



# PSYC 32: Introduction to Programming for Psychological Scientists (Winter 2020)

**Meeting times:** MWF 12:50 — 1:55 PM

**X-hour:** Tu 1:20 — 2:10 PM

**Classroom:** Moore 110

**Instructor:** Dr. Jeremy R. Manning

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**Office Location:** 349 Moore Hall

**Office Hours:** By appointment

## Course Description

Studying the mind is an increasingly computational endeavor. Modern psychological laboratories use computers to administer experiments, collect data, analyze data, create figures, write papers, and share their work with the world. Related and analogous approaches are used in fields as diverse as finance, art, biomedical science, law, and many others. In this course we will use hands-on training experiences, problem sets, and mini research projects to introduce students to a sampling of the computational tools employed in cutting-edge psychological research. A focus of the course will be on “open science” practices that enable scientists to share and clearly document each aspect of the scientific process.

*Distribution requirement satisfied: TAS (Technology or Applied Science)*

## Course Goals

This course is intended to train students to:

- Write and understand computer programs written in Python
- Design and implement (using computer code) psychological experiments
- Carry out data analyses on real experimental data
- Build basic computational models of experimental data
- Generate compelling figures to display analysis results visually

## Pre-Requisites

You must have taken PSYC 11 in order to enroll in this course. I also recommend that you take MATH 1 or 3 (Introductory Calculus) or an equivalent course prior to enrolling. Students who have already taken CS 1 should speak with me prior to enrolling.

## Course Materials

We will be working through a variety of free online books and tutorials throughout the term. This will include excerpts from the following free sources (in addition to others selected throughout the term, based on specific lecture content, and students' interests and backgrounds):

- How to Think Like a Computer Scientist, by Peter Wentworth, Jeffrey Elkner, Allen B. Downey, and Chris Meyers
- Whirlwind Tour of Python, by Jake VanderPlas
- Python Data Science Handbook, by Jake VanderPlas

You will also need a laptop computer (Mac, Windows, or Linux) capable of displaying and outputting graphics and running a web browser. *We will use our laptops nearly every day in class to do demos, hands-on exercises, and presentations.*

All course materials may be found [here](#), and an approximate list of course topics may be found [here](#). Note that the course schedule may change in any given term according to student interests, goals, abilities, and needs.

## Format and Overview

This course follows an "experiential learning" model, whereby nearly every aspect of the course will involve hands-on exercises, projects, and discussions. We will use tutorial-style lectures to solidify the key concepts, where students will follow along with the material by working through short exercises (and asking questions or solving problems in small groups) as the lectures progress. We will also use (roughly weekly) problem sets to help you gain a more in-depth understanding of the material.

### Colaboratory

We will use Google Colaboratory to develop and program analyses. This resource provides an easy means of organizing notes, code, and graphics in a single cohesive format ("notebook"). In addition to being a generally useful tool, Colaboratory has the additional benefit that all code will run on Google Cloud servers (rather than your personal computer). This substantially reduces setup costs and difficulties.

### GitHub

We will use GitHub to manage and share data and code. GitHub provides an easy way of managing multiple versions of data and code that may be easily shared and tracked. You will need to create a (free) GitHub account at the beginning of the term.

### Gitter

We will use Gitter to provide a forum for asking and answering questions, posting demos, etc. You can join Gitter using your GitHub account. Note that our Gitter forum will be publicly visible, so please take care to limit your posts to material you would be comfortable sharing with the world.

## Grading

All course assignments (problem sets) will be assigned a point value, added together, and converted to the nearest equivalent letter grade as follows (all scores in parentheses are percentages of the total possible number of points): A (93–100); A- (90–92); B+ (87–89); B (83–86); B- (80–82); C+ (77–79); C (73–76); C- (70–72); D (60–69); or E (0–59).

## The Academic Honor Principle

I expect you to abide by Dartmouth's [Academic Honor Principle](#) at all times. I encourage (and expect) you to discuss your assignments with your classmates. However, it's important that you clearly indicate which work was done by you. Further, you cannot "re-use" projects from other courses without modifying them. Put simply, you should hand in your own (new) work, even if you collaborated or discussed your assignment with a classmate. If you have any questions about the Academic Honor Principle and/or how it applies generally to this course, or specifically to a particular assignment, please ask me.

## Scheduling Conflicts

This class requires you to be physically present (e.g. to take part in the in-class discussions, give presentations, participate in lab exercises, etc.). I expect you to attend *and be on time* for every class. However, I also understand that in rare circumstances (e.g., religious observances, other fixed-schedule activities) you may need to occasionally miss class. **If you know you will have a scheduling conflict with this course during the term, please meet with me before the end of Week 2 to discuss appropriate arrangements.**

## Student Needs

I strive to maintain a welcoming and accessible classroom environment. I want you to be an active participant and contributor to ongoing discussions and activities, and that means that every student should feel comfortable in my classroom. If you would like me to be aware of any issues that arise during the term, or any personal needs that may require adjusting how I run my class or how you participate, I encourage you to see me privately. Dartmouth's [Student Accessibility Services Office](#) can also help assist with setting up disability-related accommodations.