

# Attention!

This is a *representative* syllabus.

The syllabus for the course when you enroll may be **different**.

Use the syllabus provided **by your instructor** for the most up-to-date information. Please refer to your instructor for more information for the specific requirements for a given quarter.

# Psych/Ling/Phil/CS&E 612

## Introduction to Cognitive Science

Proposed Semester-Length Syllabus  
**Undergraduate Version**

- Credits:** 3
- Times:** Tuesdays and Thursdays 09:30–11:00 a.m.
- Prerequisites:** Permission of instructor, or at least 12 (semester-length) credit hours from at least two of the following four areas: computer science, linguistics, philosophy, and psychology. At most 6 credits can come from any given area.
- Websites:** <https://carmen.osu.edu>
- Textbook:** Jay Friedenberg & Gordon Silverman (2006). *Cognitive Science: An Introduction to the Study of Mind*. Thousand Oaks, CA: Sage Publications. ISBN 1-4129-2568-1.

### Course Overview

What is cognition and how does it emerge from the brain? This course introduces you to the exciting interdisciplinary field of cognitive science. Researchers in philosophy, neuroscience, psychology, artificial intelligence, and linguistics realized that they were asking many of the same questions about the nature of the human mind/brain, that they had developed complementary and synergistic methods of investigation, and that the evidence led them to compatible answers to their questions. This course introduces cognitive science through a representative sample of such questions, methods, and answers. It is not a special-topic course for students who seek detailed knowledge in a specific area of cognitive science. We will try not to lose sight of the forest for the trees but we will take a closer look at a few trees too because science is in the details. Along the way, we will introduce the constituent disciplines and their respective contributions to the study of cognition.

### Intended Audience. Prerequisites

This course is cross-listed in the Departments of Computer Science and Engineering, Linguistics, Philosophy, and Psychology. It is intended for advanced undergraduate students in these departments. Interested students from related areas are welcome too. The formal prerequisites for taking the course are: permission of the instructor **or** at least 12 (semester-length) credit hours from at least two of the four disciplines. At most 6 credits can come from any given discipline, so the possible schemes are: 6+6, 6+3+3, or 3+3+3+3. The informal prerequisites are: willingness to step outside the confines of one's area of specialization, willingness to read the professional literature (as opposed to textbooks) with help from the instructor and one's peers, willingness to participate in

assigned date in the calendar below and come to class prepared to discuss it in detail. For some target articles, you will also be required to write a 500-word summary paper.

## Evaluation

Your grade will depend on five components in the following proportions:

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| • Summary papers (3 papers worth 8% each)     | 24% |
| • Attendance and participation in discussions | 10% |
| • Midterm Exam 1                              | 20% |
| • Midterm Exam 2                              | 20% |
| • Final Exam                                  | 26% |

Grades are based on absolute cutoffs: A=90-100%, B=80-89%, C=70-79%, D=60-69%.

**Summary papers:** There are 10 target articles listed below. Twenty-four percent of your final grade will be based on your summary papers of 3 of these 10 articles. You decide which particular target articles to *write* about, but you are expected to *read* all and come to class prepared to discuss them. Each summary paper contributes up to 8 points toward your final grade. For extra credit, you may write a fourth summary paper, worth up to 5 points. You cannot submit more than four summary papers; if you do, only the first four submissions will be graded.

Guidelines for writing good summary papers:

- Begin with an introductory paragraph that states the purpose, motivation, or goal of the target article.
- The paper should summarize two major issues or problems that are discussed in the target article. If there are more than two issues, then pick the two that you think are most relevant and important.
- Your summary paper must represent your own synthesis of information.
- The paper should include your own critical reactions to the target article. For example, you may disagree with the author(s) in certain points, or may have alternative viewpoints and/or new suggestions. Those critical reactions must be supported by concisely stated arguments and/or evidence.
- Avoid plagiarism. It is good to bring empirical evidence or arguments in support of your case, but you must cite your sources and thereby give proper credit to the original author(s).
- Each summary paper must be 400–600 words long and must be double-spaced, properly formatted, and proofread. No separate title page is required. On the upper-left corner of the first page, write the title of the target article, your name, submission date, and the number of words.
- The paper will be graded as a weighted sum of scores on three categories:
  - 50%: Thoroughness and correctness of the summary (25% for each issue).
  - 30%: Ability to critically examine the target article in your own terms.
  - 20%: General understanding of the concepts and issues involved; clarity of presentation (organization, clear writing, paper format).
- Note that PSY 612 is not a writing course and hence extensive editorial or stylistic comments on your summaries will not be offered.

