

## Course Information

- **PSY 615 Systems and Behavioral Neuroscience**
- **CRN 23538**
- **Meeting day(s) and time(s).**
  - **Lecture Time:** T/TH, 1:30-2:45pm **Location:** WALC 3148
  - **Discussion Time:** T, 3:30-4:20pm **Location:** WALC 3132
- **Instructional Modality:** Face-to-Face
- **Course credit hours:** 4

## Instructor(s) Contact Information

Susan Sangha, Ph.D. (she/her/hers)

**Email:** [sangha@purdue.edu](mailto:sangha@purdue.edu)

**Office:** PSYC 3182

**Student Hours:** By appointment

Dan Foti, Ph.D. (he/him/his)

**Email:** [foti@purdue.edu](mailto:foti@purdue.edu)

**Office:** PSYC 1142

**Student Hours:** By appointment

## Course Description

This course will provide you with a broad introduction to the field of neuroscience and how it can inform our understanding of behavior. First, we will cover neuroanatomy, synaptic communication, and plasticity. Next, we will cover neuroscience research on a range of major topics relevant to behavior: emotion, motivation, attention, learning, decision-making, and social cognition. This course will also provide a brief introduction to a variety of neuroscience research methods that are commonly used in animal and human research (e.g., electroencephalography, magnetic resonance imaging), including tutorials and live demonstrations.

## Learning Resources, Technology & Texts

There is no required textbook for this course. There will be several assigned readings per week, which will be posted on Brightspace. These readings have been selected to provide (1) foundational information regarding major theoretical models, (2) exposure to relevant research methods, and (3) up-to-date information about the current state of knowledge within the field (i.e., empirical evidence). Please make the time to read each before the class for which they are assigned. While many of the articles are review papers, there are also several reports of original research. These are intended to illustrate some of the innovative approaches and methods in current neuroscience research. Some of the readings will be difficult for those without a background in the relevant area or methodology, so please do not be discouraged if you struggle with them. Focus on the main research questions, findings, and implications, and don't worry if you can't fully grasp the more technical details.

## Learning Outcomes

By the end of the course, you will develop a better understanding of the following issues:

1. General neural architecture of core systems relevant to behavior
2. Behavioral outcomes for each major neural system
3. How brain structure and functioning are studied in animal research
4. How brain structure and functioning are studied in human research
5. How brain functioning undergirds cognition, affect, and social processes
6. Translation of basic neuroscience to clinical and other applied research

## Assignments

- 1. Class Participation/Discussion (10%):** Attendance and active participation in all class discussions is required. For assignments designated as JC under "Assignment Due" in the schedule, you are expected to submit, via email, 3 questions or critical comments regarding the designated journal club article; these should be submitted by **11:59PM 1 day prior**. JC1-6 should be submitted to Dr. Sangha, and JC7-12 should be submitted to Dr. Foti. For planned absences (e.g., University-sponsored activities, religious observances, conference travel), participation credit may be earned by attending student hours and submitting a brief thought paper (see policy on Missed Classes, below).
- 2. Live Demonstrations (10%):** We will offer several live demonstrations of neuroscience methods over the course of the semester. You are expected to attend at least one of these demonstrations by each instructor (i.e. one for Dr. Sangha and one for Dr. Foti), and submit a brief 1-page written summary of your observations. Each submitted summary will count 5% toward your overall course grade. If written summaries for more than two demonstrations are submitted, the highest scores will be kept.
- 3. Exams (2 x 25%; 50% total):** There will be two non-cumulative exams intended primarily to help you keep up with, and absorb, the material. One exam will focus on the behavioral neuroscience aspect of the course, and the other exam will focus on the systems neuroscience aspect of the course. The exams will consist of short-answer and essay questions covering both the lectures and readings. You will complete both exams at home, and turn them in electronically by the posted deadline. There will be no make-up exams.
- 4. Research proposal (5 % for oral presentation, 25% for written proposal; 30% total):** You will complete a research proposal that demonstrates your understanding of how neuroscience research can inform our understanding of behavior. While the specific topic of the research proposal is up to you, it must incorporate a neuroscience research method discussed in class (e.g., electrophysiology, functional neuroimaging, optogenetics). While the proposed research may also integrate multiple research methods, a proposal that focuses solely on molecular or cellular methods would not be appropriate. Your proposal may extend published findings. This assignment includes two pieces:
  - At the midway point of the semester, you will present a 'progress report' to the class (counting 5% toward your final course grade). This will be an opportunity to present your preliminary ideas to the class, and to receive feedback as you continue to develop your ideas into a formal research proposal. The class presentation should be approximately 10 minutes in length (this may be adjusted depending on final class size) and incorporate multimedia (e.g., Powerpoint). The presentation will be graded based on clarity and your ability to answer questions from the class.
  - At the end of the semester, you will submit a written proposal (counting 25% toward your final course grade). Your written proposal should include: (a) an introduction section that reviews the available literature and states your hypotheses, and (b) a methods section that describes your planned sample, measures, and data analyses. The written proposal will be graded based on depth of thinking and clarity of the research design.

