

Introduction to Behavioral Neuroscience: NEU 2100

This course is designed to give students a broad exposure to the biological basis of behavior. The nervous system is the central focus of this course.

Fall 2019

T 6:00-9:00

Straz 299



Kate Sadler, PhD

ksadler@carthage.edu

office hours: 5-6pm T or by appointment

favorite brain region:
amygdala

favorite paper from 2019:
Abdo et al. *Science* 365:695-699

 @katesadler77

After completing this course, you should be able to:

- Describe the molecular, cellular, and tissue-level organization of the nervous system
- Discuss how specific brain regions contribute to normal behavior; hypothesize what aberrant behaviors may occur when brain regions are damaged/diseased
- Diagram how information is transmitted in and between neurons
- Identify key information from each section of a primary literature article
- Present scientific facts to your peers and engage in related discussion

How can I succeed in this course?

Attend and actively participate in class. I do not take attendance roll call-style at the start of class, but I make a point of knowing all of my students' names early in the semester. Our class isn't very big so I'll notice if you're not around/participating actively in class. Additionally, LATE WORK will NOT BE ACCEPTED unless you have an officially excused absence (i.e. a medical issue confirmed by a doctor and/or the Dean of Students' Office, or participation in a Carthage sporting/organization event). Therefore it is critical that you attend all classes so that you can turn all of your assignments in on time.

Check Schoology often. This online hub hosts all things class related including the following: lecture outlines, PDFs of lecture slides (posted after class), the "questions after class" submission area, peer-reviewed papers and accompanying assignments, and gradebook.

Think about class outside of class. While there are no required textbooks for this course, I use Kalat *Biological Psychology* (any addition) and *Neuroscience* by Purves (PDFs of older editions are available online: <https://www.hse.ru/data/2011/06/22/1215686482/Neuroscience.pdf>) as guides for many of the lectures. Reading the accompanying book chapters, going over lecture slides, or talking about neuroscience with your peers is a great way to keep your brain engaged all semester.

How will this course be graded?

- **Exams (60%):** There will be three exams in this course, each worth 20% of your final grade. All exams are “take-home”; exams will be posted on Schoology on Thursdays and due in class the following Tuesday. On exam due dates, you will get 30 min to discuss (and amend) your answers with classmates. Don’t wait to start the exams until Tuesday morning. The exam questions have been designed to make you think and will not consist of material that can be quickly found on Google or Wikipedia.
- **Assignments (15%):** Short assignments will be assigned for completion outside of class. More detail will be provided when assigned.
- **Weekly questions (5%):** After class each week you will need to think of one question that you have; good scientists always have more questions. Your question *should be* on the material that was covered in lecture that week but could also be on a related neuroscience topic. Questions should be submitted on Schoology before Friday evening (11:59 pm), leaving me time to prepare select answers for the following class meeting.
- **Five-min neuroscience fact assignment/presentation (10%):** Each week, three or four students will give a 5 min presentation on an interesting topic in neuroscience. Example topics include: why can’t humans tickle themselves? Why is laughter contagious? Students will present and explain the neurological basis of their fact to the class in whatever format they choose; bonus points may be awarded for creativity! On presentation day, students will also hand in a one page (max) write-up about their fact including a citation list containing the peer-reviewed or reliable sources that they used to develop their presentation. A presentation sign-up sheet will be available on the first day of class.
- **Paper reviews (10%):** Over the course of the semester, you will read the following peer-reviewed journal articles:
 1. Tye et al. (2011) Amygdala circuitry mediating reversible and bidirectional control of anxiety. *Nature* **471**(7338): 358-362
 2. Martin et al. (2019) Male-specific conditioned pain hypersensitivity in mice and humans. *Current Biology* **29**: 1-10Reading guides will be completed for each section of the paper. The purpose of these assignments is to introduce you to peer-reviewed research and the many forms in which it is disseminated.

Final grades will be reported as follows: A (100-90), B (89-80), C (79-70), D (69-60), F (<60)

A note on academic honesty: academic dishonesty (e.g. plagiarism, collusion and unauthorized cooperative work, false citations, submitting somebody else’s work, etc.) will not be tolerated. Our class will follow the Carthage Community Code for academic dishonesty and associated penalties: <https://www.carthage.edu/community-code/academic-concerns/academic-honesty-guidelines/>

Students with Disabilities: Students with documented disabilities are entitled to accommodations that ensure equal access to Carthage learning experiences. Students are responsible for contacting the Center for Student Success and providing current documentation. Students who do not have current documentation or suspect they may have a learning disability may arrange for assessment services. For further information about support for students with disabilities at Carthage, please contact Diane Schowalter in the Center for Student Success at 262-551-5802. You need to present and discuss these accommodations with me within a reasonable period, prior to the Add/Drop Deadline.

Class Schedule

Date	Class	Topic	Activities	Due in class
09/10	01	Course introduction Cells of the nervous system		
09/17	02	Neuroanatomy overview Nervous system development (Dr. Ryan Hillmer; rhillmer@mcw.edu)	 Neuroanatomy case study game Plastinated brain on display	Neuroanatomy study guide
09/24	03	Electrical transmission in neurons	Acting out an action potential	P1: Introduction study guide
10/01	04	Chemical signaling between neurons	Backyard Brains spiker boxes	P1: Methods/results study guide
10/08	05	Mechanisms of drug action	Flipped classroom; review material on Schoology BEFORE coming to class	P1: Discussion study guide
10/15	06	Vision	30 min for Exam 1 review Optical illusion demonstration	Exam 1
10/22	NO CLASS: FALL BREAK			
10/29	07	Smell, taste, vestibular senses, hearing	Miracle berries taste tripping	
11/05	08	Touch, pain, itch	Homunculus mapping	Miracle berries questions
11/12	09	Hypothalamus and neuroendocrinology	30 min for Exam 2 review	Exam 2
11/19	10	Learning and memory (Dr. Nicole Ferrara and Dr. Sydney Trask; nicole.ferrara@rosalindfranklin.edu . trask@uwm.edu)	  Classical conditioning (shock reflexes) IRL	P2: Introduction study guide
11/26	NO CLASS: THANKSGIVING RECESS			
12/03	11	Limbic system and emotional processing		P2: Methods/results study guide
12/10	12	Cognition, attention, and neurodegeneration		P2: Discussion study guide
12/12	Final	Turn in Exam 3		Exam 3