PSYC 4512 Section 01 Neuropsychology  
CRN: 35385  
Spring 2017

Time: Tuesday and Friday 1:35-3:15 PM  
Location: Shillman Hall Room 220  
Instructor: Jamie G. Bunce, PhD  
Email: j.bunce@northeastern.edu *Email is the best way to reach me.  
Phone: 617-373-6327  
Office hours: Tuesday and Friday 9:30-11:30 AM and by email appointment.  
Office: 382 Nightingale Hall (Please use the phone at the entrance to the 3rd floor to dial my extension [x6327] and I will escort you to the office).  
Prerequisites: PSYC 3458

Course Description:  
We will examine the organization, emergent function and psychopathology of three fundamental neuropsychological networks: the corticolimbic, corticostriatal and corticohippocampal circuits. Over the course of the semester we will explore these circuits from a systems neuroscience perspective, relating functional anatomy to physiology and behavior. In addition, we will examine the role these circuits play in psychiatric disorders. Lecture content will be supplemented by group presentations of scientific articles describing findings from the current neuroscientific literature.

Learning Outcomes:  
1) Identify and describe the key components and functions of the corticolimbic, corticostriatal and corticohippocampal circuits  
2) Describe fundamental concepts that apply to advanced topics in neuropsychology  
3) Evaluate, orally, current theories and relevant scientific research on advanced topics in neuroscience.

Class Web Site: Class documents, assignments, grades, and resources will be available on our Blackboard site, which also includes communication tools for the class. Check Blackboard regularly for updates and announcements.

Reading Assignments: There is no required textbook for this course. If you wish to have a resource to reinforce what we cover in class, I recommend the following textbook:


We will read a number of primary research articles and reviews over the course of the semester. You will also have an opportunity to present a scientific article to the class as part of a small group. Please see “group presentations” below.

PDFs of articles will be posted on Blackboard. Everyone, with the exception of those presenting the article that day, should post a write-up of the assigned article to Blackboard
by 9PM the day before class. Write-ups should include a brief summary of the article describing, in your own words, what the article was about and why it is significant. Additionally, write-ups should include a question that emerged from the article. Questions can include “muddy concepts” or “next steps” that would carry the research further.

Class Format: This course will consist of in-class lectures and discussions covering topics and concepts related to neuropsychology. Throughout the semester we will incorporate active learning sessions to discuss topics at hand.

My lecture slides will be posted on Blackboard before class to help with note taking.

CO-OP: If, at any time, we are covering a topic that is relevant or related to your co-op experience (or one you are planning to do), please share your experience and/or insight with the class.

Grading:
Exams: 3 @ 60 % of final grade
Quizzes: 3 @ 20 % of final grade
Presentations @ 10% of final grade
Write-ups: 10% of final grade (I will drop the lowest write-up score).

Exam and quiz format may consist of: Multiple choice (scantron), Short answer, Essay, Fill-in the blank, Matching, Problem Solving, and True/False. Exams will account for 60% of your final grade.

Quizzes are designed to encourage you to regularly review your notes as well as assess the effectiveness of my lectures. Quizzes will be given at the beginning of class and should take no more than 45 minutes to complete. No make up quizzes will be given. We will have 3 quizzes over the course of the semester. Quizzes will account for 20% of your final grade.

Group Presentation: As a group, you will present (e.g., PowerPoint) a primary research article relevant to the topic du jour which I will provide. Each group will have 45 minutes to present their article to the class. Presentations should be organized around the article figures. Each group member should present at minimum, 1 figure highlighting what the figure shows and why it is significant to the overarching hypothesis of the article. To introduce the figure, each presenter should provide necessary/appropriate context to the audience, briefly highlighting relevant background information, relating findings to prior figures (when applicable) and briefly summarizing methodology used. The primary focus of the presentation should be on the results and conclusions conveyed by the figures along with an evaluation of how the research was conducted and its significance. Groups are strongly encouraged to practice the presentation ahead of time, to ensure information is conveyed clearly and concisely. Grading will reflect incomplete presentations. I will provide a handout with more detailed information on presentations and a rubric I will use for assessing presentations. Prior to class, groups should post or email their slides to assist in note taking and each group member should email me an “elevator talk” write-up, summarizing, in their own words, what they are presenting.
Grades will be on the ABCDF scale with +/- modifiers. It is anticipated that letter grades for this course will be assigned to the scale below.