## Grading Scale

Final grades will be determined as follows: 90-100% = A; 80-89% = B; 79% or below = C.

## Attendance Policy

Attendance in all lectures and active participation in all class discussions are required. Exams must be taken on the scheduled day/time, and there will be no make-up exams. For planned absences (e.g., University-sponsored activities, religious observances, conference travel) exams may be taken early and participation credit may be earned by attending student hours and submitting a brief (1-2 page) response to that week's readings; such arrangements must be negotiated with us in advance. In the event of the death of a family member, you are protected by the Grief Absence Policy for Students. For more information, see:

[www.purdue.edu/odos/services/griefabsencepolicyforstudents.php](http://www.purdue.edu/odos/services/griefabsencepolicyforstudents.php)

## Academic Guidance in the Event a Student is Quarantined/Isolated

If you must miss class at any point in time during the semester, please reach out to us via email so that we can communicate about how you can maintain your academic progress. If you find yourself too sick to progress in the course, notify us via email or Brightspace. We will make arrangements based on your particular situation. Please note that, according to [Details for Students on Normal Operations for Fall 2021](#) announced on the Protect Purdue website, “individuals who test positive for COVID-19 are not guaranteed remote access to all course activities, materials, and assignments.”

## Classroom Guidance Regarding Protect Purdue

Any student who has substantial reason to believe that another person is threatening the safety of others by not complying with Protect Purdue protocols is encouraged to report the behavior to and discuss the next steps with their instructor. Students also have the option of reporting the behavior to the [Office of the Student Rights and Responsibilities](#). See also [Purdue University Bill of Student Rights](#) and the Violent Behavior Policy under University Resources in Brightspace.

## Academic Integrity

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. Any suspected instance of academic dishonesty (e.g., plagiarism or behavior consistent with cheating) will be reported to the Office of the Dean of Students. The first instance will result in a grade of zero on that exam/assignment, and the second instance will result in an F for the course. For more information on academic integrity, including categories of academic dishonesty, please refer to Purdue's student guide for academic integrity:

[www.purdue.edu/odos/aboutodos/academicintegrity.php](http://www.purdue.edu/odos/aboutodos/academicintegrity.php)

## Nondiscrimination Statement

Purdue University is committed to providing a safe and secure campus environment for members of the university community that promotes learning. Violent behavior is prohibited while participating in any university activity. Faculty are required to report to the Office of Student Rights and Responsibilities any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

Discrimination is prohibited against any member of the University community on the basis of race, religion, color, sex, age, national origin, genetic information, marital status, parental status, sexual orientation, gender identify and expression, disability, or status as a veteran. If you believe you have been discriminated against, you may submit an anonymous complaint to the Office of Institutional Equity: <http://www.purdue.edu/report-hate>. Additionally, here is a link to Purdue's [Nondiscrimination Policy Statement](#)

## Accessibility

Purdue University is committed to making learning experiences accessible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let us know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: [drc@purdue.edu](mailto:drc@purdue.edu) or by phone: 765-494-1247.

