

PSYC 330 – Introduction to Cognitive Science

Course Description

What is the single most impactful force of nature to ever exist on this planet? It is not, as some might guess, earthquakes, volcanoes, or even massive hurricanes. It is the mind. The evolution of the mind, and the downstream consequences of possessing cognitive abilities, has shaped our world more than any cataclysmic event. Cognitive science is the study of this one phenomenon: the mind.

Cognitive science integrates theories, methodology, and techniques of analysis from various disciplines. These include but are not necessarily limited to cognitive psychology, computer science, linguistics, evolutionary psychology, and philosophy. Make no mistake about it, though, cognitive science is a discipline of its own. Making use of the tools of other disciplines and then transforming them to best investigate the implications of one overriding hypothesis: the mind is an information processor.

What does this mean for humanity? Can cognitive science unlock the form and function of the mind? Can this knowledge be used in emerging technologies? Can we, through computer models, precisely mimic the human mind? Improve upon it? Is a synthetic replication of the mind, in a robot, closer to human than are other machines? These are some of the questions, big and small, that we will answer in the Introduction to Cognitive Science.

Course Learning Objectives

At the conclusion of this course, you will be able to answer the following questions:

- What is the implication of the idea that even very basic behaviors involve storing and processing information about the environment? How is information processing related to perceptual systems?
- What are some of the historical advancements toward the development of cognitive science?
- What is the integration challenge in cognitive science, and what are the “levels” across which cognitive science must integrate disciplines?
- How does the mental architecture approach deal with the shortcomings of earlier global integration solutions?
- What is the physical symbol system hypothesis? How does it attempt to explain information storage and processing?
- What are the practical implications of the physical symbol system approach (e.g., ID3, WHISPER)?
- How do multilayer artificial neuron networks learn through experience? What are the differences for modeling information processing between physical symbol systems and artificial neuron networks?
- What does it mean to say that all information processing is modular? Is it?
- How can cognitive neuroscience help to establish a “wiring diagram” for the mind? Does knowing the brain “explain away” the processes of the mind?
- What is the mindreading system? How is this an example of the theory of information processing systems?

This course is built upon a foundation of broader learning objectives, which informed the questions above:

- **Research Methods** – Everything that we will learn is rooted in decades of empirical research. Your textbook is a compilation of the work done by hundreds of behavioral researchers. The work is based in theory and tested with rigorous scientific methodologies.
- **Critical Thinking** – I am not interested in testing your rote memorization. This course will require you to understand, integrate and master the knowledge presented. Assignments, exams, and the project will provide conduits through which you can demonstrate your knowledge.
- **Communication** – You will be asked to demonstrate your acquired knowledge through regular assignments, in-class discussions, and a professional scientific presentation.
- **Content** – We will cover basic principles, general theoretical perspectives, and the history and disciplines that inform the field of cognitive science.

Course Format

Most importantly, this is not a lecture course. You will not be subjected to hours of being “talked at.” I do not enjoy putting people to sleep, and I am sure that you do not enjoy trying to fight to keep your eyes open during class. Class time will be spent on *group discussions* guided by students, in-class group activities & games, and demonstrations that highlight course material.

This course is designed to be a highly challenging, seminar-style experience with equal attention paid to empiricism and theory. You will be responsible for regular assignments that serve to enhance the encoding, integration, application, and retention of important concepts & research. These assignments will prepare you for in-class discussions as well as for your exams and project. This class is indeed *more work* than many typical college courses, but given your hard work I promise that you will get a lot more out of it in return.

LEARNING SEQUENCE

I have developed a “consistent assessment model” (Buzinski & Roberts, 2012) of course construction after years of consolidating cognitive psychology and scholarship of teaching & learning research. The CAM involves a specific learning sequence for each chunk of course information. The sequence is as follows...

Reading

- As in any course, students must first develop a foundation of knowledge through course text reading. Thus, the first step in the CAM is to read at least one chapter from our textbook (occasionally reading will involve 2 chapter or a research article). After you complete your reading assignment, you move on to complete a pre-class worksheet...

Worksheets

- You will be expected to complete an online, pre-class worksheet each week (except where marked on the course schedule). Worksheets are designed to facilitate your understanding and integration of the important material in that week’s reading. Worksheets will consist of multiple choice and true/false questions.

- You should budget your time wisely (approximately 3hrs) to complete these assignments. Worksheets are accessible via the **Tests and Quizzes** area of Sakai, and must be submitted on Sakai by the due date listed by on your course schedule.
- It is highly recommended that you complete the worksheets in a Microsoft Word document first and then enter your answers into Sakai. This will prevent you from losing data should any errors or internet interruptions occur. Please be aware that it is your responsibility as a learner to ensure proper internet access throughout the semester. You know the due dates for every assignment in this course (see Course Schedule) – losing internet service is not an acceptable excuse for failing to complete your work.