A    93-100  4.0
A-   90-92   3.6
B+   87-89   3.3
B    83-86   3.0
B-   80-82
C+   77-79
C    73-76
C-   70-72
D+   67-69
D    63-66
D-   60-62
F    <60

**Course Policies:**

This course follows the College of Science Academic Course Policies, which are viewable at this link:


**Exam Policy:** Students will only be allowed to use the following materials during an exam: writing utensils, plain white scrap paper, and a basic calculator (if necessary). Students will not be allowed to use text books, notes, cell phones, e-readers, tablets or laptops during the exam period. Students caught with any of these materials will receive and automatic zero for the exam. Students will have the allotted class time to complete exams. Exams will primarily cover material from the current period, though knowledge of fundamental concepts covered earlier in the semester will be assumed. Make up exams can be scheduled should you have an unavoidable health or personal emergency. Only one make up exam per student per semester will be offered. Please contact me as soon as possible if you have a conflict with an exam so we can make the appropriate accommodations for you.

**Cell Phone Policy:** If there is a problem or emergency please excuse yourself and step outside of the classroom to take or make a phone call. Students who are disruptive during the class period will be warned, and receive a 2% deduction from your final grade for each time the instructor needs to address you after the first warning.

**Getting Help:** Come to my office hours; make an appointment to see me at another time; email me with questions.
**Peer tutoring:**
Students requiring additional help are advised to come to my office hours (see above) with questions. Peer tutoring is also available through the Peer Tutoring Program via this link:

http://www.northeastern.edu/undergraduate/mentoring-advising/

**Statement on Academic Integrity:**
I adhere to Northeastern’s Policy on academic integrity:

http://www.northeastern.edu/osccr/academic-integrity-policy/
Academic dishonesty is a serious offense and renders the offender liable to disciplinary action. Students caught violating the policy will be penalized according to the severity of the offense. Possible penalties range from grade reduction to failure of the course.

**Students with Disabilities:**
Accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, students must register with the Disability Resources Center (DRC), 20 Dodge Hall (x2675).
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In the event that class is canceled, all due dates (e.g., exams, quizzes) will be shifted to the next class.

Unit I: The Corticolimbic Circuit for Recognition and Reaction

01/10
1) Introduction to Neuropsychology
Review: Blumenfield Neuroanatomy through Clinical Cases; Chapter 2: Neuroanatomy Overview and Basic Definitions
How we study the brain: observation, imaging, physiology
Review: Blumenfield Neuroanatomy through Clinical Cases; Chapter 4: Introduction to Clinical Neuroradiology

01/13
2) Organization of the Corticolimbic Circuit Continued
Role of hypothalamus, brain stem, substantia innominata, insula, hippocampus and prefrontal cortex

01/17
3) Organization of the Corticolimbic Circuit Continued

01/20
4) Organization of the Corticolimbic Circuit Continued
Sequence of information processing
Presentation 1) Timbie & Barbas, 2015 Pathways for emotions: Specializations in amygdalar, mediodorsal thalamic, and posterior orbitofrontal network

01/24
Quiz #1
5) Order of the Corticolimbic Circuit
Fear learning, extinction and recall
Review: Shackman and Fox, 2016 Contributions of the central extended amygdala to fear and anxiety.

01/27
6) Corticolimbic Order Continued
Presentation 2) Mendez-Bertolo et al., 2016 A fast pathway for fear in human amygdala.
01/31
7) Corticolimbic Order Continued
Facial expressions and fear
Review: Marsh, 2016 Understanding amygdala responsiveness to fearful expressions through the lens of psychopathy and altruism.
Presentation 3) Pera-Guardiola et al., 2016 Brain structural correlates of emotion recognition in psychopaths.

