***Research Methods in Cognitive Science* (PHI5340)**
Spring 2018 – Wednesday 6:00 to 8:50
Course Syllabus

Course Instructor Information

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Course Overview

Humans perceive and interact within a complex world and we have developed a phenomenal ability to understand and succeed in this world. We engage in a large number of cognitive and collaborative processes all by storing, recalling, and utilizing information. The foundational question is how it is that the human mind/brain does all these things. Cognitive Science helps us to answer this question and this course will present an introduction to this field, a recent scientific discipline emerging from the interaction of psychology, philosophy, computer science, neuroscience, linguistics, and anthropology. This course provides students with an overview of the differing disciplinary approaches taken to understand cognition and students will learn about the overarching methodologies of cognitive science by exploring how they have been used to address specific questions. Research methods are drawn from Experimental Psychology, Philosophy, Neuroscience/Neuropsychology, and Computer Science/Engineering to investigate the phenomena encompassing cognitive science. This course will strengthen student understanding of the nature of theory construction in cognitive science by discussing the varied methods developed for testing theories. Specifically, we will discuss each of the differing categories of methods in the context of (1) Memory; (2) Embodied Cognition; (3) Social Cognition; and, (4) Narrative.

Course Teaching Philosophy

My approach for this course is to view it more as an engaging dialogue among interested minds and less as a regurgitation of material. Within this seminar we will strive for a type of knowledge co-construction that can only emerge from a meaningful discussion of concepts from the readings. Each seminar should produce a complex narrative that we collectively weave together based upon our personal knowledge, the contributions from the readings, and the discussion during the class.

Course Objectives

This course combines a variety of instructional methods, blending seminar discussions, lectures, class activities, and student presentations. Given the differing disciplines involved in this field, the course content will involve more of a representative approach of these varied areas of inquiry rather than an exhaustive review. The overarching objective is to explore differing research methods employed in the study and conceptualization of cognition and how the cognitive sciences come to understand phenomena through a multidisciplinary research approach. Within this context there are a set of modules in which you will be exposed to differing research methods. For these modules you will have assigned readings made up of articles, chapters, and/or proceedings. As a result of fully participating in this course, you should be able to:

Content Knowledge and Skills

1) Discuss some of the major areas of study in the cognitive sciences
2) Understand the differing disciplinary angles within areas of inquiry in the cognitive sciences
3) Recognize how the merging of disciplines can help us understand cognition
4) Be able to conceptualize problems and research approaches (i.e., solutions) within cognitive science
5) Effectively integrate ideas across pertinent disciplines within cognitive sciences topics

Process Knowledge and Skills

1) Through your course papers, you will understand how to access relevant information effectively and efficiently
2) Via your developing analyses of the readings and our seminar discussions, you will be able to evaluate information and its sources critically and incorporate selected information into your knowledge base
3) Through your writing assignments you will be able to determine the nature and extent of the information that is needed and use this information effectively to accomplish your specific purpose

Course Grading

The final course grade will be determined by the following criteria (described in more detail later in syllabus)

- Participation in Class and Discussion Q&As– 225 Points
- Class Presentations – 150 Points
- Semester Project Papers – 125 Points

Total Points: 500

Grades will be determined on a percentage scale. A+ 100 – 98; A 97.9 – 93; A- 92.9 – 90; B+ 89.9 – 88; B 87.9 – 83; B- 82.9 – 80; C+ 79.9 – 78; C 77.9 – 73; C- 72.9 – 70; D+ 69.9 – 68; D 67.9 – 63; D- 62.9 – 60; F Below 60.

