FOUNDATIONAL COURSES

Foundational Course One:
Course Number: BIOC 530
Course Title: Introduction to Structural Biology
Instructor(s): Baker, Klevit, Zheng, Veesler, 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)**: Structure
- **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.