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 of a given semester.

Prerequisites: Graduate standing, permission of instructor, or at least 12 credit hours from any of the following areas: computer science, linguistics, neuroscience, philosophy, and psychology.

Websites: https://carmen.osu.edu


Course Overview

This course introduces you to the exciting interdisciplinary field of cognitive science devoted to the study of human intelligence and intelligent systems. 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, but as a broad survey of different approaches within the field 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. We will discuss the foundational concepts of *computation* and *information processing* from multiple points of view. Two unifying themes are emphasized throughout: (1) Information processing: The mind/brain is viewed as a
complex system that receives, stores, retrieves, transforms, and transmits information. (2) Neuroscience grounding: Explicit effort is made to show how mental phenomena emerge from the interactions of networks of neurons in the brain.

Intended Audience & Prerequisites

This course is cross-listed in the Departments of Computer Science and Engineering, Linguistics, Philosophy, and Psychology. It is intended for graduate and advanced undergraduate students in these departments. Interested students from related areas (notably neuroscience) are welcome too. The formal prerequisites for taking the course are: graduate standing in any of these departments or permission of the instructor or at least 12 undergraduate-level credit hours from any of the four disciplines. 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 open discussions, and the ability to write clearly and concisely about topics outside one’s area of specialization.

All students must be officially enrolled in the course by the end of the second full week of the semester. No requests to add the course will be approved by the Chair after that time. Enrolling officially and on time is solely the responsibility of the student.

Course Objectives

Upon successful completion of the course, the undergraduate students will:

- Appreciate the interdisciplinary nature of cognitive science, the diversity of viewpoints, the controversies and the areas of nascent consensus.
- Be exposed to the contribution of each of the five constituent disciplines and be familiar with its methods, key concepts, and focus of investigation.
- Be proficient in the *lingua franca* of cognitive science—the language of information processing.
- Have basic familiarity with brain anatomy and physiology.
- Master multiple definitions of the foundational concepts of *computation* and *information processing* and be able to discuss them from multiple points of view.
- Know a multitude of specific concepts, theories, and experimental results covered in course. The lecture plan below lists some relevant keywords.

Textbook & Readings

The main textbook is *Cognitive Science: An Introduction to the Science of the Mind* (Bermúdez, 2014, 2nd edition, Cambridge University Press). Various learning resources are provided on the accompanying website [http://www.cambridge.org/features/bermudez/](http://www.cambridge.org/features/bermudez/). We will supplement the textbook with additional readings listed in the bibliography below. All required readings (except the textbook itself) are posted in PDF on the Carmen website [https://carmen.osu.edu/](https://carmen.osu.edu/)
Evaluation
Your final course grade will depend on the following components:

- Midterm Exam #1 (Thursday 2/4, 11:10 am, Jennings 140) 80
- Midterm Exam #2 (Tuesday 3/8, 11:10 am, Jennings 140) 80
- Final Exam (Monday 5/2, 10:00 – 11:45 am, Jennings 140) 110
- Attendance (12 random checks worth 3 points each, max 30) 30

Total: 300

Grades are based on absolute cutoffs: A: 280 - 300, A- = 270 - 279, B+/B/B- = 240 - 269, C+/C/C- = 210 - 239, D+/D = 180 - 209, E <= 179 points, respectively.

Exams: The two Midterm Exams (2/4, 3/8) and the Final Exam (5/2) are closed-book and consist of multiple-choice and short-answer questions. The exams are not cumulative, except that the topics covered in later periods of the course depend on concepts and facts introduced in the earlier periods. No make-up exams will be given, except in the case of documented illness or emergency. In the event of a last-minute emergency, you should call or email Dr. Myung, or call the office associate for the cognitive area (Jay McKirnan 614-292-1123) on the same day as the exam, preferably before the exam begins. Acceptable excuses for missing an exam are a death in your family, personal illness or the illness of your child or spouse, and unforeseen accidents like your car breaking down or getting stuck in an elevator. Please obtain documented proof of these events should they occur. If you are late for an exam, you will be allowed to take it but you will have to submit your answers by the closing time like everybody else. All make-up exams will be face-to-face oral administered by the instructor. Also note that your make-up exam questions will not be the same as the ones on the in-class written exam.

Attendance: Attendance is required. Come to class – it makes a difference. On top of that, there is a palpable incentive for attending: you earn points by just being present during a roll call. Twelve roll calls will be made during the semester without advance notice. Each time you are present at the time of a roll call you earn 3 points, up to a total of 30 points max. No excuses whatsoever are accepted for missing the roll calls.

Academic Ethics
All students enrolled in OSU courses are bound by the Code of Student Conduct (http://studentaffairs.osu.edu/resource_csc.asp). The instructor is 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. It is the responsibility of this Committee to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all
instances of alleged academic misconduct to the Committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at the above link.

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 their exam booklets 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.

**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 student 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, 1760 Neil Avenue, 614-292-3307, TDD 292-0901), please contact Dr. Myung privately (myung.1@osu.edu, 207 Psychology Bldg) by the end of the second week of classes (2/22/2016) so that any accommodations can be made.

**Course Calendar**

**Part I: Five Foundations of Cognitive Science**

1. **T 1/12 – Introduction.** Course organization, exam dates, etc. Motivation: Newell’s big question. Constituent disciplines. Interdisciplinary approach. Required readings: Textbook Section 4.1; Rapaport (2000).


4. **T & R 1/26 & 1/28– Artificial Intelligence.** Weak versus strong AI. Subfields, applications, and recent trends in AI. Turing Test. Universal Turing machine.


6. **R 2/4 – Midterm Exam #1**


**Part II: Computational Cognitive Science**


12. **T 3/8 – Midterm Exam #2**

13. **R 3/10 – Examples of Neural Network Modeling of Cognition (Continued).**


Part III: New Trends & Issues: In-class Discussions


20. M 5/2 - Final Exam (10:00 – 11:45 am)

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.

Readings

In addition to Bermúdez’ (2014) textbook, which is the main text for this course, the following readings supplement and amplify some topics of particular importance. All of the following items are available on Carmen in PDF format, except for some web versions. The list of readings is subject to change at the discretion of the instructor.


