湖北工業大學
HUBEI UNIVERSITY OF TECHNOLOGY

Course Title	Introduction to Cognitive Science
Course Code	COGS 1111
Semester	Summer 2025
Course Length	5 Weeks, 60 Contact Hours
Credits	4
Instructor	TBA
Office	TBA
Email	TBA
Prerequisite	N/A

Course Description:

The goal of cognitive science - and of this course - is to understand how the mind works. This study of the mind is heavily multidisciplinary and draws on learnings from component fields including psychology, biology, neuroscience, computer science, artificial intelligence, vision science, linguistics, philosophy, anthropology, and behavioral economics. This course will introduce you to the major tools and theories from these areas, as they relate to the study of the mind. We will employ these perspectives while exploring the key cognitive subsystems and the nature of mental processes such as perception, reasoning, memory, attention, imagery, language, intelligence, decision-making, and consciousness.

Course Goals:

Students who successfully complete this course will demonstrate competency in the following general education core goals:

- **Critical thinking skills** – Students will engage in creative and/or innovative thinking, and/or inquiry, analysis, evaluation, synthesis of information, organizing concepts, and constructing solutions.
- **Communication skills** – Students will demonstrate effective written, oral, and visual communication.
- **Teamwork** – Students will demonstrate the ability to work effectively with others to support a shared purpose or goal and consider different points of view.
- **Social responsibility** – Students will demonstrate intercultural competency and civic knowledge by engaging effectively in local, regional, national, and global communities.

Student Learning Outcomes:

Upon completion of this course, students will be able to:

- understand a variety of issues and problems in cognitive science, including its interdisciplinary nature, the place of cognitive science in the history of studying the mind, the theoretical foundations of mental representation and computation;
- evaluate theories of particular mental phenomena, including belief, consciousness, human rationality, and more;
- appreciate the contribution of each of the constituent disciplines and be familiar with its methods, key concepts, and focus of investigation;
- know multiple definitions of the foundational concepts of computation and representation and be able to discuss them from multiple points of view;
- understand the basic cognitive architecture and how perception, memory, language, motor control, and so forth come together to produce behavior.

Textbooks/Supplies/Materials Requirements:

- *Cognitive Science: An Introduction to the Study of Mind* by José Luis Bermúdez. Cambridge University Press.
- *Cognitive Psychology: A Student's Handbook* by Michael W. Eysenck. Psychology Press.
- Additional readings and research papers provided

Course Requirements:

Participation and Discussions
This component encourages active engagement in lectures, in-class exercises, and group discussions. Cognitive science thrives on collaboration and the synthesis of ideas from diverse fields; thus, students are expected to contribute thoughtfully by sharing perspectives, asking questions, and responding to their peers' ideas.

Homework
Homework assignments, comprising 15% of the overall grade, are designed to reinforce the key theories, methodologies, and terminologies discussed in class. Homework assignments may involve reading scholarly articles, analyzing case studies, or completing exercises related to mental representations, cognitive processes, and computational models.

Group Project
The group project emphasizes collaborative learning and practical application of cognitive science concepts. In small teams, students will select a real-world cognitive problem or phenomenon—such as language acquisition, decision-making in uncertain environments, or the simulation of mental processes—and develop a research-based project. This may include designing a cognitive model, analyzing experimental data, or critiquing existing theories. The group project helps students explore the interdisciplinary nature of cognitive science while building teamwork, research, and presentation skills.

Final Project,
It's a major individual assignment constituting 25% of the final grade, provides an opportunity for students to delve deeper into a specific area of cognitive science that

interests them. This project may take the form of a research paper, a computational model, or a literature review that synthesizes findings from multiple disciplines.

Final Exam
The final exam, worth 30% of the overall grade, will assess students' comprehensive understanding of the course material. It will cover key topics, including interdisciplinary approaches, mental representations, cognitive processes, and cognitive modeling. The exam may include multiple-choice questions, short-answer prompts, and essay questions that require students to apply their knowledge critically and reflect on the broader implications of cognitive science research.

Assessments: Activity	**Percent Contribution**
Participation and Discussions	10%
Homework	15%
Group Project	20%
Final Project	25%
Final Exam	30%

Grading:

Final grades will be based on the sum of all possible course points as noted above.

Percentage of available points	**Grade**
90 - 100	A
80 - 89	B
70 - 79	C
60 - 69	D
＜60	F

Course Schedule:
The schedule of activities is subject to change at the reasonable discretion of the instructor. Minor changes will be announced in class, and major ones provided in writing.