## Mental Health/Wellness Statement

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [WellTrack](#). Sign in and find information and tools at your fingertips, available to you at any time.

If you need support and information about options and resources, please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 am- 5 pm.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc. sign up for free one-on-one virtual or in-person sessions with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is completely free and can be done on BoilerConnect. If you have any questions, please contact Purdue Wellness at [evans240@purdue.edu](mailto:evans240@purdue.edu).

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office on the second floor of the Purdue University Student Health Center (PUSH) during business hours.

### **Basic Needs Security**

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. There is no appointment needed and Student Support Services is available to serve students 8 a.m.-5 p.m. Monday through Friday. Considering the significant disruptions caused by the current global crisis as it related to COVID-19, students may submit requests for emergency assistance from the [Critical Needs Fund](#)

### **Emergency Preparation**

In the event of a major campus emergency, course requirements, deadlines, and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond our control. Any changes to the course will be posted on Brightspace, sent via email, and announced in class.

### **Course Schedule**

On the following page is our [anticipated](#) course schedule, subject to change.

Week	Date	Topic	Lab Demo	Assignment Due
1	08/24	SS: Introduction; General Neuroanatomy		
	08/26	SS: General Neuroanatomy		
2	08/31	SS: Visual System		JC1 (neuroanatomy)
	09/02	SS: Visual System		
3	09/07	SS: Auditory System		JC2 (visual system)
	09/09	SS: Auditory System	Demo 1 – tour of rat surgery room; live recording of single unit activity in a freely behaving rat	
4	09/14	SS: Somatosensory System, Pain		JC3 (auditory system)
	09/16	SS: Somatosensory System, Pain		
5	09/21	SS: Motor System		JC4 (pain)
	09/23	SS: Motor System	Demo 2 – Behavioral Models	
6	09/28	SS: Limbic System		JC5 (motor system)
	09/30	SS: Limbic System		
7	10/05	SS: Synaptic Communication and Plasticity		JC6 (limbic system)
	10/07	SS: Synaptic Communication and Plasticity		
8	10/11-10/15	SS: take home exam due 10/15		<b>EXAM #1 (SS)</b>
	10/12	OCTOBER BREAK		
	10/14	Class Presentations		<b>Oral Presentation of Research Proposal</b>
9	10/19	Class Presentations		
	10/21	DF: Methods – Electrophysiology		
10	10/26	DF: Methods – Electrophysiology	Demo 3 – Human EEG	
	10/28	DF: Methods - Neuroimaging		
11	11/02	DF: Methods - Neuroimaging	Demo 4 – Human MRI	JC7 (methods)
	11/04	DF: Applications – Emotion & Motivation		
12	11/09	DF: Applications – Emotion & Motivation		JC8 (emotion/motivation)
	11/11	DF: Applications – Attention & Learning		
13	11/16	DF: Applications – Attention & Learning		JC9 (attention/learning)
	11/18	DF: Applications – Decision-making		
14	11/23	DF: Applications – Decision-making		JC10 (decision-making)
	11/25	THANKSGIVING BREAK		
15	11/30	DF: Applications – Social Cognition		
	12/02	DF: Applications – Social Cognition		JC11 (social cognition)
16	12/7	DF: Translating Neuroscience Research		
	12/9	DF: Translating Neuroscience Research		JC12 (translation)
17	12/13-12/17	DF: take home exam due 12/17		<b>EXAM #2 (DF)</b>
	12/15	DF, SS: written research proposals due at <b>9am</b>		<b>Written Research Proposal (DF, SS)</b>