

# HD 3250: Neurochemistry of Human Behavior

## Cornell Prison Education Program - Five Points CF - Fall 2021

This course will examine human behavior from a neurochemical and biological perspective. It will start by outlining the principles of normal brain activity and then explore how abnormal brain activity can occur in disease and pathology.

### Course Objectives:

- Describe how the neurotransmitters interact with receptors in the brain
- Use the principles of neurotransmission to describe behavior
- Integrate an understanding of typical and atypical neurochemical activity to explain neurological conditions

**Instructor:** Emily Olafson

**Teaching Assistants:** None

**Textbook: Essential Psychopharmacology: Neuroscientific Basis and Practical Applications** (4<sup>th</sup> Edition) by Stephen Stahl

### Grading:

Description	Details	Total
Weekly Quizzes*	15 classes x 2% each	30%
Movie Response Paper	20%	20%
Book Response Paper	20%	20%
Final Exam	Cumulative	30%

\*Virtual: weekly take-home assignments

**Weekly Quizzes:** Each class will include a quiz that consists of 5 – 10 multiple-choice, short answer, and fill in the blank questions covering content from that day's class. Each quiz is worth 2% of the students' grade and in total, the quizzes will make up 30% of the grade.

**\*Virtual alternative:** Each class will include a take-home assignment that consists of 2 short-answer questions (worth 1% each). Responses to each question should be 200-300 words. Each assignment is worth 2% of the students' grade and will consist of content from that day's class.

**Movie Response Papers:** A movie will be shown in class. At the end of the movie, students will have an hour to write a 4 – 5 page (double spaced) response paper (1000-1300 words). The goal is to analyse the neuroscience and behavioral principles that underlie the plot. Students are expected to integrate lecture material with their own interpretations of the film. The paper should not be a description of the movie, but rather an analysis of the movie's content as it relates to the brain and behavior.

**\*Virtual alternative:** A movie will be shown in the computer lab. Students will have until the next class to submit a 4 - 5 page (double spaced) response paper (1000-1300 words). The goal is to analyse the neuroscience and behavioral principles that underlie the plot. Students are expected to integrate lecture material with their own interpretations of the film. The paper

should not be a description of the movie, but rather an analysis of the movie's content as it relates to the brain and behavior.

**Book Response Paper:** The book "Transcendent Kingdom" by Yaa Gyasi will be provided at the beginning of the course. The goal is to analyse the neuroscience and behaviour principles that underlie the plot. Students are expected to write a 4 – 5 page (double spaced) response paper (1000-1300 words) relating the book's content to the lecture material, and integrate their interpretations of the book.

**Final Exam:** The final exam will take place on the last day of class and will cover all of the content covered in the class (excluding the movie & book). It will include multiple-choice, short answer, and long answer questions.

**\*Virtual alternative:** The final exam will be assigned on the last day of class and will cover all of the content covered in the class (excluding the movie & book). It will include multiple-choice, short answer, and long answer questions, and will be due 1 week after the last day of class.

#### Course Overview:

Week	Date	Topic	Chapter
1		<b>Introduction to Neuroscience</b> Nervous system organisation, cells, neuroanatomy, function	
2		<b>Chemical Neurotransmission</b> Nomenclature, neurotransmitters, signalling, action potential	1
3		<b>Targets of Psychopharmacological Drug Action</b> Ionotropic receptors, G-protein coupled receptors	2, 3
4		<b>Targets of Psychopharmacological Drug Action</b> Neurotransmitter transporters, enzymes	2, 3
5		<b>Psychosis &amp; Schizophrenia, Antipsychotic Agents</b> Schizophrenia, dopamine, glutamate, imaging, development, typical and atypical antipsychotics, clinical actions	4, 5
6		<b>Mood Disorders</b> Bipolar disorder, depression, neurotransmitters, circuits, stress, mania, imaging	6
7		<b>Antidepressants, Mood Stabilizers</b> Antidepressant classes, atypical antipsychotics, ketamine	7, 8
8		<b>Anxiety Disorders and Anxiolytics</b> Symptoms, amygdala, fear, circuits, GABA, benzodiazepines, serotonin, treatments	9
9		<b>Movie: Inside Out (94 min)</b> Movie response paper	
10		<b>Drugs of addiction</b>	14

	Dopaminergic pathways and their drug targets	
11	<b>Mechanisms of tolerance and withdrawal</b> Opioids, stress pathways, neuroadaptation	14
12	<b>Dementia</b> Causes, pathology, symptoms, stages of Alzheimer's disease, drug targets, symptom-specific treatments	13
13	<b>Disorders of sleep &amp; wakefulness</b> Neurobiology, insomnia, parasomnia	11
14	<b>Chronic pain and its treatment</b> Pain, neuropathic pain, chronic pain, fibromyalgia	10
15	<b>Final Exam</b> Covers all content, excluding movie and book	

## **Academic Integrity**

The following academic integrity statement is adapted from The Essential Guide to Academic Integrity At Cornell, August 2020: Absolute integrity is expected of every student in all academic undertakings. Integrity entails a firm adherence to a set of values, and the values most essential to an academic community are grounded on the concept of honesty with respect to the intellectual efforts of oneself and others. Academic integrity is expected not only in formal coursework situations, but in all relationships and interactions connected to the educational process, including the use of resources. A student's submission of work for academic credit indicates that the work is the student's own. All outside assistance should be acknowledged, and the student's academic position truthfully reported at all times. In addition, students have a right to expect academic integrity from each of their peers.