

# 2024-2025 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):** TBD

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

**Credits:** 3

**Quarter, Weeks, and Frequency course is offered:** Autumn, weeks 1-10. **Course not currently being offered**

**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 Subramaniam

**Location:** FH

**Credits:** 3

**Quarter, Weeks, and Frequency course is offered:** Autumn, weeks 1-10, every year. *Will be offered in Autumn 2025*

**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.

### ELECTIVE COURSES

#### Elective Course One:

**Course Number:** BIOEN 588

**Course Title:** Computational Protein Design

**Instructor (s):** Valerie Daggett

**Location:** UW

**Credits:** 4

**Quarter, Weeks, and Frequency course is offered:** Winter, weeks 1-10, every year. *Will be offered in Winter 2025*

**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):** Barry Stoddard

**Location:** FH

**Credits:** 1.5

**Quarter, Weeks, and Frequency course is offered:** Winter, weeks 1-5. *Will be offered in Winter 2025*

**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.

Elective Course Three:

**Course Number:** MEDCH 553

**Course Title:** Structure and Function of Macromolecular Protein Assemblies

**Instructor (s):** William Atkins

**Location:** UW

**Credits:** 1

**Quarter, Weeks, and Frequency course is offered:** Autumn, Winter, Spring, Summer. *Will be offered in Winter 2025*

**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. **Credit/no-credit grading only.**

Elective Course Four:

**Course Number:** MEDCH 554

**Course Title:** Biophysical & Structural Virology

**Instructor (s):** Kelly Lee

**Location:** UW

**Credits:** 1

**Quarter, Weeks, and Frequency course is offered:** Autumn, Winter, Spring, Summer. *Will be offered in Winter 2025*

**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. **Note:** Credit/no-credit grading.

Elective Course Five:

**Course Number:** MEDCH 555

**Course Title:** Biophysics and Pharmacology of Dynamic Proteins

**Instructor (s):** Abhinav Nath

**Location:** UW

**Credits:** 1

**Quarter, Weeks, and Frequency course is offered:** Autumn, Winter, Spring, Summer. *Will be offered in Winter 2025*

**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. **Credit/no-credit grading only.**

Elective Course Six:

**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

**Quarter, Weeks, and Frequency course is offered:** Winter, weeks 1-10. *Will be offered in Winter 2025*

**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 Seven:

**Course Number:** PHCOL 501

**Course Title:** Drug Discovery and Emerging Therapeutics

**Instructor (s):** TBD

**Location:** UW

**Credits:** 2

**Quarter, Weeks, and Frequency course is offered:** Autumn. ***Course not currently being offered***

**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.