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Course Description

The objective of this course is to introduce modern methods for studying the structure, function, and solution behavior of macromolecules. The course is taught in a one-hour sessions per week and will be a combination of lectures to introduce concepts and reading of current scientific literature to provide case studies using related methods.

The course will require knowledge of fundamental concepts in physical chemistry and their application to understanding the behavior of biological systems, including basic laws of thermodynamics, biochemical equilibria, reaction rates and kinetics, and molecular spectroscopy.

The course is being taught in parallel with Physical Biochemistry (BC411), which is a pre-requisite/co-requisite for the course.

Outcomes: Students in BC511 are expected to develop an appreciation for macromolecular structure-function relationships and a solid understanding of many of the biophysical techniques commonly used to study macromolecular interactions.

Assessment: Students will read current scientific research publications and explain the experimental methods and results in a group setting, as well as answer questions in both oral and written quiz formats.

Class hours: Fridays 9:00 – 9:50 in BHSCI 105

Office hours: Fridays 12:30 – 1:50 or by appointment

Pre/Co-requisites: Biochemistry (BC401 or BC351), Physical Biochemistry (BC411).

Grading: Grades in BC512 will be based (50%) on participation in class discussion of research papers where students will be called on to explain aspects of the papers for presentation. The remainder half of the grade will come from problem sets and in-class assignments.

The traditional grading system will be used (A,B,C...).

Text: There is no required text for this course. Some material will be provided via class handouts or posting on the Canvas system, and students are expected to seek out other sources as necessary themselves. Some suggested texts are:

Principles of Physical Biochemistry by van Holde, Johnson & Ho
Physical Biochemistry: Principles and Applications by David Sheehan

BC512 Syllabus – Fall 2015

<i>Date</i>	<i>Subject</i>
Aug. 28	Introduction to course OP: Review of protein structure basics, absorbance/fluorescence intro
Sep. 4	OP: Fluorescence methods
Sep. 11	OP: RNA fluorescence tools – the Spinach family of aptamers
Sep. 18	OP: FRET and anisotropy w/ paper, intro to structure prediction
Sep. 25	OP: Protein structure prediction / modeling TS: Intro to correlation spectroscopy – spatial and temporal co-localization
Oct. 2	TS: Cross-correlation and super-resolution microscopy
Oct. 9	TS: Single molecule methods
Oct. 16	TS: Paper discussion – Chu paper
Oct. 23	OP: Mass spectrometry methods
Oct. 30	OP: Discussion of mass spec paper
Nov. 6	OP: Rapid kinetics methods – stopped & quench flow
Nov. 13	TS: Discussion of kinetics paper
Nov. 20	OP: Analytical Centrifugation Methods / Multimeric assembly paper
Nov. 27	===== FALL BREAK =====
Dec. 4	EXAM
Dec. 11	OP: Chromatography techniques
No test during final exam period	

