HH/PSYC 6229 3.0 A
Statistical modelling of perception and cognition
Winter 2020

Instructor: Richard Murray rfm@yorku.ca

Lectures: Tuesdays, 11:30 - 2:30 pm, BSB 159 (Hebb computer lab)

Website: github.com/rfmurray/psyc6229

Textbooks: Jones, Maillardet, & Robinson (2014), Introduction to scientific programming and simulation using R, second edition. CRC Press.

Knoblauch & Maloney (2014), Modelling psychophysical data in R. Springer. (free PDF available through York Library)

Venables et al. (2018), An introduction to R.
(optional but useful reference; free PDF from R website)

Evaluation: three problem sets (33.3% each)

If there is a specific topic in statistical modelling that you would like to learn about, you can propose an individualized project to replace the third problem set.

Overview. This course covers fundamental statistical concepts and their application to statistical modelling in psychology. Topics in statistical foundations include probability, random variables, common statistical distributions, and Bayes' theorem. To illustrate these concepts we cover classic statistical models of behaviour and physiology, such as signal detection theory, optimal cue combination, diffusion models of reaction times, probability summation, and ideal observers. We also discuss model fitting and testing, e.g., parameter estimation, bootstrapping, goodness of fit, and model selection. The course uses R, a statistical programming language, for illustrations and problems.

LECTURE SCHEDULE

		topic
1	7-Jan	probability; programming in R
2	14-Jan	probability; programming in R
3	21-Jan	random variables
4	28-Jan	random variables
5	4-Feb	general linear model
6	11-Feb	model fitting and testing
	18-Feb	*reading week; no class*
7	25-Feb	generalized linear model
8	3-Mar	signal detection theory
9	10-Mar	cue combination
10	17-Mar	Bayesian models
11	24-Mar	MLDS
12	31-Mar	deep learning

Problem sets will be posted after lectures 4, 8, and 12, and will be due three weeks later.

Guidelines on plagiarism. An important part of learning how to solve problems and write code is discussing the problems with other people, and reading other peoples' code. This makes it important to think about what constitutes plagiarism. Here are some guidelines. You can discuss assigned problems with others as much as you want, and read each others' code, but in the end you must do your own work. If you cut and paste someone else's code, you are plagiarizing. If you find yourself looking at someone else's solutions or code while writing your own, you are probably plagiarizing. If you memorize someone else's problems or code and type them in without understanding them, you are plagiarizing. It is important that you provide your own solutions to assigned problems. That said, discussions are an important part of solving difficult problems, and it is inevitable and acceptable that different peoples' solutions will end up being similar in some ways.