

COGS/PHIL 2160: Minds, Brains, and Machines

Course Description

What is the mind? How is it related to the brain? And what does either of them have to do with machines? This is an inter-disciplinary course that is designed to familiarize you with the central questions, topics, debates, methods, and techniques involved in studying the mind, especially thinking processes or cognition. The new area of research that studies the mind and mental processes is known as cognitive science, and it combines various disciplines, including: philosophy, psychology, linguistics, neuroscience, and artificial intelligence. Although the study of thinking and mental processes has a long history, the past several decades have witnessed productive interactions among these different disciplines. The outcome is an exciting new area of research with many interesting results to its credit, as well as a number of open questions and stimulating controversies.

Course Requirements

Papers (30%)

These will be short (800-1000 words) analyses of specific research articles in cognitive science, using the QALMRI method (to be explained). Paper topics will be assigned at least one week in advance. All students must write at least **two** (out of three) papers, the first paper and one of the remaining two. If you write all three papers, your highest two marks will be counted. See due dates on schedule (deadlines will be strictly enforced and late papers will not be accepted).

Midterm Exam (25%)

The midterm exam will include multiple-choice questions and short-answer questions. Sample questions will be distributed one week before the exam.

Final Exam (35%)

The final exam will be cumulative and will include a mix of multiple-choice and short-answer questions. Sample questions will be distributed before classes end. The date of the final exam will not be announced until halfway into the semester (by the York University administration) but it will take place some time between April 7 and 24 (inclusive). *Please do not make travel plans before the date of the final exam is announced.*

Attendance and Tutorial Participation (10%)

Your tutorial leaders will be making note of your attendance at weekly tutorials and your participation in discussions. Attendance at both lectures and tutorials is vital. Lecture slides will eventually be posted on Moodle, but they will not be comprehensive and will not contain everything mentioned during lecture and class discussion. Doing the readings is a necessary but not sufficient condition for achieving a good mark in this course.

**** PLEASE NOTE**:** A make-up midterm or final exam will only be given to students with a genuine medical or other emergency that prevents them from taking the exam, but *only if* I am notified beforehand by email *and* if this is backed up by official documentation (e.g. a doctor's report).

Tutorials and Tutorial Leaders

There are three tutorial leaders for this course: Olivia Sultanescu (Tutorials 1 and 3), Brandon Tinklenberg (Tutorials 2 and 4), and Jill Cumby (Tutorial 6). Please find out which tutorial you are in, look up its time and location, and make sure you attend that tutorial section. Your tutorial leaders will be doing the bulk of the marking for this course and may have additional instructions and policies, to be announced in tutorials.

Policy on Email

Email is an effective way of communicating with me and I would encourage you to send me an email message if you have a relatively straightforward question concerning course requirements or something of that kind. However, based on past experience, I don't think email is a very good way of asking substantive questions about course content. If you have such questions and you do not get a chance to ask them in class or don't think that they've been satisfactorily answered in class, I would strongly encourage you to make an appointment to come see me during office hours (see below). I find that a substantive academic discussion is hard to carry out over email and it's usually more productive to conduct it face-to-face. Incidentally, *please include your full name* and student number in your email. I won't respond to unsigned emails!

Office Hours

My regular office hours this semester are Tues 12:30-1:30 and Thurs 10:30-11:30; I will also hold additional office hours by appointment. My office is Ross S 431, down the hall from the Department of Philosophy office. Please contact me by email if you would like to make an appointment outside my regular office hours. Even if you intend to show up during my regular office hours, it is preferable to contact me beforehand, so that I can help ensure that you don't have a long wait. If you show up at the time of our pre-arranged appointment and I'm meeting with another student, please give a knock on the door to let me know you're there.

