

Principles of Cognition (Psych & Cog Sci 830:201:01)

Syllabus

Meeting Times: Mondays and Thursdays 12:00 - 1:20

Recitation (4 credit enrollees only) Thursdays 10:20-11:25 (in ARC-203)

Room: LCB-110

Professor: C.R. Gallistel

TA: John Wilder

Course Summary

Cognitive science is the intersection of psychology, linguistics, computer science and philosophy of mind. Its central doctrine is the computational theory of mind. The goal of this course is to make students conversant with core concepts and principles of this theory: information, representation, computation, intentionality, compositionality, optimization, efficient coding, constrained probabilistic inference (Bayesian inference), and levels of analysis.

Requirements

- 1) Two midterms and a final exam; mostly multiple choice (70%). The questions probe your understanding of the principles and concepts. They require thought. The emphasis is on your understanding of the principles, not on your mastery of the facts, although principles without facts are like skeletons with no flesh.
- 2) Active participation on the course bulletin board, where students post questions and comments on the readings and the lectures and where the professor and the TA and their fellow students respond to the questions and comments. The professor and the TA will pose questions of their own to inspire discussion. Many of these questions will arise from the readings. Active participation requires a minimum of 10 postings. A student's postings are graded by the professor and the TA for their quality (30% of course grade).
- 3) Cognitive science students taking the course for 4 credits do a research paper on one of several topics TBA

Textbook

Steven Pinker, "How the mind works." Available in paperback from Amazon for \$12.55. This is *much* more readable, more interesting and cheaper(!) than the standard texts. Buy it and read it cover to cover, the earlier in the course the better. Then revisit portions as they become relevant to the lectures. Other readings are to be downloaded from the course's Sakai site

Final Exam: Thursday, 12/20, 12:00-3:00

Schedule of Lectures

Thurs 9/6 History

Reading: Pinker, Chapter 1

Mon 9/10 History

Reading: Chomsky: Reflections on Language, Chap 1

Turing: Computing machinery and intelligence

Thurs 9/13 The Computational Theory of Mind

Reading: Pinker pp. 5- 10, 21-31. Marr *Vision* pp. 3 -20

Mon 9/17 Levels of Analysis

Reading: Marr, pp. 20-27; Nagel What is it like to be a bat?

Thurs 9/20 Representations - 1

Reading: Gallistel Mental representations

Mon 9/24 Representations - 2

Thurs 9/27 Representations - 3

Mon 10/1 Information - 1

Reading: Pinker, p. 25-27, 65-66, 175-176

Gallistel & King, Chap. 1 Information

Thurs 10/4 Information - 2

Mon 10/8 Review

Thurs 10/11 *Midterm 1*

Mon 10/15 Bayesian Inference -1

Reading: Gallistel & King, Chap. 2, Bayesian Updating

Thurs 10/18 Bayesian Inference - 2

Mon 10/22 Bayesian Inference - 3

Thurs 10/25 Decisions

Mon 10/29 Perception - 1

Reading: Pinker 5-10, 211-284, 245-248, 268-284

Thurs 11/1 Perception - 2

Mon 11/5 Perception -3

Thurs 11/8 Perception - 4

Mon 11/12 Review

Thurs 11/15 *Midterm 2*

Mon 11/19 Learning & Memory -1

Reading: Gallistel & King: Preface

Tues 11/20 Learning & Memory - 2

Mon 11/26 Learning & Memory - 3

Thurs 11/29 Language - 1

Mon 12/3 Language -2

Thurs 12/6 Language - 3

Mon 12/10 Review