

PSYC 360 – BIOPSYCHOLOGY 2017-2018 (Term 1)

COURSE ESSENTIALS

When: Tuesday & Thursday 9:30 – 10:50am

Where: Term 1: Buchanan A203, Term 2: Buchanan A102

Instructors: Jason Snyder (Term 1)
jasonsnyder@psych.ubc.ca
CBH 3453
Office hours: at your convenience, by appointment
(also, after class works)
(also, email is bad for course content questions)

Charlis Rainecki (Term 2)

TA: TBD

Website: See connect.ubc.ca - Here I will post lecture outlines, the course schedule and any updates or changes, grades, supplementary links and readings. Check regularly.

Textbooks: Selected readings will be provided from: Kandel, E.R. et al. (2012), Principles of Neural Science, 5th Edition.

The course assumes a biopsychology background (specifically PSYC 260). However, if you have a background in science or psychology and are willing to put in the effort you will do well.

Lecture slides will be published online before class, may change at the last minute, and may be updated after class if content was added / fixed / clarified during class (i.e. always check before a test that you have the latest content).

Feel free AT ANY POINT to ask questions, make observations, compliment my wardrobe etc.

GOALS

By the end of this course I hope that you will understand the neurobiology of many of your everyday experiences. Mainly because this will totally impress your friends at parties. More specific goals of PSYC 360 are that:

- 1) You will appreciate that neurons and circuits are the foundational units of brain function, and you will know about classic and state of the art methods for studying them.
 - a. Visualizing neurons as anatomical building blocks
 - i. Golgi, dye injection, genetically-encoded, immunohistochemistry, electron microscopy
 - b. Neurons as physiologically functional building blocks
 - i. Ionic basis of the membrane potential and excitability
 - ii. Synaptic transmission
 - c. Neurons cooperate to form circuits
 - i. Synaptic convergence/divergence, feedforward and feedback inhibition
 - ii. The stretch reflex circuit as an example of simple circuit that regulates behavior

- 2) You will be able to identify shared and unique mechanisms by which sensory stimuli are detected, converted to electrical signals and represented in the brain
 - a. Basic sensory anatomy and physiology explains many psychophysical phenomena
 - b. Visual, auditory/vestibular, somatosensory, chemical sensory systems
 - i. Specialized sensory organs convert external stimuli into action potentials
 - ii. (Sensory) neurons have receptive fields that relate to their function
 - iii. The spectrum of sensory stimuli is organized according to anatomical maps
 - iv. Simple sensory neural representations are processed to form complex representations

- 3) You will appreciate that different memory systems learn about complementary aspects of experience.
 - a. Sensory information merges in the hippocampus to form episodic memories of specific experiences
 - i. Lateral and medial entorhinal cortex neurons represent object and spatial information, respectively
 - ii. Hippocampal neurons represent specific details of experiences and, together, they form memories that can be used flexibly
 - b. Synapses undergo plasticity to store memories in circuits
 - i. LTP as a synaptic model of memory
 - ii. Early LTP, late LTP and linking memories
 - c. Hippocampal memories transform and are consolidated into semantic/gist/factual memories in the neocortex
 - i. Standard model vs Multiple Trace model of memory consolidation

- d. The striatum forms habit-based memories (that can support or compete with hippocampal memories)
- 4) You will appreciate that memory guides future behaviors and is disrupted in many psychiatric conditions
- a. Memories allow for imagination of future experiences
 - b. Memory generalization contributes to anxiety disorders
 - c. Alzheimer's disease impacts specific aspects of episodic memory

In short, my hope is that by the end of the first term you will have a holistic picture of how sensory information enters the brain, is remembered as something meaningful, and used to guide behavior.