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## Academic Ethics

All students enrolled in OSU courses are bound by the Code of Student Conduct ([http://studentaffairs.osu.edu/resource\\_csc.asp](http://studentaffairs.osu.edu/resource_csc.asp)). The instructor and course assistants are committed to maintaining a fair assessment of student performance in this course. Suspected violations of the Code will be dealt with according to the procedures detailed in the Code. Specifically, any alleged cases of misconduct will be referred to the Committee on Academic Misconduct.

There are two major ethical considerations in this course. First, all exams are closed book. No notes may be used during the examinations and you may not confer with your fellow students or look at other examinations for answers during the exam period. Prior to the examinations, you are encouraged to study in small groups. However, once you enter the examination room, you are expected to work alone. Second, you are expected to work alone on your homework assignments. You may not turn in anything that you did not *completely* write. Be careful about plagiarism; attribute quotes and ideas that others have previously published where appropriate. A very comprehensive website that describes most aspects of plagiarism has been produced by Northwestern University (<http://www.northwestern.edu/uacc/plagiar.html>).

## Accommodations for Students with Special Needs

The policy of The Ohio State University is to provide every reasonable, appropriate, and necessary accommodation to qualified disabled students. The University's colleges and academic centers evaluate and judge applications on an individual basis and no categories of disabled individuals are automatically barred from admission. The privacy rights of each disabled person are honored to the fullest extent possible. The University's interest in a student's disabilities are only for the purpose of accommodating his/her specific disability, thereby providing an academically qualified disabled student access to programs and activities accorded all other qualified students. Whenever generally accessible facilities do not adequately accommodate a specific disability, the University makes every reasonable accommodation and program or facility adjustment to assure individual access. These policies are fully supported and practiced in this class.

If you have a disability documented with the Office of Disability Services (<http://www.ods.ohio-state.edu>, 150 Pomerene Hall, 614-292-3307), please contact the instructor privately by the end of the second week of classes so that any accommodations can be made.

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The above calendar is subject to change at the discretion of the instructor, depending on the rate of progress through the material, student interest in alternative topics, and/or scheduling constraints.

### Additional Readings

In addition to Friedenbergs & Silverman's textbook, which is the main text for this course, the following readings supplement and amplify some topics of particular importance. The 10 discussion papers are required readings. The remaining references are optional, except when a particular fragment is explicitly singled out as required reading by the instructor. The list of readings is subject to change at the discretion of the instructor.

1. Anderson, John R. (2007). Cognitive architecture. Chapter 1 in *How can the human mind occur in the physical universe?* (pp. 3-39). New York: Oxford University Press.
2. Anderson, John R. & Lebiere, Christian (2003). The Newell Test for a theory of cognition. *Behavioral and Brain Sciences*, 26, 587-640. **Discussion paper #1, due ??/??.**
3. Bechtel, William (2008). Representations and mental mechanisms. Chapter 5 in *Mental Mechanisms: Philosophical Perspectives on Cognitive Neuroscience*. New York: Routledge. ISBN 0-8058-6334-6.
4. Biederman, Irving & Cooper, Eric E. (1991). Priming contour-deleted images: Evidence for intermediate representations in visual object recognition. *Cognitive Psychology*, 23, 393-419. [Available on Carmen] **Discussion paper #2, due ??/??.**
5. Chomsky, Noam (1986). Knowledge of language as a focus of inquiry. Chapter 1 in *Knowledge of language: Its nature, origin, and use* (pp. 1-14). New York: Praeger. Reprinted in B. C. Lust & C. Foley (Eds.) (2004). *First Language Acquisition: The Essential Readings* (pp. 15-24). Malden, MA: Blackwell Publishing. **Discussion paper #3, due ??/??.**
6. Eichenbaum, Howard (2002). Amnesia: Learning about memory from memory loss. Chapter 1 in *The Cognitive Neuroscience of Memory: An Introduction*. Boston, MA: Oxford University Press. **Discussion paper #4, due ??/??.**
7. Feldman, Jerome (2006). The language wars. Chapter 22 in *From Molecule to Metaphor: A Neural Theory of Language* (pp. 271-282). Cambridge, MA: MIT press.
8. Haugeland, John (1997). What is mind design? In J. Haugeland (Ed.), *Mind Design II: Philosophy, Psychology, Artificial Intelligence*. Cambridge, MA: MIT Press.
9. Kolb, Brian & Whishaw, Ian (2006). How does the nervous system function? (pp. 34-73). Chapter 2 in *An Introduction to Brain and Behavior* (2<sup>nd</sup> Ed.). New York: Worth Publishers.
10. McClelland, James L. (2000). Connectionist models of memory. In E. Tulving & F. Craik (Eds.), *The Oxford Handbook of Memory* (pp. 583-596). Oxford Univ. Press.
11. McClelland, J. L., Rumelhart, D. E., & Hinton, G. E. (1986). The appeal of Parallel Distributed Processing. In D. E. Rumelhart, J. L. McClelland, and the PDP Research