COGS 1111 Schedule

Lecture	Topic	Readings
L1	**Introduction to Cognitive Science**	*Bermúdez*
	History & Foundations of Cognitive Science	Chapter 1
	Overview of Component Fields: Psychology, Neuroscience, Computer Science, Linguistics, Philosophy	
L2	Evolution of Human Cognition	*Bermúdez*
	Brain Basics: Anatomy, Neurotransmitters, Action Potentials	Chapter 3
L3	**Philosophy of Mind**	handouts
	Philosophical Theories of Mind: Cartesian Dualist Theory, Putnam's Functionalism	
	Continental tradition: Kant, Hegel, Heidegger, Sartre	
L4	**Philosophy of Mind (Cont.)**	handouts
	Phenomenology: Edmund Husserl	
	Epistemology: Benedict de Spinoza, Bertrand Russell	
	Consciousness: Daniel Dennett	
L5	**Logic, Reasoning, Judgment, Problem-Solving & Decision Making**	*Eysenck*
	Neural Basis of Judgement and Decision-Making	Chapter 12

L6	Theoretical Foundations: Tversky and Kahneman	*Eysenck*
	Bounded Rationality Framework	Chapter 13
L7	Inductive and Deductive Reasoning, Inferences	*Eysenck*
	Closed vs. Open Loop System of Decision-Making	Chapter 14
L8	**Information Processing**	*Bermúdez*
	Theoretical Foundations	Chapter 1
L9	**Information Processing (Cont.)**	*Bermúdez*
	Models: Serial-Sequential, Parallel, Cascade	Chapter 1
	Types: vertical or horizontal	
L10	**Linguistics**	*Bermúdez*
	Neural Basis	Chapter 1
	Evolution of Language: Learned vs. Innate	
	Competing Theories: N. Chomsky, B.F. Skinner, S. Pinker	
L11	**Linguistics (Cont.)**	*Bermúdez*
	Physical Symbol Hypothesis	Chapter 1
	Syntax, Semantics, Discourse, Conceptual Systems	
	Language and Developmental Lifespan	
L12	**Psychology: Attention**	*Bermúdez*
	Theories: Descartes, Berkeley, James, Locke, Broadbent	Chapter 9
	Neural Structures and Connectivity	
	Process of attention (alerting, awareness, sensory input, affect, arousal)	
L13	**Psychology: Memory**	*Bermúdez*
	Neural Structures	Chapter 3
	Physiology (Long-Term Potentiation)	*Eysenck*
	Types of Memory & Memory as a Storage System	Chapter 6
L14	**Learning**	*Eysenck*
	Theories of Learning: Behaviorism, Cognitivism, Constructivism	Chapter 6
	Classical Conditioning	
L15	**Learning (Cont.)**	*Eysenck*
	Operant Conditioning	Chapter 6
	Social/Observational Learning	
L16	**Vision & Perception**	*Bermúdez*
	Neuroanatomy and Function	Chapter 2
	Spatial	*Eysenck*
	Object Recognition	Chapters 2-3
L17	**Vision & Perception (Cont.)**	*Bermúdez*
	Complex Perceptual Processes	Chapter 2
	Mirror Neurons	*Eysenck*
	Vision in Relation to Other Systems	Chapters 2-3
L18	**Cognition & Emotion**	*Eysenck*
	Neural Basis of Cognition and Emotion	Chapter 3
	Network Theories of Human Emotion	
L19	**Cognition & Emotion (Cont.)**	*Eysenck*
	Action-Readiness Theory, Core-Affect Theory, Communicative Theory	Chapter 3
	Impact of Emotion on Cognitive Processes	
L20	**Neuroscience (Part 1: Structural Imaging)**	*Bermúdez*
	Introduction: Molecules, Neurons, Circuits, Functional Networks	Chapter 3
	Structural Methods & Applications	
L21	**Neuroscience (Part 2: Functional Imaging)**	*Bermúdez*
	Functional Methods, Applications, Neuroplasticity	Chapter 3
	Functional Magnetic Resonance Imaging (fMRI)	
	Additional Methods for Brain Runction: Neuropsychology &	

	Psychometrics	
L22	**Data Science & Artificial Intelligence** Machine Learning overview and components Supervised v/s unsupervised Learning Feature Engineering	*Bermúdez* Chapter 12
L23	**Cognitive Architectures: ACT-R** Parallel Distributed Processing (PDP)	handouts
L24	**Cognitive Models and Simulations** Case Studies in Cognitive Modeling	handouts
L25	**Group Project Showcase** **Individual Final Project Submission**	/
/	Final Exam	/

Accommodation Statement

Academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor's attention, as he/she is not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow.

Academic Integrity Statement

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in coursework may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Other Items:

Attendance and Expectations

All students are required to attend every class, except in cases of illness, serious family concerns, or other major problems. We expect that students will arrive on time, be prepared to listen and participate as appropriate, and stay for the duration of a meeting rather than drift in or out casually. In short, we anticipate that students will show professors and fellow students maximum consideration by minimizing the disturbances that cause interruptions in the learning process. This means that punctuality is a must, that cellular phones be turned off, and that courtesy is the guiding principle in all exchanges among students and faculty. You will be responsible for the materials and ideas presented in the lecture.

Assignment Due Dates

All written assignments must be turned in at the time specified. Late assignments will not be accepted unless prior information has been obtained from the instructor. If you believe you have extenuating circumstances, please contact the instructor as soon as possible.

Make-Up Work
The instructor will not provide students with class information or make-up assignments/quizzes/exams missed due to an unexcused absence. Absences will be excused and assignments/quizzes/exams may be made up only with written documentation of an authorized absence. Every effort should be made to avoid scheduling appointments during class. An excused student is responsible for requesting any missed information from the instructor and setting up any necessary appointments outside of class.

Access, Special Needs, and Disabilities
Please notify the instructor at the start of the semester if you have any documented disabilities, a medical issue, or any special circumstances that require attention, and the school will be happy to assist.