2022-2023  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 December 2022
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: 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: 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 (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  
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: NEUR 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 Six:  
Course Number: PHCOL 534  
Course Title: Molecular Basis of Addictive Drug Action  
Instructor(s): Chavkin, Bruchas  
Location: UW  
Credits: 2  
Quarter, Weeks, and Frequency course is offered: Autumn, 1-10, even years, will be offered Autumn 2022  
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.

Elective Course Seven:  
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 2023  
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.

GENERAL METHODS/PROFESSIONAL DEVELOPMENT (GM/PD) COURSES

GM/PD Course One:
Course Number: BIOL 540B
Course Title: Uncommon Leaders: Women in Black, Indigenous, People of Color in Science
Instructor(s): Billie Swalla
Location: TBA
Credits: 2.0
Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-5
Attributes: Graded, Career development and methods
Sub Area (if applicable):
Synopsis: This course is to learn about Women and Black, Indigenous, People of Color in Science and how they have extra challenges to overcome because of their identity. The way that some people think about their science is different and can lead to new discoveries and insights. It is important that you delve into the person that you choose to study and also what is exciting and transformational about their science. We will work on Wikipedia pages for these scientists and you will contact them and hopefully be able to interview them.

GM/PD Course Two:
Course Number: CENV 500
Course Title: Communicating Science to the Public Effectively
Instructor(s): Nicole Gregorio
Location: UW
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Winter, will be offered in Winter 2023
Attributes: Career development and methods
Sub Area (if applicable):
Synopsis: Whether you’re looking to give an unforgettable job talk, change a policymaker’s mind, or finally get your family to understand your research, the Engage course is a great professional development opportunity and learning experience. This is a discussion-based course for graduate students in the sciences that focuses on effective techniques for communicating science, with an emphasis on sharing your science with non-specialists. At the end of the quarter, each student will present a 20 minute public talk on their graduate research to be delivered during the 2023 Engage: The Science Speaker Series at Town Hall Seattle. In this course, students will:
• Develop and practice analogies to distill their research
• Perfect their elevator pitches
• Practice storytelling, audience consideration, and cultural competency
• Play improv games to leverage improvisation as a public speaking tool
• Engage in weekly readings and discussions
• Hear from guest speakers on science communication
Note: Space is limited in this course and it often fills quickly, with an extensive waitlist. An application process and expectation agreement must be completed by the student to be considered for the course. Please reach out to the instructor for more information.
GM/PD Course Three:
Course Number: MCB 512
Course Title: Scientific Speaking 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 Four:
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 2023
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. After completing the course, students should understand and interface differently with science they encounter, papers they read, and their own projects.

GM/PD Course Five:
Course Number: MCB 560
Course Title: MCB Biotechnology Externship
Instructor(s): Celeste Berg
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

Updated December 2022
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.

**GM/PD Course Six:**
- **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.