

2026-2027 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): David Veessler

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 2026.*

Schedule for 2026-27: 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 2026.*

Schedule for 2026-27: 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): TBD

Location: UW

Credits: 4.0

Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10, every year. *Will be offered in Winter 2027.*

Schedule for 2026-27: TBD

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 2026.*

Schedule for 2026-27: 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: A minimum grade of 1.7 in either CHEM 224, CHEM 239, CHEM 259, or B CHEM 239.

Note: MCB students must obtain approval from the MCB Co-Directors for this 400-level class to count toward their 18 graded credits. Only **one** 400-level class can count towards the 18-graded credits requirement.

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 2027.

Schedule for 2026-27: Tues, Thurs. 3:20-4:50 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. ***Information on next offering not available.***

Schedule for 2026-27: 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. *Information on next offering not available.*

Schedule for 2026-27: 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: MCB 517

Course Title: Molecular Mechanisms of the Central Dogma

Instructor (s): Yasuhiro Arimura, Steve Henikoff, Chris Lapointe

Location: FH

Credits: 1.5

Quarter, Weeks, and Frequency course is offered: Autumn, weeks 6-10, every year. *Will be offered in Autumn 2026.*

Schedule for 2026-27: Tues, Thurs. 1:30-2:50 p.m.

Attributes: Lecture

Sub Area (if applicable):

Synopsis: A five-week graduate survey course that covers a broad range of chromatin and translation regulation. This course will also cover the latest biology techniques, such as next-generation sequencing, cryo-electron microscopy, and single-molecule analysis, that are used for investigating the mechanisms of gene expression.

Instructions: Contact graduateeducation@fredhutch.org for add code.

Elective Course Seven:

Course Number: MEDCH 541

Course Title: Biological Mass Spectrometry

Instructor (s): N/A

Location: N/A

Credits: 3.0

Quarter, Weeks, and Frequency course is offered: Spring, weeks 1-10. *Information on next offering not available.*

Attributes: Lecture

Schedule for 2026-27: N/A

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 Eight:

Course Number: PBIO 545 (offered jointly with NEURO 545)

Course Title: Quantitative Methods in Neuroscience

Instructor (s): TBD

Location: UW

Credits: 3.0

Quarter, Weeks, and Frequency course is offered: Winter, weeks 1-10. *Tentatively offered in Winter 2027.*

Schedule for 2026-27: TBD

Attributes: Seminar, 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 Nine:

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 2026.*

Schedule for 2026-27: 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.

Prerequisite: Organic chemistry, biochemistry, and introductory anatomy and physiology.