Cogs 111: Introduction to Cognitive Science

Spring 2008 Syllabus

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Hours: MF 10:00-11:50 & 1:00-1:50;

M 3:00-3:50; Tu 5:00-5:50; W 1:00-1:50

Time & Place: MWF 2:00-2:50 in KC 101

Course Description

This course will introduce basic concepts, issues and methodologies associated with the interdisciplinary study of human cognition. Specific topics will include (among others) the nature and definition of mind, memory, perception, intelligence, and consciousness. We will also examine some elementary neuroscience, agent-environment relations, robotics and other efforts to model human intelligence using machines. Insights will be appropriately drawn from several fields, including anthropology, artificial intelligence, biology, linguistics, neuroscience, philosophy, psychology and robotics.

N.B. This course is offered for general education credit as a three-hour non-lab science option, but it also serves as a requirement for majors and minors in cognitive science and majors in psychology. So, please do not expect an easy course. Cognitive science is difficult, exceedingly difficult in places, but I will do my best to make things clear. Your carefully articulated questions will go a long way in helping in this regard.

Methodology

Individual class sessions will take a variety of forms. Sometimes they will involve further elucidation of key material in the reading assignment for the day. In these cases, I will pick one or two topics and add detail that is not covered in the book. On other occasions, I will present material that is not covered in the book at all. The main lesson for students to draw from this is that the textbook and my lectures supplement each other; you will not be getting a repeat of the text in class. As a consequence, doing well in the course requires your own initiative in reading and studying the text as well as striving for a reasonable comprehension of my lectures.

Required Text

Friedenberg, Jay and Gordon Silverman. *Cognitive Science: An Introduction to the Study of Mind*. London: Sage Publications, 2006. 1-4129-2568-1.

Assignments

Each student will be required to take three exams during the regular semester and a comprehensive, final exam at the end. In addition, each student will submit a five-page research paper as specified in the guidelines below.

Grading

30% - Regular Exams (10% each)
25% - Final Exam
25% - Paper
20% - Class Participation

Paper Requirements, Recommendations and Evaluation

The topic for your paper must be directly pertinent to cognitive science and must involve the use of empirical research published in an appropriate scholarly journal. A minimum of four journal articles is required. Do not use encyclopedia entries or resources found online, unless they are articles published in a peer-reviewed, academic journal. Avoid news stories from the popular press, since these often exaggerate the more modest claims made in scientific research.

For this paper, think in terms of reporting on a particular research experiment. Address particulars such as how the experiment was designed and what it managed to show. You are not expected to do your own experiments. Do not attempt broad topics like the current state of robotics in cognitive science or how the brain allows us to think. Rather, think small. In fact, the more narrow your topic, the better your paper will be.

The safest course of action for this paper is to start with a single journal article. A quick study of it should point you toward other articles that you will need. However, if you are going to take this approach, and I highly recommend that you do, you must start early, since you may be making use of interlibrary loan, and this will delay your research.

Your paper must be longer than four pages and no longer than five, not including the cover page. It must be in Times New Roman, 12 point font and formatted in the APA style, 5th edition. (Copies of the style manual are available in the library, bookstore and at Barnes & Noble.) Be sure to include a title. Staple the paper in the top, left corner. Submit it to Turnitin.com and provide me with a print copy on or before **April 7th**. Late papers will be penalized a part letter grade for each day that they are late.

Your papers will be evaluated according to the following qualities, though they will not be graded according to an average based on an individual assessment of each area. (In other words, I will consider the paper as a whole looking at the following for guidance.)

- *Focus* – Does the paper stick to its topic, addressing necessary details while avoiding extraneous ones?

- *Organization* – Is the paper well-organized with respect to the order and presentation of ideas? Are ideas properly subordinated throughout the paper?

- *Clarity* – Is the paper generally clear and the prose readable? Is the thesis and argument explicit?

- *Factuality* – Are the factual assertions advanced in the paper true? Are they adequately supported by documentation as needed?

- *Documentation* – Is the selection and use of sources appropriate for the topic? Is the paper properly documented with citations to your sources?

