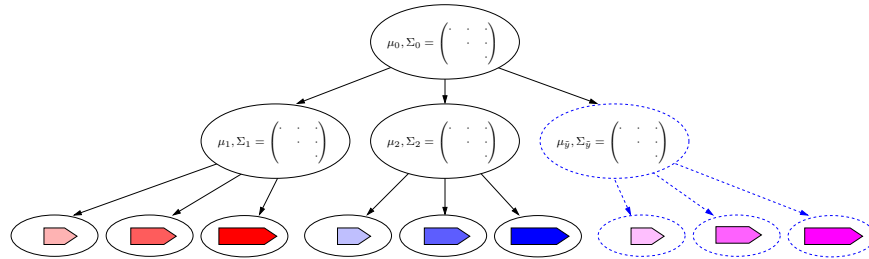


PSYC S410: Computational Psychology

Spring 2022



1 Course information

Class schedule Section 01: M/T/Th/F 2:00–2:50 pm
Section 02: M/T/Th/F 3:00–3:50 pm
Room A202

Instructor Alan Jern
Office: A106
Email: jern@rose-hulman.edu

Open meeting time Tuesday 4:00-5:00 pm (On Microsoft Teams)

2 Overview

One of the limitations of current psychological science is that many theories are qualitative in nature. They can make general predictions about things like whether people are more likely to take one action or another or remember one word or another, but they have difficulty making specific quantitative predictions. For example, exactly how much more likely is it that someone will take an action or what is the precise mathematical relationship between how many times someone sees a word and well they will remember it? The goal of computational psychology is to develop theories of cognition and behavior that are precise enough that they can be implemented as computer programs and make precise quantitative predictions.

In this course, you will learn how to think like a computational psychologist. You will also learn how mathematical and computational tools from probability, statistics, and machine learning can be used to develop models of human learning and reasoning. By the end of this course, you should be able to:

- Explain the similarities and differences between machine learning / AI and computational psychology.
- Read, understand, and critique an academic journal article describing a computational model.
- Implement a computational model from a specification in a published journal article.
- Interpret the predictions of a computational model.
- Design and build a simple behavioral experiment and compare the data you collect to model predictions.

3 Assessment

Component	Points
Syllabus quiz	10
Homeworks (5)	350
Project	340
Reading responses (6)	100
Paper presentation	100
Participation	100
Total	1000

3.1 Homework

Homework assignments will consist of coding assignments and experiment data collection. They will generally be based on material you learned in the preceding week.

3.2 Reading responses

You will learn about most of the specific computational models in this class by reading published papers that we will discuss in class. To encourage you to come to class prepared for discussion, you must submit reading responses for some of these readings. For each paper, I will post one or two questions online that will help to guide your reading. You will submit a response to these questions before class on the specified date. Your total response does not need to be longer than 2–3 paragraphs.

There are 13 assigned readings, but **you only need to submit 6 reading responses**. Your lowest of the 6 scores will be dropped. If you submit more than 6, I will only accept your first 6 submissions.

3.3 Paper presentation

You will be randomly assigned to a group that will lead one paper discussion. On your group's assigned day, you will be expected to summarize the main questions raised by the paper, the methods used in the paper, the results, and come prepared with some discussion questions for the rest of the class. On the class day before your assigned day, I will spend half of the class period

meeting with your group to clarify details of the paper, answer your questions, and help guide your presentation. Therefore, you are required to attend on the day **before** your scheduled presentation day having already thoroughly read through your assigned paper (even if you didn't understand every part of it).

3.4 Project

At the end of the quarter, you will complete a group project. More details about the scope and expectations for this project will be posted on Moodle.

Assignment	Points
Project proposal	40
Presentation	50
Report	250
Total	350

3.5 Participation

Because this course involves lots of discussion, I expect you to be an active participant, both asking and answering questions in class, though not necessarily every day. I also expect you to have good attendance and to show up to class on time.

Your participation score will be self-assigned using a rubric I will provide you. At two points in the quarter, you will use the rubric to determine what participation score you have earned for that half of the quarter. I will review these scores and may make adjustments if I feel they are wildly off the mark.

3.6 Final grade

Grades will be assigned as follows.

Points	Grade
≥ 900	A
870–899	B+
800–869	B
770–799	C+
700–769	C
670–699	D+
600–660	D
< 600	F

4 Course policies

4.1 Late assignments

For the entire course, you will have **two free late days** that can be used for homework assignments ONLY (you cannot use late days to submit reading responses because that would defeat the purpose

of the reading responses). Assignments will be considered one day late if they are submitted any time after the submission deadline up to 24 hours later. Assignments will be considered two days late if they are submitted any time between 24 and 48 hours after the submission deadline. You don't need to notify me in advance if you plan to use one of your late days—I will keep track of your late days.

Any assignments submitted after using your late days will not be accepted. The purpose for this policy is to help me grade and return your work in a timely fashion.

4.2 Blind grading

Do not include your name on anything (including file name) you submit on Moodle, unless I say otherwise. The reason for this is because I use a feature on Moodle called blind grading that lets me grade your assignments without seeing your names—your names (which Moodle knows) are revealed after I've finished grading the assignment. I do this to keep my grading as fair as possible. If you put your name on the assignment, it undermines the process.

4.3 Communication

You can expect the most up-to-date information about the course to be on the Moodle page. When I make changes to the schedule, I will share the most important updates as Announcements on Moodle which will automatically be emailed to you.

I will post more minor updates, like responses to student questions, in a Teams group that you will be automatically added to. If you have a question for me (about course content, requirements, or assignments) that isn't specifically about you, post it on Teams. That way, I can answer it there and everyone can see my answer. If you email it to me, I will just ask you to repost it in Teams. I will also hold my office hours (called “open meeting times” above) on Teams.

Therefore, you should check Moodle and Teams regularly (at least twice per week for Moodle and once per week for Teams).

4.4 Asking for help

I highly encourage you to contact me if you ever need help in this course. That's what I'm here for! But I also want you to encourage you to be self-sufficient whenever possible. So if you ever ask me a question that can be easily answered on this syllabus or the Moodle page (a due date, a page limit, whether an upcoming exam is open-book), **I will deduct 1 point from your grade total.**

The corollary of this policy is that if you ever find anything on this syllabus or the Moodle page that looks like a genuine mistake (the wrong date, inconsistent information) and you ask me about it, **I will give you 1 point of extra credit.** (Only the first person to tell me gets the extra credit.)

4.5 Academic integrity

Academic misconduct will be addressed according to the policies described in the Rose-Hulman student handbook. Academic misconduct includes: (1) submitting work that is not your own; (2) copying ideas, words, or graphics from any source without appropriate citation; (3) misrepresenting your work or yourself (i.e., deliberately submitting the wrong assignment or lying to explain a late

assignment); (4) collaborating with other students when this is not permitted; and (5) submitting the same work for credit in two courses without prior consent of both instructors. If you are unsure whether something qualifies as academic misconduct, please check with me before engaging in the behavior.

5 Course schedule

The course schedule, along with reading assignments and a list of tasks for each week will be posted on Moodle.