

## 2023-2024 MCB Area of Interest Course Information

# Neuroscience

Please check the University of Washington Time Schedule for the most updated course information.

### FOUNDATIONAL COURSES

#### Foundational Course One:

**Course Number:** NEURO 501

**Course Title:** Introduction to Neurobiology

**Instructor (s):** Carlson

**Location (e.g., UW, FH, SLU):** UW

**Credits:** 3

**Quarter, Weeks, and Frequency course is offered:** Autumn, weeks 1-10

**Attributes (e.g., graded, lecture-based):** Lecture-based

**Sub Area (if applicable):**

**Synopsis:** Survey of molecular, cellular, and developmental neuroscience, including gene regulation, the cytoskeleton, protein sorting in the secretory pathway, growth factors, and neurotransmitter receptors. Includes lecture discussion of original literature.

**Note:** Must email instructor for permission.

#### Foundational Course Two:

**Course Number:** NEURO 504

**Course Title:** Biophysics of Nerve, Muscle, and Synapse

**Instructor (s):** Sullivan

**Location:** UW

**Credits:** 3

**Quarter, Weeks, and Frequency course is offered:** Autumn, weeks 1-10

**Attributes:** Lecture-based

**Sub Area (if applicable):** Cell signaling

**Synopsis:** Introduces biophysical properties of nerve and muscle cells. Topics include intrinsic electrical properties of neurons, ion channels, receptor signaling, calcium signaling, contraction of muscles, and synaptic function.

#### Foundational Course Three:

**Course Number:** NEURO 548

**Course Title:** Molecular Mechanisms of Synaptic Plasticity

**Instructor (s):** TBD

**Location:** UW

**Credits:** 2

**Quarter, Weeks, and Frequency course is offered:** Spring, weeks 1-5, even years, *will be offered in Spring 2024*

**Attributes:** Literature review, discussion

**Sub Area (if applicable):**

**Synopsis:** Discusses recent primary literature on the molecular mechanisms underlying structural and functional changes of dendritic spines and synapses in the mammalian brain as result of synaptic activity and experience.

## ELECTIVE COURSES

### Elective Course One:

**Course Number:** CONJ 531

**Course Title:** Signaling Mechanisms in Excitable Cells

**Instructor (s):** Zagotta, Gordon, Asbury

**Location:** UW

**Credits:** 1.5

**Quarter, Weeks, and Frequency course is offered:** Autumn, weeks 1-5

**Attributes:** Lecture-based

**Sub Area (if applicable):**

**Synopsis:** Mechanisms of cellular signaling, particularly in nerve and muscle. Electrical, chemical, and mechanical signaling in the cell that lead to processes such as electrical excitability, action potentials, and muscle contraction.

**Prerequisite(s):** Comprehensive undergraduate course in general biochemistry and molecular biology, or permission of instructor.

### Elective Course Two:

**Course Number:** CONJ 532

**Course Title:** Signal Transduction from the Cell Membrane to the Nucleus

**Instructor (s):** Ong

**Location:** UW

**Credits:** 2

**Quarter, Weeks, and Frequency course is offered:** Autumn, weeks 6-10

**Attributes:** Lecture-based

**Sub Area (if applicable):**

**Synopsis:** Intracellular signaling pathways leading from cell membrane receptors to nucleus. Pathways activated by seven transmembrane receptors and G-proteins, insulin/PI3 kinase, MAPKs, and WNTs and mechanisms of signal termination. Cytokine/Jak/Stat signaling and role of subcellular localization in signal transduction.

### Elective Course Three:

**Course Number:** CONJ 544

**Course Title:** Protein Structure, Modification, and Regulation

**Instructor (s):** Stoddard, Campbell, Bradley

**Location:** FH

**Credits:** 1.5

**Quarter, Weeks, and Frequency course is offered:** Winter, weeks 1-5, odd years, *will be offered in Winter 2025*

**Attributes:** Lecture, literature review, methods

**Sub Area (if applicable):**

**Synopsis:** Overview of general principles of protein structure, including forces that contribute to folding and stabilization (in week 1), followed by comparative presentation of the primary means by which protein structure and function are studied (NMR, Crystallography, CryoEM and Computational Structure Prediction and modeling) in weeks 2 through 5. The course is intended for molecular and cellular biology student without a background or ongoing research training or experience in structural analyses. The course will introduce students to the basic principles,

differences and similarities between different approaches for structural analyses, and will use examples from the recent literature to learn how to evaluate and exploit such studies.

Elective Course Four:

**Course Number:** CONJ 556

**Course Title:** Drug Addiction: Mechanisms, Prevention, and Treatment

**Instructor (s):** Ferguson

**Location:** UW

**Credits:** 2

**Quarter, Weeks, and Frequency course is offered:** Winter, weeks 1-10, even years, *will be offered in Winter 2024*

**Attributes:** Literature and discussion based

**Sub Area (if applicable):**

**Synopsis:** Key advances, insights, methods, and challenges for our understanding of drug addiction from psychological, pharmacological, psychiatric, community prevention, legal, and neurodevelopmental perspectives. Enhances familiarity with the multidisciplinary approaches required to understand addiction as a disease.

Elective Course Five:

**Course Number:** NEURO 503

**Course Title:** Cognitive And Integrative Neurobiology

**Instructor (s):** TBD

**Location:** UW

**Credits:** 4

**Quarter, Weeks, and Frequency course is offered:** Dependent on department availability, *not currently offered in 2023-2024*

**Attributes:** Lecture, Literature review, discussion

**Sub Area (if applicable):**

**Synopsis:** Survey of all aspects of neuroscience, including a discussion of higher neural processes like motivation, decision making, attention, learning, and memory. Lecture and discussion of original literature.

**Note:** Must email instructor for permission.

Elective Course Six:

**Course Number:** NEURO 511

**Course Title:** Seminar in Neurobiology and Behavior

**Instructor (s):** Phillips, Stuber

**Location:** UW

**Credits:** 2

**Quarter, Weeks, and Frequency course is offered:** Autumn, weeks 1-10

**Attributes:** Literature review, discussion-based

**Sub Area (if applicable):**

**Synopsis:** Weekly faculty lectures, student presentations, and discussions of past and current scientific literature in neurobiology and behavior.

Elective Course Seven:

**Course Number:** PHCOL 534

**Course Title:** Molecular Basis of Addictive Drug Action

**Instructor (s):** Chavkin, Bruchas

Updated October 2023

**Location:** UW

**Credits:** 2

**Quarter, Weeks, and Frequency course is offered:** Autumn, 1-10, even years, *will be offered in Autumn 2024*

**Attributes:** Literature, discussion-based

**Sub Area (if applicable):**

**Synopsis:** Advanced consideration and discussion of current research literature addressing the basis of opioid, psychostimulant, and cannabinoid effects on signal transduction events, electrical activity of neurons, and drug-motivated behaviors in animal models of human substance use disorder.

**Prerequisite(s):** PHCOL 512 or permission of instructor.

Elective Course Eight:

**Course Number:** PHCOL 537

**Course Title:** Molecular Neurobiology of the Cell Membrane

**Instructor (s):** Nathanson

**Location:** UW

**Credits:** 2

**Quarter, Weeks, and Frequency course is offered:** Winter, weeks 1-10, odd years, *will be offered in Winter 2025*

**Attributes:** Discussion-based, student led lectures

**Sub Area (if applicable):**

**Synopsis:** This graduate level course covers the cell biology of eukaryotic cell membranes and how they contribute to normal functioning and disease. Students will take turns introducing weekly topics and will participate in discussions of 2-3 papers assigned for each class.