

CHEM 3130-1: Chemical Systems III
(Macromolecular Structure and Dynamics)

Instructor: Dr. Martin Margittai

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Class hours: MWF 11:00 am — 11:50 am in Olin Hall 103

Office hours: Tuesdays and Thursdays, 11:00 am —12:00 am.

Objectives: 1) To develop an understanding of the physical properties of biological macromolecules.

2) To comprehend modern methods for analyzing macromolecular structure.

Grading: Exams 1-3 (25% each), presentation (25%).

Text: *Principles of Physical Biochemistry* (2nd ed)
by Van Holde, Johnson, & Ho (2006)

Original papers will be posted on blackboard.

Additional useful books (not required):

Physical Chemistry, Principles and Applications in Biological Sciences by Tinoco, Sauer, Wang & Puglisi (2002)

Physical Biochemistry: Principles and Applications by David Sheehan (2009)

Principles of Fluorescence Spectroscopy by Joseph R. Lakowicz (2006)

Crystallography Made Crystal Clear by Gale Rhodes (2006)

Biomolecular Crystallography by Bernhard Rupp (2010)

Intermolecular and Surface Forces by Jacob N. Israelachvili (2009)

NMR Spectroscopy Explained by Neil E. Jacobsen (2007)

NMR of Proteins and Nucleic Acids by Kurt Wüthrich (1986)

Nucleic Acids by Bloomfield, Crowthers & Tinoco (2000)

Principles of Nucleic Acid Structure by Wolfram Saenger (1983)

The Physics of Proteins by Hans Frauenfelder (2010)

Protein Physics by Finkelstein & Ptitsyn (2002)

CHEM 3130-1 Syllabus – Spring 2012

Dates	Topics Covered	Reading Chapters
	Conformation and Behavior of Biological Macromolecules	
03/26/12	Proteins	1
03/28/12	Nucleic Acids	1
03/30/12	Calorimetry DSC and ITC	2
04/02/12	"	2
04/04/12	Molecular Interactions & Conformational Transitions	3
04/06/12	"	3
04/09/12	"	4, papers
	Techniques for the Study of Biological Structure and Function	
04/11/12	Separation and Characterization of Macromolecules	5
04/13/12	"	5
04/16/12	EXAM 1: 03/26/12 - 04/13/12, 11:00 am – 11:50 am	
04/18/12	Absorption Spectroscopy	9
04/19/12	Special Event Molecular and Cellular Biophysics Symposium at DU	
04/20/12	CD Spectroscopy	10
04/23/12	Fluorescence Spectroscopy	11
04/25/12	"	11
04/27/12	"	11
04/30/12	NMR Spectroscopy	12
05/02/12	"	12
05/04/12	"	12
05/07/12	X-ray Crystallography	6
05/09/12	"	6
05/11/12	"	6
05/14/12	EXAM 2: 04/18/12 – 05/11/12, 11:00 am – 11:50 am	
05/16/12	Other Scattering and Diffraction Techniques	7
05/18/12	Mass Spectrometry	15
05/21/12	"	15
05/23/12	Single Molecule Methods	16
05/25/12	Presentations	
05/30/12	Presentations	
06/01/12	Presentations	
06/06/12	EXAM 3: comprehensive, 10:00 am – 11:50 am	