- *Format* – Does the paper adhere to the formatting guidelines of the 5th edition of the APA style manual?

- *Grammar* – Is language used according to the rules of grammar? Is it properly academic?

When it comes to help with academic style in writing, I have found no book better than Joseph M. Williams, *Style: Toward Clarity and Grace*. Chicago: The University of Chicago Press, 1990. This book is not a writing manual for beginning students, but a carefully prepared handbook for those who already know how to write in general and wish to address academic audiences. If you wish to work in academia, regardless of field, this book is a must read.

Crick Lectures

The University of Evansville's programs in the cognitive and neural sciences jointly sponsor an annual lecture series on topics of mutual interest to the two programs. This semester's "Crick Lectures in the Cognitive and Neural Sciences" are scheduled for Wednesday, February 20th and Wednesday, April 16th, 4:00-:500 p.m. in KC 101. The February lecture will be presented by Dr. John Layer (UE) and will focus on cognitive ergonomics or the role of cognition in the workplace. The April lecture will be presented by Trent Kriete (UC – Merced and UE Alumnus, '99) and will examine computer models of autism. Attendance at both lectures is required; however, we will not hold class on Monday, February 25th and Wednesday, April 16th, to make up for them.

Policies and Rules

It would be a wonderful world, if classrooms could run without rules, but experience has repeatedly taught me that they are necessary. The following stem primarily, but not exclusively, from two sources. The first is a matter of maintaining respect for honest students with a genuine desire to know. Being fair makes it imperative that they have every opportunity to learn and that they are not lost among the students who take a class only to meet a requirement and who, as a consequence, may only be looking for the highest grade in exchange for the least amount of learning.

The second is to help me maintain my concentration in the classroom. Most of my difficulty with this latter issue derives from the fact that class lecture is a form of conversation. Once I perceive that my interlocutor is no longer listening, my priority automatically shifts from delivering a message to re-establishing contact, and I lose my train of thought. One student in a class can easily throw me off.

It is my hope that the following will respond adequately to these issues and that we will be able to conduct class at a level befitting an institution of higher learning. (In other words, we're not in high school anymore!)

Academic Honesty

All work submitted in this course must be prepared by the student expressly for this course. A student who submits work that is plagiarized, bought, borrowed from the archives of a fraternity, copied from another student, etc., *will fail the course.* (If you don't believe me, ask around.) I fully support the University's Academic Honor Code. To avoid confusion, students should keep in mind that plagiarism occurs not only when someone copies an author word for word, but also when someone uses another's ideas without giving credit, even if the ideas are paraphrased. Always document your sources!

Attendance Policy

I do not have an attendance policy *per se*. However, this course is structured in such a way that students who do not show up regularly may (will?) have trouble passing it. After all, it is difficult to participate if you're not present, and I frequently test on material that is not in the reading. (Since I do not have an attendance policy, there is no reason to send excuses for missing class, whether by email or by phone. Your reasons for missing class are private and do not concern me. Please, in other words, keep them to yourselves.)

Course Participation

Course participation grades are not automatic. They are based on oral contributions to the collective learning experience of the class as a whole in terms of asking pertinent questions, answering questions correctly or, at least, provocatively, making insightful observations, and offering other meaningful expressions of interest in the material that help encourage learning. I begin by assuming a C for each student's course participation

grade and move from there. Students should realize that *it is possible to talk a lot in class and receive a low grade for course participation*.

Electronic Technology in the Classroom (Cell Phones, Laptops, Etc.)

The use of laptops, cell phones, gaming devices and other electronic contraptions is not permitted in class. Students caught using them will be asked to leave. (You can wear a watch, if you must, but please don't sit staring at it during my lectures.)

Email

I do not read my UE email at home and, as a consequence, I will only answer email from that account during my scheduled office hours. Even then, I am not apt to sustain long, academic dialogues in this forum. (For extended discussion, please come visit me in person. Office hours are posted above.) Furthermore, during office hours, I will defer to students who show up in person, and this means that I may not be able to answer your email in the short term.

Food in the Classroom

No eating in class.

