Proteins and Nucleic Acids (PHOL 456) Fall 2012 3 credits

Tuesday/Thursday, 3:30-5:00pm
Room E504

The goal of this course is to provide a basic working knowledge of Molecular Biology and Protein structure/function. The course begins with a discussion of modern molecular biology techniques, including various approaches to gene cloning and the use of cloned genes in animal and cell based studies. This is then followed by an introduction to the principles of protein structure, the physical basis of protein folding and stability, and an introduction to bioinformatics approaches to protein analysis. The course then addresses techniques for protein purification and characterization, followed by a discussion of the principles of enzyme catalysis and methods for experimentally characterizing enzyme activity.

Grading

Class participation	20%
Homework & presentation	20%
Midterm exam	30%
Final exam	30%

The midterm exam will cover the Nucleic Acids section of the course and the final exam will cover Proteins.

Reading Materials:

Nucleic acids
"Genes VIII" by B. Lewin

Proteins
"Proteins: structures and molecular properties" by T. E. Creighton
"Structure and mechanism in protein science" by A. Fersht

General
Just about any general biochemistry textbook.

PHOL 456 **Schedule and Syllabus**

			NUCLEIC ACIDS
August	28	Tuesday	Intro. & background; refresher on "the central dogma of molecular biology" (**TM, RR AND MP**)
August	30	Thursday	DNA and RNA: structure and function (**TM**)
September	4	Tuesday	DNA thermodynamics and gel electrophoresis (**TM**)
September	6	Thursday	In vitro nucleic acid manipulation & expression systems (**TM**)
September	11	Tuesday	Probing the genome I: DNA properties & target sequence identification (**TM**)
September	13	Thursday	Probing the genome II: Target sequence detection/identification (**TM**)
September	18	Tuesday	cDNA and genomic cloning (**MP**)
September	20	Thursday	Eukaryotic expression systems (**MP**)
September	25	Tuesday	Antisense technology (**MP**)
September	27	Thursday	Transgenic animals (**MP**)
October	2	Tuesday	Gene regulation (**MP**)
October	4	Thursday	**DEPARTMENTAL RETREAT BREAK**
October	9	Tuesday	Review session (**MP & TM**)
October	11	Thursday	**EXAM**
October	16	Tuesday	**STUDENT PRESENTATIONS**
			PROTEINS
October	18	Thursday	Amino acid properties and primary structure (**RR**)
October	23	Tuesday	From primary to tertiary structure (**RR**)
October	25	Thursday	Physical properties of proteins in solution: folding, stability, dynamics (**RR**)
October	30	Tuesday	Methods and strategies in protein purification (**WS**)
November	1	Thursday	Biochemical characterization of proteins (**WS**)
November	6	Tuesday	Immunochemical techniques (**WS**)
November	8	Thursday	Diversity of protein architecture & bioinformatics (**MB**)
November	13	Tuesday	Bioinformatics II (**MB**)
November	15	Thursday	Enzyme kinetics & regulation I (**RR**)
November	20	Tuesday	Enzyme kinetics & regulation II (**RR**)
November	22	Thursday	**Thanksgiving**
November	27	Tuesday	**TBA** (+ review session)
November	29	Thursday	**EXAM**
December	4	Tuesday	**STUDENT PRESENTATIONS**

Instructors

Nucleic Acids

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