

Psychology 565, section 1 Functional Neuroanatomy

Semester: Fall 2019

Meeting Day/Time: M/W 2:30-3:50

Location: Psychology A, room 256



Course Director: Dr. Brenda Anderson

Office: Psychology B, room 216

Office Hours: By appointment. Available anytime over email. Online office hours available.

Email: Brenda.Anderson@stonybrook.edu

Course website: Blackboard, Psych 565

Course Materials:

Textbooks: -Kandel, Schwartz and Jessel, Principles of Neural Science 5th ed. (required)

Supplementary readings will be made available online or through the campus library.

-The class will rely on the Michigan State University online atlas at the following link: <https://msu.edu/~brains/brains/human/index.html>

-Many of the lectures will be streamed online. This allows students who are new to neuroanatomy to rewind, and move through the material at a slower pace. Some topics may be familiar to student with more preparation. Streaming allows those students to listen at a faster rate. Pre-recorded lectures also allow students to see the anatomy up close rather than on a small tv screen from across the room. The recordings will, in many cases replace our meetings and will be accompanied by assignments to ensure you watched.

-The recordings will be available in two forms

Stony Brook IVQ system: Login with your Stony Brook login and password.

These usually have embedded quizzes.

YouTube. There will be a Blackboard quiz to complete in association with these videos.

These are unlisted so you will have to find them through the link available in Blackboard.

-All materials made available for this course are solely for your personal use during the semester in which you are enrolled as per the TEACH Act. Materials should not be widely distributed or posted on any public site.

- The instructor reserves the right to modify any aspect of this syllabus as necessary to accommodate unforeseen circumstances or to maintain the fair and orderly conduct of the course.

-Cell phone use is prohibited in class. Computers, tablets, and like devices can be used only for class-related activities (e.g. note taking). It is highly recommended, however, that you take notes by hand.

(<http://www.psychologicalscience.org/index.php/news/releases/take-notes-by-hand-for-better-long-term-comprehension.html>)

Objectives:

Function can be derived from the structure of everyday objects and architecture. It should not be surprising then to find that function can be derived from the study of brain architecture and neural connectivity. For example, Ramon y Cajal identified many dynamic mechanisms in the nervous system simply by studying the anatomy of neurons. These properties were later confirmed by physiologists, and continue to be recognized as fundamental principles of neural signaling. Similarly, Marr (1969) and Albus (1970), inspired by the anatomical connections in the cerebellum hypothesized that the cerebellum could be a site for learning. It took more than a decade before physiologists recognized and described the form of plasticity that could support the learning mechanisms predicted by Marr and Albus. By studying anatomical structure and connectivity we hope to better understand brain function and the organization of behavior.

in contrast to similar courses in the medical school context, and to conform to the interests of psychologists, this course emphasizes the connectivity of higher order brain regions, while de-emphasizing spinal cord anatomy and the study of peripheral nerves. Students will first be introduced to the global nervous system organization, and a representative sensory system. Cortical organization will then be discussed. Traditional motor output pathways will be covered. Then the extrapyramidal motor systems will be discussed. Finally, the course ends with a discussion of the limbic system and the coordinated endocrine, autonomic, and motor output. How these latter systems are integrated into emotion will be discussed as well. Throughout the course, each anatomical circuit will be associated with behavioral functions. Although we cover structure-function relationships, there is an equal emphasis on the integrated interactions across regions. By studying the integrated connectivity of the brain, students will gain new insight into the organization of behavior, which is the focus of the field of psychology. The course is expansive, and yet it should be considered foundational. It does not cover all of the newest information, but focuses on the long held understanding of brain anatomy, which forms the basis from which to add emerging details in our understanding of neuroanatomy.

COURSE LEARNING OBJECTIVES:

Student will be able to identify the location of major brain structures and regional subdivisions as well as classify regions based on function.

Students will be able to identify and recognize major pathways by which information flows into, through and out of the brain.



Students will be able to state the global structure/organization of the brain, and the major regions supporting the divisions of the global structure.

Students will understand the strategy by which the brain processes the features of the external world.

Together these objectives will provide a framework and knowledge base that supports greater depth of understanding, synthesis and analysis of the literature from the fields of neuroscience, including behavior, cognitive and affective neuroscience. In addition, students will be better prepared to make original and lasting research contributions.

Course Requirements:

-The course will be a combination of online video lectures and assignments and face to face discussions.

Assessment:

-Exams will cover material from the online and face to face lectures, text and readings. Some exams may be online, in which case additional readings that supplement the lectures may be included.

-Additional work will be required, which include quizzes on Blackboard, quizzes integrated into videos, or written homework assignments, including summaries of supplementary readings. Points will also be offered for class participation during discussion of readings.

While the instructor will employ email and Blackboard as appropriate, students are also responsible for information about course matters communicated to students during class time.

-Students are strongly encouraged to ask questions and provide feedback on the course content, delivery methods and assignments. Through feedback, the course can improve. In order to help receive a timely response to questions and issues, provide comments or questions that include the topic, video item and timepoint, or the assignment number/title and question number, or text with page and paragraph (quotes help). Copy the specific question in an email and be specific about the issue. Students are encouraged to post through discussion boards so that all students have the ability to see the question and response.

