ITCS 6216/PSYC 6216/PSYC 6010 – *Introduction to Cognitive Science*

> *Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in **information**?*
> -T.S. Elliot

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Office Hours: **11 am – 1:**30 pm, TWR, open door policy 9-5 M-F, scheduled appts. not necessary

Text: *Cognitive Science: An Introduction to the Science of the Mind*, by Bermudez
Cognitive Science: An Interactive Approach, P. Goolkasian, Ed.

Lecture: TR 2:00– 3:15, 5094 Colvard

Prerequisites: By Permission

49er Express: All course-related documents (e.g., handouts, & homework assignments) and student grades will be posted on **Moodle pages** in 49er Express. See 49er Express webpage if you have problems: https://secure.uncc.edu/express/

Goals:
1) To undertake a survey of major topics in the sub-fields of cognitive science.
2) To identify the fundamental concepts in cognitive science.
3) To gain exposure to the scientific literature in cognitive science via assigned readings.

Overview: This course will provide an overview of cognitive science. That is, scientific research and theory regarding how cognitive systems, both biological and artificial, represent and process knowledge, and produce intelligent action.

Approximate Grading (based on total points earned)**:**

Online Chapter Quizzes	100 pts	29%
Term Paper: Topic Proposal & Partial List of References	20 pts	6%
Term Paper	80 pts	23%
1 Take Home Exam	50 pts	14%
Comprehensive Final (based on webtext multiple choice quiz questions)	50 pts	14%
Discussion Participation	50 pts	14%
	350 total	

Notes on Grades:

(A) Quizzes will be based on the CSAIA text and will be administered online in Moodle. Quizzes will be time-limited (20 minutes) and students may take each chapter quiz 3 times (only the highest score will be recorded in Moodle). Quiz deadlines will be indicated in the syllabus when the quizzes become available (see syllabus updated in Moodle).

(B) Students will write a term paper (10-15 pages, double-spaced, in APA or other similar scientific writing style appropriate for the student's home department) that is a focused review of an instructor approved topic from the cognitive science literature. Students will first turn in a brief paragraph outlining their term paper topic for instructor approval. The term paper should have a minimum of 7 references from the cognitive science literature (i.e., not counting textbooks or websites) that will be cited and discussed in the term paper, and a minimum of 3 references for the topic proposal.

(C) To demonstrate integrative learning, students will complete a take home examination, based on lectures and assigned readings in the first portion of the course. The format will be short essay on thought questions requiring integration of knowledge from a variety of sources for the course.

(D) The comprehensive final examination will be comprised of a random selection of questions from the quizzes associated with the CSAIA text chapters.

(E) Late work will, in general, be penalized by 20% of its original maximum value.

(F) Minor adjustments to weighting of assignments, quizzes, and exams may be necessary.

Academic Integrity: UNCC's code of Student Academic Integrity will be followed and enforced in this course. In particular, the following conduct is prohibited: cheating, fabrication and falsification, multiple submissions, plagiarism, abuse of academic materials, and complicity in academic dishonesty. A fuller description of this code can be obtained on p. 275 of the catalogue and complete text of it can be obtained from the Office of the Dean of Students. Violation of the code will result in failure for that activity, possible failure of the course, and possible reporting to Department Chair and Dean. Please see the instructor if you have any questions regarding what constitutes academic dishonesty.

Tentative Schedule :   (CS-Cognitive Science, M-Mind)

Week	Date	Topic(s)	CSAIA	CSAISM	Reading	Assignment
1	Jan. 10	Introduction				Watch Human Spark Online
	12	CRUM	1	6		*http://www.pbs.org/wnet/humanspark/*
2	17	CRUM			1	
	19	Emergence of Cognitive Science		1, 2		
3	24	Representation	2		2	
	26	Representation				
4	31	Representation			3, 4, 5	
	Feb. 2	Representation		6,7	6	
5	7	Cognitive Neuroscience	5	3		
	9	Cognitive Neuroscience				
6	14	Brain Imaging		11		
	16	Brain Imaging				
7	21	Working Memory, Imitation			7, 8	
`	23	Brain Machine Interfaces, Default Network			9, 10	
8	28	Dynamical Systems, Situated Cog.	12	13	12	
	Mar. 1				13, 14	Paper Topic Proposals Due
9	6, 8	***Spring Break* NO CLASS**				
10	13	Topical Discussion			11, 12	
	15	Topical Discussion			13, 14, 15	
11	20	Connectionism	6 (pt VII)	8		
	22	Connectionism				
12	27	Connectionism				
	29	Language	9			
13	Apr. 3	Language				
	5	Language				
14	10	AI	11			Watch NOVA Episode on Watson
	12	Robotics				**http://video.pbs.org/video/1786674622/**
15	17	Robotics & Topical Discussion				
	19	Paper Preparation, **NO CLASS**				
16	24	Topical Discussion			16, 17, 18, 19, 20	
	26	Topical Discussion			19, 20, 21	
17	May 1	Topical Discussion			22, 23	Take Home Midterm Exam Due
Final	8	Term Paper Consultation (***Tuesday, May 8th, 2:00-4:30 pm***)				**Term Paper Due, 8th at midnight**

NOTE: **(A)** Unforeseen circumstances may necessitate changes to course schedule or policies. Ample notice will be given. **(B)** If you have a specific disability that qualifies you for academic accommodation, please notify the instructor and provide certification (Office of Disability Services, 237 Fretwell, 704-687-4355, www.uncc.edu/dability/).

