ME.100 (BIOPHYSICS)

ME.100.300. Research Practicum. 0 Credits.
N/A

ME.100.600. Scientific Foundations of Medicine-Macromolecules. 0 Credits.

ME.100.699. Biophysics Elective. 0 Credits.
For Medical Students only. Specialized Topics in Biophysics. Refer to Medical Student Electives Book located at https://www.hopkinsmedicine.org/som/students/academics/electives.html.

ME.100.705. Computer Modeling Of Biological Macromolecules: Lecture. 0 Credits.
Lecture will offer an introduction to the mathematical aspects of computer representation and manipulation of macromolecules

ME.100.706. Fundamentals Of Protein Crystallography. 0 Credits.
An introductory course designed to present the core knowledge and theoretical underpinnings of protein crystallography necessary to function in the laboratory. Assigned readings and problem sets will be given.

ME.100.707. Advanced Topics in Protein Crystallography. 1 Credit.
An introductory course designed to present the core knowledge and theoretical underpinnings of protein crystallography necessary to function in the laboratory. Assigned readings and problem sets will be given.

ME.100.708. Proteins and Nucleic Acids. 0 Credits.

ME.100.709. Macromolecular Structure and Analysis. 1.5 Credits.
The course will cover the structure and properties of biological macromolecules and the key methods used to study them, including X-ray crystallography, nuclear magnetic resonance, spectroscopy, microscopy, and mass spectrometry.

ME.100.710. Biochemical and Biophysical Principles. 1.5 Credits.
The physical and chemical principles underlying biological processes are presented and discussed. Topics include thermodynamics, chemical equilibrium, chemical and enzymatic kinetics, electrochemistry, physical chemistry of solutions, and structure and properties of water. Elementary concepts of statistical thermodynamics will be introduced as a way of correlating macroscopic and microscopic properties.

ME.100.712. Computer Modeling Of Biological Macromolecules: Lab. 3 Credits.
The laboratory course will familiarize students with practical aspects of molecular modeling. It teaches the necessary tools to create and manipulate computer generated models of biological-interest molecules. Techniques such as comparative modeling will be introduced.

ME.100.713. Using Structure to Understand Biology. 1 Credit.
The goal of this course is to teach students how to make use of structural information in the PDB using commonly available tools that are accessible to the non-expert. Students will learn how to read a structure paper, understand structure quality and limits of interpretation, and use coordinates from the Protein Data Bank to explore a structure and make figures. Topics covered will include non-covalent interactions, modeling point mutants, identifying binding pockets, making homology models, and calculating electrostatic surface potentials. Classes will combine lectures, hand-on computer demonstrations and critical reading of papers. A final project will require a short write-up and presentation that implements the programs and principles learned in the class

ME.100.714. Single-Molecule Single-Cell Biophysics. 1 Credit.
This elective course offers an introduction to the field of single molecule and single cell biophysics to graduate students in Johns Hopkins University and will be delivered in the School of Medicine. We will examine technologies such as single molecule fluorescence and force measurements, super-resolution imaging and single cell fluorescence detections that enable high precision molecular visualizations in vitro and in cells.

ME.100.715. Proteins and Nucleic Acids II. 3 Credits.
Critical reading and analysis of primary source literature is vital to scientific discourse and discovery. Students will be responsible for analyzing and critiquing papers in diverse topics and systems ranging from replication, transcription, and translation to enzyme mechanism, drug resistance, innate immunity, and signaling. Methods covered will include structural, biochemical, single-molecule, single-cell, and genomic approaches. Students will deliver analytic presentations on at least two ground-breaking papers relevant to these areas, and will be expected to actively participate in class discussion of experimental methodology and logic of other papers assigned in the course.

ME.100.716. Analysis of Macromolecules. 2 Credits.
The course will cover (1) macromolecules, (2) physical chemical principles dictating their biological behavior, and (3) methods to study them. Lectures will focus on practical application of the methods, experimental design, data collection, and elementary aspects of data analysis.

ME.100.801. Research. 0 Credits.
Thesis research

ME.100.804. Topics in Macromolecular Structure and Function I. 0 Credits.
This is the first part of a seminar course covering a variety of topics involving the structure and function of proteins and nucleic acids. Recent topics have included: protein folding, evolutionary significance of introns, protein-DNA interactions, solution structure of peptides, prospects for designing novel proteins, and two-dimensional NMR.

ME.100.807. Research. 0 Credits.
Thesis Research

ME.100.808. Topics in Macromolecular Structure and Function II. 0 Credits.
This is the second part of a seminar course covering a variety of topics involving the structure and function of proteins and nucleic acids. Recent topics have included: protein folding, evolutionary significance of introns, protein-DNA interactions, solution structure of peptides, prospects for designing novel proteins, and two-dimensional NMR.