# Syllabus Psychology 363 Fall 2020

Computing and Psychology Research

Britt Anderson

*<2020-08-12 Wed>*

## 1 Instructor and TA Information

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

### 1.1 Office Hours

This can be done virtually using the WebEx tool in Learn. If you contact me and the TA we can set up a time for live support. It may also be possible to make short screen casts indicating solutions to specific problems. **Write** us and we will help.

## 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 with your domain 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 (a Ubuntu flavor) and tools available within that space. Later on, after this course, if you wish to return to the world of OSX and Windows10 you will know what you are looking for, and you will have the skills necessary to make it available. OSX already has a lot of those tools hidden away under the hood (look in your applications folder for the utilities folder. Open up the terminal and type "python" then hit the enter key. You may be surprised to see you already had python installed?). Windows too is moving to support Linux. The WSL2 (windows subsystem for linux 2) works very well for everything except applications with a visual components, but I expect that will change in the near future.

I will structure a series of activities on a loosely weekly basis, as if we were meeting in class. You will do the exercises, and by the end of the course you will be amazed at what you can do, and confident that you have the computing skills to do whatever in the future you may need or want to do.

## 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 tasks. You will then collaborate with me, your TA, and your classmates to accomplish those tasks. Expect to spend a lot of hours on some of them, but the skills you gain will pay dividends for a long time. If you make a sincere effort to do the assignments, your grade will be fine.

## 2.5 Course Outline

For an online course you are free to choose when you do each exercise, but I have scheduled assignments to encourage you to follow a consistent steady pace.

Look at learn to see what the assignments are, and when they are due. Some assignments will be elementary; sometimes simply uploading a screenshot, but they do require that you keep making progress through the material and do not get stalled.

| Week | Date | Topic |
|---|---|---|
| 0 | Sept | Course Introduction |
| 1 | Sept | RStudio |
| 2 | Sept | Installing OS and Software - Linux |
| 3 | Sept | More time for Installation and Command Line Basics and Emacs |
| 4 | Oct | Python |
| 5 | Oct | R |
| 6 | Oct | Data Handling in R and Python |
| 7 | Oct | Introduction to Plotting |
| 8 | Nov | Programing Psychology Experiments in Python |
| 9 | Nov | Writing Research Reports |
| 10 | Nov | Final Proj |
| 11 | Nov | Final Proj |
| 12 | Dec | Final Proj |

## 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 | + 4% |
| Assignments | 50% |
| Final Paper/Project | 30% |
| Participation | 20% |

Participation is hard to judge in an online course. So, how can I know you are participating?

- Are you turning in assignments on time?
- Have I had an email from you telling me who you are and discussing any class material?
- Are you participating in the class discussion on Learn and, more importantly, on the github issues page. Make sure you make yourself visible to me. That will help me to help you in the course, and it will also give me a basis for awarding full participation marks.

### 2.6.1 Components 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 4% in value for research participation. All 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** These will be limited to particular tasks in the beginning. As we progress later assignments will build on skills learned earlier. It would be unwise to skip or give up on the first few hoping the later ones will be easier. The opposite is likely to be the case. By making relatively frequent assignments I can give you more feedback on your work, much like if we had a regular weekly class. While the weight of any one assignment can be small, they build up. Don't skip them. It hurts your grade, but more importantly your learning. For most assignments there will be a dropbox on Learn. For others, I may have you do something on line, and merely signal to me via a dropbox that you are ready for your work to be examined and to remind me to give you credit for your assignment. As an example, I may have you post code or text on the course's Github page, but ask you to make a dropbox submission that you have done so for grading. The grades will be recorded in Learn so that you can track your performance.

**Participation** This is an aggregate assessment that accumulates through your participation. That means interactions with me, but also your student peers. Explore the content with each other, raise questions and objections, and collaborate. And find a way to make sure I know this is happening. You can create "issues" on github for discussions or use the discussion forums in Learn, or anything similar - but be aware that I do not have Facebook and therefore won't be able to see any discussions you conduct there on social media. Another way to engage with this class is to make your own content. Feel a video I made wasn't clear? Think you have a better way to explain how to solve a task? Then do it, share it, post it, and you will learn, I will learn, your peers will learn, and I can give you credit. We can create places to host shared content. Just let me know your needs.

**Final Project** This may be the most challenging component for a remote learning situation, but not an unreasonable one. Think about all the grad students now having to work from home and finish their PhD's online with only remote feedback. In industry your ability to collaborate

virtually is a key skill. By doing this final project you will be cultivating your ability to work in this way. A successful project is also a way you can advertise your skill to future supervisors or employers. Make it something you can show case.

For your project you will submit a paper (pdf or html). This paper will be in the form of a research report and include introduction, methods, results, discussion and reference sections. Each section will be extremely brief. We want the structure of a research paper, but not the depth or details. The method, results and data in the paper will come from a simple experiment written by you (and your team) using the tools you will learn in this course. Your paper will be reproducible in that the statistical methods and graphics will be in the document that produces the pdf/html (how this happens will be come clearer with examples that I will walk you through in the course - don't worry too much if the details are hazy at this stage). You will also submit the document that you used to produce the pdf/html - probably an Rnw/Rmd/org file - though others are possible with my permission.

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 (prefered, but Javascript acceptable) using the Psychopy library we will learn in class. Source code should be included as an appendix. Data will be collected from classmates or friends - this isn't a real experiment; just a proof of concept. You can write code, and it works well enough for someone to push buttons without crashing everything. This faux-research data will provide the subtrate for analysis and plotting and experience with the challenges of programming an experiment and then using that code to gather data. Your numbers of subjects will be too small for confidence in the results, but we are focusing here on learning the tools, so that the number of people you find to take your task is not an important consideration for your grade on this component. The report should include simple summary statistics and at least two plots visualizing the data. This report must be **reproducible**. This means that if you give me the report file, data file, and bibliography file I can run your code on my computer and I will produce the same pdf/html output you did. You can use any format that allows me to compile the final paper from the data files and the source files, which you are also required to submit. The `.org` format is recommended as that is the one that will be demonstrated in the course, but alternatives would include `Rmd` and `Rnw`.

# 3 Late Work Policy

For full credit work must be turned in on time as specified in the Learn Dropboxes. However, as this is a class dedicated to doing, late assignments will be considered for partial credit up to the date of the Final Project being due. We will agree this date together in class.

# 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

Your participation and activity in class is one of the ways I guage your participation grade. If you are not in class I can't say that you participated. In this way absences impact your grade, but there is no formal attendance policy that results in an automatic loss of credit for unexcused absences.

# 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 departments 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.