**Worksheets must be your own work. The same rules of plagiarism and intellectual honesty apply to your worksheets that apply to any course essay or exam that you have ever taken.

Demonstrations of Expertise

- To start each class where marked (10 total) you will be asked multiple choice or short answer questions that will be answered via Poll Everywhere. These questions will review broad themes that will be discussed across the following two classes in order to further ensure proper encoding and understanding of course information.

Mastery Checks

- After reading, completing a worksheet, demonstrating your expertise, and discussing material in class, your mastery of the information from that section of class will be tested with an in-class Mastery Check. Mastery Checks will be conducted at the end of every class where marked (10 total), and will contain 5-10 multiple choice, true/false, or fill-in-the-blank questions. Mastery Checks, like worksheets, are not collaborative assignments and will be completed individually.
- Mastery Checks have the added benefit of consolidating and reinforcing mental models of the knowledge that you would have just developed from the assignment sequence for that section of class (e.g., Roediger & Karpicke, 2006a). In other words, they actually help to concrete memory of the material that was just covered.

Exams

- There will be 3 unit exams designed to assess your understanding and application of the essential concepts and theories in cognitive science. Exams will be a combination of multiple choice and short essay questions. Anything covered in class or in the assigned work is fair game, though the worksheet questions, mastery checks, and in-class assignments will highlight the most important concepts for you to focus on. You can expect exams to be cumulative with regards to the application of early theoretical perspectives to newer material. There will be no “make up” exams without a valid medical excuse or other **documented** emergency.

Team Project

- An overarching goal of this class is to apply the theoretical principles of cognitive science to build an “Introduction to Cognitive Science” website. Your website will be hosted on UNC’s servers and will be a prime example of the excellent applied work that you completed as an undergraduate Psychology major as well as an enduring resource for public good and education (*Note. Any student who wishes for his/her website to remain private from public view will have the option of marking it as such*).

- Websites will feature a main homepage and several sub-pages. The homepage will introduce your team and the discipline of cognitive science. Each sub-page will focus on presenting selected contributions to cognitive science of one of its constituent disciplines (e.g., cognitive psychology, computer science).
- Further details on the team project will be distributed in a separate project handout but you can expect it to be a major focus of your work in this course, as well as a very demanding but ultimately rewarding assignment.

Student Responsibilities

There is a growing yet troubling belief among college students that academe is not the “real world.” That the professionalism, etiquette, timeliness, and tone attributed to a professional work environment need not be present in a college classroom. While this may have been your experience before, it will not be so now. A major component of my philosophy is that college must serve as a training ground for the rest of your life, and we have a duty to afford you the socialization not only to theoretical concepts and material but also to the skills and expectations needed to properly conduct yourself in any future career.

I expect that students will take *personal responsibility* for their learning in this course.

- **Budget your time:** You must plan your time efficiently. According to the University of North Carolina student guidelines, you should plan for 2 hours of out-of-class work per week for every 1-hour spent in class.
- **Be on time (and prepared):** If you would not walk into a board meeting ten minutes late, then do not walk into a class meeting casually late or unprepared.
- **Seek assistance:** If you need a concept clarified, help with effective study habits, or anything else relevant to the course, it is your responsibility to a) attempt to resolve the issue via effort and research, b) contact your teammates for help, and c) contact me for resolution.
- **Get the info:** You are responsible for all information presented in class, even if you have an excused absence for a particular day. If you are going to miss a class meeting, plan to get the information needed.
- **NO LAPTOPS:** I have considered all of the evidence for and against the inclusion of laptop computers in class. At this point there is a preponderance of evidence that laptop computers do more harm than good. They inhibit memory at all stages of cognition. They lower motivation to process. They distract peers. If necessary for medical purposes students may take notes on a laptop (medical excuse required), but are asked to open only Microsoft Word or a note-taking application.

I expect students to maintain proper *classroom etiquette* in order to ensure an environment that fosters learning and development.

- Treat the views, opinions, experiences, and abilities of your fellow classmates and instructor with the same respect that you would expect to be treated with.
- Engaging in social conversation with a classmate while the instructor or fellow students are talking is not only exceptionally disrespectful and rude; it is completely unacceptable.
- Asking questions of a classmate while others are talking is along the same lines. Please allow a speaker to finish their thought and ask any questions you might have of the entire class. We cannot engage in a great discussion if questions are not bounced off the entire group.

