Updated: 7/24/2023

PSYC 4431 – Advanced Topics in Cognitive Science
Fall 2023

Instructor Information:

Instructor:	Matthew Robison
Office:	402 Life Science Building
Office Telephone:	817-272-5511
Email address:	matthew.robison@uta.edu
Faculty profile:	https://www.uta.edu/academics/faculty/profile?username=robisonm
Office hours:	By appointment

Teaching Assistant:

Course Information:

Class Meetings: Tuesdays and Thursdays (Seminars)
12:30 – 1:50 PM
424 Life Science

Thursdays (Labs)
2:00 – 3:50 PM
420 Life Science

Course Content:

This course is an advanced topical course in cognitive psychology that will include both conceptual and technical components. You will learn how to generate theories, develop hypotheses, and test those hypotheses with experiments. We will read original research, develop psychological experiments, implement those experiments, and analyze the data. Along the way, you will learn how to critically read research, compare and test theoretical predictions, program psychological experiments in Psychopy, and analyze and visualize data in R.

Student Learning Outcomes:

In this course you will learn how to:
- Read original research with a critical eye
- Develop theories that make testable hypotheses
- Build and implement experiments
- Write R code to analyze data
- Write R code to visualize data
- Report results of experiments
- Interpret output of experiments to confirm or disconfirm a hypothesis

Required Textbooks and Other Course Materials

There is no required text for this course. However, we will read original research papers weekly. I will provide these papers as PDFs, but they are also available in academic search engines such as Google Scholar, PubMed, and PsycInfo. There will also be suggested reading if students would like additional supplements to the in-class materials.

Building Experiments in Psychopy
Peirce, Hirst, & MacAskill
If you would like a general how-to book on building experiments, this is a good overview.

An Introductory Guide to R
Einspruch
If you would like an introductory-level how-to book on programming in R

Technology requirements

We will be using Psychopy and R software in this course. You will need to install Psychopy, R, and R Studio. You can do via the links posted below. Psychopy is available for Mac and Windows systems. R is available for Mac, Windows, and Linux systems. ***Please download and install Psychopy, R, and R Studio before the first class meeting so you can follow along.***

Please bring your laptops to the seminars and labs so you can follow along as we build experiments and analyze data.

Downloading R and R Studio for the first time

Download Psychopy

(Unless you know what you're doing, follow the default settings for installation. This will make things easier down the road).

Grading

Homework assignments (x 12) – 20 points each	240 points
Lab assignments (x 12) – 20 points each	240
Quizzes (x 5) – 20 points each	100
Final project	200
Attendance/Participation	40
	820 points

A = 90 – 100%
B = 80 – 89%
C = 70 – 79%
D = 65 – 69%
F = Below 65%

I reserve the right to adjust exam grades upward (curve) based on the average grades of students on exams. I will never adjust grades downward. I will also round grades up to the nearest percentage point (e.g., 89.6% → 90%). However, do not ask me to round up beyond that (e.g., 88.7% → 90%). There are plenty of opportunities for you to maximize your semester point total and grade. Please take advantage of them.

Homework Assignments
Over the course of the semester, you will complete laboratory-style cognitive tasks. These will be available online, and must be completed before the associated due date to receive credit.

You may do them at your own pace. They will typically take anywhere from 10 to 30 minutes to complete.

Lab Assignments

In labs, you will be given a set of exercises to complete, usually in PsychoPy or R, and the assignment will be due at midnight on the Sunday following the labs. You will be graded for completeness.

Final Project

The culmination of this course is the proposal of an experiment which tests a theory regarding a cognitive phenomenon (e.g., attention, memory). This will involve a thorough review of the extant literature on the topic, including empirical demonstrations of the phenomenon and proposed theoretical explanations for the phenomenon. Each student will develop an idea for an experiment testing a theory, either an existing theory or their own. The proposal needs to have a specific and testable hypothesis and a clear and precise methodology.

