2022-2023  MCB Area of Interest Course Information
Gene Expression, Cell Cycle & Chromosome Biology

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

FOUNDATIONAL COURSES

Foundational Course One:
Course Number: CONJ 532
Course Title: Signal Transduction from The Cell Membrane to The Nucleus
Instructor (s): Shao-En Ong
Location: UW
Credits: 2.0
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 6-10
Attributes: Lecture
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.

Foundational Course Two:
Course Number: CONJ 537
Course Title: Mechanisms of transcriptional regulation
Instructor (s): Steve Hahn, Toshio Tsukiyama, Sita Kugel, Daphne Avgousti
Location (e.g., UW, FH, SLU): FH
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 6-10. Offered every other year (even number years). Last offered in Autumn 2022.
Attributes (e.g., graded, lecture-based): Lecture-based
Sub Area (if applicable):
Synopsis: A five-week graduate survey course concentrating on biochemical mechanisms of gene transcription. The course will cover a broad range of transcriptional regulation including: Mechanisms of transcriptional initiation; Regulation of transcription by chromatin; Transcriptional regulation, development and diseases in mammals.

Foundational Course Three:
Course Number: GENOME 551
Course Title: Principles of Gene Regulation
Instructor (s): Cole Trapnell
Location: UW
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Winter, weeks 6-10; will be offered in Winter 2023
Attributes: Lecture
Sub Area (if applicable):
Synopsis: Course covers fundamentals of gene regulation in eukaryotes including principles of cis and trans regulation of gene expression; DNA and RNA binding proteins; role of chromatin
structure in gene expression; epigenetic regulatory mechanisms; RNA-based regulatory mechanisms; and post-transcriptional regulation. The course centers on reading and discussion of landmark primary literature in the aforementioned areas.

**Note:** May be redundant with CONJ 537 and therefore may be an excellent substitute for students that are unable to take CONJ 537 due to scheduling conflicts.

**ELECTIVE COURSES**

**Elective Course One:**

**Course Number:** CONJ 524  
**Course Title:** Structural basis for signal transduction  
**Instructor(s):** Wenqing Xu  
**Location:** UW  
**Credits:** 1.5  
**Quarter, Weeks, and Frequency course is offered:** Winter, weeks 6-10  
**Attributes:** Lecture-based  
**Sub Area (if applicable):**

**Synopsis:** There are three learning objectives. (1) By the end of the course, students are expected to know the common structural features and signaling/regulatory principles of most important signaling protein families, including kinases, phosphatases, ubiquitin ligases, G-proteins and GPCRs. (2) Through structural analysis, students are expected to learn ways to design approaches to specifically manipulate or control these molecular systems. (3) Through homework and discussions, students are required to be able to download PDB files, analyze the molecular structure (using program such as Pymol), and obtain desired structure-function relationship information.

**Elective Course Two:**

**Course Number:** CONJ 531  
**Course Title:** Signaling Mechanism in Excitable Cells  
**Instructor(s):** William Zagotta  
**Location:** TBA  
**Credits:** 1.5  
**Quarter, Weeks, and Frequency course is offered:** Autumn, weeks 1-5  
**Attributes:** Lecture and Literature Review  
**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.

**Note:** This course is more geared towards students interested in neuroscience, but nonetheless is a great complement to the commonly studied signaling pathways that are discussed in other courses (such as CONJ 532).

**Elective Course Three:**

**Course Number:** MCB 539  
**Course Title:** Biological Basis of Neoplasia  
**Instructor(s):** David MacPherson, Bob Eisenman  
**Location:** FH  
**Credits:** 3
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.

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 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.