

2023-2024 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, Kleivit, 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): Phil Bradley, Melody Campbell, Elizabeth Humphries, Maggie Russell, Manu Setty, Rasi 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, Offered 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: CONJ 544

Course Title: Protein Structure, Modification and Regulation

Instructor (s): Stoddard

Location: FH/UW

Credits: 1.5

Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-5, *will be offered in Winter 2024*

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 Three:

Course Number: MEDCH 553

Course Title: Structure and Function of Macromolecular Protein Assemblies

Instructor (s): W. Atkins

Location: UW

Credits: 3.0

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

Attributes: Lecture

Sub Area (if applicable):

Synopsis: Discussion of research strategies, methods, and current literature concerning macromolecular self-assembly processes and protein-protein interactions as they relate to biological specificity. Emphasis on experimental approaches used in current literature.

Prerequisite: permission of instructor.

Elective Course Four:

Course Number: MEDCH 554

Course Title: Biophysics & Structural Virology

Instructor (s): K. Lee

Location: UW

Credits: 1.0

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

Attributes: Literature review

Sub Area (if applicable): Virology, Biophysics

Synopsis: Discusses current topics in virus research and literature. Weekly sessions led by all participating members of the research group. **Prerequisite:** permission of instructor. **Credit/no-credit only.**

Elective Course Five:

Course Number: MEDCH 555

Course Title: Biophysics and Pharmacology of Dynamic Proteins

Instructor (s): A. Nath

Location: UW

Credits: 1.0

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

Attributes: Literature review

Sub Area (if applicable): Biophysics, Protein Dynamics

Synopsis: Discusses current topics in protein dynamics, focusing on intrinsically disordered proteins and drug-metabolizing enzymes. Weekly sessions led by all participating members of the research group. **Prerequisite:** permission of instructor.

Elective Course Six:

Course Number: PBIO 545 (same as NEURO 545)

Course Title: Quantitative Methods in Neuroscience

Instructor (s): F. 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 Seven:

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.