Course Syllabus – Cognitive Science Spring 2025

Course Information

Course Number/Section	CGS 2301.001
Course Title	Cognitive Science
Term	Spring 2025
Days & Times	Tuesday & Thursday 8:30am – 9:45am
Location	GR 3.420

Professor Contact Information

Professor	Dr. Jiahui Guo, Ph.D.
Email Address	jiahui.guo@utdallas.edu
Office Location	GR 4.802C
Office Hours	By appointment

Teaching Assistant	Emily Smith
Email Address	emily.smith2@utdallas.edu
Office Location	JO 2.302
Office Hours	Tuesday 11:30am – 12:30pm

Course Description

Cognitive science is the interdisciplinary study of how minds work. This course will introduce you to the major tools and theories from these areas as they relate to the study of the mind from fields including psychology, neuroscience, philosophy, and computational modeling. We will employ these perspectives while exploring the nature of mental processes such as perception, memory, language, and social cognition.

Student Learning Objectives/Outcomes

After completing the course, students should be able to:

1. Describe and explain the nature of the relevant psychology and cognitive science-related fields and scientific disciplines.

2. Describe and analyze major theoretical perspectives and overarching themes of psychology and other cognitive science-related fields and discuss their historical development.
3. Use critical thinking to summarize and evaluate scholarly literature.
4. Set up scientific problems in feasible and solvable ways as illustrated in the various subjects in class.

Required Textbooks and Materials

The readings and other course materials will be posted on eLearning.

Academic Calendar & Exam Dates

Date	Topic	Reading	Presentation
January 21	Introduction	R1	
January 23	History of Cognitive Science		
January 28	Methods I	R2	Demo Presentation
January 30	Methods II		P1 (R1)
February 4	Methods III	R3	P2 (R2)
February 6	Basic Neuroscience I	R4+5	P3 (R3)
February 11	Basic Neuroscience II	R6	P4 (R4+R5)
February 13	Mind and Machine I	R7+R8+R9	P5 (R6)
February 18	Mind and Machine II	R10+R11	P6 (R7+R8+R9)
February 20	Hemispheres of the Brain	R12	P7 (R10+R11)
February 25	Sensation I	R13+R14	P8 (R12)
February 27	Brain Development and Health	R15	P9 (R13+R14)
March 4	Exam 1 review		
March 6	**Exam 1**		
March 11	Sensation II	R16+R17	P10 (R15)
March 13	Perception I	R18	P11 (R16+R17)
March 18	Spring Break (No Class)		
March 20	Spring Break (No Class)		
March 25	Perception II	R19	P12 (R18)
March 27	Memory I	R20+R21	P13 (R19)
April 1	Memory II	R22+R23	P14 (R20+R21)
April 3	Exam 2 review		
April 8	**Exam 2**		

April 10	Memory III	R24	P15 (R22+R23)
April 15	Language	R25	P16 (R24)
April 17	Social Cognition I	R26+R27	P17 (R25)
April 22	Social Cognition II	R28	P18 (R26+R27)
April 24	Emotion I	R29+R30	P19 (R28)
April 29	Emotion II	R31+R32	P20 (R29+R30)
May 1	Consciousness		P21 (R31+R32)
May 6	Exam 3 review		
May 8	**Exam 3**		

Reading List

R1 Miller, G. A. (2003) The cognitive revolution: A historical perspective. *Trends in Cognitive Sciences*, 7(3), 141–144.

R2 Makin, S. (2018) The world's strongest MRI machines are pushing human imaging to new limits. *Nature News*

R3 Greenemeier, L. (2014) Decoding Brain. *Scientific American MIND*, November, 40-45

R4 Sherwood, C., & Schumacher M. (2024) Are we Wired differently? *Scientific American*, March, 10-13

R5 Koch, C. (2023) The brain electric. *Scientific American*, June, 19-23

R6 Bertolero, M., & Bassett (2023) How matter becomes mind? *Scientific American*, June, 4-11

R7 Koch, C. (2015) Do androids dream? *Scientific American MIND*, November, 24-27

R8 Savage, N. (2019) How AI and neuroscience drive each other forwards. *Nature Outlook*

