

Course: Structural biology**Instructor: Ka-Lok Ng****Course description**

This course is designed to give students a general understanding of the structural biology. Structural biology is a branch of molecular biology, biochemistry, and biophysics concerned with the molecular structure of biological macromolecules, especially proteins and nucleic acids, how they acquire the structures they have, and how alterations in their structures affect their function. This subject is of great interest to biologists because macromolecules carry out most of the functions of cells, and because it is only by coiling into specific three-dimensional shapes that they are able to perform these functions. This architecture, the "tertiary structure" of molecules, depends in a complicated way on the molecules' basic composition, or "primary structures."

References

Protein: structure and function

Whitford: John Wiley & Sons

Bioinformatics: genes, proteins, and computers

Orengo, Jones, and Thornton: BIOS scientific Publishers

Course Schedule

Introduction to protein, Amino acids: the building blocks of proteins

Dihedral angles (ϕ and ψ) in the backbone of biopolymers and the Ramachandran plots.

Protein 1D, 2D and 3D databases: PDB, SCOP, DSSP, Uniprot

Fibrous proteins

Membrane proteins

Membrane proteins

Diversity of proteins

Enzyme kinetic

Mid-term exam

Physical methods of determining the three dimensional structure of protein

Protein folding in vivo and in vitro

Protein structure prediction: homology, threading, ab initio prediction

Protein-protein interaction network

System biology

Protein structure and molecular approach to medicine

student presentation

student presentation

student presentation

Course evaluation

Passing score for graduate course is 70. In general, score is allocated between class attendance, homework, mid-term written exam, final written exam and student oral presentation. Course instructor reserves the right to adjust the grading scheme.