2025-2026 MCB Area of Interest Course Information

Biophysical & Structural Biology

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

Area Directors

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FOUNDATIONAL COURSES

Foundational Course One:

Course Number: BIOC 530
Course Title: Introduction to Structural Biology
Instructor (s): TBD
Location (e.g., UW, FH, SLU): UW
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 1-10. *Will be offered in Autumn 2025.*
Schedule for 2025-26: Mon, Wed, Fri. 11:30-12:20 p.m.
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): Arvind "Rasi" Subramaniam
Location: FH
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 1-10, every year. *Will be offered in Autumn 2025.*
Schedule for 2025-26: Tues, Thurs. 3:30-4:50 p.m.
Attributes: Graded, lecture, hands-on computational work
Sub Area (if applicable): Computational
Synopsis: Introduction to established best practices in computational biology. Learn to organize unstructured data into standard formats, transform data for statistical

analyses, and visualize the transformed data. Learn workflows for reproducible research such as version control, project organization, and code documentation. Gain basic experience with Linux command line tools and the Python and R programming languages. Classes will involve hands-on learning through coding exercises, collaborative problem solving, and extensive use of online learning resources.
Instructions: Contact graduateeducation@fredhutch.org for add code.

ELECTIVE COURSES

Elective Course One:

Course Number: BIOEN 588
Course Title: Computational Protein Design
Instructor (s): Valerie Daggett
Location: UW
Credits: 4.0
Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10, every year. *Will be offered in Winter 2026.*
Schedule for 2025-26: Thurs 10:00-11:20 a.m., Fri 10:00 a.m. – 2:20 p.m.
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: CHEM 460
Course Title: Spectroscopic Molecular Identification
Instructor (s): Tomikazu Sasaki
Location: UW
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 1-10. *Will be offered in Autumn 2025.*
Schedule for 2025-26: Mon, Wed, Fri. 11:30 a.m. – 12:20 p.m.
Attributes: Lecture
Sub Area (if applicable): Structure
Synopsis: Basic theory of spectral techniques - infrared and ultraviolet/visible spectroscopy, NMR, and mass spectrometry - with emphasis on spectral interpretation skills needed for the elucidation of structure, conformation, and dynamics in organic and biological chemistry.
Prerequisite: Permission from MCB co-directors because it is a 400-level course.

Elective Course Three:

Course Number: CONJ 544
Course Title: Protein Structure, Modification and Regulation
Instructor (s): Barry Stoddard
Location: FH
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-5, every year. *Will be offered in Winter 2026.*
Schedule for 2025-26: Tues, Thurs. 1:30-2:50 p.m.
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.
Prerequisite: Introductory biochemistry and cell biology.
Instructions: Contact graduateeducation@fredhutch.org for add code.

Elective Course Four:

Course Number: CONJ 545
Course Title: Molecular Interactions and Medicine
Instructor (s): N/A
Location: N/A
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Spring. ***Not currently offered***
Schedule for 2025-26: N/A
Attributes:
Sub Area (if applicable):
Synopsis: Forces governing molecular interactions in biology; with a focus on medicine. Principles of computer modeling techniques in use for predicting the molecular behavior of proteins, ligands, and their complexes. In computro ligand discovery; drug design, and the understanding at the atomic level of some genetic diseases. Two computer lab sessions.

Elective Course Five:

Course Number: CONJ 548
Course Title: Modeling Proteins and Proteomes
Instructor (s): N/A
Location: N/A
Credits: 1.5
Quarter, Weeks, and Frequency course is offered: Winter. ***Not currently offered.***

Schedule for 2025-26: N/A
Attributes:
Sub Area (if applicable): Structural modeling
Synopsis: Hands-on experience for modeling protein structures, using the models to predict function, and applying the prediction methods to all proteins encoded by an organismal genome. Provides an overview of protein structure, how it mediates function, and its importance for understanding protein interaction networks. Technologies involved for protein structure modeling.

Elective Course Six:

Course Number: MEDCH 541
Course Title: Biological Mass Spectrometry
Instructor (s): Dale Whittington
Location: UW
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-10. *Will be offered in Spring 2026.*
Attributes: Lecture
Schedule for 2025-26: Mon, Wed, Fri. Time TBD.
Sub Area (if applicable): Structure/Dynamics
Synopsis: Covers the basics of modern ionization methods and mass analyzers; small molecule structure assignment, quantitative assay development by LC-MS and metabolomics; quantitative discovery-based proteomics and validation methods; and peptide sequence determination, post-translational modification mapping, and protein structure determination methods.
Prerequisite: Permission of instructor.

Elective Course Seven:

Course Number: PBIO 545 (offered jointly with NEURO 545)
Course Title: Quantitative Methods in Neuroscience
Instructor (s): Fred Rieke, Anitha Pasupathy, Wyeth Bair
Location: UW
Credits: 3.0
Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10. *Will be offered in Winter 2026.*
Schedule for 2025-26: Mon 12:30-1:50 p.m., Thurs 11:30 a.m. – 12:50 p.m.
Attributes: Seminar, computer exercises
Sub Area (if applicable): Biophysics, Neuroscience
Synopsis: Provides exposure to a variety of quantitative methods that are applicable to the study of the nervous system, and an intensive tutorial on mathematical methods and their application to neuroscience research. Format revolves around computer exercises and discussion of journal papers. Topics may

include linear systems theory, Fourier analysis, ordinary differential equations, stochastic processes, signal detection theory, and information theory.

Elective Course Eight:

Course Number: PHCOL 501
Course Title: Drug Discovery and Emerging Therapeutics
Instructor (s): Ning Zheng
Location: UW
Credits: 2.0
Quarter, Weeks, and Frequency course is offered: Autumn, weeks 1-5, every year. *Will be offered in Autumn 2025.*
Schedule for 2025-26: Mon, Tues, Wed, Fri. 9:30-10:20 a.m.
Attributes: Lecture
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.