Neuroscience of Exercise

Why study how physical activity influences the brain?

The human body a remarkable collection of molecules, cells, and tissues that work together in sophisticated and intricate ways. The brain is particularly stunning because it allows thoughts, emotions, language, art, science and so much more. The human brain’s ~86 billion neurons and ~100 trillion synapses are only ~2% of a body’s weight, yet consume ~20% of its energy. In recent years a rapidly expanding body of evidence demonstrates that physical activity not only strengthens muscles and improves cardiovascular health. Exercise also exerts powerful effects on the brain, from generating new neurons to improving cognition and learning. Exercise may help to ward off dementia and may treat a wide variety of mental health conditions from depression and anxiety to ADHD and addiction. Not surprisingly, BIO261 gets more interesting and exciting every year. I look forward to us learning together this semester (and well beyond).

Approach

BIO261 emphasizes learning how to read, discuss, and interpret scientific research. Active class sessions expect students come prepared, take risks, and support each other’s learning. This course is not about memorizing facts, but rather about understanding and questioning how scientific discoveries are made, communicated, evaluated, and advanced. Students will learn useful skills that they can apply to understand and further our collective scientific understanding of our natural world.
**Learning Goals**

Each student will:

- develop strategies to understand and critique a variety of research publications
- seek out and build her/his own scientific knowledge related to the topic
- develop individual and collaborative strategies for expanding her/his scientific knowledge
- prepare a thoughtful, visual, research-centered recording that can be shared (TED talk)
- strengthen her/his scientific communication skills
- learn to use scientific databases to identify relevant scientific literature
- develop abilities to converse about science with peers, scientists, and non-scientists

**Learning Expectations**

Each student will:

- come to class thoughtfully prepared
- participate by asking questions, answering questions, and contributing knowledge
- complete assignments and readings on time
- communicate concerns and questions to the instructor in a timely fashion
- learn from mistakes
- respect others (peers, instruments, staff, etc.)
- work responsibly and safely in the lab
- be curious and enthusiastic
- be self-motivated and take responsibility for learning

**Learning & Accommodations**

We all learn in different ways. Successful learners are typically well aware of their own unique portfolio of abilities, challenges, and preferences. Please keep in mind that many academic support services are freely available on campus such as the Writing Center, Speaking Center, Math & Science Center, Dean of Students Office, Student Health Office, and Center for Teaching & Learning and it is to everyone’s benefit to use these resources to do well. If you need specific accommodations to participate in this course please talk to the instructor very early in the semester regarding your individual learning needs so we can develop a workable plan together.

**Super Helpful and Free Campus Resources** (that all students should use frequently)

**Librarians** – schedule an appointment at: http://davidson.libguides.com/consultation

**Speaking Center** – https://www.davidson.edu/offices/ctl/students/speaking-center

**Writing Center** – http://www.davidson.edu/offices/ctl/students/writing-center

**Media Lab** – tutors in Chambers B263 - https://www.davidson.edu/offices/its/for-faculty/training-and-support

**Davidson Writer** - http://davidsonwriter.redbrickroad.net
Communication & Feedback  Some of our conversations this semester and beyond can be handled efficiently by email, although others will be far more effective over the phone or face-to-face. I am happy to communicate with you via the most appropriate mechanism for each individual situation. In general, email works best for me for short questions and setting up appointments; I pride myself on responding promptly (within a business day, usually faster). Texting is rarely the most effective way to reach me. Also, please provide feedback throughout the course what works well and what can be improved so that we all may learn more effectively. Communicate potential concerns as early as possible because it is very difficult for me to address issues that are not brought to light.

Office Hours/Appointments  In my experience it is unfortunately impossible to set regular office hours that work for every student’s schedule. Consequently, I offer office hours by appointment so that I can be available to all students. My Outlook calendar is always up to date and I encourage you to send calendar invitations at mutually convenient times. You may also make appointments with me via a short email that offers a few times when you are available so that I may reply with a calendar invitation for a mutually convenient time. In addition, Jenny Ingraham in the Biology office (Watson 162) has full access to my schedule and is happy to make appointments on my calendar for you.

Attendance  Attendance is expected at all class meetings because nearly all class periods will include activities. If you absolutely need to miss a meeting please make advance arrangements. You must review the syllabus carefully during the first week of the semester. If any dates conflict with important religious holidays for your faith, athletic commitments, or other excused absences please let me know immediately so we can discuss appropriate adjustments.

Course Materials
- Student Lab Notebook by Hayden McNeil (carbonless pages; optional)
- various PDFs of journal articles, reviews, chapters, and other short publications (on Dropbox)

Honor Code  It is your responsibility to reaffirm the Davidson Honor Code on assignments by stating the Honor Pledge and signing your name in ink. Unpledged work will not be accepted. If you have any questions please ask. Make sure to cite your sources (images and papers) so that your reader has enough information to locate your primary sources. Please do not take risks with citation issues and consult with me if you are uncertain when citations are necessary. Plagiarism is an academic violation with severe consequences. Consult the Biology Department’s Plagiarism Statement within The Biology Department Handbook.
An Important Note on Evaluation and Grades

Please keep in mind that grades simply summarize performance on specific pieces of work at specific moments in time. Understand that mistakes and emotions are often our best (though perhaps not favorite) teachers when we are able to learn from them. Grades do not (and cannot) summarize anyone’s worth, potential, uniqueness, charm, beauty, or ability.

Grading Scale + Descriptions

A (95-100%) & A- (90-94.9%)
complete and consistently flawless work

B+ (87-89.9%), B (83-86.9%), & B- (80-82.9%)
complete and strong work
few minor/moderate flaws

C+ (77-79.9%), C (73-76.9%), & C- (70-72.9%)
complete and competent work
some minor/moderate flaws

D+ (65-69.9), D (60-64.9%)
complete yet poor/marginal work
many moderate and/or some severe flaws

F (0-59.9%)
incomplete and/or incompetent work
many severe flaws

Graded work

All assignments must be completed in order to pass the course. The course grade will be calculated from the following components:

15% Prep Pages & Participation
25% Assignments (A#01-14)
35% Project (video + supporting docs)
25% Final (take home + oral)

Prep Pages are the notes you take for your own learning in preparation for our class meetings. Prep pages reward and encourage regular class preparation, which helps learning and class engagement for all. Turn in hard copy evidence of your preparation at the start of every class meeting. If you choose to use a Hayden McNeil lab notebook you should keep the original and turn in the yellow (back) copy of your prep page(s) at the start of every class meeting. Each prep page must be labeled with your name and the meeting date. See the first flip for more details on the process and expectations. Each student may skip any two days of prep without penalty by submitting a page with name, date, and the notation “skip” in the prep page folder no later than one class session after the skipped date.

Deadlines are firm unless extended by the instructor. Late work will be penalized 5% for the first 1-60 minutes late and 0.5% for every hour late thereafter. Extension requests will be considered only in advance due to unforeseen or extreme circumstances such as serious illness, family emergency, religious observance, etc. Being busy is not a reason to request or expect an extension.

Life Happens Extensions are two free, non-divisible eight-hour extensions that can be redeemed on any individual (not group) assignment without explanation or penalty to accommodate minor unforeseen circumstances such as printer snafus, lost keys, etc. Simply indicate the phrase “life happened” in an obvious way.

Your Grades will be viewable through Moodle’s gradebook feature throughout the semester. Note that prep page grades will be updated only once or twice during the semester because you should be able to gage your own completion of prep pages with full accuracy.