02/03
8) Corticolimbic Circuit Disorder
Disorders associated with amygdala hyperactivity
Presentation 4) Yoon et al., 2016 Recovery from posttraumatic stress requires dynamic and sequential shifts in amygdalar connectivities.
Presentation 5) Quinones-Laracuente et al., 2015 The effect of repeated exposure to ethanol on pre-existing fear memories in rats.

02/07
9) Corticolimbic Circuit Disorder Continued
Autism
Presentation 6) Nickl-Jockschat et al., 2015 Neural networks related to dysfunctional face processing in autism spectrum disorder.

02/10
10) Corticolimbic Circuit Disorder Continued
Psychopathy, depression and Williams syndrome
Presentation 7) Hilimire et al., 2015 Effects of subcallosal cingulate deep brain stimulation on negative self-bias in patients with treatment-resistant depression.

02/14
EXAM #1

Unit II: Corticostriatal Circuit for Motivation and Action

02/17
11) Organization of the Corticostriatal Circuit
Dopaminergic pathways

02/21
12) Corticostriatal Circuit Order
Review: Haber and Behrens, 2014 The neural network underlying incentive-based learning: implications for interpreting circuit disruptions in psychiatric disorders.
Presentation 8) Heilbronner et al., 2016 Circuit-based corticostriatal homologies between rat and primate.
02/24
13) Corticostriatal Circuit Order Continued
Reward Learning
Costs vs. Rewards
Trust and Schadenfreude
Presentation 9) Rock et al., 2016. An inhibitory corticostriatal pathway.

02/28
QUIZ #2
14) Corticostriatal Circuit Order Continued
Review: Salamone et al., 2016 Activational and effort related aspects of motivation: neural mechanisms and implications for psychopathology

03/03
15) Corticostriatal Circuit Disorder
Presentation 10) Yohn et al., 2016 Not all antidepressants are created equal: differential effects of monoamine uptake inhibitors on effort-related choice behaviors.

03/04-03/12 NO CLASS SPRING BREAK

03/14
16) Corticostriatal Circuit Disorder
Disorders associated with ventral striatum hypo- and hyperactivity
Presentation 11) Jimenez-Sanchez et al., 2016 Behavioral, neurochemical and molecular changes after acute deep brain stimulation of the infralimbic prefrontal cortex.

03/17
17) Corticostriatal Circuit Disorder Continued

03/21 EXAM #2

Unit III: Corticohippocampal Circuit for Memory and Executive Control

03/24
18) Organization of the Corticohippocampal Circuit
Organization of the hippocampal formation
Medial temporal lobe memory system
Pathways to and from the hippocampus
Review: Hasselmo, 2015 If I had a million neurons: potential tests of cortico-hippocampal theories.
03/28
19) Corticohippocampal Circuit Order
   Memory
   Long term potentiation
   Physiological Dynamics

03/31
20) Corticohippocampal Circuit Order Continued
   Prefrontal cortex and executive control
   Working memory
   Response selection

04/04
   QUIZ #3
21) Corticohippocampal Disorder
   Alzheimer’s Disease

04/07
22) Corticohippocampal Disorder Continued
   Amnesic syndromes
   Clive Wearing
   Henry Molaison
   Presentation 13) Annese et al., 2014 Postmortem examination of patient H.M.’s brain based on
   histological sectioning and digital 3D reconstruction

04/11
23) Corticohippocampal Disorder Continued
   Presentation 14) Lendvai et al., 2013. Neurochemical mapping of the human hippocampus reveals
   perisynaptic matrix around functional synapses in alzheimer’s disease.

04/14
24) Corticohippocampal Disorder Continued
   Prefrontal executive control dysfunction
   Anxiety disorders
   Bipolar disorder

04/18
25) Corticohippocampal Disorder Continued
   Obsessive compulsive disorder
   Executive control dysfunction and schizophrenia

EXAM 3 – (Held during finals week. Date, time and location TBA)

This syllabus is subject to change with notification.