Packing Up to Go

Often the most critical minutes in a class session are the last five, where conclusions are drawn and assignments are made. Please do not start to pack up your belongings before the end of class.

Stay at Home Policy

I easily lose focus when students aren't paying attention, whether because they are talking to each other, passing notes, studying for another class, etc. If you do not wish to pay attention, please take advantage of my lack of an attendance policy and stay at home. After all, you get nothing for just showing up without paying attention, and I'm probably going to dock your participation grade just the same as if you had stayed at home.

Some Electronic Resources

1) *CogPrints* is a free, online paper archive of papers relating to all aspects of cognitive science. The archive is fully-searchable and available at http://cogprints.org.

2) *Noesis: Philosophical Research Online* also indexes a fair amount of philosophy relating to the many issues discussed in the text. See http://noesis.evansville.edu.

3) For detailed background of key philosophical concepts relating to the course, see the *Stanford Encyclopedia of Philosophy*, available at http://plato.stanford.edu.

4) *Psyche* is an online journal sponsored by the Association for the Scientific Study of Consciousness and regularly publishes top names in consciousness studies. It is available online for free at http://psyche.cs.monash.edu.au.

5) *The Mind Project* is an initiative to build an introductory cognitive science resource online. It includes many interactive, multimedia modules, several of which I will use in class. See http://www.mind.ilstu.edu/.

6) UE/CNS is a Facebook group for UE faculty, students and alumni interested in the study of cognition and behavior in human and non-human animals and other animats. If you are interested in pursuing research in artificial intelligence, cognitive psychology, cognitive science, neuroscience or robotics beyond this course or are simply interested in keeping up with some cognitive science news, please send a request to join, and I will be happy to approve it.

Some Print Resources

The available resources relating to cognitive science are extensive, and it would be a misrepresentation of the field to attempt even a small list. But here are some of my favorites. (I say this without meaning to imply that I agree with them.)

Bennett, M. R. & Hacker, P. M. S. (2003). *Philosophical foundations of neuroscience*. Malden, MA: Blackwell Publishing.

Calvin, W. H. (1996). *How brains think: Evolving intelligence, then and now*. NY: Basic Books.

Churchland, P. S. (1986). *Neurophilosophy: Toward a unified science of the mind/brain*. Cambridge, MA: MIT Press.

Churchland, P. M. (1998). *Matter and consciousness: A contemporary introduction to the philosophy of mind*. Cambridge, MA: MIT Press.

Churchland, P. M. (1989). *A neurocomputational perspective: The nature of mind and the structure of science*. Cambridge, MA: MIT Press.

Churchland, P. M. (1995). *The engine of reason, the seat of the soul: A philosophical journey into the brain*. Cambridge, MA: MIT Press.

Clark, A. (1993). *Associative engines: Connectionism, concepts and representational change.* Cambridge, MA: MIT Press.

Clark, A. (1997). *Being there: Putting brain, body, and world together again.* Cambridge, MA: MIT Press.

Clark, A. (2001). *Mindware: An introduction to the philosophy of cognitive science*. Oxford: Oxford University Press.

Clark, A. (2003). *Natural-Born cyborgs: Minds, technologies, and the future of human intelligence*. Oxford: Oxford University Press.

Copeland, J. (1993). *Artificial intelligence: A philosophical introduction*. Malden, MA: Blackwell Publishing.

Damasio, A. R. (1994). *Descartes' error: Emotion, reason and the human brain*. NY: Harper Collins.

Dennett, D. C. (1987). *The intentional stance*. Cambridge, MA: MIT Press.

Dreyfus, Hubert L. (1992). *What computers still can't do: A critique of artificial reason*. Cambridge, MA: MIT Press.

Haugeland, J. (1985). *Artificial intelligence: The very idea*. Cambridge, MA: MIT Press.

Haugeland, J. (Ed..). (1997). *Mind design II: Philosophy, psychology, artificial intelligence*. Cambridge, MA: MIT Press.

Norman, D. A. (1993). *Things that make us smart: Defending human attributes in the age of the machine*. Cambridge, MA: Perseus Books.

Pinker, S. (1997). *How the mind works*. NY: W. W. Norton and Company.

