2022-2023 MCB Area of Interest Course Information

Cancer Biology

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

FOUNDATIONAL COURSES

Foundational Course One:

Course Number: MCB 539  
Course Title: Biological Basis of Neoplasia  
Instructor (s): MacPherson, Eisenman  
Location (e.g., UW, FH, SLU): FH  
Credits: 3.0  
Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-10, will be offered in Spring 2024  
Attributes (e.g., graded, lecture-based): 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 COURSES

Elective 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.

Elective Course Two:  
Course Number: CONJ 544  
Course Title: Protein Structure, Modification and Regulation  
Instructor (s): Stoddard, Campbell, Bradley  
Location: FH  
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 students 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 to structural analyses, and will use examples from the recent literature to learn how to evaluate and exploit such studies. Grading is based on participation, questions and answers, and a final writing assignment.

Elective Course Three:

Course Number: GENOME 565
Course Title: Advanced Human Genetics and Genomics
Instructor(s): King, Eichler
Location: UW
Credits: 4.0

Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10
Attributes: Career development, graded, lecture, literature review, methods

Sub Area (if applicable):

Synopsis: The goal of the course is to provide students with knowledge and tools most useful for successful research in human genomics. Components of the course are: gene discovery and molecular function; genomic architecture; cancer genetics; and human diversity and evolution. The course meets winter quarter, with three lectures per week by the instructors and weekly section meetings. Multiple problem sets are based on real data. GENOM 361 or 371 is a prerequisite; for genetics courses taken elsewhere, please ask the instructors. The class typically includes about 40 students.

Elective Course Four:

Course Number: MCB 522
Course Title: The Developmental Basis of Human Disease
Instructor(s): Moens
Location: FH
Credits: 3.0

Quarter, Weeks, and Frequency course is offered: Autumn 1-10 (odd-numbered years)
Attributes: Lecture, literature review

Sub Area (if applicable):

Synopsis: Rapid advances in human genetics have identified a host of new genes associated with rare human genetic disorders. In many cases, the functions of these genes have already been elucidated by developmental and cell biologists working in non-human model systems. This ten-week course will explore the intimate relationship between developmental biology and human disease, including both inherited genetic disorders and cancer. Each week we will choose a different human disorder whose underlying genetic cause has been discovered. We will then discuss how the causal gene or genetic pathway controls normal animal development.
The second meeting of each week will be an opportunity for students to present papers from the literature to uncover specific mechanistic links between normal developmental gene functions and disease.

**Elective Course Five:**

**Course Number:** PATH 518  
**Course Title:** Emerging Topics in Cancer  
**Instructor(s):** Risques, Chen  
**Location:** UW  
**Credits:** 2.0  
**Quarter, Weeks, and Frequency course is offered:** Winter 1-10, odd years  
**Attributes:** Lecture  
**Synopsis:** Science and translational advances in cancer and therapeutics, related to recent major technological progress in cancer research. Explores how knowledge of cancer genetics as well as new molecular discoveries are translated to clinical management and treatment options.

**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  
**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.