PSYC 315: Introduction to Neuroscience
Department of Psychology & Neuroscience

Target Audience: Neuroscience is a field that seeks to understand the structure and function of the nervous system and brain. This course is intended for undergraduate students interested in understanding the molecular, cellular, behavioral, and computational mechanisms of the brain.

Course Goals and Key Learning Objectives:
- Describe some of the current methods used in neuroscience research
- Explain experimental design
- Describe the basic anatomy of the cell types of the CNS, including their main components
- Describe fundamental neuroanatomy of the human brain
- Describe how neurons communicate
- Describe the organization and function of sensory systems (taste, visual system)
- Describe the biological basis of anxiety and affective disorders, and available treatment
- Explain the importance and usefulness of animal models in neuroscience
- Describe the neurobiological basis of memory

Required Textbook: Neuroscience: Exploring the Brain, 4th edition (Note: there are books on reserve at the Undergraduate Library.)

Course Structure: We are going to use a lot of class time engaging in small group active-learning activities (e.g. problem-solving, discussion, etc.). Using this approach means that you will need to make a significant effort to be an active learner. The instructor and your instructional assistants (IAs) are eager to facilitate your learning during class time. Rather than sitting passively listening to lectures, important concepts will be introduced via the pre-assigned readings, and in some cases, short videos. During class you will come prepared to use what you have learned by putting larger conceptual ideas together and designing experiments. This approach is a lot more fun than sitting passively listening to a lecture! And besides being fun, you will have many opportunities in class to work through concepts that are giving you trouble, or practice explaining concepts to your peers. There is research showing that one of the best ways to learn is to teach! Thus, during class, I will encourage you to work on the assigned activities in small groups. This means that you will need to make sure you come to class prepared to work.

<u>You can prepare for class by following these steps</u>
1. Complete the assigned readings and watch the online videos before class.
2. Do the study questions, making sure you answer the questions in your *own words*. Bring your responses with you to class to work on them further with your peers.
3. Do the timed online quizzes to assess your reading comprehension.
4. Identify the concepts that you are having difficulty with so that you can work through these concepts with me, your IAs, and/or your peers. *Please remember that we are all here to make sure that you succeed in this class! If you are having trouble, please see one of us for help. And the sooner the better. There is very little that we can do to help you succeed if you wait until the end of the semester*

WHAT YOU SHOULD BRING TO CLASS EVERY DAY:

1. A laptop or notebook for note taking. Note: educational research shows that students learn more by handwriting notes!
2. Extra blank paper for drawings, notes, activities etc.
3. 3 x 5 index cards with or without lines, preferably white.
4. A smart-device: either your laptop/ipad/smartphone enabled for UNC wi-fi access.

Course Requirements:

1. **Quizzes (10%)**: Online timed quizzes will be used as a study tool and to assess your learning. These quizzes will help you keep abreast of your reading for the class, and will help you determine if you took away key concepts from the reading. As you read your textbook, take notes in your own words. To assist you in targeting important concepts, selected review questions from the end of the textbook chapter and study questions are highlighted or provided. Be sure to use these tools to prepare for the quizzes. Sitting with your textbook and a highlighter is not likely to be productive. Quizzes are due *prior* to the relevant class, closing 1 hour before class begins. Quizzes will include 5-10 multiple choice questions. Your lowest 2 quiz scores will be dropped. *Make up quizzes will not be administered.* ***Tip:*** Although you are allowed to use your textbook and notes when you take the online quizzes, I recommend that you do them without guidance. The quizzes are meant to serve as a diagnostic tool to help you determine if you understand what you read.

2. **Reading questions (3%):** Extra readings outside of the textbook will be used to prepare you for the guest lecturers who will come to talk about their research. A set of reading questions accompany the assigned readings. You will complete the reading and the questions before the designated class, submitting your responses to the reading questions via Sakai. Note that reading questions are distinct from the study questions you will work on before and during class time. In some cases, your reading questions may be related to textbook readings (e.g., on days when there are guest lectures). Be sure to answer these and submit them on Sakai one hour before class time.

