

Psychology 254: Computing Methods for Psychology
Fall Quarter 2007: Wednesdays, 2-4:50 PM, Franz Hall room A258
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Computers have become a ubiquitous feature in experimental psychology. This course is designed to teach basic computer methods that are relevant to work in experimental psychology and cognitive science. Topics to be covered include simulation/modeling, statistical data analysis, and stimulus presentation. The course is taught using MATLAB, but only basic programming knowledge is assumed; no prior knowledge of MATLAB is required.

Learning to program is like any other skill, in that it takes many years of practice to become highly proficient, so the goal of the course is more modest: Students should leave the course with enough knowledge to perform basic tasks using MATLAB, and should gain enough background to allow them to bootstrap themselves into more extensive programming with additional experience beyond the class.

Prerequisites: The only official coursework prerequisite is the graduate statistics series. However, students are also expected to have some experience with computer programming (equivalent to PIC10A). In addition, a number of the exercises will involve basic linear algebra, and students without experience in linear algebra should complete these tutorials:

http://people.hofstra.edu/faculty/Stefan_Waner/RealWorld/tutorialsf1/frames3_1.html
http://people.hofstra.edu/faculty/Stefan_Waner/RealWorld/tutorialsf1/frames3_2.html

Format: The format of the class will be roughly half lecture and half hands-on programming exercises. In addition, most sessions will have take-home exercises for the students to complete outside of class. The grade will be based on these take-home exercises, as well as on writeup of a final programming project.

Text: There will not be a textbook for this course. Instead, readings and course materials will be posted to the course web site.

<http://www.poldracklab.org/teaching/psych254>

In addition, the MathWorks web site has extensive reference materials:

<http://www.mathworks.com/access/helpdesk/help/techdoc/matlab.shtml>

Course outline:

Meeting date	Topics covered
Sep 26	Introduction to programming languages – Why MATLAB? Variables and data types Matrices and variable indexing Strings MATLAB built-in functions: Getting help in MATLAB
Oct 3	Basic data input and output Basic plotting MATLAB scripts Control Flow: If and switch statements, For and while loops Programming strategies The find() command
Oct 10	Structured data types Functions Debugging strategies
Oct 17	System-level interaction in MATLAB Random numbers
Oct 24	Data analysis: matrix formulation of the GLM Signal detection theory
Oct 31	Math modeling: memory models
Nov 7	Neural network modeling
Nov 14	Stimulus presentation and psychophysics
Nov 21 (no class)	
Nov 28	Image and signal processing: fMRI data analysis
Dec 5	Final project consultation/catch-up session