

The Science of the Mind

HONS 3303

Fall 2011
Texas Tech University

COURSE DESCRIPTION

We have sciences of the physical world (physics), chemical world (chemistry), and biological world (biology). But can we have a science of the mind? *Cognitive science* answers affirmatively, and 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 some 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, and consciousness. We will also consider objections from skeptics who doubt whether cognitive science can succeed in its aim of providing a comprehensive science of the mind.

This course satisfies the Texas Tech University core curriculum requirement in Social and Behavioral Science. The objective of a social and behavioral science component of a core curriculum is to increase the student's knowledge of how social and behavioral scientists discover, describe, and explain the behaviors and interactions among individuals, groups, institutions, events, and ideas. Such knowledge will better equip students to understand themselves and the roles they play in addressing the issues facing humanity. Students graduating from Texas Tech University should be able to demonstrate the ability to assess critically claims about social issues, human behavior, and diversity in human experiences.

INSTRUCTOR DETAILS

Professor: Jacob Beck

Email: jacob.beck@ttu.edu

Office: Philosophy Building, 265G

Office Hours: Tuesdays 2:00-4:00

MEETINGS

T/Th 11-12:20 in English & Philosophy 151.

GRADING

Participation	10%
2 Midterm Exams	30%
1 Final Exam	35%
1 Research Paper	25%

PARTICIPATION

Participation begins with attendance and a careful reading of the material. In the classroom, participation is not about quantity. The best student is not he who speaks most. But it isn't exactly about quality either. Our discussions would be terrible if we each only spoke up when we were sure that we had something deeply profound to offer. Rather, the key to participation, and to good

discussions, is (aside from preparation) *honesty*. Be honest in stating what you do understand (or think you understand) and what you don't understand, and together we'll try to figure it all out.

EXAMS

The midterm exams will have a multiple-choice format. The final exam will have two parts: a non-cumulative multiple-choice portion that covers the last third of the semester; and an essay-based portion that covers the entire semester. You will receive the essay questions ahead of time.

RESEARCH PAPER

Many of the topics we discuss in class are controversial, with cognitive scientists themselves disagreeing about what the evidence shows. The point of the research paper is to force you to dig a bit deeper to get a feel for the nature of such controversies in cognitive science and the methods that are used to address them. You will be required to closely engage conflicting primary sources and weigh the evidence for yourself.

STUDENTS WITH DISABILITIES

Students who require special accommodations because of a disability should contact me as soon as possible with documentation from AccessTECH in the Student Counseling Center in West Hall. To preserve confidentiality, you may contact me in private or by email.

ACADEMIC INTEGRITY

Plagiarism will be taken extremely seriously. Without exception, the discovery of a plagiarized text will result in failure of the course and be forwarded to the Dean of the College, potentially resulting in further penalties as well. Information on Texas Tech's policy regarding academic integrity can be found at <http://www.depts.ttu.edu/studentjudicialprograms/academicinteg.php>. This link also includes information about how to paraphrase and cite sources.

LEARNING OUTCOMES & ASSESSMENT METHODS

Learning Outcomes	Assessment Methods
1. Identify and critique alternative explanations for claims about social issues and human behavior.	<ul style="list-style-type: none"> • Research paper • Essay-based examination • Class discussions
2. Demonstrate knowledge of the appropriate methods, technologies, and data that social and behavioral scientists use to investigate the human condition.	<ul style="list-style-type: none"> • Multiple-choice examinations • In-class experiments • Class discussions
3. Identify and characterize the principal techniques cognitive scientists use to study the mind.	<ul style="list-style-type: none"> • Multiple-choice examinations • Class discussions • Polling
4. Analyze and evaluate the core principles of cognitive science.	<ul style="list-style-type: none"> • Essay-based examination • Research paper • Class discussions

SCHEDULE & READINGS

The following is an outline of what we will cover this semester. The textbook for the course, *Cognitive Science: An Introduction to the Science of the Mind*, by José Luis Bermúdez, is available at the TTU bookstore. The remaining readings will be available online from TTU Course Reserves.

DATE	THEME	TOPICS	READINGS & ASSIGNMENTS
8/25	Precursors to Cognitive Science	Psychoanalysis & Behaviorism	
8/30	Early Theories & Results	Turing Machines & Computation	JLB, 5-16 Crane, <i>The Mechanical Mind</i> , 83-99
9/1		Language	JLB, 16-40
9/6		Marr's Theory of Vision	JLB, 47-54 Marr, <i>Vision</i> , ch. 1
9/8		Mental Imagery	JLB, 40-46 Shepard & Metzler, "Mental Rotation of Three-Dimensional Objects"
9/13	Enter the Brain	Basic Brain Anatomy; Two Visual Systems	JLB, 59-70; 325-335
9/15		Techniques for Brain Recording; Neural Seduction	JLB, 108-112; 335-361 Weisberg et al., "The Seductive Allure of Neuroscience Explanations"
9/20	Modeling the Mind I: Classical Architectures	Physical Symbol Systems; LOT	JLB, 145-164; 177-213
9/22		The Chinese Room; The Frame Problem	JLB, 165-171 Searle, "Can Computers Think?"
9/27	Exam 1		
9/29	Modeling the Mind II: Neural Networks	Motivations; Perceptron Convergence	JLB, 71-77; 215-233
10/4		Backpropagation; Sample Networks	JLB, 233-262; 277-281
10/6	Modeling the Mind III: Probabilistic Cognition	Bayesian Inference; Causal Nets	Griffiths et al., "Probabilistic Models of Cognition"
10/11	Fall Break—No Class		
10/13	Modularity	Input Systems & Central Systems	JLB, 287-303 Fodor, "A Précis of <i>The Modularity of Mind</i> "
10/18	Evolutionary Psychology	Evidence for Natural Selection; 3 Theses of Evolutionary Psychology	Pinker, <i>How the Mind Works</i> , 36-44; 149-174 Kurzban, Cosmides, & Tooby, "Can Race Be Erased?"
10/20		Massive Modularity	JLB, 303-320
10/25		Mate Selection	Pinker, <i>How the Mind Works</i> , 460-493 Brown et al., "Dance Reveals Symmetry Especially in

			Young Men”
10/27	Morality	The Puzzle of Altruism & Moral Emotions	JLB, 101-108 Pinker, <i>How the Mind Works</i> , 396-416
11/1	Exam 2		
11/3	Morality (cont’d)	Emotion-Based Theories	Pinker, “The Moral Instinct”
11/8		Dual Process Theories	Cushman, Young, & Greene, “Our Multi-System Moral Psychology”
11/10	Innateness	Depth Perception	Spelke & Newport, “Nativism, Empiricism, and the Development of Knowledge,” 275-277; 285-291
11/15			
11/17		Object Perception	Spelke & Newport, 291-299; 321-329 JLB, 262-274
11/22	Mathematics	The Number Sense	Dehaene, “Talented and Gifted Animals” Research Paper Due
11/24		Thanksgiving Break	
11/29		Integers & Beyond	Dehaene, “The Adult Number Line” Halberda, “Individual Differences in Non-Verbal Number Acuity Correlate with Maths Achievement”
12/1	Consciousness	Philosophical Theories	Chalmers, “The Puzzle of Conscious Experience”
12/6		Empirical Theories	Block, “Two Neural Correlates of Consciousness”
12/12	FINAL EXAM, 7:30–10:30a.m.		