EVALUATION (first term)

Performance will be evaluated with a midterm exam and an end of term final exam

- each exam will be 80min (i.e. same duration as class, even if during the final exam period)
- exams will be weighted equally
- exams are based on the material covered in class AND the assigned readings
- exams will not be explicitly cumulative, though later material will build on material covered earlier in the course.
- the format will be 25 multiple choice questions, 10 fill in the blank, and 5 short answer questions.
- grades will be available on connect.ubc.ca. The Department of Psychology requires that class averages be 66-70%; grades may be scaled and are not official until they appear on your final academic record.

If you miss an exam you must notify me within 24hrs and provide a doctor's note that states that you were unable to attend, on the date in question, for medical reasons. We will then schedule a makeup exam.

The course TA, Alyssa Ash, will grade the exams, will be available to review your exam with you and will resolve the majority of grading issues that may arise.

TERM 1 SCHEDULE

Sept. 7	Lecture 1: Course Intro
Sept. 12	Lecture 2: Neurons – anatomy and methods pt1
Sept. 14	Lecture 3: Neurons – anatomy and methods pt2
Sept. 19	Lecture 4: Membrane potential, action potential
Sept. 21	Lecture 5: Mem. Potential & Synaptic transmission
Sept. 26	Lecture 6: Synaptic transmission
Sept. 28	Lecture 7: Synaptic interactions & circuits
Oct. 3	Lecture 8: Visual System (retina)
Oct. 5	Lecture 9: Visual System (pathways & circuits)
Oct. 10	Lecture 10: Visual System (cortex)
Oct. 12	Lecture 11: Auditory System
Oct. 17	Lecture 12: Somatosensory & Olfactory Systems
Oct. 19	Midterm exam
Oct. 24	Lecture 13: Ventral Stream, Association Cortex
Oct. 26	Lecture 14: Dorsal Stream, Association Cortex
Oct. 31	Lecture 15: Medial and lateral entorhinal cortex
Nov. 2	Lecture 16: Hippocampal place cells and memory pt1
Nov. 7	Lecture 17: Hippocampal place cells and memory pt2
Nov. 9	Lecture 18: Prefrontal Cortex (Meagan Auger)
Nov. 14	Class cancelled
Nov. 16	Lecture 19: Hippocampus & flexible, detailed memory
Nov. 21	Lecture 20: Synaptic plasticity
Nov. 23	Lecture 21: Memory and Disorders pt1 (Alyssa Ash)
Nov. 28	Lecture 22: Memory and Disorders pt2
Nov. 30	Lecture 23: Wrapup / Review session
Dec. 5-20	December Exam

Psychology Department's Position on Academic Misconduct

Cheating, plagiarism, and other forms of academic misconduct are very serious concerns of the University, and the Department of Psychology has taken steps to alleviate them. In the first place, the Department has implemented software that can reliably detect cheating on multiple-choice exams by analyzing the patterns of students' responses. In addition, the Department subscribes to TurnItIn – a service designed to detect and deter plagiarism. All materials (term papers, lab reports, etc.) that students submit for grading will be scanned and compared to over 4.5 billion pages of content located on the Internet or in TurnItIn's own proprietary databases. The results of these comparisons are compiled into customized "Originality Reports" containing several sensitive measures of plagiarism; instructors receive copies of these reports for every student in their class. In all cases of suspected academic misconduct the parties involved will be pursued to the fullest extent dictated by the guidelines of the University. Strong evidence of cheating or plagiarism may result in a zero credit for the work in question. According to the University Act (section 61), the President of UBC has the right to impose harsher penalties including (but not limited to) a failing grade for the course, suspension from the University, cancellation of scholarships, or a notation added to a student's transcript. All graded work in this course, unless otherwise specified, is to be original work done independently by individuals. If you have any questions as to whether or not what you are doing is even a borderline case of academic misconduct, please consult your instructor. For details on pertinent University policies and procedures, please see Chapter 5 in the UBC Calendar (<http://students.ubc.ca/calendar>) and read the University's Policy 69 (available at <http://www.universitycounsel.ubc.ca/policies/policy69.html>).