

2022-2023 MCB Area of Interest Course Information

Biophysical & Structural Biology

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

FOUNDATIONAL COURSES

Foundational Course One:

Course Number: BIOC 530

Course Title: Introduction to Structural Biology

Instructor (s): Baker, Klevit, Zheng, Veessler, Hol, Daggett, Maly, Weiner

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

Credits: 3.0

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

Attributes (e.g., graded, lecture-based): Lecture-based

Sub Area (if applicable): Biochemistry/Structure

Synopsis: Graduate-level discussion of the structure, function, and chemistry of proteins, control of enzymatic reactions. Prerequisite: a comprehensive course in biochemistry and permission.

Foundational Course Two:

Course Number: MCB 536

Course Title: Tools for Computational Biology

Instructor (s): A. Subramaniam

Location: FH/UW

Credits: 3.0

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

Attributes: Graded, lecture, hands-on computational work

Sub Area (if applicable): Computational

Synopsis: Introduces computational research methods to graduate students in biomedical science and related disciplines. Provides a survey of the most common tools and programming languages in the field. Students will gain foundational knowledge in reproducible computational science, including workflows and code documentation, and sufficient expertise that they can continue learning relevant tools to suit specific research interests. Classes will involve hands-on learning through coding exercises, collaborative problem solving, and extensive use of online learning resources.

ELECTIVE COURSES

Elective Course One:

Course Number: BIOEN 588

Course Title: Computational Protein Design

Instructor (s): V. Daggett

Location: UW

Credits: 4.0

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

Attributes: Lab based

Sub Area (if applicable): Computational

Synopsis: Explores methods in protein engineering, emphasizing biomedical and biotechnological applications. Includes molecular visualization, homology modeling, molecular

dynamics, computational protein design, and evaluation of designs. Introduces current research in subject area. Students learn to use and apply computational tools to investigate design problems.

Elective Course Two:

Course Number: B STR 519

Course Title: Current Problems in Macromolecular Structure

Instructor (s): Stenkamp

Location: UW

Credits: 2.0

Quarter, Weeks, and Frequency course is offered: Autumn, Winter, Spring, Summer

Attributes: Literature review

Sub Area (if applicable): Structure

Synopsis: Literature review for new topics in biological structure and macromolecules.

Elective Course Three:

Course Number: CONJ 544

Course Title: Protein Structure, Modification and Regulation

Instructor (s): Stoddard, Strong

Location: FH/UW

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): Structure

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: MEDCH 528

Course Title: Biophysical Enzymology and Biopharmaceuticals

Instructor (s): Atkins, Catalano

Location: UW

Credits: 3.0

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

Attributes: Lecture

Sub Area (if applicable):

Synopsis: Covers in-depth treatment of chemical catalysis and transition state theory as related to enzyme mechanisms; thermodynamics and kinetics of protein-ligand interactions, protein-protein-interactions and protein-lipid interactions, and methods for their study. Discusses therapeutically relevant examples, including viruses, therapeutic antibodies, and drug targets. (<http://courses.washington.edu/medch528/>)

Elective Course Five:

Course Number: P BIO 545 (same as NEURO 545)

Course Title: Quantitative Methods in Neuroscience

Instructor (s): Rieke

Location: UW

Credits: 3.0

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

Attributes: Literature review, computer exercises

Sub Area (if applicable): Biophysics, Neuroscience

Synopsis: Discusses quantitative methods applicable to the study of the nervous system.

Revolves around computer exercises/discussion of journal papers. May include linear systems theory, Fourier analysis, ordinary differential equations, stochastic processes, signal detection, and information theory.

Elective Course Six:

Course Number: PHCOL 501

Course Title: Drug Discovery and Emerging Therapeutics

Instructor (s): N. Zheng

Location: UW

Credits: 2.0

Quarter, Weeks, and Frequency course is offered: Autumn

Attributes:

Sub Area (if applicable): Pharmacology

Synopsis: Consideration of the general principles and current approaches involved in modern drug discovery and development, with an emphasis on basic concepts in drug action, delivery, and metabolism. Discussion of novel drug discovery techniques and emerging non-standard therapeutics.

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.