Sample Syllabus 1

Course Description

Cognitive science seeks to understand the mind by integrating findings from such variegated disciplines as philosophy, psychology, neuroscience, linguistics, anthropology, evolutionary biology, and artificial intelligence. Among the core principles guiding cognitive science are that mental processes are typically unconscious and computational; that the mind is a biological organ housed in the brain and shaped by evolution; and that many mental capacities are modularly implemented and innate. We will examine these core principles and apply them to understand a wide range of phenomena, including perception, language, mental imagery, attention, logical reasoning, mathematical reasoning, morality, intelligence, navigation, mindreading, consciousness, and emotion.

Grading

3 Short Essays 30%
2 Midterms 40%
1 Final Exam 30%

Texts

The majority of readings for this course will come from the textbook *Cognitive Science: An Introduction to the Science of the Mind*, by José Luis Bermúdez (4th edition, 2023)
Note: Test banks are available for instructors, please check it on the website of the textbook.

DATE	THEME	Topics	Readings
Week 1, Sec.1	The Road to Cognitive Science	Introspection; Behaviorism; Cognitive Science	JLB, 1.1-1.2 Chomsky, "Review of Skinner's Verbal Behavior"
Week 1, Sec.2			
Week 1, Sec.3	Early Theories & Results	Language in Humans & Machines; Information Processing; Mental Imagery; Marr's Theory of Vision	JLB, 1.3-2.3 Shepard and Metzler, "Mental Rotation of Three-Dimensional Objects"
Week 2, Sec.1			
Week 2, Sec.2			
Week 2, Sec.3	Enter Brains & Biology	Visual Pathways; Neurons; Neural Architecture; Neuro-Imaging; Natural Selection	JLB, 3 & 9. Mishkin, Ungerleider, & Macko, "Object Vision and Spatial Vision: Two Cortical Pathways." Pinker, How the Mind Works, 36-44; 149-174 Short Essay 1
Week 3, Sec.1			
Week 3, Sec.2			
Week 3, Sec.3			
Week 4, Sec.1	Merging Disciplines; Levels of Explanation; Tools of Analysis	Case Study 1: Language learning	JLB, 10
Week 4, Sec.2		Case Study 2: Object perception	JLB, 11
Week 4, Sec.3		Case Study 3: Number	Dehaene, "Talented and Gifted Animals"

Week 5, Sec.1			Wynn, "Addition and Subtraction by Human Infants" Feigenson, Dehaene, & Spelke, "Core Systems of Number"
Week 5, Sec.2		Case Study 4: Morality	Pinker, How the Mind Works, 396-416 Cushman, Young, & Greene, "Our Multi-System Moral Psychology" Pinker, "The Moral Instinct"
Week 5, Sec.3			
Week 6, Sec.1	Catch Up		
Week 6, Sec.2	Review		
Week 6, Sec.3	Exam 1		
Week 7, Sec.1	The Innateness Debate	Nativism; Empiricism; Depth Perception; Object Perception	Gibson, "The Visual Cliff" Samuels, “Innateness in Cognitive Science”
Week 7, Sec.2			
Week 7, Sec.3	Modeling the Mind I: Physical Symbol Systems	Computation Theory; Turing Machines; AI; The Language of Thought; The Chinese Room	JLB, 1.2, 6.0-6.3, 7.0-7.4 Crane, The Mechanical Mind, 83-91 & 92-99 Searle, "Can Computers Think?"
Week 8, Sec.1			
Week 8, Sec.2			
Week 9, Sec.3	Modeling the Mind II: Neural Networks	Connectionism; Single Unit and Multilayer Neural Networks; Perceptron Convergence; Back Propagation; Sample Networks	JLB, 3.3, 8.0-8.4; 9.0-9.5 Pinker and Prince, "Rules and Connections in Human Language" McLeod, Plunkett, and Rolls, Introduction to Connectionist Modeling of Cognitive Processes, 210-219 Short Essay 2
Week 9, Sec.1			
Week 9, Sec.2			
Week 10, Sec.1	Catch Up		
Week 10, Sec.2	Review		
Week 10, Sec.3	Exam 2		
Week 11, Sec.1	Cognitive Architecture	Modularity: Modest & Massive	JLB, 10.0-10.4 Fodor, "A Précis of The Modularity of Mind"
Week 11, Sec.2		Case Study 1: Navigation	Gallistel, "The Replacement of General-Purpose Learning

Week 11, Sec.3			Models with Adaptively Specialized Learning Modules" Hermer & Spelke, "A Geometric Process for Spatial Reorientation in Young Children" Epstein & Kanwisher, "A Cortical Representation of the Local Visual Environment"
Week 12, Sec.1		Case Study 2: Mindreading	JLB, 13 Leslie, “Pretense and representation: The origins of theory of mind”
Week 12, Sec.2			
Week 12, Sec.3	The Challenge of Consciousness	The Easy and Hard Problems; Unconscious information processing; Function of consciousness Global Workspace	JLB, 15 Block, “Comparing the Major Theories of Consciousness” Chalmers, “The Puzzle of Conscious Experience” Prinz, The Conscious Brain, Chapter 9, ‘What is consciousness? Neurofunctionalism’
Week 13, Sec.1			
Week 13, Sec.2			
Week 13, Sec.3			
Week 14, Sec.1	The Emotions: From Cognitive Science to Affective Science	Basic emotions	JLB, 16.1 Ekman, “An argument for basic emotions.”
Week 14, Sec.2		Affective space	JLB, 16.2
Week 14, Sec.3		Fear and Amygdala	JLB, 16.3 Feinstein, Adolphs, Damasio, and Tranel “The Human Amygdala and the Induction and Experience of Fear”
Week 15, Sec.1	Catch Up / Short Essay 3 Due		
Week 15, Sec.2	Review		
Week 15, Sec.3	Final Exam		

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