

# 2023-2024 MCB Area of Interest Course Information

## Cell Signaling & Cell/Environment Interactions

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

### FOUNDATIONAL COURSES

#### Foundational Course One:

**Course Number:** CONJ 531

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

**Instructor (s):** Chip Asbury, Sharona Gordon

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

**Credits:** 1.5

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

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

**Sub Area (if applicable):**

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

**NOTE:** this course only covers the first 5-weeks of a quarter-long course, NEURO504. If your main interest is in neurobiological research, we recommend enrolling in the full course (NEURO504).

#### Foundational Course Two:

**Course Number:** CONJ 532

**Course Title:** Signal Transduction: From the cell membrane to the nucleus

**Instructor (s):** Shao-En Ong, Smita Yadav

**Location:** UW

**Credits:** 1.5

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

**Attributes:** Lecture and Literature Review

**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.

#### Foundational Course Three:

**Course Number:** PHCOL 531

**Course Title:** Genetic Analysis of Signaling Systems

**Instructor(s):** Stanley McKnight

**Location:** UW

**Credits:** 3

**Quarter, Weeks, and Frequency course is offered:** Spring, odd years, weeks 1-10, *last offered in Spring 2023*

**Attributes:** Lecture-based with literature review

**Sub Area (if applicable):**

**Synopsis:** Introduction to classic model organisms including plants, yeast, slime mold, flies, worms, fish, mice, and humans and a discussion of their use in current signal transduction research.

## **ELECTIVE COURSES**

Signaling occurs in all cells. Because the field of cell signaling is relevant to all aspects of cell and molecular biology, students choosing this area of interest will usually find their work overlaps with at least one of the other areas of interest. Therefore, we advise students who choose this area to identify a secondary (minor) area of interest and include electives from that area in their course plans.

### Elective Course One:

**Course Number:** MCB 529

**Course Title:** Cell Migration

**Instructor (s):** TBD

**Location:** FH

**Credits:** 1.5

**Quarter, Weeks, and Frequency course is offered:** Winter. *Course is not currently being offered.*

**Attributes:** Lecture, literature review

**Sub Area (if applicable):**

**Synopsis:** Explores mechanisms of cell migration in vivo and in cell culture. Discusses the cell biology of different forms of cell migration, the extracellular cues that direct migration, and how these cues are integrated by the migrating cell.

**Note:** Offered jointly with CONJ 529

### Elective Course Two:

**Course Number:** MCB 539

**Course Title:** Biological Basis of Neoplasia

**Instructor(s):** David MacPherson and Bob Eisenman

**Location:** FH

**Credits:** 3.0

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

**Attributes:** Lecture and Literature Review

**Sub Area (if applicable):**

**Synopsis:** Introduces the major themes in research in the biology of neoplastic change. Covers principle molecular mechanisms responsible for tumor initiation and progression, with a specific emphasis on intracellular signaling, DNA repair, cell cycle checkpoints, and loss of normal tissue homeostasis. The latest state of the art research in Cancer Biology will be presented by invited scientists, experts in their relevant field. The discussion meetings will concentrate on selected major papers in cancer biology and be presented and discussed by the students with help and guidance of the instructors.

### Elective Course Three:

**Course Number:** NEURO 504

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

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

**Location:** UW

**Credits:** 3.0

**Quarter, Weeks, and Frequency course is offered:** Autumn, weeks 1-10, *will be offered in Autumn 2023*

**Attributes:** Lecture

**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.

**Note:** Offered jointly with PBIO 504

Elective Course Four:

**Course Number:** NEURO 557

**Course Title:** Ion Channel Gating

**Instructor (s):** Zagotta

**Location:** UW

**Credits:** 1.5

**Quarter, Weeks, and Frequency course is offered:** Spring, weeks 6-10. ***Course not currently offered, check with the department for more information about when this course will be offered next.***

**Attributes:** Lecture

**Sub Area (if applicable):**

**Synopsis:** Compares and contrasts mechanisms of gating in ligand-gated and voltage-gated ion channels. Covers basics of ligand gating and voltage gating, kinetic schemes, inactivation and desensitization, gating currents and partial agonists, and ion channel structure.

**Note:** Offered jointly with PBIO 557

Elective Course Five:

**Course Number:** PBIO 555

**Course Title:** Sensory Receptors

**Instructor (s):**

**Location:** UW

**Credits:** 1.0

**Quarter, Weeks, and Frequency course is offered:** ***Course not currently offered, check with the department for more information about when this course will be offered next.***

**Attributes:** Lecture

**Sub Area (if applicable):**

**Synopsis:** Five-lecture mini-course examines how different kinds of sensory receptors detect and respond to different modalities of sensory stimuli. Discussion focuses on the cellular and molecular mechanisms of the underlying transduction processes and the experimental evidence that they are based on.

**Note:** Offered jointly with NEURO 555

Elective Course Six:

**Course Number:** PHCOL 505

**Course Title:** Endocrine Pharmacology

**Instructor (s):**

**Location:** SLU

**Credits:** 1.5

**Quarter, Weeks, and Frequency course is offered:** Spring, weeks 1-5. ***Course not currently offered, check with the department for more information about when this course will be offered next.***

**Attributes:** Graded, Lecture

**Sub Area (if applicable):**

**Synopsis:** Consideration of the pharmacology of endocrine systems including the hypothalamic/pituitary regulatory peptides, glycoprotein hormones/growth factors, peptide and steroid hormones. Lecture, group discussion, and analysis of recent research.

**Prerequisite(s):** Organic chemistry, biochemistry, and introductory anatomy and physiology.