Course: PNP 201 Inquiry in the Cognitive Sciences

Instructor: Carl Craver (ccraver@wustl.edu)
Office Hours: Tuesday after class and by appointment
Ground Floor, Wilson Hall.

TAs: Arnon Cahen (acahen@artscl.wustl.edu)
Office Hours: Tues. 1-2,
Ground Floor, Wilson Hall.
Adam Shriver (ajshrive@artscl.wustl.edu)
Office Hours Thurs. 1-2.
Ground Floor, Wilson Hall.

Course Description: A technique-based introduction to contemporary cognitive science.

From this course, you will gain:
1. reading knowledge of the central techniques of cognitive science;
2. understanding of the strengths and weaknesses of different investigative strategies;
3. understanding of how different techniques can be integrated in the study of the mind-brain;
4. ability to find, read, summarize, and criticize research reports; and
5. basic theoretical background knowledge relevant to cutting-edge cognitive science.

Course Structure: After a brief introduction to cognitive science, we will consider one technique per week. In general, the first reading for the week provides a general overview to the technique. The second reading is a research report that features the technique in action. Students will write “journal club” papers on the article in order to learn to extract relevant information, to critically evaluate experiments, and to convey that information to others.

Course Texts:
Journal club readings available online at the library.

Grading:

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<td>Mid-Term Exam</td>
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<td>Final Exam</td>
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<td>Journal Clubs</td>
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<td>Attendance/Participation</td>
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Components:

Mid-Term and Final Exams are designed to test basic mastery of basic course content AND to assess the depth of that mastery. Exams are partly multiple choice, partly short-answer, and partly essay. The exams are not cumulative (that is, the final will be drawn from only material presented in class after the mid-term).

Journal Clubs are short two-page papers designed to teach you how to read, summarize, and criticize research in cognitive neuroscience. The page limit is strict: Papers more than 650 words will be returned without a grade (include word-count with name and paper title in header). Papers must be spell-checked and grammar-checked or they will be returned without grade. Papers should be turned in by hard copy to Arnon and Adam by the beginning of class. Late papers immediately drop by 1/2 letter grade, and they fall by one letter grade per day after that. Your grade will be
based on the best three of five possible journal clubs for each student group. Group A (A-M) and Group B (N-Z) are designated on the syllabus and will alternate journal clubs.

Journal club papers will list and answer the following questions of the research report in question. Answers will be discussed in class.

1) **What was done?**
   What is the central experiment/set of experiments in this report? What are the most salient aspects of the methods?
2) **Why was it done?**
   What is the motivation for having done the experiment? How do they introduce the topic?
3) **What did they find?**
   What are the crucial numerical comparisons/data that constitute the central findings of the paper?
4) **What does it mean?**
   What conclusions do they draw from this data?
5) **What's wrong/What's left?**
   What are the limitations of the study? What further studies could be done?

Students NOT writing on a given week will be expected to answer questions about the text as participation. Furthermore, they will be responsible for answering questions about the material on the exam.

**Attendance and Participation:** The TAs will take attendance every week. We will also make note of class participation, especially during journal clubs.

**Cheating and/or Plagiarism** will not be tolerated. Those caught cheating or plagiarizing will fail the course and will be recommended to the student judicial board. Specifically, you are not allowed to copy text, or even to closely paraphrase text, from the journal club article into your journal club paper.
Course: PNP 201 Inquiry in the Cognitive Sciences
Instructor: Carl F. Craver (ccraver@wustl.edu)
    Office Hours: Wed. after class and by appointment
    Ground Floor, Busch Hall
TA: Matt James (mdjames@wustl.edu)
    Office Hours: Wed. 11:30-12:30, Fri. 3-4
    Ground Floor, Busch Hall

Course Description: An introduction to the methods, models, and techniques used in contemporary cognitive science.

From this course, you will gain:
1. reading knowledge of the central techniques of cognitive science.
2. understanding of the strengths and weaknesses of different investigative strategies;
3. understanding of how different techniques can be integrated in the study of the mind-brain;
4. ability to find, read, understand, and summarize original research reports;
5. basic theoretical background knowledge relevant to cutting-edge cognitive science.

Course Structure: After a brief introduction to cognitive science, we will consider one technique per week. The first reading for the week provides a general overview to the technique. The second reading is an original research report or review article that features that technique in action. Articles have been chosen for currency and intrinsic interest.

Course Texts:


Journal club readings available online as library journals.

Grading:

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Components:

Mid-Term and Final Exams are designed to test basic mastery of basic course content AND to assess the depth of that mastery. Exams are partly multiple choice, partly short-answer, and partly essay. The exams are not cumulative (that
is, the final will be drawn from only material presented in class after the mid-term).

