

COURSE SYLLABUS

BIPN 152 “Healthy & Diseased Brain”

SPRING 2022

Lectures Tue/Thur 2:00-3:20pm, Galbraith Hall 252

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

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

Office hours: Thursdays, 12-1pm; location: SCRM 2803 (north side of the Sanford Consortium building); Prof. Halpain will also be available 20 min before each lecture to answer questions; alternative office hours by appointment. Please send a request with possible time windows, via email: shalpain@ucsd.edu Please come by to discuss course material, inquire about my research, or ask about neuroscience careers, what it’s like being a scientist.... 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

Project-based learning is an important part of this course. The reasons for this are two-fold. First, the project 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 and participation, 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. For many students, that came in especially handy when taking MCATs or other future exams.

Projects include the following (see grade policy for point values):

- A. The 5 Qs. Learning 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 IAs 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 seven assigned papers during the term.
- B. Journal Club. Learning to give a Journal Club presentation. This will build student’s skills in verbal scientific presentations. Journal clubs are common ways that scientists share info with colleagues that they obtain from reading scientific papers. However, these skills are not only important if you’re planning to attend graduate school... doctors, therapists, and other health professionals also share info using a similar formalized presentation style. Working in small groups, students will take turns presenting the assigned “5Q” papers in a journal club format. Your IAs will provide guidance and lead by example.
- C. Neuro3L. Near the end of the quarter, students will submit a 3-4 min video that explains a neuroscience concept at three levels of understanding (i.e., so that a kindergartner, a middle-schooler, and a college student can understand it). Examples will serve as your guide. This assignment is meant to be fun and low-stress. It is evaluated on quality of information and clarity of explanation.... not on podcast production values (costumes and props are optional!)

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. Prerequisites for undergraduate Biology courses are found at <https://www.biology.ucsd.edu/education/undergrad/course/prereq.html>

(Note, because this is a new pre-req implemented in Fall 2021, for SP22, we are allowing BIPN 140 to be taken concurrently). 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 given 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 SP22

1000 points total

❖ 500 points from exams

3 “Mini-Midterm” exams; 100 points each = 300 points

1 Final exam = 200 points

❖ 440 points from project assignments

Neuro3L = 200 points

Journal club presentation = 100 points

Answers to the 5 Qs (submitted to IAs) = 7 x 20 points each = 140 points

❖ 60 points from Section Participation**

During each of the nine Discussion Sections with your IA, there will be a short 1-3 question quiz, for which you will receive participation credit: 9 x 5 points = 45 points

End-of-term Reflection: feedback on your learning and our teaching = 15 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 & section participation 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 by your IA as an oral exam. Alternative exam dates are NOT available in advance, even by pre-arrangement.

Late submissions of assignments are penalized with point deductions.

*** Section participation: Students are expected to participate in their UCSD registrar-assigned Section, and to regularly attend its meetings, and thereby receive participation points. We are making every effort to offer you Sections at a wide range of times, so if your current situation requires you to change Section, please follow the instructions announced by the IAs. We recognize that urgent matters do arise, so please arrange with your IA how to make up missed Section meetings (limits may apply).*

2022 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