6. Chalmers, David J. (2002). *Philosophy of Mind: Classical and Contemporary Readings*. New York: Oxford University Press. ISBN 0-19-514581.
7. Churchland, Patricia S. & Sejnowski, Terrence J. (1994). *The Computational Brain*. MIT Press. ISBN 0-262-53120-8.
8. Dawson, Michael (1998). *Understanding Cognitive Science*. Malden, MA: Blackwell Publishers. ISBN 0-631-20894-1.
9. Dennett, Daniel C. (1981). True believers: The intentional strategy and why it works. In A. F. Heath (Ed.), *Scientific Explanation*, Oxford: Oxford University Press. [Reprinted in Haugeland (1997) and Chalmers (2002).]
10. Eichenbaum, Howard (2002). *The Cognitive Neuroscience of Memory: An Introduction*. Boston, MA: Oxford University Press. ISBN 978-0-19-514175-7.
11. Feynman, Richard (1984/1996). Feynman Lectures on Computation (Edited by T. Hey and R. W. Allen). Cambridge, MA: Perseus Publishing. ISBN 0-7382-0296-7.
12. Flanagan, Owen (2007). *The really hard problem: Meaning in a material world*. Cambridge, MA: MIT Press. ISBN 987-0-262-06264-0.
13. Gluck, M. A., Mercado, E., & Myers, C. E. (2008). *Learning and Memory: From Brain to Behavior*. New York: Worth Publishers. ISBN 0-7167-8654-0.
14. Harris, D. M. & Harris, S. L. (2007). *Digital Design and Computer Architecture*. San Francisco, CA: Morgan Kaufmann. ISBN 0-12-370497-9.
15. Haugeland, John (1985). *Artificial Intelligence: The Very Idea*. MIT Press. ISBN 0-262-58095-0.
16. Haugeland, John (Ed.) (1997). *Mind Design II: Philosophy, Psychology, Artificial Intelligence* (2<sup>nd</sup> Ed.). Cambridge, MA: MIT Press. ISBN 0-262-58153-1.
17. Hofstadter, Douglas R. (1985). Review of *Alan Turing: The Enigma*. Chapter 12 in *Metamagical Themas: Questing for the Essence of Mind and Pattern* (pp. 483-491). Basic Books.
18. Kim, Jaegwon (2006). *Philosophy of Mind* (2<sup>nd</sup> Ed.). Cambridge, MA: Westview. ISBN 0-8133-4269-4.
19. Kolb, Brian & Whishaw, Ian (2008). *Fundamentals of Human Neuropsychology* (6<sup>th</sup> Ed.). New York: Worth Publishers. ISBN 0-7167-9586-8.
20. Kolb, Brian & Whishaw, Ian (2006). *An Introduction to Brain and Behavior* (2<sup>nd</sup> Ed.). New York: Worth Publishers. ISBN 0-7167-1187-7.
21. Lakoff, George & Johnson, Mark (1980). *Metaphors We Live By*. Chicago: The University of Chicago Press. ISBN 0-226-46801-1.
22. LeDoux, Joseph (2002). *The Synaptic Self: How Our Brains Become Who We Are*. New York: Viking Penguin. ISBN 0-670-03028-7.
23. Newell, Allen (1990). *Unified Theories of Cognition*. Cambridge, MA: Harvard University Press. ISBN 0-674-92099-6.