

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Psychology 140 – Physiological Psychology

3 hours lecture, 3 units

Catalog Description

Examination of the relationships between bodily processes and aspects of behavior. Review of fundamental research methods and major research findings in physiological psychology. Application of experimental methods in psychology, physiology and related disciplines to the understanding of perceptual processes, the control of movement, sleep and waking, reproductive behaviors, ingestive behaviors, emotion, learning, language and mental disorders are explored.

Prerequisite

“C” grade or higher or “Pass” in PSYC C1000 (Formerly PSY 120) or equivalent

Entrance Skills

Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:

- 1) Distinguish basic psychological terminology:
 - a. Identify terms used within psychology
 - b. Distinguish the different sub-areas
 - c. Identify the different approaches
- 2) Interpret experimental design:
 - a. Identify basic types of research methods
 - b. Delineate the different strengths and weaknesses of each method
 - c. Apply research-based critical thinking
 - d. Use and misuse of statistics
- 3) Distinguish and use information from areas that are important to physiological psychology:
 - a. Psychobiology: neuron and brain, autonomic nervous system, genetics
 - b. Sensation and perception: signal detection theory, the sense organs, organization
 - c. Consciousness: sleep and dreams, hypnosis, drugs
 - d. Learning: classical conditioning, operant conditioning, observation learning
 - e. Memory: stage theory, forgetting, biology of memory
 - f. Motivation and emotion: drives, theory, achievement and affiliation, aggression, love
 - g. Development: physical, cognitive and social development
 - h. Psychological disorders: DSM classifications, casual theories
 - i. Health: stress and illness

Course Content

- 1) Historical and philosophical origins of physiological psychology
- 2) Basic science review: cellular biology, chemistry, electronics
- 3) Synthetic evolution: Darwinian theory, genetics, molecular biology
- 4) Scientific methodologies and ethical considerations in: experimental lesioning, stimulating and recording, clinical techniques in accidents and surgery; histological procedures, non-invasive procedures such as CAT scans, PET scans and NMR imaging
- 5) Neuroanatomy
- 6) Neuronal anatomy and physiology
- 7) Sensory coding mechanisms and perceptual processes: vision, hearing somesthesia, taste and smell
- 8) Movement control mechanisms: pyramidal and extrapyramidal motor systems

- 9) Hormonal and neuronal feedback mechanisms
- 10) Homeostasis: physiological and behavioral processes in the regulation of food intake, water balance, body temperature, reproduction
- 11) Emotion: autonomic bases, expression, cognitive factors and control, psychosomatic disorders, hedonic systems, aggression
- 12) Biological rhythms such as sleep and dreaming
- 13) Physiological bases of learning and memory, and hemispheric lateralization of higher mental processes
- 14) Physiological bases of psychopathology

Course Objectives

Students will be able to:

- 1) Describe how the general principles and tools of physiological psychology are applied to behavioral research.
- 2) Identify the major anatomical structures of the brain by their function and their relative position.
- 3) Examine neurons and glial cells at the molecular level and describe their function.
- 4) Classify the actions of neurotransmitters and receptor types and predict their effects on the postsynaptic membrane.
- 5) Define proliferation, migration and differentiation during development of the human nervous system and their relevance to neural plasticity.
- 6) Describe the generation of motor movement from neural input.
- 7) Explain the actions of visual perception from the retina to the visual cortex and their response to damage.
- 8) Use anatomical structures and transmitter actions to describe different levels of consciousness and attention processes.
- 9) Analyze and categorize the function of different hypothalamic nuclei controlling body state regulation.
- 10) Discuss the functioning of the limbic system and its role in producing emotional, attack and escape behavior.
- 11) Use diagrams to demonstrate the biological basis of learning and memory.
- 12) Compare and contrast the function and strengths of the left and right hemispheres in the brain.
- 13) Correctly classify different psychological disorders by describing their physiological cause and treatment.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Quizzes and exams that measure students' ability to recognize, describe, explain, and provide examples of various topics, information, and issues related to the mind as a biological organism.
- 2) Diagrammatic analysis and explanation of various anatomical structures and their functions.
- 3) Group or individual projects or research papers that require students to explain research methods and behavioral outcomes.
- 4) Interactive group activities in which students analyze, discuss and draw conclusions about the brain and mind.

Special Materials Required of Student

Access to Canvas Learning Platform

Minimum Instructional Facilities

- 1) Smart classroom
- 2) Internet Access

Method of Instruction

- 1) Lecture and discussion
- 2) Group discussion, cooperative learning exercises
- 3) Guest speakers (optional)
- 4) Individual and group projects, structured in-class exercises, demonstrations

Out-of-Class Assignments

- 1) Vocabulary worksheets
- 2) Student multimedia presentations to discuss and show various topics for classroom discussion
- 3) Assigned reading and multimedia course-specific content and written reactions
- 4) Building Models of structures out of various mediums

Texts and References

- 1) Required (representative examples):
 - a. Biological Psychology 13th edition, Kalat, Cengage 2018.
 - b. Social Sciences LibreTexts – Biological Psychology (OERI)
(<https://socialsci.libretexts.org/Bookshelves/Psychology>)
 - c. OpenStax. (2024). *Introduction to behavioral neuroscience*. OpenStax.
<https://openstax.org/details/books/introduction-behavioral-neuroscience>
- 2) Supplemental: None

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Describe how the general principles and tools of physiological psychology are used ethically in the scientific investigation of the interaction between brain and behavior.
- 2) Diagram and label the general anatomical structures of the nervous system including hemispheres, lobes, areas, nuclei, synapses and neurochemical pathways of influence.
- 3) Describe the transduction of sensory systems and their interaction with hormones altering consciousness, satiety, memory, reproductive, and emotional behaviors.
- 4) Explore and explain the interaction of brain systems and chemicals that may produce abnormal behaviors, disorders, and lead to a possible treatment.