Accommodation

Students with health-related, learning, physical, psychiatric, or sensory disabilities who require reasonable accommodations in teaching style or evaluation methods should discuss their concerns with me as soon as possible so that appropriate arrangements can be made. Please also refer to the University Senate Policy on Academic Accommodation:

<http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/>

Academic Honesty

All students are expected to abide strictly by standards of academic honesty. Please familiarize yourselves with the University Senate Policy on Academic Honesty:

<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>

If you have any questions concerning what constitutes cheating or plagiarism, please consult with me as soon as possible.

Course Schedule

The reading for the class indicated must be done *before* the class in question.

DATE	TOPIC	READING CS = <i>Cognitive Science</i> text (see below) All other readings posted on Moodle
Thurs Jan 5	Introduction	No reading
Tues Jan 10	Cognition & Behavior (I)	CS 1.1 (pp.5-13)
Thurs Jan 12	Cognition & Behavior (II)	Chomsky, "Review of Skinner"
Tues Jan 17	Algorithms & Computation	CS 1.2 (pp.13-16)
Thurs Jan 19	Language (I)	Jackendoff, <i>Patterns in the Mind</i> (pp.8-35)
Tues Jan 24	Language (II)	CS 1.3-1.5 (pp.16-25); CS 2.1 (pp. 29-40)
Thurs Jan 26	Mental Imagery (I)	CS 2.2 (pp.40-46); Shepard & Metzler, "Mental Rotation of Three-Dimensional Objects"
Tues Jan 31	Mental Imagery (II) FIRST PAPER DUE	Pylyshyn, "Tacit Knowledge and 'Mental Scanning'"
Thurs Feb 2	Vision (I)	CS 2.3 (pp.46-55)
Tues Feb 7	Vision (II)	Marr, <i>Vision</i> , pp.20-38
Thurs Feb 9	Brain Structure & Function (I)	CS 3.1-3.2 (pp.59-71); CS 11.1 (pp.325-335)
Tues Feb 14	MIDTERM	
Thurs Feb 16	Brain Structure & Function (II)	CS 4.5 (pp.108-113); CS 11.5 (pp.352-358)
Tues Feb 21 & Thurs Feb 23	READING WEEK NO LECTURES/TUTORIALS	
Tues Feb 28	Mental Representation & Symbolic Systems (I)	Crane, "Puzzle of Representation," pp.8-26
Thurs Mar 2	Mental Representation & Symbolic Systems (II)	CS 6.1-6.2 (pp.145-165)
Tues Mar 7	Mental Representation & Symbolic Systems (III) SECOND PAPER DUE	CS 6.3 (pp.165-173); Searle, "Can Computers Think?"
Thurs Mar 9	Artificial Neural Networks (I)	CS 3.3 (pp.71-77); CS 8.1 (pp.215-222)
Fri Mar 10	Last date to drop course without receiving a grade	

Tues Mar 14	Artificial Neural Networks (II)	CS 8.3-8.4 (pp.233-242); CS 9.1-9.2 (pp.247-262)
Thurs Mar 16	Modularity (I)	CS 10.1-10.2 (pp.287-303)
Tues Mar 21	Modularity (II)	CS 4.4 (pp.99-105); CS 10.3 (pp.303-314)
Thurs Mar 23	Morality (I)	Pinker, "The Moral Instinct"
Tues Mar 28	Morality (II)	Haidt, "The New Synthesis in Moral Psychology"
Thurs Mar 30	Topic to be decided (I)*	
Tues Apr 4	Topic to be decided (II)* THIRD PAPER DUE	

* The last topic will be decided several weeks into the semester based on student preferences.

Textbook and Readings

There is a required textbook for this course:

Jose Luis Bermudez, *Cognitive Science: An Introduction to the Science of the Mind* (1st Edition), Cambridge University Press.

This edition of the textbook is freely available from the library website (Scott Library) and can be downloaded there. A link will be provided on the Moodle page for the course. (Note that in the reading schedule above, I've indicated both page numbers and chapter and section numbers, in case you're using a later edition.)

All other required readings for the course will be posted on the course Moodle page.