Kukla, A. & Walmsley, J. (2006). *Mind: A historical & philosophical introduction to the major theories.* Indianapolis: Hackett Publishing.

Course Calendar

1/9	**-**	Course Introduction; Syllabus Review
1/11	**-**	Introduction: What is Cognitive Science? Reading Assignment: Chapter One
1/14	**-**	Philosophical Questions and Quandaries Reading Assignment: Chapter Two
1/16	**-**	Philosophical Questions and Quandaries Reading Assignment: Chapter Two
1/18	**-**	Philosophical Questions and Quandaries Reading Assignment: Chapter Two
1/21	**-**	No Class (MLK Day)
1/23	**-**	A Brief History of Psychology Reading Assignment: Chapter Three
1/25	**-**	A Brief History of Psychology Reading Assignment: Chapter Three
1/28	**-**	A Brief History of Psychology Reading Assignment: Chapter Three
1/30	**-**	**First Exam**
2/1	**-**	Artificial Intelligence Reading Assignment: Chapter Ten
2/4	**-**	Artificial Intelligence Reading Assignment: Chapter Ten
2/6	**-**	Artificial Intelligence Reading Assignment: Chapter Ten
2/8	**-**	Artificial Intelligence Reading Assignment: Chapter Eleven
2/11	**-**	Artificial Intelligence Reading Assignment: Chapter Eleven
2/13	**-**	Artificial Intelligence Reading Assignment: Chapter Eleven
2/15	**-**	Some Basic Neuroscience Reading Assignment: Chapter Six

2/18	-	Some Basic Neuroscience Reading Assignment: Chapter Six
2/20	-	Some Basic Neuroscience Reading Assignment: Chapter Six Crick Lecture: 4:00-5:00 p.m. in KC 101. Dr. John Layer, UE Engineering.
2/22	**-**	**Second Exam**
2/25	**-**	No Class (in exchange for Crick Lecture on 2/20)
2/27	**-**	Artificial Neural Networks Reading Assignment: Chapter Seven
2/29	**-**	Artificial Neural Networks Reading Assignment: Chapter Seven
3/10	**-**	Artificial Neural Networks Reading Assignment: Chapter Seven
3/12	**-**	Cognitive Psychology, Vision and Attention Reading Assignment: Chapter Four
3/14	**-**	Cognitive Psychology, Vision and Attention Reading Assignment: Chapter Four
3/17	**-**	Cognitive Psychology, Vision and Attention Reading Assignment: Chapter Four
3/19	**-**	Memory, Imagery and Problem Solving Reading Assignment: Chapter Five
3/21	**-**	No Class (Easter Break)
3/24	**-**	No Class (Easter Break)
3/26	**-**	Memory, Imagery and Problem Solving Reading Assignment: Chapter Five
3/28	**-**	Memory, Imagery and Problem Solving Reading Assignment: Chapter Five
3/31	**-**	**Third Exam**
4/2	**-**	Evolutionary Psychology and Cognition Reading Assignment: Chapter Eight
4/4	**-**	Evolutionary Psychology and Cognition Reading Assignment: Chapter Eight

4/7	**-**	Evolutionary Psychology and Cognition Reading Assignment: Chapter Eight **Paper Due**
4/9	**-**	Language and Cognition Reading Assignment: Chapter Nine
4/11	**-**	Language and Cognition Reading Assignment: Chapter Nine
4/14	**-**	Language and Cognition Reading Assignment: Chapter Nine
4/16	**-**	No Class Crick Lecture: 4:00-5:00 p.m. in KC 101. Trent Kriete, UC Merced.
4/18	**-**	Robots, Etc. Reading Assignment: Chapter Twelve
4/21	**-**	Robots, Etc. Reading Assignment: Chapter Twelve
4/23	**-**	Robots, Etc. Reading Assignment: Chapter Twelve
4/25	**-**	What Next? Reading Assignment: Chapter Thirteen
4/28	**-**	What Next? Reading Assignment: Chapter Thirteen
5/6	**-**	**Final Exam (Comprehensive) in KC 101, 2:45 – 4:45.**