Chemistry 538, (16:160:538) Spring 2010
Biophysical Chemistry II: Methods in Molecular Biophysics

Babis Kalodimos and David A. Case, instructors
Spring 2010, Tuesdays, 5-8pm, BME 128

This course will cover basic features of experimental and computational methods in common use in molecular biophysics. It will cover the theory and practice of crystallography, NMR, calorimetry, hydrodynamics (including fluorescence and light scattering), optical and IR spectroscopy, and molecular dynamics simulations. It can serve as a follow-on course to Biophysical Chemistry I, but that course is not a pre-requisite.

The course text is *Methods in Molecular Biophysics: Structure, Dynamics, Function*, by I.N. Serkyuk, N.R. Zaccai and J. Zaccai, (Cambridge University Press, 2007). This text is recommended but is not required.

Instructors: Babis Kalodimos (http://chem.rutgers.edu/~babis/)
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Date	Subject	Text Chapter	Instructor
Jan 19	Introduction to macromolecular structures and their physical environment	A	DAC
Jan 26	Thermodynamics, calorimetry and surface plasmon resonance	C	BK
Feb 2 Feb 9	Hydrodynamics: macromolecular diffusion, electrophoresis and centrifugation; fluorescence anisotropy and dynamic light scattering; infrared and Raman spectroscopy	D,E	DAC
Feb 16	Crystallography and cryo-electron microscopy	G,H	DAC
Feb 23	Mid-term exam; mass spectroscopy	B	DAC
Mar 2 Mar 9	Molecular dynamics simulations. Theory and practice of carrying force-field based studies of macromolecules	I	DAC
Mar 23	Introduction to NMR: spin Hamiltonians, chemical shielding, spin-spin coupling, dipolar interactions	J1	BK
Mar 30	Experimental NMR: multi-dimensional spectroscopy, pulse sequences, assignment strategies	J2	BK
Apr 6 Apr 13	Protein structure determination; NMR studies of dynamics: spin relaxation, chemical exchange and hydrogen exchange studies	J2, J3	BK
Apr 20 Apr 27	Optical microscopy: light, fluorescence and atomic force microscopy; single molecule detection and manipulation	F	BK