

# **Computers in Visual Cognition Research Lab Course**

**Thursdays 9:00 a.m. - 11:45 a.m.**

**Psychology Room 219**

## **Contact Information**

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or by appointment

Teaching Assistant:

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Lab/Office hours: Tuesdays, 2:00 – 4:00 p.m.  
Room 289

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## **Overview:**

The goal of this seminar is to provide graduate students with the technical skills necessary to program experiments using the Matlab Psychophysics Toolbox, as well as to do basic data analysis. This is a lab course in which students will learn by doing. Students will have to turn in weekly assignments and complete a semester project, which will include designing and programming an experiment and summarizing the results from data collected on their experiment. No prior programming experience is required.

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## **Course Organization:**

The weekly meetings will consist of interactive lectures mixing the presentation of new material with active programming by the students. The first section of the course will be an introduction to programming in general (using the Matlab language). The second section will concentrate on learning how to use the Psychophysics Toolbox for programming behavioral experiments in Matlab. Each student will have to design and program one experiment or complex data analysis program by the end of the semester.

## **Course Website:**

A Compass course website can be accessed from:

<http://compass2g.uiuc.edu>

I will post general course information, handouts and **sample code** there. It is imperative that you have access to this website.

**Textbook:**

There will be no “official” textbook in this course. I will distribute a “reference guide to Matlab” and handouts. The Matlab reference guide is very thorough (if you know the name of the command you want to use!!), if only too technical at times.

Ione Fine and Geoffrey Boynton just published a book: “Matlab for the Behavioral Sciences”. You can find the electronic version of the book on Amazon, for the incredibly low price of \$9.99! It does not cover content related to the Psychophysics Toolbox, but it is a great thing to have handy for the first part of the semester.

<http://www.amazon.com/Matlab-Behavioral-Sciences-ebook/dp/B00CPT86NC>

I do recommend the book: “Matlab for Behavioral Scientists”, **second edition**, by David Rosenbaum, Jonathan Vaughan & Brad Wyble. It is pricey: \$55 new on Amazon, but you may be able to find used for cheaper:

[https://www.amazon.com/MATLAB-Behavioral-Scientists-Second-Rosenbaum/dp/0415535948/ref=dp\\_ob\\_title\\_bk](https://www.amazon.com/MATLAB-Behavioral-Scientists-Second-Rosenbaum/dp/0415535948/ref=dp_ob_title_bk)

**Grading:**

Students will be responsible for turning in weekly assignments (a total of 10) via email by the following **Wednesday at noon**. You should submit the assignment **both to me and Michael**.

There will be a grace period of 8 days for turning in late assignments, ending before class starts at 9:00 a.m. on Thursday of the week following the Wednesday deadline.

- Each completed (and correct) assignment will be worth **4 points**.
- Incomplete or incorrect assignments will be worth anywhere between 1 and 3 points, depending on the level of understanding demonstrated in the assignment.
- Assignments turned in late, but within the grace period, will be worth **0 points**.
- Assignments turned in after the grace period (or not turned in at all) will be worth – **4 points**. Yes, that’s NEGATIVE 4 points.

There will be two in-class two hour-long, open-book examinations, each worth a maximum of 20 points.

The students will also be graded on one semester project, worth 20 points.

The final graded will be obtained by adding the total number of points obtained on assignments (maximum of 40 points), in class exams (maximum of 40 points) and the final project (maximum of 20 points), for a total maximum of 100 points.

Academic integrity: Academic integrity is, for the most part, DISCOURAGED!! I’m kidding, but when working on assignments, feel free to ask others for help, see how they completed their assignment and adapt their solutions to your own programs. I’m not saying that you should blindly copy others’ work, but, if at first you don’t succeed, don’t get stuck. In the course website, there is a chat room and a discussion board for that very

purpose. At the very least, if you are a beginning programmer, I highly recommend planning to do your homeworks with at least one other classmate. Programming with friends around is an excellent strategy to deal with frustration but also, to avoid “proofreading blindness”: how you cannot see the errors in your own writing that are obvious to others.

One of the objectives of the course is to develop a community of Matlab users, sharing problems and solutions. And make sure you use all of the tools at your disposal (reference books, Matlab’s website, Matlab’s “help” and “lookfor” commands, each others’ brains) to reach your goal.

### **Class Schedule:**

The schedule below is indicative of the topics that we will cover, although the specific dates at which we arrive to any specific topic may vary.

August 25: “Hello world!”

Introduction to programming. What is a vector, a matrix and how to handle them.

Let’s dance to the algorithm.

Assignment 1 is given (due August 31).

September 1: My first program.

What is a variable, what kinds there are. Pointers. So... what’s a program?

Basic flow control, conditional statements, different loops, first and last cases, end conditions. Logic! And yes, your first program: ENCRYPT.m.

Assignment 2 is given (due September 7).

September 8: Advanced Flow Control. Exercises.

Assignment 3 is given (due September 14).

September 15: Calculations and transformations: interacting with memory.

Functions. Computations, manipulating numbers as strings and vice-versa, reading and writing to matrices.

Assignment 4 is given (due September 21).

September 22: Images: interacting with the screen.

Draw using matrices.

Colormaps.

Read and write image files.

Assignment 5 is given (due September 28).

September 29: Applied Exercises. Reading code. Eval function.

Assignment 6 is given (due October 5).

**October 6: EXAM 1.**

October 13: Exam review. Debugging: the unbeatable 1%.  
Breakpoints, data markers, flags, COMMENTS.  
How do I know where I went wrong?  
Assignment 7 is given (due October 19).

October 20: Experiments in Matlab. The Psychophysics Toolbox.  
Planning an experiment and what the toolbox can do for you!  
Experiment 1: RSVP with letters. Structures.  
Assignment 8 is given (due October 26).

October 27: Psychophysics Toolbox 2: images and responses.  
Semester projects are assigned.  
Assignment 9 is given (due November 2).

November 3: Psychophysics Toolbox 3: Timing and balance.  
Assignment 10 is given (due November 9).

**November 10: Exam 2.**

November 17: No class. Work on YOUR projects!

November 24: No class (Thanksgiving).

December 1: Last class. Wrap up, data management, excel, other small things.

**December 8: Semester Projects are due at NOON.**

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