CS/ISYE/PST/PSY 3790: Introduction to Cognitive Science

Instructor: Ron Ferguson
Klaus 1447 • MWF 11:05-11:55

CogSci 3790 covers a broad range of topics that are tied together by Cognitive Science’s central metaphor — the mind as information processor. During the term, you will explore the basics of cognitive science, covering aspects of philosophy, psychology, artificial intelligence, and other areas.

Logistically, 3790 will be like many other lecture-based courses. There will be readings on the basics of cognitive science, which will be combined with lectures that go in depth on selected topics from the text (you will be expected to learn and understand the material in both the lectures and the book). You will also develop your own understanding of a single aspect of cognitive science through work on a final paper.

CLASS COMMUNICATION

For most class communication, we’ll be using the 3790 class blog (cogsci3790.wordpress.com). You can either read this page directly or use an RSS aggregator to read either the main entries or the main entries plus comments. All non-urgent class announcements will be on the blog. Urgent announcements (e.g., if class is cancelled) will be handled via email.

Grades will be handled via WebCT. In the past we’ve had some problems with grades being visible to students, so if grades do not appear after a homework is handed back, please let me or the TAs know.

OFFICE HOURS

Ron Ferguson [rwf AT cc]: Wednesdays from 12:00-1:00 in the open area outside the classroom.

Justin Jang [jang AT cc]: Fridays 10-11am in the open area outside the classroom or in the classroom.

Neil Cutshaw [amator AT cc]: Monday 10:00-11:00 am in the classroom or the open area outside the classroom.
ASSIGNMENTS

Homeworks

There will be approximately 10 homeworks or in-class exercises over the course of the term. There may also be quizzes.

Exams

There will be two exams in this class — one near the middle of the term, and another the week before dead week. These exams will not be cumulative. There will not be a final exam.

Paper

A 8-12 page final paper will be required on one of a set of given topics.

Grading

- Final paper - 30% (this includes preparatory assignments)
- Exam 1 - 20%
- Exam 2 - 20%
- Homeworks, quizzes, and in-class exercises - 30%

Re-grading requests: If you feel that an assignment or test has been graded incorrectly, please return the assignment to the grading TA with a written description of the problem within 1 week of the return date.

Group assignments: Group assignments will be held by the grading TA so that all group members have access to it

Plagiarism. Instances of plagiarism will result in a zero for the assignment and possible referral to the Dean of Students. If you are unsure of what constitutes plagiarism, see this helpful brochure from Indiana University.

EXCUSED ABSENCES

A makeup exercise, worth approximately two quizzes or one homework, will be offered at the end of the term. This will cover any missed quizzes or exercises. If you have a situation, such as illness, that causes you to miss more than a few classes, contact one of the teaching assistants.
LATE ASSIGNMENTS

Assignments due in class are due at the beginning of class (to minimize disruptions). Late assignments will be assessed a 10% penalty per day. Assignments turned in after the beginning of class will be assessed a 5% penalty. For example, an assignment 1 day late with a grade of 80% would receive a penalty of 8% (10% of 80%). Sorry, but no assignments will be accepted more than 48 hours late.

READING SCHEDULE

This is a draft of the reading schedule for Spring. It is likely that the schedule will “stretch out” a bit as topics and readings are added. We will try to keep the exams on schedule, however.

Lecture links with asterisks (*) are from Fall term. These lectures will be replaced by the Spring lectures after the lecture is given.

The main textbook for this class is *Cognitive Science: An Introduction to the Study of Mind*, by Friedenberg and Silverman (hereafter called F&S). It is available from both the Georgia Tech Bookstore and Engineer’s Bookstore. Be sure to look under all the crosslisted sections (CS, ISYE, PST, PSY) if you do not find it under your section.

Web-based readings can be accessed directly by clicking on the link for that reading.

Critical dates:

• January 12 (Friday): End of Phase II Registration
• January 15 (Monday): MLK Holiday
• February 19 (Monday): Exam 1
• March 2 (Friday): Last day to drop class
• March 19-23: Spring Break
• April 2: Paper topic due
• April 9: Paper outline draft due
• April 16: Paper mini-draft due
• April 20 (Friday): Exam 2
• May 1 (Tuesday): Final paper due

PART I: AN INTRODUCTION AND AN EXAMPLE DOMAIN

Week 1 (January 8): Introduction to Cognitive Science*
• Lecture 1: *Introduction to the class.* Reading: F&S, chapter 1.

Week 2 (January 15): Representation and Analogy*

• January 15: MLK Holiday

Week 3 (January 22): Analogical Reasoning*

• Lecture 6: *Feature-based models of analogy* (no additional readings)
• Open slot

PART II: PHILOSOPHICAL AND PSYCHOLOGICAL FOUNDATIONS

Week 4 (January 29): The Mind-Body Problem*

• Lecture 8: *Spock’s brain, Descarte’s pineal gland.* Reading: F&S, chapter 2.

Week 5 (February 5): Precursors to Cognitive psychology*

• Lecture 11: *Analogies of the mind.* Reading: F&S, chapter 3.
• Lecture 12: *Gestalt: The sum of its parts.* No additional reading.
• Lecture 13: *Behaviorism.* No additional reading.

PART III: AREAS OF COGNITION
Week 6 (February 12): Perception*

- Lecture 15: Feature integration theory. No additional reading.

Week 7 (February 19): Memory (plus Exam 1)*

- Midterm 1 (February 19)
- Lecture 18: More memory (no additional readings)

Week 8 (February 26): Problem solving*

- Monday: Problem solving (plus discussion of exam 1)
- Lecture 19: ACT-R
- Lecture 20: Using ACT-R to model memory deficits

Week 9 (March 5): Imagery and neuroscience*

- Lecture 21: The imagery debate. Reading: TBA
- Lecture 23: Other neuroscience topic (or overflow)

Week 10 (March 12): Language*

- Lecture 25: Grammar
- Lecture 26: The Whorf-Sapir hypothesis

Week 11: SPRING BREAK (March 19-23)

PART III: COMPUTER MODELING TECHNIQUES IN COGNITIVE SCIENCE

Week 12 (March 26): Networks*

• Lecture 29: Semantic networks, continued.

**Week 13 (April 2): Artificial Intelligence***

• Lecture 30: Turing meets Eliza, unhappily. Reading: F&S, chapter 10
• Lecture 31: The frame problem. Reading: F&S, chapters 11
• Lecture 32: Cyc’d — is large scale knowledge possible?

**Week 14 (April 9). Robotics***

• Lecture 33: Fuzzy logic. No additional reading.
• Lecture 34: Robotics. Reading: F&S, chapter 12.

**PART IV: EMERGING AREAS OF COGNITIVE SCIENCE**

**Week 15 (April 16): Evolutionary models of cognition*** (plus Exam 2)

• Lecture 36: Evolutionary cognition - Basic concepts. Reading: F&S, chapter 8.
• Lecture 37: Evolutionary cognition - Evolution’s “fingerprints”.
• April 20: Exam 2

**Weeks 16 (April 23): Situated cognition***


**Final paper due on Tuesday, May 1.**