3. **Participation (12%):** participation points will be earned using PollEverywhere (https://pollev.com/neurons) and by actively participating in class. For the first week of class, a response to the Poll will earn one participation point. After that, a correct response to the Poll will continue to earn one point, and an incorrect response will earn half a point. *Please remember to register for PollEverywhere, as unregistered responses cannot earn points.*

4. **Design an experiment (25%):** For these assignments you will work in small groups, then submit your assignments individually before the next class. We will have 5 classes that are completely devoted to designing experiments to further your understanding of how neuroscience research is conducted within research laboratories. On days that you design your own experiments, you will work in teams. You will be given a brainstorming prompt (on Sakai), along with some guidelines. You should bring at least one idea with you to class to 'pitch' to your group (more than one is good too!). This pitch will be submitted via PollEverywhere at the beginning of class (part of your participation grade). In your groups, you'll discuss your ideas, and help each other come up with some or all of the following: 1) a well-defined research questions; 2) your hypothesis; 4) an outline of what experiment(s) you propose to test your hypothesis and predictions; 5) a graph or other diagram of your predicted results. Use these brainstorming activities wisely! While you are working in your research teams, your instructional assistants and I will be ready to answer any questions that you have. After class, you will compile the feedback you received, and submit your experiment (500-750 words, or 2-3 pages) on Sakai (under "Assignments"). Because you can drop your lowest score late assignments will not be accepted.

5. **Exams:** There will be 3 in-class exams, and a cumulative final exam. Each in-class exam will cover assigned materials since the previous exam. Exams will consist of multiple choice questions (including diagram identification). Because you will be able to drop your lowest exam score (excluding the final exam), make-up exams will not be administered. Note that the final exam is weighted more heavily than the mid-term exams, reflecting the fact that it will be cumulative. **Final Exam Schedule**: We are required to have our final exam on Friday, **December 11** at **12:00pm**. If you have two exams at the same time or three exams within 24 hours and you want to reschedule the exam, please see an academic advisor for an exam excuse form.

Course Grading Criteria
10% Online Quizzes (drop 2 lowest scores)
3% Reading Questions (drop lowest score)
12% Participation
25% Design an Experiment (drop lowest score)
25% Exams (3 in total, drop lowest score)
25% Cumulative Final Exam

Letter Grade Assignments
A = 94-100 C+ = 77-79 F = 0-59
A- = 90-93 C = 74-76
B+ = 87-89 C- = 70-73
B = 84-86 D+ = 67-69
B- = 80-83 D = 60-66

* Final grades are rounded (.4 down and .5 up). For example 89.4 = 89/B+; 89.5 =90/A-.

Note on attendance: Regular attendance and class participation are expected. You are responsible for your attendance and for any information you miss by not attending class.

Accessibility Resources & Service: If you have accommodations to take exams at the Office of Accessibility Resources, please let me know as soon as possible (and well before the first exam).

ACADEMIC INTEGRITY: As in all Carolina courses, the Honor Code is in effect. Ideas or information in your written work and class presentations **must be appropriately referenced**, whether the original source is written or verbal. Five or more words taken verbatim from any source must be placed in quotation marks with the source appropriately referenced. Observing the Honor Code also means that during exams, you should not look at another person's exam; talk to anyone, either in person or by cell phone or email; or use the Internet, or any other text or notes. Please report any violations that you observe. If you have not done so previously, please review the academic code at UNC at http://integrity.unc.edu/hc_handout.html. Suspected cases of academic misconduct must be reported to the Office of the Dean of Students.

Digital etiquette: It is necessary to use a digital device during class time. Please be respectful of your classmates and restrict your use to course content. If you choose to buy a new sweater or surf Facebook anyway, we will ask you to put your device away for the rest of the class, and you will forfeit your participation points for that day. It's likely that there will be times in class when you have completed your work, but your classmates have not – use this time to review your notes or ask us questions before

we move on. We are all working as a learning team in class, and we're only as awesome as our weakest link! Don't let it be you!

