

PSYC 4: INTRODUCTION TO BIOPSYCHOLOGY

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2025
Units:	5
Hours:	5 lecture per week (60 total per quarter)
Prerequisite:	PSYC 1 or 1H.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Area 4: Social & Behavioral Sciences
Transferable:	CSU/UC
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- Each student will demonstrate their knowledge of biological processes that form the basis of all human behavior.
- Each student will demonstrate their knowledge of the relationship of the human brain and nervous systems.

Description

This course examines how the nervous system impacts human behavior and consciousness with the understanding that the mind and body are connected. Students will have the opportunity to examine how biological factors interact with social, cultural, and environmental influences to shape their individual and collective experiences. Various topics are covered, including sleep and dreaming, learning and memory, brain functioning, sensory perception, substance use, human sexuality, emotions, and psychological disorders.

Course Objectives

The student will be able to:

1. Define biopsychology and explain its purpose
2. Explain how their brain develops and functions during their everyday activities, including during sleep and dreaming, learning and memory, sensory perception, substance use, human sexuality, emotional experiences, and psychological disorders
3. Understand the different components of the nervous system and how they connect to their experience living in their bodies
4. Understand how genetic predispositions and the environment interact to influence their behaviors, traits, and physical and psychological health
5. Analyze biopsychology theories and research through a lens of cultural diversity
6. Recognize the technologies and research methods used by biopsychologists

Course Content

1. Introduction to the biological approach to behavior
 - a. Definition of neuroscience and biological psychology and related fields
2. Genetics and behavior
 - a. Mendelian genetics
 - b. Sex-linked and sex-limited genes
 - c. Genetic changes
 - d. Hereditary and environmental influences of behavior
 - e. Explanation of evolution and evolutionary psychology
3. Use of animals in research
 - a. Ethics of research using animals
4. The anatomy of neurons and the explanation of how neurons communicate
 - a. Explanation of glial cells and aspects of neuroanatomy that are relevant to understanding neural communication, such as the blood barrier, synapses, neurotransmitters, ions, etc.
5. Drugs and addiction and how psychoactive drugs exert their effects
6. All relevant and foundational knowledge of the anatomy of the nervous system, including the anatomy of the brain and the peripheral nervous system
 - a. Research methods used to study the nervous system, including MRI, PET, fMRI, EEG, and newer technologies
7. Brain development and neuroplasticity
 - a. Maturation of the brain during fetal development
 - i. Neuronal survival and apoptosis
 - b. Differentiation of the cortex
 - i. The effects of experiences on the organization and functioning of the developing brain
 - c. Development of the adolescent brain and development across the life-span
 - i. Changes in the brain associated with aging
 - d. Plasticity after brain damage
 - i. How to reduce harm after a stroke
 - ii. Regrowth of axons and learned adjustments in behavior
8. Vision
 - a. General principles of perception
 - b. The connection between the eye and the brain
 - i. Visual receptors: rods and cones
 - ii. Color vision theories and color vision deficiency
 - c. How the brain processes visual information
 - i. Processing in the retina
 - ii. Processing in the primary visual cortex
 - iii. The development of the visual cortex
 - d. Explanation of the paths of vision in the brain
 - i. Perceptions of shapes, colors, and motion
9. Other sensory systems
 - a. Auditory sensory systems
 - b. The mechanical senses
 - c. The chemical senses
10. Movement
 - a. Muscles and their movements
 - i. Fast and slow muscles and muscle control by proprioceptors
 - b. Brain mechanisms of movement
 - c. Movement disorders

- i. Parkinson's disease
 - ii. Huntington's disease
 - iii. Hereditary and environment in movement disorders
- 11. Wakefulness, sleep, and dreaming
 - a. Circadian rhythms
 - i. Endogenous cycles
 - ii. Resetting the biological clock
 - iii. The suprachiasmatic nucleus
 - iv. Light and the biological clock
 - v. Brain chemistry and melatonin
 - b. Stages of sleep
 - c. Sleep disorders
 - d. Theories and biological mechanisms of dreaming
- 12. Internal regulation
 - a. Controlling the body's temperature
 - b. Thirst
 - c. Hunger
 - d. Eating disorders
- 13. Gender, sexuality, and reproductive behaviors
 - a. Organizing effects of sex hormones during prenatal development
 - i. Activating effects of sex hormones during brain development
 - b. Variations in sexual behavior
 - i. Mating behavior
 - ii. Gender identity and gender differences
 - c. Sexual orientation
- 14. Emotional behaviors
 - a. Theories of emotion, including the James-Lange theory and modern theories
 - b. Physiological arousal and emotion
 - c. Brain areas associated with emotion
 - i. Contributions of the left and right hemispheres
 - d. The functions of emotions
 - i. The functions of emotions in moral decision making
 - e. Attack and escape behaviors
 - i. Fear and anxiety
 - ii. Anxiety disorders
 - f. Stress and health
 - i. Concepts of stress
 - ii. Stress and the hypothalamus-pituitary-adrenal cortex axis
 - iii. The immune system
 - iv. Post-traumatic stress disorder
- 15. The biology of learning and memory
 - a. Localized representations of memory
 - i. The engram
 - b. Types of memory
 - i. Long-term, short-term, procedural, implicit, explicit, etc.
 - c. Brain structures associated with memory
 - d. Types of amnesia
 - i. Korsakoff's syndrome
 - ii. Alzheimer's disease
 - e. The brain mechanisms and structures associated with learning
 - i. Long-term potentiation and consolidation
- 16. Cognitive functions
 - a. Lateralization and functions of the left and right hemispheres of the brain

- b. The corpus callosum
 - c. Hemisphere specializations and communication
- d. Evolution and physiology of language
 - i. Precursors of language and how humans evolved language
 - ii. Brain damage and language, including Broca's aphasia and Wernicke's aphasia
- e. Consciousness and attention
- 17. Biology of psychological disorders
 - a. Mood disorders
 - i. Major depressive disorder
 - ii. Bipolar disorder
 - iii. Genetic influences and other biological influences of mood disorders
 - b. Antidepressant drugs
 - c. Seasonal affective disorder
 - d. Schizophrenia
 - i. Genetic and other biological influences of schizophrenia
 - ii. The neurodevelopmental hypothesis of schizophrenia
 - e. Treatments of schizophrenia
 - i. Antipsychotic drugs and dopamine
 - ii. Role of glutamate
 - iii. Newer drugs

Lab Content

Not applicable.

Special Facilities and/or Equipment

When taught as an online distance learning section, students and faculty need ongoing and continuous internet and email access.

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Multiple choice quizzes
 Essay exams
 Research papers
 Summaries and analysis of primary source research articles
 Personal reaction papers
 Problem-solving exercises
 Midterms
 Final exams

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lectures
 In-class readings
 Videos
 Class discussion
 Active learning and group activities

Representative Text(s) and Other Materials

Pinel, John P.J., and Steven J. Barnes. *Biopsychology*, 11th ed. 2021.

Kalat, James W.. Biological Psychology, 14th ed.. 2023.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Reading and studying of textbook
2. Reading and critically analyzing primary source research articles
3. Reading current event articles that relate to prejudice and discrimination
4. Writing research papers
5. Writing essay exam questions
6. Writing personal reaction papers

Discipline(s)

Psychology