R9 Aanthaswamy, A. (2023) In AI, is bigger always better? *Nature News*

R10 Jones, N. (2023) How to stop AI deepfakes from sinking society — and science. *Nature News Feature*

R11 Koch, C. (2015) Intelligence without sentience. *Scientific American MIND*, July, 26-29

R12 Gazzaniga, M. (1998) The split brain revisited. *Scientific American*, July, 50-55

R13 Buzsáki, G. (2023) Constructing the world from inside out. *Scientific American*, June, 32-39

R14 Seth, A. (2023) Our inner universes. *Scientific American*, June, 12-18

R15 Kaas, J & Hackett T. (1999) 'What' and 'where' processing in auditory cortex. *Nature Neuroscience News & Views*

R16 Churchland, A. (2011) Normalizing relations between the senses. *Nature Neuroscience News and Views,* **14**, 672–673, https://doi.org/10.1038/nn.2850

R17 Ringach, D. (2003) Look at the big picture (details will follow). *Nature Neuroscience News and Views,* **6**, 7–8. https://doi.org/10.1038/nn0103-7

R18 Tsao, D. (2023) Face Values. *Scientific American*, June, 55-61

R19 Koch, C. (2015) The face as entryway to the self. *Scientific American MIND*, January, 26-29

R20 Shen, H. (2018) How to see a memory? *Nature News Feature*

R21 Beck, J. & Clarke, S. (2023) Born to count. *Scientific American*, June, 40-47

R22 Smith, K. (2012) Neuroscience: Idle minds. *Nature News Feature*, **489**, 356–358. https://doi.org/10.1038/489356a

R23 Musser, G. (2023) An AI Mystery. *Scientific American*, September, 58-61

R24 Musser, G. (2024). A truly intelligent machine. *Scientific American*, April, 31-36

R25 Meyvis, T. & Yoon, H. (2021) Adding is favoured over subtracting in problem solving. *Nature News and Views*

R26 Kineally, C. (2018) What makes language distinctly human. *Scientific American*, September, 55-59.

R27 Dehaene, S., Dehaene-Lambertz, G. (2016) Is the brain prewired for letters? *Nature Neuroscience News and Views*, **19**, 1192–1193. https://doi.org/10.1038/nn.4369

R28 Martone, R. (2023) Sense of self. *Scientific American*, December, 8-11

R29 Musser, G. (2023). Synchronized Minds. *Scientific American*, July/August, 50-57

R30 Rao, R. & Stocco, A. (2014) When two brains connect. *Scientific American MIND*, November, 36-39

R31 Schafer, M. & Schiller, D. (2023) The brain's social road maps. *Scientific American*, June, 62-67

R32 Koch, C. (2018) What is Consciousness? *Scientific American*, June, 60-64

Grading Policy

Exams: Exams count for 75% (75 points) of the final grade. We will have three exams based on the lectures and readings, all in multiple-choice and short-answer format, and each exam weighted equally. The three exams will be non-cumulative. Final grades will be calculated as the average of the 3 exam scores (each exam will count for 1/3 the 75% of final grade), which means each exam counts for 25% of the final grade.

Presentation: Each student is required to present one of the assigned articles to the class. Presentation counts for 15% (15 points) of the final grade. No credit will be given if the presentation requirement is not completed. Details will be given in class.

Attendance: Attendance will be evaluated as follows: If you attend more than 80% of the classes, you will get all 10 points for attendance; between 60-79% of classes, 6 points; between 40-59%, 4 points; 20-39% 2 points; less that 20%, 0 points.

In addition, pop-quizzes may be conducted as part of the attendance check. These quizzes are intended to both encourage attendance and facilitate comprehension. As such, points will be awarded for participation. While the grades on the quizzes will not contribute to the final grade. **Bonus points** will be awarded for completion of all pop-quizzes/attendance checks (2 points).

Final grading will be based on a set of a priori criteria: 90% and above for the A range, 80% and above for the B range, 70% and above for the C range, and 60% and above for the D range. Pluses and minuses will be assigned based on the distribution of the final score after including bonus points. I reserve the right to alter these criteria based on the grade distribution.