***Changes to the Syllabus**: Because we have many guest lecturers who have generously agreed to come and talk about their research, scheduling conflicts may arise. If changes to the schedule are necessary, I will announce this in class or post an announcement on Sakai. It is your responsibility to check it and your UNC email account regularly.

SCHEDULE

Below is a detailed outline of the class. On Sakai, you will also find workflow suggestions to keep you on track for each Unit. You should always refer to the syllabus and the "Unit" tool on Sakai when you are preparing for class. There may be instances where I add additional short readings or videos. This content will be uploaded to Sakai in the appropriate Unit.

<table>
<tr><th>Date
What's due?</th><th>Topics and Subtopics</th><th>Readings, videos, and other activities to do before class</th></tr>
<tr><td>8/19</td><td>Introduction to Class
-Describe course components; make introductions; create teams</td><td>Bring a copy of the syllabus with you to class</td></tr>
<tr><td>UNIT 1</td><td></td><td></td></tr>
<tr><td>8/21 (Quiz 1)</td><td>Neuroscience: Past, present and future: The origins of Neuroscience; Neuroscience today (levels of analysis)
-Define neuroscience in your own words
-Identify something about neuroscience that you don't know
-Explain how you would go about finding out about what you don't know
-Explain why progress in science often slow
-Explain the reductionist approach used to study how the brain works
-Compare the levels of analysis: molecular, cellular, systems, behavioral, and cognitive neuroscience</td><td>Read textbook: Ch 1 (4-14)
-Identify at least one neuroscientist at UNC who does: molecular, cellular, systems, behavioral, and cognitive neuroscience. Bring your list to class.</td></tr>
<tr><td>8/24 (Quiz 2)</td><td>Neuroscience: Past, present and future: Neuroscience today
-Describe the four essential steps in the scientific process, with examples: observation, replication, interpretation, and verification
Experimental Design
4 Basic types of experiments to test the hypothesis A->B->C
<table>
<tr><th>Experiment</th><th>Prediction</th></tr>
<tr><td>Determine</td><td>None (A makes C happen)</td></tr>
<tr><td>Block</td><td>Blocking B blocks A causing C</td></tr>
<tr><td>Mimic</td><td>Activating B causes C</td></tr>
</table>
</td><td>Read textbook: Ch 1 (14-21)
Watch video on Sakai: experimental Design
Bring activity with you to class</td></tr>
</table>

	Measure | A makes B happen	
UNIT 2		
8/26 (Quiz 3)	<u>Neurons and glia: The neuron doctrine; The prototypical neuron</u> -Explain what Golgi and Cajal disagreed about -Diagram a neuron and label its components -Explain the ways in which neurons specialized for communication -Describe the components of the cytoskeleton and explain what each component does https://news.unchealthcare.org/news/2014/september/unc-researchers-link-gene-to-increased-dendritic-spines-2013-a-signpost-of-autism	Read textbook Ch 2 (46-54) Read profile
8/28 (Quiz 4)	<u>Neurons and glia: Classifying neurons; Glia</u> -Describe two ways that neurons can be classified -Describe the differences between sensory, motor and interneurons -Describe the main types of glial cells, and the main function of each -Glia outnumber neurons in the brain, yet neurons are the predominant focus of neuroscience textbooks. Why? <u>Immunocytochemistry and *In situ* hybridization</u> -Compare immunocytochemistry and *in situ* hybridization	Read textbook Ch 2 (46-54) Read textbook Ch 6 (145-147)
8/31 (Reading questions due)	<u>Binge drinking changes the expression of mRNA and protein in the brain</u> **<u>Guest Lecturer:</u>** John D. Casachahua, Graduate student in the Department of Psychology & Neuroscience https://thielelab.web.unc.edu/	Read "Bad mix for the teen brain" and complete reading questions Visit John's lab website
UNIT 3		
9/2 (Quiz 5)	<u>The structure of the nervous system: Gross organization of the mammalian nervous system</u> -Describe the gross organization of the mammalian nervous system in terms of the two divisions: the central nervous system (CNS) and the peripheral nervous system (PNS). Include a description of what each part does in terms of function -Sketch a brain and label: cerebrum, cerebellum, brain stem, spinal cord. Describe what each of these parts do in terms of function -Describe the function differences between the dorsal and ventral roots of the spinal cord. -Describe the difference between 'efferent' and 'afferent' -Describe the methods used to investigate the internal structures of the brain	Read textbook Ch 7 (180-191), Box 7.2 & 7.3; Table 7.1 & 7.2 Watch videos on Sakai
9/4 (Quiz 6)	<u>The structure of the nervous system: A guide to the cerebral cortex</u> -Describe how the human brain is similar and different from other mammalian brains -Sketch a brain and label the four lobes of the cerebral cortex -Describe the three types of mammalian cortex -Describe how cells of the cerebral cortex are organized	Read textbook Ch 7 (205-215) beginning at 'Special features of the human CNS' Read textbook Appendix (220-237)

	-Describe the organization and function of primary, secondary, association, and motor cortex	Bring self-quiz worksheets to class
9/7	<u>Labor day – NO CLASS</u>	
9/9 (Reading questions due)	<u>Imaging the structure of the living brain</u> -Compare MRI and fMRI -Compare fMRI and PET -Describe what diffusion tensor imaging (DTI) is used for -Provide specific examples of when you would use MRI, fMRI or DTI <u>Conducting functional imaging experiments: it's harder than it looks!</u> **<u>Guest Lecturer:</u>** Dr. Kelly Giovanello, Ph.D., Associate Professor, Director of the Cognitive Neuroscience of Memory Laboratory, Department of Psychology & Neuroscience http://psychology.unc.edu/2015/07/09/dr-kelly-giovanello/	Review Ch 7 (188-190) including Box 7.2 & 7.3 Complete reading questions Watch videos Read about Dr. Giovanello's research
9/11 (Submit brainstorming idea in class)	*In-class activity*: Design an experiment with your team! -Design a functional imaging experiment -Determine which of the four basic types of experiments you will use to test your predictions & hypothesis -Come up with a research question to bring to class to discuss	Bring brainstorming activity with you to class Review video: "Experimental design" from Unit 1
UNIT 4		
9/14 (Quiz 7; Experiment 1 due)	<u>The resting membrane potential</u> -Explain why a neuron needs a resting potential -Describe how the resting membrane potential is maintained -Explain what it means if K_+ ions are at equilibrium -Explain the importance of the sodium-potassium pump -Describe what happens to the membrane potential when the brain is deprived of oxygen	Read textbook Ch 3 (56-79) Watch video(s) on Sakai
UNIT 5		
9/16 (Quiz 8)	<u>The action potential: properties of the action potential; the action potential in theory; the action potential in reality</u> -Draw a typical action potential. Label the axes and each phase of the action potential -Describe the key events that underlie each phase: Threshold; Rising phase; Overshoot phase; Falling phase; Undershoot phase; Refractory period -Explain why the action potential is referred to as all-or-none -Imagine that you want to reduce how many action potentials a given neuron can fire – propose a way to do this	Read textbook Ch 4(82-99); Box 4.1 & 4.2
9/18 (Quiz 9)	<u>The action potential: Optogenetics</u> -Describe how optogenetics works -List some uses for optogenetics -Describe the limitation(s) that optogenetics can overcome https://news.unchealthcare.org/news/2014/november/lighting-up-neurons <u>The action potential: Action potential conduction; Action potentials, axons, and dendrites</u> -Describe how an action potential is propagated along an axon	Read textbook Ch 4 Optogenetics (86-88, Box 4.2); watch video Read profile Read textbook Ch 4 (100-107; Boxes 4.3, 4.4, 4.5, & 4.6

	-Explain how the conduction velocity of a neuron varies with axonal diameter (draw a diagram to illustrate this) -Describe the factors that enable salutatory conduction to occur -Explain why action potentials move *away* from the cell body -Explain how local anesthetics work -Describe two demyelinating diseases -Describe adaptation -Describe what factors that determine each neuron's unique physiology	Watch video(s) on Sakai
9/21	**EXAM 1**	Units 1-5
UNIT 6		
9/23 (Quiz 10)	Synaptic transmission: Types of synapses; Principles of chemical synaptic transmission -Compare the similarities and differences between electrical and chemical synapses -Compare and contrast neurotransmitter-gated ion channels and g-protein-coupled receptors -Explain the differences between agonists and antagonists -Draw a diagram to help you describe each of the steps in synaptic transmission	Read textbook Ch 5 (110-132); Box 5.1, 5.5 Watch video(s)
9/25 (Quiz 11)	Synaptic transmission: Principles of synaptic integration -Explain the purpose of synaptic integration -Describe how EPSPs and IPSPs contribute to the generation of an action potential in the post-synaptic cell (draw a diagram to illustrate this) -Explain the dendritic length constant (draw a diagram to illustrate this) -Compare membrane resistance and internal resistance -Compare and contrast spatial summation and temporal summation -Describe how a modulator can change length constant	Read textbook Ch 5 (132-141)
UNIT 7		
9/28 (Quiz 12)	Neurotransmitter systems: Studying neurotransmitter systems; Neurotransmitter chemistry -Identify the criteria used to determine if a substance in the brain is a neurotransmitter -Describe the methods and strategies used to demonstrate the criteria you identified -Describe each of the major neurotransmitters (Table 6.1) in terms of function	Read textbook Ch 6 (144-163); Box 6.2
9/30 (Quiz 13)	Neurotransmitter systems: Transmitter gated channels; G-protein-coupled receptors; Divergence and convergence in neurotransmitter systems -Compare and contrast neurotransmitter-gated ion channels and g-protein-coupled receptors -Compare convergence and divergence of neurotransmitter systems Chemical control of the brain and behavior: The diffuse modulatory systems of the brain	Read textbook Ch 6 (163-177); Box 6.4 Read textbook Ch 15 (538-548)

	-Describe how diffuse modulatory systems are similar -Describe each of the four diffuse modulatory systems in terms of organization and function -Explain how hallucinogens and stimulants work on modulatory systems to exert their effects	
UNIT 8		
10/2 (Reading questions due)	Motivation: Reinforcement and reward; The role of dopamine in motivation -Explain dopamine's role in terms of 'wanting' and 'liking' -Describe how dopamine contributes to addiction Dopamine and habit formation: basic research **Guest Lecturer**: Dr. Tatiana Shnitko, Post-doctoral Research Associate in the Behavioral and Pharmacological Neurodynamics Lab, Bowles Center for Alcohol Studies.	Read textbook Ch 16 (566-571); Box 16.5 & answer reading questions Read "Good habits, bad habits" and answer reading questions Watch video
10/5	Dopamine and habit formation: translational research Addiction as maladaptive learning **Guest Lecturer**: Theresa McKim, Graduate Research Assistant, Department of Psychology & Neuroscience https://cablab.web.unc.edu/	No reading! Visit Theresa's lab website
10/7 (Submit brainstorming idea in class)	*In-class activity*: Design an experiment with your team! -Design a human OR animal experiment that tests some aspect of habit formation -Determine which of the four basic types of experiments you will use to test your predictions & hypothesis -Come up with a research question to bring to class to discuss	Bring brainstorming activity with you to class
UNIT 9		
10/9 (Quiz 14, Experiment 2 due)	Chemical Senses: Taste -Identify the five basic tastes -Compare and contrast taste buds and papillae -Describe the cellular mechanisms underlying each of the five tastes -Diagram the pathway that taste information takes from tongue to primary gustatory cortex -Discuss the potential evolutionary benefits for each of the five tastes http://www.jove.com/video/52860/10enver-papillae-protocol-for-objective-analysis-of-fungiform-papillae	Read textbook Ch 8 (266-278); Box 8.1 & 8.2) Watch video(s)
UNIT 10		
10/12 (Quiz 15)	Visual System: The Eye: The structure of the eye; Image formation by the eye; Microscopic anatomy of the retina; retinal processing and output -Draw and label structures of the eye -Describe how structures of the eye refract light to focus an image on the retina -Compare the similarities and differences between cones and rods -Explain why our vision is much better at the fovea than elsewhere -Identify and describe the cells of the retina, and discuss the pattern of their interconnections	Read textbook Ch 9 (296-312 & 219-325 to end of 'ganglion cell receptive fields') Watch video(s)

	-Describe how you would find the receptive field of a ganglion cell -Describe the differences between receptive field center and receptive field surround	
10/14 (Quiz 16)	**FALL BREAK – NO CLASS**	
10/19 (Reading questions due)	Guest Lecturer: Dr. Spencer Smith, Ph.D., Assistant Professor, Department of Cell Biology & Physiology, UNC School of Medicine and UNC Neuroscience Center. http://www.slslab.com/ http://news.unchealthcare.org/news/2014/august/the-two-photon-future http://www.unc.edu/spotlight/building-a-better-microscope/	Visit Dr. Smith's lab website Read the profile of Dr. Smith's research Watch video
10/21 (Quiz 17)	The Central Visual System: Physiology of the striate cortex; Beyond the striate cortex; From single neurons to perception -Explain the characteristics of receptive fields in the striate cortex -Describe the main differences between simple and complex cortical cells -Describe the functional differences between the dorsal stream and the ventral stream -Describe the function of area IT -Describe the hierarchy of receptive fields in the visual system	Read textbook Ch 10 (347-351 to end of "simple and complex receptive fields"; 356-364 to end of "receptive field hierarchy and perception"); Box 10.3 Watch video(s)
10/23 (submit brainstorming idea in class0	*In-class activity:* Design an experiment with your team! TBA	Bring brainstorming activity with you to class
10/26	**EXAM 2**	Units 6-10
UNIT 11		
10/28 (Quiz 18, Experiment 3 due)	Brain mechanisms of emotion: The limbic system; Emotional theories and neural representations; Fear and the amygdala -Identify structures of the limbic lobe -Explain the problems with the idea that there is a single system for emotions -Compare basic theories of emotion with dimensional theories of emotion -Describe the effects of amygdala stimulation and lesions of the amygdala -Describe the procedure for producing learned fear -Describe the neural circuit that supports learned fear http://www.brainfacts.org/About-Neuroscience/Animals-in-Research/Success-Stories/Articles/2012/Animals-Post-Traumatic-Stress-Disorder	Read textbook Ch 18 (621-635) Read linked article
UNIT 12		
10/30 (Quiz 19)	Mental Illness: Anxiety disorders; Affective disorders -Identify the characteristic(s) that all anxiety disorders share -Describe the HPA axis in terms of structure and function -Describe how the HPA axis is regulated by the amygdala and the hippocampus	Read textbook Ch 22 (756-771); Box 22.3

	-Describe the available treatments for anxiety disorders -Describe the symptoms of depression -Describe the biological theories of affective disorders -Describe the available treatments for depression	
11/2 (Reading questions due)	<u>The importance of animal models in neuroscience</u> -Why is it necessary to use animals to model human behavior and disease? -What steps are taken to ensure that animals are treated humanely? http://bnpsych.unc.edu/animal-use/ <u>An animal model of post-traumatic stress disorder</u> **<u>Guest Lecturer</u>**: Meghan Jones, Graduate student, Department of Psychology & Neuroscience http://psychology.unc.edu/2015/07/07/dr-donald-lysle/	Review textbook Ch 1 (16-18 'The use of animals in neuroscience research') Read the information about animal use contained in the link Read "Totaling recall" and answer reading questions Learn about the research conducted in Meghan's lab Watch Video
11/4 (Submit brainstorming idea in class)	*In-class activity:* Design an experiment with your team TBA	Bring brainstorming activity with you to class
UNIT 13		
11/6 (Quiz 20, Experiment 4 due)	<u>The Electroencephalogram</u> -Explain what the EEG is used for -Explain what generates the fluctuations and oscillations in the EEG -Describe the factors that affect the amplitude of the EEG -Describe what MEG is used for -Explain the benefits of using EEG and/or MEG instead of fMRI or PET -Describe the mechanisms of synchronous brain rhythms -Explain some potential reasons why there are so many rhythms in the brain	Read textbook Ch 19 (646-655 to end of "Functions of brain rhythms"); Box 19.1
11/9 (Reading questions due	<u>EEG and Brain Stimulation to Treat Depression</u> http://www.newyorker.com/magazine/2015/04/06/electrified **<u>Guest Lecturer</u>**: Dr. Flavio Frolich, Ph.D., Assistant Professor, Department of Cell Biology & Physiology, UNC School of Medicine and UNC Neuroscience Center. http://frohlichlab.org/ http://news.unchealthcare.org/news/2015/april/scientists-use-brain-stimulation-to-boost-creativity-set-stage-to-potentially-treat-depression	Watch Video Read New Yorker article and answer reading questions Visit Dr. Frolich's lab website Read profile
UNIT 14		
11/11 (reading questions due)	<u>Wiring the brain: The genesis of neurons</u> **<u>Guest Lecturer</u>**: Dr. William Snider, M.D., Department of Cell & Molecular Physiology, Director of the UNC Neuroscience Center. http://www.med.unc.edu/neuroscience/faculty/faculty-2/william-d-snider-md	Read textbook Ch 2 Box 2.7 (50-51); Ch 23 (784-795) Read profile TBA

UNT 15		
11/13 (Reading questions due)	Traumatic brain injury **Guest Lecturer**: Dr. Kevin Guskiewicz, Ph.D., Kenan Distinguished Professor and Chair of the Department of Exercise and Sport Science, and McArthur Fellow. http://college.unc.edu/administrationcontacts/guskiewicznaturalsciences/ http://www.newsobserver.com/sports/college/acc/unc/article30327246.html	Read "Fatal strikes" and do reading questions Read textbook Box 2.4 (40-41) Read about Dr. Guskiewicz's research
UNT 16		
11/16 (Quiz 21)	Memory: Types of memory and amnesia; Declarative memory -Compare and contrast declarative and nondeclarative memory -Describe the differences between retrograde and anterograde amnesia -Identify the structures of the medial temporal lobe (MTL) and describe how information flows through the MTL -Describe how a cell assembly could support memory -Describe at least two pieces of experimental evidence that support the idea that the MTL supports declarative memory	Read textbook Ch 24 (824-830 & 835-844); Box 24.1 Listen to Radiolab podcast "On repeat" starting at min 6:25 http://www.radiolab.org/story/91573-adding-memory/
11/20	**EXAM 3**	Units 11-16
UNIT 17		
11/23 (Reading questions due)	Placebo effects **Guest lecturer**: Christina Lebonville, Graduate Research Assistant, Department of Psychology & Neuroscience http://donlysle.web.unc.edu/	Read "Cure in the mind" and do reading questions Visit Christina's lab website Listen to Radiolab podcast "Placebo" start at min 4:28 http://www.radiolab.org/story/91540-pinpointing-the-placebo-effect/
11/25 & 11/27	**THANKSGIVING – NO CLASS**	
11/30 (Submit brainstorming idea in class)	*In-class activity*: Design an experiment with your team! □ Design an experiment to test any hypothesis you are interested in pursuing □ You can use any methods that we have discussed in class!	Bring brainstorming idea with you to class
12/2 (Experiment 5 due)	Review class	

Final Exam: Friday, December 11th, 12:00pm