is worth .25 credits for each 15-minutes of participation. Researchers will record student's participation and at the end of the term the REG Coordinator will provide the course instructor with a credit report of the total credits earned by each student.

- (a) How to participate? Study scheduling, participation and grade assignment is managed using the SONA online system. All students enrolled in this course have been set up with a SONA account. You must get started early in the term. For instructions on how to log in to your SONA account and for a list of important dates and deadlines please, as soon as possible, go to: <https://uwaterloo.ca/research-experiences-group/welcome-research-experiences-group-and-sona/sona-information>

Participating/SONA information and how to log in to Sona and sign up for studies: <https://uwaterloo.ca/research-experiences-group/welcome-research-experiences-group-and-sona/sona-information>

Please do not ask the Course Instructor or REG Coordinator for information unless you have first thoroughly read the information provided on this website.

More information about the REG program in general is available at: <https://uwaterloo.ca/research-experiences-group/welcome-research-experiences-group-sona-information>

Sona Information on the REG Participants website or you can check the Sona FAQ on the REG website homepage for additional information: https://uwaterloo.ca/research-experiences-group/sites/ca.research-experiences-group/files/uploads/files/sona_faq_for_fall_2019.pdf

2. Option 2: Article Review as an alternative to participation in research Students are not required to participate in research, and not all students wish to do so. As an alternative, students may opt to gain research experience by writing short reviews (1½ to 2 pages) of research articles relevant to the course. The course instructor will specify a suitable source of articles for this course (i.e., scientific journals, newspapers, magazines, other printed media). You must contact your TA to get approval for the article you have chosen before writing the review. Each review article counts as one percentage point. To receive credit, you must follow specific guidelines. The article review must:

- Be submitted before the last day of lectures. Late submissions will NOT be accepted under ANY circumstances.
- Be typed
- Fully identify the title, author(s), source and date of the article. A copy of the article must be attached.
- Identify the psychological concepts in the article and indicate the pages in the textbook that are applicable. Critically evaluate the

application or treatment of those concepts in the article. If inappropriate or incorrect, identify the error and its implications for the validity of the article. You may find, for example, misleading headings, faulty research procedures, alternative explanations that are ignored, failures to distinguish factual findings from opinions, faulty statements of cause-effect relations, errors in reasoning, etc. Provide examples whenever possible.

- Clearly evaluate the application or treatment of those concepts in the article.
- Keep a copy of your review in the unlikely event we misplace the original.