When I receive questions, I will do my best to share the issue with other students so that we have full transparency. If you find that I have not done so, please alert me so I can improve the transparency of the course.

Course Calendar

See Blackboard for the course calendar

Grading

1) Exams (6)

a. Exam questions will be in the form of short answer, matching, fill in the blank and regional identification.

2) Homework/Participation Points. Additional points will be given for

a. Preparation and participation in discussions of supplementary readings

b. Homework assignments on Blackboard

Final grades will be calculated as the sum of the following two scores:

Exam points earned/Exam points possible * 70 for a maximum of 70% points.

Homework points earned/homework points possible * 30 for a maximum of 30% points.

By remaining enrolled in this course, you agree to

Minimal Student Responsibilities

Acknowledge you have been given information about Student Accessibility Services

Academic Integrity Statement

And acknowledge that the instructor must report all suspected occurrences of academic dishonesty

And to respect the rights, privileges and property of other people as outlined in the Critical Incidence Management Statement

All of which are outlined at this link:

https://www.stonybrook.edu/sb/bulletin/current/policiesandregulations/policies_expectations/min_instructional_s

Similarly, as the instructor, I agree to my instructional responsibilities as outlined at the same site, and include

Being respectful and polite

Providing a syllabus.

Meeting with the class regularly and promptly at the location scheduled or providing online materials.

Being available to meet with students for at least 3 office hours per week.

Assigning grades based on a body of the students work.

Conducting course evaluations

Providing prompt feedback on assignments and exams.

Providing timely notification of academic performance (e.g., students will have

Information about exam performance by the 9th week of the semester).

Avoiding any relationships that would compromise our objectivity, and the integrity of the teacher student relationship.

Sharing all information with all students in the course (e.g., changes in the grading policy will be posted so that all students have access to that information).

Observing the final exam schedule outlined by the university

Student Accessibility Support Center Statement

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website: <http://www.stonybrook.edu/ehs/fire/disabilities>.

Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Resources:

<http://www.columbia.edu/itc/hs/medical/neuroanatomy/neuroanat/> [interactive, click on cell, and cell in image colors to show where it is located]

<http://library.med.utah.edu/kw/hyperbrain/animations/pathways/quiz3.html> [great interactive pathway quizzes]

more from the same group at:

<http://library.med.utah.edu/WebPath/HISTHTML/NEURANAT/NEURANCA.html>

<http://www.loni.ucla.edu> [brain atlas]

<http://www9.biostr.washington.edu/da.html> [brain atlas]

http://pathology.mc.duke.edu/neuropath/nawr/nawr_index.html

<http://www.med.harvard.edu/AANLIB/home.html>

<http://www.pbs.org/wnet/brain/3d/index.html>

<http://neuroanatomy.bsd.uchicago.edu/> [cropped images, not ideal for students, by system, development, EM, comparative atlas]

Additional readings to consider:

Beauchamp, M.S. (2005). See me, hear me, touch me: multisensory integration in lateral occipital-temporal cortex. *Curr Opin in Neurobio*, 15: 145-153.

Schroeder, CE et al. (2003). Anatomical mechanisms and functional implications of multisensory convergence in early cortical processing. *International J. of Psychophysiology*, 50, 5-17.

Petrides, M. (2005). Lateral prefrontal cortex: architectonic and functional organization. *Phil Trans. R. Soc. B* 360: 781-795.

DORIT BEN SHALOM and DAVID POEPEL (2008). Functional Anatomic Models of Language:

Assembling the Pieces *NEUROSCIENTIST* 14(1):119–127, 2008.

Centenary of Christfried Jakob's discovery of the visceral brain: An unheeded precedence in affective neuroscience, Triarhou, L.C. , *Neuroscience and Biobehavioral Reviews*, 32, 984-1000.

Swanson, L. (2000). What is the Brain? *Trends in Neuroscience*, 23, 519-527.

-Swanson, L. (2005). Anatomy of the Soul as Reflected in the Cerebral Hemispheres: Neural Circuits Underlying Voluntary Control of Basic Motivated Behaviors. *Journal of Comparative Neurology*. 493:122-131.

Supplementary reading:

Sommer and Wurtz, 2008. Brain Circuits for the Internal Monitoring of Movements, *Ann Rev Neurosci*, 31:317-338.

[Additional interesting resources](#)

[Data base for cell type neurochemistry:](#)

Resources for more detail: <http://senselab.med.yale.edu/> [provides information about receptor and neurotransmitter types] NeuronDB provides a dynamically searchable database of three types of neuronal properties: voltage gated conductances, neurotransmitter receptors, and neurotransmitter substances. It contains tools that provide for integration of these properties in a given type of neuron and compartment, and for comparison of properties across different types of neurons and compartments. CellPropDB: Cellular Properties Database (CellPropDB) provides a simple repository for data regarding membrane channels, receptor and neurotransmitters that are expressed in specific types of cells. The database

By remaining enrolled in this course, you confirm that you have read the syllabus and understand the grading system. With that in mind, you understand that all students will be graded as fairly as possible. You understand that your grade along with all grades in the course will be based on your test performance, and the quality of your homework, participation in group activities, and attendance. With fairness in mind, you recognize that students cannot ask for special consideration when final grades are given. Therefore, you will not ask the instructor to change a grade because of outside circumstances.

