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

Updated Sept. 2021
**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.

*Updated Sept. 2021*
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

Updated Sept. 2021
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.

Updated Sept. 2021