Research and General Help

Ask for Help

- Academic Plaza Consultation Services (library.uta.edu/academic-plaza)
- Ask Us (ask.uta.edu/)
- Research Coaches (http://libguides.uta.edu/researchcoach)

Resources

- Library Tutorials (library.uta.edu/how-to)
- Subject and Course Research Guides (libguides.uta.edu)
- Librarians by Subject (library.uta.edu/subject-librarians)
- A to Z List of Library Databases (libguides.uta.edu/az.php)
- Course Reserves (https://uta.summon.serialssolutions.com/#!/course_reserves)
- Study Room Reservations (openroom.uta.edu/)

Updated: 7/24/2023

Course Schedule

Week	Date	Topic(s)	Assignment(s)	Reading(s)
1	8/22	A brief history of cognitive psychology	Sternberg task DUE: 8/25 at 11:59 PM	Cronbach (1957)
	8/24	Building and testing theories		
	lab	*Making a PsychoPy experiment*		
2	8/29	Spatial Attention	Posner cueing task DUE: 9/7 at 11:59 PM	Posner et al. (1978)
	8/31	Experimental Design		
	lab	*Posner cueing task*	DUE: Psychopy Lab #1	
3	9/5	Cognitive control	Flanker task Stroop task	Eriksen & Eriksen (1978)
	9/7	Multitasking and task-switching	CVOE task	
	lab	*Flanker task*	DUE: Psychopy Lab #2	
4	9/12	Vigilance	Mackworth Clock test DUE: 9/14 at 11:59 PM	Mackworth (1948)
	9/14	**Final Project Discussion**	Psychomotor vigilance task	
	lab	*Clock test*	DUE: Psychopy Lab #3	
5	9/21	Working memory	Change detection task DUE: 9/21 at 11:59 PM	Peterson & Peterson (1959)
	9/23	Working memory		Luck & Vogel (1997)
	lab	*Change-detection task*	DUE: Psychopy Lab #4	
6	9/26	Modal model of memory	Word decisions Immediate free recall DUE: 9/28 at 11:59 PM	Murdock (1962)
	9/28	Levels of processing		Craik & Lockhart (1974)
	lab	*Free recall task*	DUE: Psychopy Lab #5	
7	10/3	False memory	DRM task	Roediger & McDermott (1995)
	10/5	Retrieval practice		Roediger & Karpicke (2006)

	lab	*DRM paradigm*	DUE: Psychopy Lab #6	
8	10/10	Heuristics and biases	Cognitive Reflection Test	Kahneman & Tverksy (1984)
	10/12	Heuristics and biases		
	lab	*Framing effect*	DUE: Psychopy Lab #7	
9	10/17	Intro to R Studio, scripts, etc		
	10/19	Variables, vectors, dataframes		
	lab	*R Lab #1*	DUE: R Lab #1	
10	10/24	Packages, projects, importing data		
	10/26	Mutate, filter, select		
	lab	*R Lab #2*	DUE: R Lab #2	
11	10/31	Group and summarize		
	11/2	Pivot wider/longer		
	lab	*R Lab #3*	DUE: R Lab #3	
12	11/7	ggplot (plot types)		
	11/9	ggplot (plot customization)		
	lab	*ggplot*	DUE: R Lab #4	
13	11/14	R Markdown		
	11/16	**No class, no lab**		
14	11/21	**Thanksgiving – no class**		
	11/23	**Thanksgiving – no class**		
15	11/28	*t*-test		
	11/30	ANOVA		
	lab	R Lab #5	DUE: R Lab #5	
16	12/5	Final class discussion – topic TBD		

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.

Institutional Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Attendance

At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. **Attendance at lectures and labs is mandatory.** However, I understand there may be instances when you cannot come to class. It is your responsibility to complete any assignments you miss. As the instructor of this section, I will passively monitor attendance. If I notice you are not attending lectures and/or labs, I reserve the right to dock you points for attendance. *Coming to office hours should not serve as a replacement for coming to lectures and labs.* However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

Emergency Exit Procedures

Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, do not take an elevator but use the stairwells instead. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.