Readings

1. Scharenborg, O., & Boves, B. (2010). Computational modeling of spoken-word recognition processes: Design choices and evaluation. *Pragmatics & Cognition, 18*, 136–164. doi 10.1075/

2. Solomon, K.O., Medin, D.L., & Lynch E. (1999). Concepts do more than categorize. *Trends in Cognitive Sciences, 3*, 99-105.

3. Pylyshyn, Z. (2003). Return of the visual image: Are there really pictures in the brain? *Trends in Cognitive Sciences, 7*, 113-118. Doi:10.1016/S1364-6613(03)00003-2

4. Kosslyn, S. M. (2005). Mental images and the brain. *Cognitive Psychology*, *22*, 333-347. doi:10.1080/02643290442000130

5. Johnson-laird, P. N. (2010). Mental models and human reasoning. *Proceedings of the National Academy of Sciences, 107,* 18243–18250. doi:10.1073/pnas.1012933107

6. Anderson, J.R. (1995). ACT: A simple theory of complex cognition. American Psychologist, 51, 355-365.

7. Buchsbaum, B.R., & D'Esposito, M.D. (2008). The search for the phonological store: From loop to convolution. *Journal of Cognitive Neuroscience, 20*, 762-778.

8. Rizzolatti, G., & Sinigaglia, C. (2010). The functional role of the parieto-frontal mirror circuit: Interpretations and misinterpretations. *Nature Reviews: Neuroscience, 11*, 264-274.

9. Nicolelis, M.A.L. (2003). Brain-machine interfaces to restore motor function and probe neural circuits. *Nature Reviews: Neuroscience, 4*, 417-422.

10. Zhang, D., & Raichle, M.E. (2010). Disease and the brain's dark energy. *Nature Reviews: Neurology, 6*, 15-28.

11. Raichle, M.E., & Snyder, A.Z. (2007). A default-mode of brain function: A brief history of an evolving idea. Neuroimage, 37, 1083-1090.

12. Seidenberg, M.S. (2005). Connectionist models of word reading. *Current Directions in Psychological Science, 14*, 238-242.

13. McClelland, J.L., Botvinick, M.M., Noelle, D.C., Plaut, D.C., Rogers, T.T., Seidenberg, M.S., & Smith, L.B. (2010). Letting structure emerge: Connectionist and dynamical systems approaches to cognition. *Trends in Cognitive Sciences, 14,* 348-356.

14. Markman, A.B., & Dietrich, E. (2000). Extending the classical view of representation. *Trends in Cognitive Sciences, 4,* 470-475.

15. Goldman, A., & de Vignemont, F. (2009). Is social cognition embodied? *Trends in Cognitive Sciences, 13*, 154-159.

16. Regier, T. & Kay, P. (2009). Language, thought, and color: Whorf was half right. *Trends in Cognitive Sciences, 13*, 439-446.

17. Hagoort, P. (2005). On Broca, brain, and binding: A new framework. *Trends in Cognitive Sciences, 9*, 416-423.

18. Edelman, G. (2007, November 16). Learning in and from brain-based devices. *Science, 318*, 1103-1105.

19. Fleischer, J.G., & Edelman, G.M. (2009, September). Brain-based devices: An embodied approach to linking nervous system structure and function to behavior. *IEEE Robotics & Automation Magazine.* **NOTE: pdf available from Google Scholar.**

20. Bernardet, U., Valjamae, A., Inderbitzin, M., Wierenga, S., Mura, A. & Verschure, P.F.M.J. (2011). Quantifying human subjective experience and social interaction using the eXperience Induction Machine. *Brain Research Bulletin, 85*, 305– 312.

21. Greene, J.D., Nystrom, L.E., Engell, A.D., Darley, J.M., & Cohen, J.D. (2004). The neural bases of cognitive conflict and control in moral judgment. *Neuron, 44*, 389-400.

22. Gotlib, I.H., & Hamilton, P.J. (2008). Neuroimaging and depression: Current status and unresolved issues. *Current Directions in Psychological Science, 17*, 159-163.

23. Arnesten, A.F.T. (2009). Stress signaling pathways that impair prefrontal cortex structure and function. *Nature Reviews Neuroscience, 10*, 410-422.