

PSYC 0140L - BIOPSYCHOLOGY LABORATORY

Catalog Description

Formerly known as PSYC 40L

Corequisite: Completion with grade of "C" or better or concurrent enrollment in PSYC 140

Hours: 54 laboratory

Description: Focuses on the applied study of the nervous system and its connection to behavior. Specific topics include organization of the brain, anatomy and physiology of the neuron and an examination of sensory motor systems and states of consciousness. Students are introduced to sheep brain and cow eye dissection procedures, interactive computer simulation programs and lab experiments including EEG and EMG data collection. (CSU, UC)

Course Student Learning Outcomes

- CSLO #1: Describe and examine the basic research techniques and experiments used in the investigation of biological psychology using brain dissection procedures, interactive computer simulations and lab experiments with data collection and analysis.
- CSLO #2: Apply knowledge of the anatomy, physiology, and organization of the nervous system through dissection of sheep brains.
- CSLO #3: Characterize the physiology of neurons and nerve conduction using computer simulations.
- CSLO #4: Apply knowledge of the anatomy and physiology of sensation and perception including vision, audition, smell, and taste through experimentation, computer simulations, and dissection.

Effective Term

Fall 2024

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

0

Total Student Learning Hours

54

Course Objectives

1. Describe the various research methods commonly utilized in biopsychological research.
2. Explain the anatomy, physiology and organization of the nervous system through dissection of sheep brains.
3. Describe the primary features of neurons, glia, and synapses at the cellular level.

4. Examine the electro physiology of neurons and nerve conduction using computer simulations.
5. Compare and contrast the human nervous system with that of other animals.
6. Analyze the basic processes of sensation and perception for the main sensory systems using the principles of psychophysics.
7. Investigate the relationship between brain and various mental processes such as learning, memory and emotions.
8. Critically evaluate the concept of lateralization.

General Education Information

- Approved College Associate Degree GE Applicability
 - AS - Life Science Lab
- CSU GE Applicability (Recommended-requires CSU approval)
 - CSUGE - B3 Lab Activity
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
 - IGETC - 5C Laboratory Science

Articulation Information

- CSU Transferable
- UC Transferable

Methods of Evaluation

- Classroom Discussions
 - Example: Research Methods Discussion Questions 1. The prefrontal lobotomy was a procedure in which the front of the brain was lesioned in patients deemed to have mental illness that did not respond to other treatments. The prefrontal lobotomy was widely used in the 1940s and 1950s. It was based on observations of one chimpanzee, whose behavior changed after receiving bilateral lesions to her prefrontal lobe. Largely on this evidence, doctors performed prefrontal lobotomies on human patients who suffered from psychiatric disorders to calm them down. There were side effects and this therapy often did not provide the expected benefits for the patients. What was wrong with the progression from a few primates to widespread use in humans? What questions should have been asked before the technique was used in people? 2. Would you donate your brain to the Harvard Brain Bank? Why or why not? Discuss the pros and cons of donation for science and the pros and cons of donation for you and your family and/or loved ones. Students will have gone through a lecture with reading materials and videos discussing the above topics. The below responses come from having discussed these topics in class in on-ground sessions. For Question 1 – Student responses could include: a) The need to do more animal testing before moving on to human testing. b) The need to test the outcome against other techniques. c) The need to have control groups for the anesthetic and sham surgery. d) The idea that the outcome may be less desired than the problem they were trying to treat in the first place. e) The idea that behavior in humans is more complex than that of other species and therefore we cannot start applying a technique in humans and expect the same outcome as the other species. f) Or other applicable research method critiques not specifically listed here to include the ethics of changing how another human beings' brain operates in such a drastic fashion without more evidence. For Question 2 – Student responses could include: a) A yes, no, or unsure answer for donation. b) Personal feelings of either wanting to be part of scientific research or not wanting to

be part of scientific research. May include specific reasons for their feelings. c) Discussions of bodily integrity after death and how this may be important to them or their family members for a variety of reasons. d) Discussions of wanting to help society in its goal to understand the human brain. e) Or other applicable ideas regarding the ethics or personal/familial feelings on the donation of body parts in general or the brain specifically. Rubric grading.

- Essay Examinations
 - Example: Write a short essay discussing at least three staining techniques used to study neurons. Essay will be graded based upon rubric developed by instructor and shared with students.
- Objective Examinations
 - Example: Observe a golgi stained section of rat brain under a virtual microscope. Scan the section for neurons with their dendritic arbors. Find one pyramidal cell and draw it in as much detail as possible. Identify its various dendrites (apical shaft, oblique branches off the apical shaft, and the basilar branches). What is the purpose of such a long apical shaft? The skill demonstration is graded on a rubric.
- Reports
 - Example: After completing the cow eye dissection complete a lab report on eye structures and functions. Rubric grading.
- Skill Demonstrations
 - Example: Identify the brain structures in a sheep brain. Dissect a sheep brain in the coronal plane and identify the corpus callosum. Assignment will be graded based upon accuracy and completion.

Repeatable

No

Methods of Instruction

- Laboratory
- Distance Learning

Lab:

1. The instructor will guide the students through an experiment to examine the sensitivity differences between different skin regions using a measure called two-point touch detection.
2. Instructor demonstrates a sheep brain dissection to identify the cranial nerves and then guides groups of students in completing a dissection and identifying the nerves.

Distance Learning

1. Lectures will be presented using slide show presentation, with accompanying audio-recordings and written transcripts to help accomplish the goal of universal access. Students will be directed to watch videos or go to websites when appropriate to delve into the lecture topic. For example, when discussing ways to examine the living human brain, students will be directed to watch a video of an fMRI scan to learn about how this scanning technique works, and the conclusions we can draw from the brain visuals it provides.

Typical Out of Class Assignments Reading Assignments

1. Review the visual anatomy material from lab handouts and the text book in preparation for the cow eye dissection in the lab. 2. Read the "Neurons in Action" lab hand out on Resting membrane and Action

Potential lab simulations in preparation for the computer simulation exercises on neurophysiology.

Writing, Problem Solving or Performance

1. Students will dissect a whole sheep brain in the lab and identify the key structures in dorsal, ventral, lateral and midsagittal views. 2. Determine your two-point threshold by finding the lowest mm distance on the chart for each body part where the participant said I feel two points. You will have one threshold for each body part. Draw a bar on the chart below depicting your two-point threshold for each body part. Then answer the questions below based on your data. Submit this worksheet in LMS.

Other (Term projects, research papers, portfolios, etc.)

Each week students will complete lab worksheets on experiments, lab activities, simulations and dissections completed in the lab.

Required Materials

- A Colorful Introduction to the Anatomy of the Human Brain: A Brain and Psychology Coloring Book
 - Author: Pinel and Edwards
 - Publisher: Allyn & Bacon
 - Publication Date: 2007
 - Text Edition: 2nd
 - Classic Textbook?:
 - OER Link:
 - OER:
- The Sheep Brain: A Basic Guide
 - Author: Cooley and Vanderwolf
 - Publisher: A.J. Kirby Co.
 - Publication Date: 2004
 - Text Edition:
 - Classic Textbook?:
 - OER Link:
 - OER:
- Biological Psychology
 - Author: Kalat
 - Publisher: Cengage
 - Publication Date: 2018
 - Text Edition: 13th
 - Classic Textbook?:
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.