

COURSE SYLLABUS

BIPN 152 “Healthy & Diseased Brain”

SPRING 2024

Lectures Tue/Thurs 2:00-3:20 pm, Tata Hall 3201

Discussion section, via Zoom, Fridays, noon

INSTRUCTOR: Professor Shelley Halpain, Ph.D. (she/her)

shalpain@ucsd.edu

NOTE: When emailing Prof. Halpain please always put “BIPN 152” in the subject line, along with any other relevant topic phrase

Office hours: Thursdays, 12:30-1:30pm; location: SCRM 2803 (2nd floor north side of the Sanford Consortium building); you may reach me there either in person or via zoom. In addition, Prof. Halpain will be available for *up to 15 min after each lecture* to answer questions about the lecture material. NOTE: Prof. Halpain will answer questions about course content. Any questions about course policy & logistics should first be addressed by checking Canvas or by contacting your IA. Students may use Prof. Halpain’s office hours to discuss course material, inquire about research, or ask about neuroscience careers... Or whatever’s on your mind.

Course Description. BIPN 152 is a 4-unit upper division course that delves into the physiological, genetic, cellular, and molecular basis of human brain function, as well as many neurological and neuropsychiatric diseases. Emphasis is placed throughout not only on understanding course content but also on the development of critical thinking skills. The course begins with fundamental neuroscience concepts (e.g., basic neuroanatomy, the biophysical basis of axon potentials, synaptic transmission, etc.) and covers a diverse series of topics ranging from learning and memory, epilepsy, Alzheimer’s and other neurodegenerative diseases, mood disorders like depression, bipolar disorder, & anxiety, disorders of neurodevelopment (lissencephaly, schizophrenia, autism), pain, and drug addiction. Students will be instructed in how to read, interpret, and summarize relevant research papers from the primary scientific literature. In addition, students will gain experience in communicating important scientific concepts to others.

This course builds on knowledge in the areas of human and animal physiology, cell biology, cell signaling and pharmacology. By focusing on selected diseases and disorders of the nervous system, we deepen our understanding of how the brain and nervous system function under healthy conditions.

By the end of this course, students can expect to achieve the following goals:

- Extend their fundamental knowledge of neurobiology concepts
- Learn where to find and how to evaluate reliable sources of information on neurological/neurodevelopmental/neuropsychiatric conditions
- Gain confidence in reading the scientific literature, and applying those same skill sets to evaluating the nature and quality of information in other areas of science and society
- Improve their ability to explain key neuroscience concepts to non-experts of any age

Active learning is an important part of this course. The reasons for this are two-fold. First, the reading assignments will be low-stress ways to obtain points and optimize your final grade. Unlike exams, they will be scored more heavily on your effort, rather than on specific knowledge. Second, many education studies have shown that active learning is a great way to deepen and retain information. Many past students in BIPN 152 have commented that topic areas connected to the projects were ones for which they could still remember details years later.

The project for SP24 will be **The 5Qs**: a series of reading assignments and written responses designed to help you learn to read the scientific literature. Reading scientific papers published by actual scientists in actual

journals can be intimidating, even for graduate students (even for professors). Our goal is to lessen your anxiety and give you confidence that you, too, can tackle a scientific paper in the primary research literature, even without having to be an expert. This project is called "The 5 Qs." Prof. Halpain will provide a guide on how to extract key take-aways from a science paper, and your IA will help you do this each week, and improve along the way. By following the "5Qs" rubric provided, students will submit a short, written summary of nine assigned papers during the term, which will be peer-reviewed for points.

Knowledge and skills gained in BIPN 152 are applicable toward a wide variety of career goals: medicine (doctors, nurses, physician assistants, physical therapists, medical technologists, pharmacists, dentists, opticians, psychotherapists, public health professionals... etc.); science (basic or applied research in biotechnology & pharmaceuticals, bioengineering; biophysics....etc.); teaching (K-12; higher ed); public communication (journalism, podcasts), fundraising (non-profits, corporate investments)... and many others, some not yet invented.

Course prerequisites: BIPN 140 or equivalent is required.

A basic understanding of neuronal communication and the cellular and physiological level is assumed, and the following concepts should be familiar to all enrolled students: the main types of cells that comprise the nervous system; the basic structure of the neuron; fundamental biophysics of membrane potentials; basis of the action potential; basis of excitatory and inhibitory synaptic potentials; neuronal signal integration; function of voltage-gated and ligand-gated ion channels, function of G-protein coupled receptors; concepts of agonist and antagonist pharmacology. *Each of these topics will be briefly reviewed at appropriate times during the course.* However, remedial instruction will be the responsibility of the student. During the first week a non-graded assessment quiz will be available on Canvas so that students can self-evaluate their level of preparedness and plan accordingly. Skills refreshment is encouraged by reviewing course notes/materials/reading assignments from BIPN 140 (Cellular Neurobiology) or BIPN 100 (Human Physiology). Please note that the UCSD Teaching & Learning Commons has general student support services available: <https://commons.ucsd.edu/for-students/> Please communicate with Prof. H and/or your IA if at any point you feel unsure of your level of preparedness for this course.

OSD Accommodations. Prof. Halpain and her IAs always do their utmost to accommodate students with disabilities. Please submit your official OSD request forms to Prof. H. by the end of week 2, to optimize our accommodations planning. **Student-athletes.** Please request accommodations by end of week 2 if possible. Coaching staff will be asked to proctor your written exams; alternative is taking an oral make-up exam within 2 days of missed exam (not offered for the final exam).

BIPN 152 Grade Policy SP24

1000 points total

❖ 800 points from exams

3 “Mini-Midterm” exams; 150 points each = 450 points

1 Final exam = 350 points

❖ 180 points from weekly homework assignments

Answers to the 5 Qs (graded by IA) = 9 x 20 points each = 180 points

❖ End-of-term Reflection: feedback on your learning and our teaching = 20 points

Extra credit: There are no opportunities to earn “extra credit,” out of fairness to all in the class. Your way to earn “extra credit” is to perform exceptionally well on exams and assignments.

Exam make-up policy:

If you **MUST** miss an exam due to illness or personal emergency, you should contact your IA and simultaneously Prof. Halpain before the exam if at all possible! Make-up exams will differ from the original, and will be delivered as an oral exam. Alternative exam dates are **NOT** available in advance, even by pre-arrangement.

Late submissions of homework assignments are not accepted

2024 BIPN 152 GRADE DISTRIBUTIONS

≥ 970	A+
910-969	A
880-909	A-
830-879	B+
790-829	B
750-789	B-
710-749	C+
670-709	C
570-669	C-
510-569	D
< 510	F