**Journal Clubs** are designed to teach you how to read, summarize, and discuss recent research reports in cognitive neuroscience. Papers more than 650 words will be returned without a grade (include word-count with name and paper title in header). Papers must be spell-checked and grammar-checked or they will be returned without grade. Papers should be turned in by hard copy to Matt James by the beginning of class. Late papers immediately drop by 1/2 letter grade, and they fall by one letter grade per day after that. You will do a total of three journal clubs, and you will turn them in on the day assigned to your group on the class calendar: Group A (last name starting with A-H), Group B (last name starting with G-N), or Group C (last name starting with O through Z).

Journal Clubs will list and answer the following questions in order:

1) **What was done?**
   What is the central experiment/set of experiments in this report? What are the most salient aspects of the methods?

2) **Why was it done?**
   What is the motivation for having done the experiment? How do they introduce the topic?

3) **What did they find?**
   What are the crucial numerical comparisons/data that constitute the central findings of the paper?

4) **What does it mean?**
   What conclusions do they draw from this data?

5) **What’s wrong/What’s left?**
   What are the limitations of the study? What further studies could be done?

Students NOT writing on any given week will be expected to answer questions about the text and will be responsible for answering questions about it on the exam.

**Extra Credit.** Students can achieve 4 points of extra credit added to the overall score by attending all of the WIPS during the semester. Consult the PNP Calendar for dates and times. Aside from that, there is no extra credit. You should also sign up to be on the PNP mailing list and attend the PNP Club meetings.

**Attendance and Participation:** Matt James will take attendance every week. We will also make note of class participation, especially during journal clubs.

**Cheating and Plagiarism** will not be tolerated and will fail the course and will be recommended to the student judicial board. Specifically, you are not allowed to copy text, or even to closely paraphrase text, from the journal club article into your journal club paper.
Course Calendar

August 29 Course Introduction

OVERVIEW: The Structure of Cognitive Neuroscience

August 31 An Example: Blindspots
Reading: Ramachandran, V.S. Phantoms in the Brain Chapter 4 (handout).

September 5 Mechanisms, Explanation, and the Causal Structure of the Mind-Brain
Reading: Craver Explaining the Brain Chapter 1 (emailed to class)

September 7 Interlevel Integration and the Mosaic Unity of Neuroscience
Reading: Kandel and Squire “From Mind to Molecules” in Memory: From Mind to Molecules Scientific American. (on eres)

September 12 Supermodels and Chiasma

September 14 Cognitive Neuropsychology I
Reading: SRG Chapter 2

September 19 Neuropsychology Journal Club
Bonus Material: Video of K.C.
Journal Club: Group A
Assignment note: PICK ONLY ONE ISOLABLE STRAND OF EXPLORATION AS THE FOCUS FOR YOUR JOURNAL CLUB REPORT.

September 21 Neuropsychology in Non-Human Primates
Reading: SRG Chapter 3

September 26 Non-Human Primates Journal Club
Reading: (Available online) Machado and Bachevalier 2006. The impact of selective amygdala, orbital frontal cortex, or hippocampal formation lesions on established social relationships in rhesus monkeys (Macaca mulatta). Behav Neurosci.Aug;120(4):761-86.
Journal Club: Group B

September 28 Electroencephalography (EEG)
Reading: SRG Chapter 10
Oct 3 EEG Journal Club
Journal Club: Group C

October 5 functional Magnetic Resonance Imaging (fMRI)
Reading: SRG Chapter 9

October 10 fMRI Journal Club
Journal Club Group A

October 12 Transcranial Magnetic Stimulation (TMS)
Reading: SRG Chapter 1

October 17 TMS Journal Club
Journal Club Group B

October 19 Computers and Cognition
Reading: Turing Computing Machinery and Intelligence (ERES)

October 24 Exam Review

October 26 Mid-Term Exam

October 31 Brain Day
Come in your favorite brain-related costume.

November 2 Connectionism I
Reading: Gluck and Myers Chapters 1 and 2 (ERES)

November 7 Connectionism II
Reading: Gluck and Myers Chapters 3 and 4 (ERES)

November 9 Connectionism Journal Club
November 14 Single Neurons and Primate Cognition
   Reading: SRG Chapter 6

November 16 Single Unit Recording Journal Club
   Journal Club Group A

November 21 Chemistry and Cognition
   Reading: SRG Chapter 13

November 23 Magnetic Resonance Spectroscopy Journal Club
   Journal Club Group B

November 28 Imaging Genetics
   Reading: SRG Chapter 11

Nov 30 MYSTERY, SURPRISE, FUN, FUN, FUN

December 5 Imaging Genetics Journal Club
   Assignment note: PICK ONLY ONE ISOLABLE STRAND OF EXPLORATION AS THE FOCUS FOR YOUR JOURNAL CLUB REPORT.
   Journal Club Group C

December 7 Wrap-up Day/Final Review