- Save newspapers, word & math puzzles, and electronic communications (e.g., texting, email, facebook, twitter) for outside of class.

I expect that all students will maintain *professional communication* standards.

- All email communication should have a title line that begins with the course number (PSYC 330.001) and then what the email pertains (e.g., PSYC 330 project question)
- All emails should contain a separate salutation (Dr. Buzinski,), body (Your question or comment), and signature (Sincerely, your name).
- I expect that all students will *contribute equally* to their team project.
- Social loafing was described by Latane, Williams, & Harkins (1979) as a social disease and it will not be tolerated in this class.
- Part of your project grade will be determined by intra-team evaluations, given at random points throughout the semester.
- If you do not contribute equally and consistently, **do not expect to receive the same grade** on your project as your fellow team members.

Evaluation

Your grades are not given to you and you do not “deserve” an A for simply being in class or trying hard. Grades are operationalizations of course mastery, retention, & achievement. They are earned through your diligence, creativity, and performance. They should not be viewed as a goal or end-state, but rather an indication of your progress as a cognitive scientist. Your grades will be determined by the following factors.

Assignment	Possible Points
Worksheets	5 each = 50 total
Mastery Checks	15 each = 150 total
Exam 1	200
Exam 2	200
Exam 3	200
Project	200
TOTAL	1000

Grade	Points
A	940-1000
A-	900-939
B+	866-899
B	833-865
B-	800-832
C+	766-799
C	733-765
C-	700-732
D+	666-696
D	633-665
D-	600-632
F	< 600

Grade Questions: I will be happy to discuss any questions that you may have with particular grades. Grade questions must be submitted **in writing within 1 week** of receiving the grade. This includes final course grades. After 1 week students may still meet to discuss graded assignments but no formal re-grading will be conducted and grades will be final.

Make-ups: If you have an excused absence and miss an assignment, then you have exactly **2 weeks** to make up the missed assignment. After two weeks, your grade will automatically revert to a zero. The only caveat to this policy is if your excused absence forces you to miss an extended period of time and you cannot realistically complete the missed assignment within the two week period. Documentation will be required for this type of absence.

Extra Credit: You will have several opportunities throughout the semester to earn extra credit points via participation in activities done in class. If you are absent during a day in which an extra credit activity is done, you forfeit the opportunity to obtain these points.

University Policies

Academic Integrity Policies: All students are expected to be familiar with the University Honor code and its policies regarding academic dishonesty, found in the Instrument of Student Judicial Governance. Any instance of academic dishonesty will result in zero points for that assignment, and may result in failing the course.

Disabilities Services: If you have a physical, medical, psychological, or learning disability that is going to impact your attendance or require accommodation, please let me know. In order to ensure that your learning needs are appropriately met, you will need to provide documentation of your disability or medical condition to the Department of Disability Services. The Department of Disability Services will then provide verification of disability that describes the accommodations needed for this class, which you should provide to me.

Week	Tuesday	Thursday
1	Introduction to PSYC 330 Cognitive Science	Historical Precursors (DOE1) Read Ch. 1; WRK 1
2	Historical Precursors (MC1)	Developing Cognitive Science (DOE2) Read Ch. 2; WRK 2
3	Developing Cognitive Science (MC2)	Project Work: Homepage Homepage draft text due
4	Integrating Disciplines in Cognitive Science (DOE3) Read Ch. 4; WRK 3	Integrating Disciplines in Cognitive Science (MC3)
5	Integration Solutions (DOE4) Read Ch. 5; WRK 4	Integration Solutions (MC4)
6	EXAM 1	Project Work: Sub-page 1
7	Physical Symbol System (DOE5) Read Ch. 6; WRK 5	Physical Symbol System (MC5)
8	Applying Symbol Systems (DOE6) Read Ch. 7; WRK 6	Applying Symbol Systems (MC6)
9	Project work: Sub-page 2	HOLIDAY
10	Neural network Models (DOE7) Read Ch. 8; WRK 7	Neural Network Models (MC7)
11	EXAM 2	Project Work: Sub-page 3
12	Cognitive Structure (DOE8) Read Ch. 10; WRK 8	Cognitive Structure (MC9)
13	Neuro-Cognitive Science (DOE9) Read Ch 3.1-3.3 & Ch. 11.1-11.2; WRK 9	Neuro-Cognitive Science (MC9)
14	Mindreading (DOE10) Read Ch. 12; WRK 10	Mindreading (MC10)
15	Presentations	HOLIDAY
16	Presentations	Final Exam

*Note: Schedule is tentative and subject to change. Any changes will be announced on Sakai.