

## 2021-2022 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 2022*

**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 514

**Course Title:** Molecular Medicine

**Instructor (s):** Liles

**Location:** UW

**Credits:** 3.0

**Quarter, Weeks, and Frequency course is offered:** Winter, weeks 1-10

**Attributes:** Lecture

**Sub Area (if applicable):**

**Synopsis:** This course focuses on the impact of basic science on medicine and medical practice. In this quarter-long course, patient case histories are used to introduce key areas of clinical research and investigative medicine. An important aim is to introduce clinical problems in a way that is directly accessible to graduate students, to facilitate the reading of basic science and primary clinical literature on common problems, and to foster participation in the many clinical seminars at the UW and affiliated institutions that are focused on human disease problems. Topics covered are in five major disease areas: inflammation and host response; vascular disease; obesity, weight regulation and appetite; cancer biology; drug development; and gene- and cell-based therapeutics. The interplay between clinical care and investigation will be emphasized both to introduce students to medical practice, and to indicate the impact of basic science on the practice of medicine. This course is taught by faculty who are both practicing physicians and clinician investigators.

##### Elective Course Two:

Updated Sept. 2021

**Course Number:** CONJ 524

**Course Title:** Structural Basis of Signal Transduction

**Instructor (s):** TBA

**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:** 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 mechanisms. (3) Through homework and discussion, students are required to be able to download PDB files, analyze the molecular structure (using programs such as Pymol), and obtain desired structure-function relationship information.

Elective Course Three:

**Course Number:** CONJ 544

**Course Title:** Protein Structure, Modification and Regulation

**Instructor (s):** Stoddard

**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, 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 Four:

**Course Number:** CONJ 545

**Course Title:** Molecular Interactions and Medicine

**Instructor (s):** Verlinde

**Location:** UW

**Credits:** 1.5

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

**Attributes:** Lecture, methods

**Sub Area (if applicable):**

**Synopsis:** This course aims to provide a basic understanding of the various forces governing molecular interactions in biology, with a focus on medicine. In addition, students will be introduced to the principles of computer modeling techniques that are in use for predicting the molecular behaviour of proteins, ligands and their complexes. The power of these techniques will then be illustrated in terms of ligand discovery, drug design, and the understanding at the atomic level of some genetic diseases. Practical experience will be gained during one computer lab session. Note that this is NOT a training course in using a particular molecular software package.

Elective Course Five:

**Course Number:** GENOM 565

**Course Title:** Advanced Human Genetics and Genomics

**Instructor (s):** King

**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. GENOM372 is a prerequisite; for genetics courses taken elsewhere, please ask the instructors. The class typically includes about 40 students.

Elective Course Six:

**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, weeks 1-10, odd 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 Seven:

**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, weeks 1-10, odd years

**Attributes:** Lecture

**Sub Area (if applicable):**

**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.

Elective Course Eight:

**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, nitric oxide and WNTs and mechanisms of signal termination. Cytokine/Jak/Stat signaling and role of subcellular localization in signal transduction.

## 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

**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.