

Class Meeting: **M & W** 1:30-2:50 in Heg 106

Lab Meeting: **F** 1:10-3:10 in Heg 204

Office Hours: **W 12:30-1:30 & F 3:30-5**

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### Course Description — *Learning about learning*

What is learning? How can we learn more quickly? What happens in our brains when we learn? This course will tackle an experimental investigation of what influences the depth and quality of our learning. We will take a synthetic look at the psychology, philosophy, and cognitive science of learning, reading books such as Benedict Carey’s *How We Learn* and Daniel Kahneman’s *Thinking, Fast and Slow*. A major focus of the course will be student-generated, quantitative experiments designed to test ideas about learning. In addition, one of these experiments will incorporate practical probability and statistics. Our course motto will be “It costs very little to find out,” that is, we will aim to test ideas by trying them. This course will challenge you to take a more active role in choosing how you go about learning. No specific science or mathematics background beyond algebra is assumed.

### Goals:

- For you to experience autonomy and claim ownership over your learning processes. There are the goals that a professor sets for a course, but unless an individual sets their own goals for that course they are less likely to extract as much as they could.
- I would like to give an unintimidating introduction to probability and statistics as tools. There is a wonderful microcosm of learning within the realm of games of chance and the art of forecasting known as Bayes’ rule. We will explore these ideas fully.
- I am astounded by how many people feel themselves to be outsiders to science and mathematics. I aim for you to feel empowerment around using scientific approaches to investigate questions and answers in your own lives.
- To reflect on discrepancies between your experience of the utility of an activity and the reflection of that utility in data and vice versa.
- For you to pick up a few tools of use to you in the lifetime practice of learning.

**Homework** — We will have a steady stream of reading, writing responses, and probability and statistics exercises. In terms of feedback, my main mission will be to get homework back to you quickly. I will grade problems on wholistic 0-5pt and on  $\checkmark+$ ,  $\checkmark$ ,  $-$  scales. If you have any questions about what this means, don’t hesitate to ask. I care most about the effort you invest and you can receive credit on this basis. The goal of the homework is for us to engage each other in a discussion of the course material regularly, please come and visit as often as you like to discuss. Along these lines, I recommend that you work together; this is invaluable in learning. Please write things up yourself to show me and you that you understand it (this helps battle the illusion of explanatory depth, which we will discuss).

### Grading Structure

Homework	25%
Labs	25%
Attendance	10%
Quizzes	5%
In-class exam	15%
Take home exam	20%

**Self Experiments** — A central idea of this course is to run self experiments. In Josh Kaufman’s words these are “lovable learning projects” that you will design to learn something that you are interested in. You will spend 20 hours working on these experiments over the course of three weeks. We will discuss the many associated logistics in the first few weeks of the course, but you can already start thinking about what you might want to do.

**Course website:** <http://faculty.bard.edu/haggard/teaching/sci127Sp20/>

Week	Topics	Lab
1/27	Stories & Storytelling, Stats	M & M’s
2/3	Self Experimentation, Habits	Cooking
2/10	Time Use & Goal Setting	Time Use
2/17	Cognitive Biases	Self Experiment 1.1
2/24	Memory	Memory
3/2	Reasoning amidst uncertainty & Bayes rule	Self Experiment 1.2
3/9	Explanatory Depth	In-lab Exam
3/16	Metacognition	Self Experiment 2.1
3/23	<b>Spring Recess</b>	<b>No Lab</b>
3/30	Expert Performance	Problem Solving
4/6	Grit & Affect	Self Experiment 2.2
4/13	Learning Styles, Science, & Learning	<b>No Lab</b>
4/20	Forecasting & Feedback	Forecasting Lab
4/27	( <b>Mon./Tues. Advising days</b> ) History of Education	Epistemology
5/4	Philosophy & Learning	Cooking 2
5/11	How can we use science to learn? <b>Compltn days begin 5/13</b>	
5/18	<b>2nd take home due 5/19, 5pm</b>	

**Note:** I reserve the right to adjust this syllabus during the semester

**Take home** — This will be a four or five hour self-timed, open-book exam. You can study as much as you like using any resource up to opening the exam. However, once you have opened the exam I ask that you only refer to your class notes. I ask that you honor your peers and the effort that we all put into the class by not referencing the internet or any other outside materials and by sticking to the agreed upon parameters of the exam.

**Quizzes** — Sporadic brief (10-15min) quizzes will help you keep track of what you should know and the few things you should memorize.

**Lateness and Other Anomalies** — This course moves at a steady clip. To keep you from getting behind, I will not accept late work, but I will drop your two lowest homework scores. If there is a clear reason and you contact me about it ahead of time, I will consider very occasional exceptions.

**Texts to purchase:**

1. *Made to Stick*, by C. Heath and D. Heath.
2. *How We Learn: The Surprising Truth About When, Where, and Why It Happens*, by B. Carey.
3. *Ultralearning*, by Scott H. Young.

**Additional Texts we will draw from:**

*Predictably Irrational*, D. Ariely

*Make it Stick: The Science of Successful Learning*, P. C. Brown

*Mindset*, C. Dweck

*Grit: The Power of Passion and Perseverance*, A. Duckworth

*The Power of Habit: Why We Do What We Do in Life and Business*, C. Duhigg

*The Road To Excellence: the Acquisition of Expert Performance in the Arts and Sciences, Sports, and Games*, K. A. Ericsson

*Peak: Secrets from the New Science of Expertise*, K. A. Ericsson & R. Pool

*Four Hour Chef*, T. Ferriss

*Moonwalking with Einstein*, J. Foer

*Succeed*, H. Grant Halverson

*Teaching to Transgress*, b. hooks

*Thinking Fast and Slow*, D. Kahneman

*The First 20 Hours*, Josh Kaufman

*Smart Thinking*, A. Markman

*Brain Rules: 12 Principles for Surviving and Thriving at Work, Home, and School*, J. Medina

*Deep Work*, C. Newport

*A Mind for Numbers: How to Excel at Math and Science*, Barbara Oakley

*Fluent Forever*, Gabriel Wyner

*On Writing Well*, W. Zinsser

I have read over this syllabus. I commit to stick to the parameters of the take home exam. I will strive to be my best self in this course, both in how I interact with everyone involved and with respect to my efforts.

Signed:

Date: