NEURAL CONNECTIONS:
HANDS-ON NEUROSCIENCE

Department of Psychology and Neuroscience
MWF 11:15-12:05pm
PSYC424 Course Syllabus

Hands-on Neuroscience for Everyone

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Office hours: by appointment

Student Mentors: Danielle Nicholson
Savannah Loehr

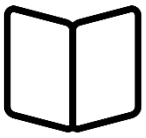
COURSE DESCRIPTION: This APPLES service-learning class is focused on neuroscience outreach activities that we bring to the community. Through the planning and sponsorship of hands-on neuroscience activities for the Morehead Planetarium and Science Center, Carolina First Look, The North Carolina Museum of Life and Science, and others, we will gain a deeper understanding of comparative neuroanatomy, human neuropathological diseases and brain injury, electrical properties of neurons, and sensory and motor system function. Students in this class will be tasked with using the Makerspace to design and construct their own hands-on neuroscience activities and will reflect on the meaning of community engagement. Over the course of the semester, each student will complete a minimum of 30 hours of service within the community. Prerequisite: PSYC315 (Introduction to Neuroscience) or Biopsychology (PSYC220)

APPLES Service-Learning

COURSE OBJECTIVES

1) Define and describe service learning
2) Describe basic brain anatomy
3) Describe fundamental neurophysiology and neurochemistry
4) Describe how the brain and spinal cord mediate sensory processing and movement
5) Explain the causes and symptoms of common neuropathological and neuropsychiatric diseases
6) Create novel hands-on activities using Makerspace resources
7) Evaluate practical methods to improve inclusivity in STEM
8) Evaluate the utility of science outreach

COURSE RESOURCES



Required textbook: Neuroscience for Dummies, second edition. You should also have access to a Biopsychology textbook, or a Neuroscience textbook. Additional supplemental readings will be posted on Sakai.

Course website: Quizzes, assignments, etc can be found on the course Sakai site.

For fun!

I post about our adventures as well as Neuroscience-related content on Facebook: https://www.facebook.com/UNCneuralconnections/

Twitter: @awesomeneuron

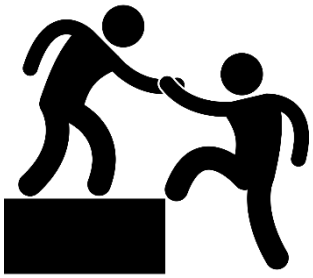
Twitter: @UNCNeuroscience

Student mentors: Because outreach is so much fun, many students want to keep doing it long after class is over! We are so lucky to have some previous Connectors join us this semester to act as mentors. Danielle and Savannah have done a lot of outreach and can help you with planning, getting activities together, and will provide some cheerleading if you get nervous! You can reach them via the messaging tool on Sakai, and both of them will attend various classes and events this semester. Please use them as a resource!

OTHER RESOURCES ON CAMPUS

The Writing Center is a wonderful resource to use if you need some help with your writing and editing skills, and The Learning Center would love to coach you – they have excellent coaching opportunities for things like time management, study skills, and goal setting. Give them a try!

If you experience difficulty during the semester that interferes with your ability to come to class or complete your work, including difficulty securing food or housing, or stress and mental health issues, I urge you to contact the Office of the Dean of Students (in person or by phone 919-966-4042) or Counseling and Psychological Services (in person or by phone 919-966-3658). If the Dean of Students is consulted, they can notify all of your instructors (for all of your classes) at your request. Their services are confidential. I also encourage you to please let me know if you see something that may indicate one of your classmates is in need of assistance. My hope is that we will be able to work together as a supportive community – so if you see something, please say something.



If you require an accommodation, please contact the Office of Accessibility and Resources. If you have accommodations to take exams at the Office of Accessibility Resources, please let me know as soon as possible.

COURSE REQUIREMENTS

Quizzes: We will review the basics of neuroscience through lecture, readings, small group work, and hands-on activities. Quizzes delivered via Sakai will be used as a study tool and to ensure you took away the key concepts for each topic we cover. Quizzes will include ~10 multiple choice questions. Your lowest quiz score will be dropped, so quizzes will not be re-administered after the due date for any reason.

Participation: Much of our class time will be devoted to discussion, and designing and practicing hands-on activities. *Being present in class for these activities is imperative to the success of our outreach efforts.* Frequent absences from class will have a significant impact on your final grade. I will take attendance. Missing 3 or more classes (unexcused) will reduce your participation grade to 0%.

There are several opportunities to earn participation points in class:

i. Guest discussion: When we have guests come to class, you'll do some preparation so that you are ready to engage our guest in a conversation about service learning, STEM education, the programs/research the guest administers or engages in, etc. You will need to do some research before class, and based on this research, prepare at least 3 discussion questions. **You will hand these questions in at the beginning of class.** Retain a copy for yourself so that you can use these questions to facilitate your own discussion during class time. Questions and your participation in class will be graded: 0 (no participation/no questions), 0.5 (minimal contribution), 1 (insightful comments/questions).

ii. Discussion classes: For designated discussion classes, we will consider assigned readings (found on Sakai) and/or discuss our experiences out in the community delivering neuroscience activities. If we are discussing assigned reading, reading questions will be posted on Sakai, and you should respond to these questions *in your own words*, submitting your responses via Sakai no later than 1 hour before class begins.

iii. Hands-on classes: On days when we work on hands-on activities in class (see class schedule), you will either be delivering an activity, or acting as an audience for other students to practice their activities. You will provide critical feedback to students to help them improve their activities. If you are providing feedback, I will provide you with a rubric. These will be handed in and graded. If you are presenting, you will write a one page summary that includes: 1) specific learning objective(s), 2) potential problems or obstacles you may experience, and how you will deal with them, 3) a summary of your design process. You will sign up to present hands-on activities during class time the first week of class.

Reflection on outreach activities: An important component of our outreach activities is to ensure that we engage our (mostly) young audience, getting them excited about (neuro)science. We will have many opportunities to de-brief in class, sharing our experiences at outreach events, reflecting on what worked, what didn't, and how we can do better. We will also reflect on how teaching others in the community about neuroscience has enriched our own understanding of the brain. Participation in these class discussion is an integral part of learning from our collective experiences. Note that we will also have several guests visit us to talk about a number of important topics related to science education, diversity, inclusivity, community engagement, and service learning. Please be an active participant in these classes!

There are 4 reflection assignments that each student will complete over the course of the semester:

i. Science in everyday life: We will begin by thinking about and discussing why science is important in our everyday life (with a focus on neuroscience). As part of this reflection, we will consider what kinds of barriers exist that prevent people from participating in science. There is research suggesting that many people, including school-aged children, do not think they are good at

science. Through readings (found on Sakai), small group discussions, and presentations by special guests from our community, we will identify some strategies to break down barriers and inspire our audience to see how science impacts their own everyday life. You will then write a 4-5 page paper, identifying specific barriers, and how we can move past those barriers to promote success and persistence in science through science outreach.

ii. Preparation for outreach activities: Each student will present their pre-designed activity to other students in class before going out into the community. You will write one page summary that includes: 1) specific learning objective(s), 2) potential problems or obstacles you may experience, and how you will deal with them, 3) a summary of your design process (just a few sentences is fine). We will discuss these questions in class in preparation for going out into the community. In addition, your classmates will provide you with specific and constructive feedback about what works well, what might need some work, and the level of engagement that you have accomplished. We will follow a similar procedure for the activities that you design using Makerspace resources. These will be due throughout the semester.

iii. Journal: Each student will keep a journal of their experiences in the community, and the design process using Makerspace resources. Your journal will be in the form of blog posts on Sakai (see additional instructions there). We will debrief in class several times throughout the semester using our journals to facilitate discussion.

iv. Final reflection paper: Finally, each student will write a reflective paper on the outreach activities you participated in. Reflect on your experiences and the purpose of community outreach. Prompts to get you started are posted on Sakai.

Design your own activity (Final exam): You will present your self-designed hands-on activity during the final exam period (May 8thnd, noon). You will hand in an accompanying manual for your activity (via Sakai) on the last day of class. To design your activity: Pick a topic / theme related to neuroscience that can be made into an activity, game, etc. *Your selected topic and idea should be pre-approved*. *If you need specialized supplies, please let me know ASAP so that I can order them for you*. These activities will be presented in class before we bring them out into the public, so you will have the opportunity to refine your activity. At the end of the semester, these activities will be made available to the general public. In order to make sure your activity can be implemented by others, you will include a manual for the activity that includes: 1) the rationale behind the activity, 2) the learning objective(s), 3) what materials are needed, and 4) step-by-step instructions. In addition, you will provide information on how to deliver the activity to young learners, and ways to modify the activity for an adult audience. You should have opportunities to bring your activity out into the community, and to present it in class. This should mean you are logging the things that worked, and those that didn't in your reflection journal (see above), and improving your activity with each presentation. Remember that getting a beautiful final product will be iterative, and you might experience failure along the way. This a normal part of the design process, and something that we will reflect on, as we consider how our outreach audience reacts to and ultimately learns from an iterative process. *Your self-designed activity will be presented during the final exam period and will constitute your final exam for this class.*

Please note: all written assignments must be written in your OWN words with appropriate citations. If you are not sure how to paraphrase or avoid plagiarism, please come and see me (or the Writing Center) for help!

Science Outreach: Over the course of the semester, each student will complete a minimum of 30 hours of service within the community. *Note that our outreach activities will often occur during evening and weekend hours*. **You must be able to commit to a *minimum* of 30 hours.** If you do not complete these hours by the last day of classes, you will earn a 0 on all assignments. Remember that we are all ambassadors for UNC when we are out interacting with the public. Being prompt, prepared, respectful, and **enthusiastic** about science outreach are absolutely imperative. I reserve the right to reduce your final grade by a full letter grade (or more) if there are significant issues with being prompt, prepared, etc. I have high expectations and feel confident that as Carolina students, you'd never let these things become issues.

i. Participation in outreach events: Initially, you will work in small groups (2-3 students), practicing hands-on neuroscience activities that are provided to you or that you modify from activities you find using the resources on Sakai. Pre-designed activities will be posted on Sakai, and I will have all of the equipment and resources needed. We will bring these activities to the Carolina First Look students, or to the North Carolina Museum of Life and Science and/or partner with the Morehead Science Center. In most cases, our target audience will be mostly middle-school children, but we will also interact with many adult learners. We will make a number of visits with these activities, and each of you will get a chance to present a different activity for each visit. These activities will highlight each of the topics that we cover in class (e.g., we will use hands-on activities to enhance our own understanding of course material). There will also be special events that will require a team of students to design neuroscience activities around a specific theme. We will go over these events and activities in class.

YOUR GRADE

Your service is an integral part of the class and is necessary in order to complete these assignments. Remember that you must complete 30 hours of service hours by the last day of classes.

1. Quizzes (drop lowest score) (2%)
2. Participation in class (18%)
    - Discussion questions and participation in discussions with guests (7%)
    - Reading questions and participation in discussion classes (7%)
    - Hands-on classes (4%)
3. Reflection Activities (55%)
    - Science in everyday life paper (10%)
    - Preparation summaries (10%)
    - Journal (10%)
    - Final reflection paper (25%)
4. Final Exam: Self-designed Neuroscience Activity (25%)

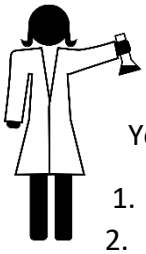
Letter Grade Assignments

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-.

COURSE EXPECTATIONS

We are going to use a lot of class time engaging in discussion and working on hands-on activities. You cannot be successful in this class if you are not prepared to be an active learner. You will need to engage in discussion and be ready to provide detailed and constructive criticism to your classmates to help them improve. It is ok if you don't know something: more important is that you admit it, ask questions, and make an effort to search for an answer.



I expect that you will come to class prepared to work!

You can prepare for class by following these steps:

1. Complete the assigned readings, homework, and/or quizzes before coming to class.
2. Come to class with a positive attitude. I know it's hard some days – I have hard days too! However, we are working as a team, and even one bad attitude can have a significant impact on our ability to trust each other and do our best work.
3. Be open to criticism. It's how we will all get better.
4. Have fun with this! If we don't have fun, there's no way we'll be able to get our audience to have fun.

I expect that you will respect our learning environment and each other!

You may need to use a digital device during class time. Please be respectful of your classmates and restrict your use to course content. 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 questions before we move on. Even better: **help your classmates**!

I expect that you will show integrity and academic honesty, respecting the Honor Code, always!

As in all Carolina courses, the Honor Code is in effect. The work you submit in this class will be your own work. It is your responsibility to speak with me if you are not sure what constitutes plagiarism or have any questions about the Honor Code. If you have not done so previously, please review the academic code at UNC at http://integrity.unc.edu/hc_handout.html. All suspected cases of academic misconduct must be reported to the Office of the Dean of Students, and thus I am compelled to do so if I suspect academic misconduct of any kind.

Finally, please do not post materials (notes, videos, slides, etc) from this class elsewhere without my permission.