

2021-2022 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.

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):

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): Barria

Location: UW

Credits: 2

Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-5, even years

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:

Updated Sept. 2021

Course Number: Conj 544

Course Title: Protein Structure, Modification, and Regulation

Instructor (s): Stoddard

Location: Fred Hutch

Credits: 1.5

Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-5, *will be offered in Winter 2023*

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, followed by an extended coverage of the means by which protein structure and function are modified and regulated. Examples from recent developments in protein folding, processing, and allosteric regulation.

Elective Course Two:

Course Number: Conj 556

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

Instructor (s): Chavkin

Location: UW

Credits: 2

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

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 Three:

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 Four:

Course Number: Conj 531

Course Title: Signaling Mechanisms in Excitable Cells

Instructor (s): Zagotta

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: comprehensive undergraduate course in general biochemistry and molecular biology, or permission of instructor.

Elective Course Five:

Course Number: Conj 532

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

Instructor (s): Scott, Ong, Gardner

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, nitric oxide and WNTs and mechanisms of signal termination. Cytokine/Jak/Stat signaling and role of subcellular localization in signal transduction.

Elective Course Six:

Course Number: Phcol 504

Course Title: Neuropharmacology

Instructor (s): Bajjalieh

Location: UW

Credits: 2

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

Attributes: Lecture-based

Sub Area (if applicable):

Synopsis: Consideration of the neurobiological basis of drug action on the central nervous system, including mechanism of action and therapeutic use in psychiatric disorders; neurodegeneration/neuroinflammation; control of neuronal excitability and pain; and drug abuse and addiction. Lecture, group discussion, and analysis of recent research.

Elective Course Seven:

Course Number: Phcol 530

Course Title: Neuronal Signaling Pathways

Instructor (s): Hague, Beavo, Storm, Xia

Location: UW

Credits: 2

Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10, even years

Attributes: Discussion-based, student led lectures

Sub Area (if applicable):

Synopsis: Advanced consideration of the molecular events between drug or hormone binding to receptors and the resulting responses. Emphasizes roles played by signal transduction pathways in regulation of synaptic plasticity, memory formation, neuronal apoptosis, and developmental neurobiology. Prerequisite: UCONJ 532 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

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.

Elective Course Nine:

Course Number: Phcol 534

Course Title: Molecular Basis of Addictive Drug Action

Instructor (s): Chavkin, Phillips, Stella

Location: UW

Credits: 2

Quarter, Weeks, and Frequency course is offered: Autumn, 1-10, even years

Attributes: Literature, discussion-based

Sub Area (if applicable):

Synopsis: Advanced consideration and discussion of current literature addressing the basis of opiate, psychostimulant, and cannabinoid effects on signal transduction events, electrical activity of neurons, and drip-motivated behaviors in animal models of human drug abuse. Prerequisite: PHCOL 512 or permission of instructor.

GENERAL METHODS/PROFESSIONAL DEVELOPMENT (GM/PD) COURSES

GM/PD Course One:

Course Number: UCONJ 510

Course Title: Introductory Laboratory Based Biostatistics

Instructor (s): Lloyd Mancl

Location: UW

Credits: 2.0

Quarter, Weeks, and Frequency course is offered: Summer

Attributes: Lecture-based with assignments

Sub Area (if applicable):

Synopsis: Introduces methods of data description and statistical inference for experiments. Covers principles of design and analysis of experiments; descriptive statistics; comparison of group means and proportions; linear regression; and correlation. Emphasizes examples from laboratory-based biomedical sciences, and provides demonstrations using standard statistical programs.

GMPD Course Two:

Course Number: MCB 533

Course Title: How to give a scientific seminar

Instructor(s): Jihong Bai

Location: FH

Credits: 1.5

Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-5, *will be offered in 2023*

Attributes: Career development and methods

Sub Area (if applicable):

Synopsis: A crucial part of a scientific career is the ability to effectively deliver a research seminar. This course will focus on all aspects of giving a seminar and teach students how to introduce the research topic, how to make clear and effective slides, and how to explain methods and data in a clear manner. Students will prepare their own research seminar throughout the course. Each week they will practice a part of it and receive feedback from other students and the instructors. By the end of the course, students will have an entire seminar about their thesis project prepared. The course will also give examples of good and bad seminars and help students learn how to communicate with non-scientists about their research.

GM/PD Course Three:

Course Number: MCB 543

Course Title: Logic Constructs and Methodologies of Biological Research

Instructor(s): Sandra Bajjalieh

Location: UW

Credits: 3.0

Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-10, *will be offered in 2022*

Attributes: Career development and methods

Sub Area (if applicable):

Synopsis: This course surveys the logic and methods of scientific practice from historical, practical, and sociological points of view. Topics covered include how the philosophy of science influences experimental approaches, how the demarcation between science and pseudoscience has evolved, how common cognitive biases lead to errors in judgement and interpretation, and how sociological factors impact scientific progress.

GM/PD Course Four:

Course Number: MCB 560

Course Title: MCB Biotechnology Externship

Instructor(s): Nina Salama

Location: TBA

Credits: 2.0

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

Attributes: Career development and methods

Sub Area (if applicable):

Synopsis: This externship program provides MCB students with the opportunity to gain firsthand research experience in biotechnology companies in the Puget Sound area. Applications are available in the early spring and reviewed by the Externship Program Director. Applications are submitted to participating companies to find a suitable match. This externship is only available during the summer between Year 1 and Year 2 to students who have completed 3 rotations and identified a dissertation laboratory. Students are supported by MCB for the summer quarter.