Course & Instructor Policies

Make-up Exams
Make-up exams will be given only if: (a) you were seriously ill and have documentation from a physician, or (b) you have a police report (e.g., auto accident) indicating you were detained the day and time of the exam, or (c) you have made arrangements prior to the exam to attend an

important event (e.g., a funeral). In any of these cases, you must notify the professor in advance of the scheduled time of the exam (call or leave an e-mail message if you can do nothing else). Otherwise, you will receive an F on the exam. It is the student's responsibility to make sure that an exam is made up within one week of the scheduled time. It is to your advantage to take the regular exam: Make-up exams may be more difficult to compensate for the advantage of greater study time.

Faulty Exam Questions
Occasionally, exam questions can be unclear and faulty. If you encounter such a question, let me know immediately after the exam period.

Class Materials

The instructor may provide class materials that will be made available to all students registered for this class as they are intended to supplement the classroom experience. These materials may be downloaded during the course; however, these materials are for registered students' use only. Classroom materials may not be reproduced or shared with those not in class or uploaded to other online environments except to implement an approved AccessAbility Resource Center accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Research Exposure Credit Requirement (REC):

One requirement of all students enrolled in this class is completion of two research exposure credits. This requirement provides students practical and direct experiences with research and is an important means to understanding behavioral research. Details about this requirement appear on the separate Research Exposure Credit Requirement handout distributed on the first day of class and/or posted on the course eLearning page. Failure to complete the research exposure requirement will result in lowering your total grade in this class. For each Research Exposure Credit you fail to complete, your course grade will be reduced by 1/3 letter grade. For example, if you only complete one of the two required credits and your grade for all other course requirements is an A+, then your grade would be lowered from an A+ to an A. If you do not complete both credits, your grade would be lowered from an A+ to A-. The deadline for completion of these credits is **May 1st at 11:59pm.**

Class Attendance

The University’s attendance policy requirement is that individual faculty set their course attendance requirements. Regular and punctual class attendance is expected. Students who fail to attend class regularly are inviting scholastic difficulty. In some courses, instructors may have special attendance requirements; these should be made known to students during the first week of classes.

Class Participation

Regular class participation is expected. Students who fail to participate in class regularly are inviting scholastic difficulty. A portion of the grade for this course is directly tied to your participation in this class. It also includes engaging in group or other activities during class that solicit your feedback on homework assignments, readings, or materials covered in the lectures (and/or labs). Class participation is documented by faculty. Successful participation is defined as consistently adhering to University requirements, as presented in this syllabus. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

Note: the instructor may choose to include one or neither of the following statements:

(a) Texas Senate Bill 17, the recent law that prohibits diversity, equity, and inclusion programs and activities at public universities in Texas, does not in any way apply to academic course instruction. Students should not feel the need to self-censor or limit their participation in academic courses pertaining to topics of race and racism, structural inequality, LGBTQ+ issues, or diversity, equity, and inclusion, and related topics.

(b) Texas Senate Bill 17, the recent law that prohibits diversity, equity, and inclusion programs and activities at public universities in Texas, does not in any way apply to academic course instruction.

Class Recordings

Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. Unless the AccessAbility Resource Center has approved the student to record the instruction, students are expressly prohibited from recording any part of this course. Recordings may not be published, reproduced, or shared with those not in the class, or uploaded to other online environments except to implement an approved AccessAbility Resource Center accommodation. Failure to comply with these University requirements is a violation of the Student Code of Conduct.

NOTE: if the instructor records any part of the course, then the instructor will need to add the following syllabus statement:

The instructor may record meetings of this course. These recordings will be made available to all students registered for this class if the intent is to supplement the classroom experience. If the instructor or a UTD school/department/office plans any other uses for the recordings, consent of the students identifiable in the recordings is required prior to such use unless an exception is allowed by law.

Comet Creed

This creed was voted on by the UT Dallas student body in 2014. It is a standard that Comets choose to live by and encourage others to do the same:

"As a Comet, I pledge honesty, integrity, and service in all that I do."

Academic Support Resources

Please visit the Academic Support Resources page to view the University's academic support resources for all students.

UT Dallas Syllabus Policies and Procedures

Please visit the Syllabus Policies page to view the University's policies and procedures segment of the course syllabus.

Please review the catalog sections regarding the credit/no credit or pass/fail grading option and withdrawal from class.

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.