Sample Syllabus 2

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.

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).

Class readings and quizzes

There are readings assigned for every class. See the table below. There will be 5 surprise quizzes during the semester. These will collectively count for 10% of the final grade.

Exams

There are three tests in the format of multiple-choice during the semester.
(Note: Test banks are available for instructors, please check it on the website of the textbook.)

Term paper

Information on length and topic will be distributed in due course.

DATE	TOPIC	TEXTBOOK READING	SUPPLEMENTARY READING
Week1-1	Introduction and overview	Introduction	
Week1-2	The turn away from behaviorism; Analyzing language	1.1, 1.3	Chomsky, 'Review of Skinner's *Verbal Behavior*'
Week1-3	Information and information-processing	1.4, 1.5	Miller, 'The magical number 7'
Week2-1	Computation and information	1.2	Tim Crane, *The Mechanical Mind*, pp. 83-99
Week2-2	Computer models of language	2.1	Nigel Ward, *SHRDLU*
Week2-3	Mental imagery	2.2	Shepard and Metzler, 'Mental rotation of 3D objects'
Week3-1	Marr's theory of vision	2.3	Marr, 'Artificial intelligence: A personal view'
Week3-2	Visual pathways in the brain	3.1, 3.2	Mishkin, Ungerleider, and Macko, 'Object vision and spatial vision'
Week3-3	Using PET to study lexical processing	3.4	Posner et al. 'Localization of cognitive operations in the human brain'

Week4-1	Event-related fMRI and the BOLD signal	3.5 and 3.6	Raichle, 'Bold insights'
Week4-2	**Review**		
Week4-3	**CLASS TEST**		
Week5-1	Physical symbol systems	4.1	Newell and Simon, 'Computer science as empirical inquiry'
Week5-2	The Language of Thought hypothesis	4.2	Block, 'The mind as the software of the brain' [sections 1 & 2 only]
Week5-3	The Russian Room and strong AI	4.3	Searle, 'Is the brain a digital computer'
Week6-1	Neurally inspired information processing; Single-layer networks	5.1, 5.2	Text only
Week6-2	Single-layer and multilayer networks	5.3, 5.4	Text only
Week6-3	Dynamical systems hypothesis	6.1	Beer, 'Dynamical approaches to cognitive science'
Week7-1	Applying dynamical systems	6.2	Smith and Thelen, 'Development as a Dynamical System'
Week7-2	Bayesianism in cognitive science 1	7.1, 7.2	Text only
Week7-3	Bayesianism in cognitive science 2	7.3	Text only
Week8-1	**Review**		
Week8-2	**CLASS TEST**		
Week8-3	The modularity of mind	8.2	Fodor, 'A précis of *The Modularity of Mind*'
Week9-1	The massive modularity hypothesis	8.3	Cosmides & Tooby. 'Reasoning and natural selection'
Week9-2	Cognition and neuroanatomy	9.1, 9.2	Mundale, 'Neuroanatomical foundations of cognition'
Week9-3	The neuroscience of attention	9.3, 9.4	Text only
Week10-1	Evaluating neuroimaging	11.5	Logothetis, 'What we can and what we cannot do with fMRI'
Week10-2	Language learning and rules	10.1, 10.2	Rescorla, 'The language of thought hypothesis'
Week10-3	Neural network models of language	10.3	Pinker and Prince, 'Rules and connections in human language'
Week11-1	Bayesian language learning	10.4	Chater, Oaksford, Hahn, and Heit, 'Bayesian models of cognition'
Week11-2	From machine learning to deep learning	12.1, 12.2	Text only
Week11-3	Deep learning 2	12.3, 12.4	Lecun, Bengio, and Hinton, 'Deep learning'

Week12-1	Mindreading and pretend play	13.1, 13.2	Stone and Gerrans, 'What's domain-specific about theory of mind?'
Week12-2	Mindreading system	13.3	Text only
Week12-3	Mindreading and simulation, The neuroscience of mindreading	13.4, 13.5	Davies, 'Simulation theory' Frith and Frith, 'The neural basis of mentalizing'
Week13-1	Situated Robotics	14	Clark, 'An embodied cognitive science'
Week13-2	The function of consciousness; Unconscious information processing	15.1, 15.2	Milner and Goodale, 'Two visual systems re-viewed'
Week13-3	The hard problem of consciousness; Global workspace theory of consciousness	15.3, 15.4	Block, 'On a confusion about the function of consciousness'
Week14-1	Ekman's basic emotions	16.1	Ekman, 'An argument for basic emotions.'
Week14-2	Affective space	16.2	Text only
Week14-3	Emotion of fear	16.3	Feinstein, Adolphs, Damasio, and Tranel "The Human Amygdala and the Induction and Experience of Fear"
Week15-1	**Review**		
Week15-2	**CLASS TEST**		

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