Week	Date	Class Topics and Readings
Week 1	01/10	Course Introductions and Overview
Module 1 – Experimental Psychology - *Understanding cognition through behavioral experiments*		
Week 2	01/17	Experimental Psychology RM Overview, and Liao et al. (2016)
Week 3	01/24	***No Class – National Academies of Science and NSF Meetings***
Week 4	01/31	Cutting et al. (2012) and Green (2004)
Week 5	02/07	Szpunar (2010) and Mahar et al. (2017)
Module 2 – Philosophy – *Approaching cognition through analytical thinking*		
Week 6	02/14	Philosophy RM Overview, and Floridi (2013)
Week 7	02/21	Cole et al. (2002) and Gallagher, S. & Brøsted Sørensen, J. (2006)
Week 8	02/28	Collins et al. (2008) and Cappelletto (2003)
Module 3 – Neuroscience – *Analyzing cognition by studying the brain*		
Week 9	03/07	Neuroscience RM Overview, and Cacioppo et al. (2003)
Week 10	03/14	***No Class – Spring Break***
Week 11	03/21	Krach et al. (2008) and Klin et al. (2003)
Week 12	03/28	Speer et al. (2009) and Jack et al. (2013)
Module 4 – Computer Science/Engineering – *Conceptualizing cognition through human technology interaction*		
Week 13	04/04	Computer Science RM Overview, and Nilsson et al. (2012)
Week 14	04/11	Pennathur (2013) and Admoni et al. (2014)
Week 15	04/18	Rosenberg et al. (2013) and Firger (2013), Hameed et al. (2010) and Norton (2006)
Course Conclusion		
Week 16	04/25	*Final Papers Due*

Detailed Description of Class Requirements

Class Participation and Article Discussion Questions (225 points total)

This course is a graduate seminar; as such, a substantial part of the learning will take place as part of the give-and-take of class discussion and debate. Therefore, all student participants will have read and thought about the assigned materials prior to coming to class. In order to have a fulfilling discussion it is essential that you give substantial thought to the articles. To facilitate this you are to complete the article summary sheet provided for each module (i.e., **one typed article summary sheet for each article**). This should be turned in to me at the end of each class for which those readings were assigned. Note that the summary sheet requests information taken from the paper in question as well as requires more substantive thought – the subsections respectively titled "Thinking Methodologically" and "Thinking Theoretically/Creatively". The goal with the summary sheet is to ensure that you have considered not only the main purpose of the paper, but also the broader issues associated with the paper's content. Your answers to these questions do not necessarily need to be lengthy, rather, it is more important that they be well thought out. Answering these summary sheets will also help you participate in the seminar discussion which is a component of your grade.

Article Lead Discussant (150 points total)

Content Knowledge and Skills

In addition to regular class participation, during the semester, **YOU** will be responsible for leading discussion on at least **TWO** of the weekly readings (see separate sheet for your assignment). This will require a PowerPoint presentation of the material. The purposes of this are first, to develop skill in organizing and presenting information and, second, to allow you to think more deeply about the material presented in the reading. Your presentation should provide an overview/summary of the paper along with criticisms/issues you would like to raise for discussion on this paper. A good presentation would integrate material across the readings and highlight the similarities and differences in the approaches presented in the papers. For example, you might want to note how the weaknesses in one of the approaches presented can be strengthened via an approach from one of the other papers. Essentially, do your best to show how these papers/approaches complement each other and help us understand a given issue.

Process Knowledge and Skills

In order to lead to a demonstration of information fluency in Cognitive Science and encourage multidisciplinary thinking, you are to use your own experience and/or area of inquiry as a way to enhance your presentation. So the latter portion of your presentation should discuss the paper from the context of your domain of interest and critically evaluate its strengths and weaknesses from that particular disciplines perspective. Related to this, you are to bring three "thought" questions for your reading that you will use to lead a discussion with the class and help students to similarly think critically about the readings. Given the goal of fostering multidisciplinary thinking you should use your personal area of interest as a stepping off point for these questions. Additionally, you should be comfortable enough with the material in your paper to be able to adequately field any questions that are asked during/after your presentation. If you email your PPT to me by 2:00pm on the day of your presentation, I will print copies for your. Otherwise, you will need to supply a copy of your slides for each student in the class (using the printing function in PPT that prints 3 slides per page with the "notes" section adjacent).

Semester Project Research Paper (125 points)

For this project you are to choose a particular topic within the cognitive sciences and explore it via development of a conceptual issue or problem. You are to do this through an analysis of the relevant ideas via a research proposal. Your proposal should involve solving/addressing the problem area you have identified. Depending upon your interests this research can involve either an experiment or development of a model/simulation/technology. The first part of this paper process will be development of an idea and outline for the paper as well as an agreed upon initial reading list for your paper. For your final paper you should first present a critical literature review and then follow this with your means of investigating the question of interest.