Fall 2014: MCB C100A / Chem C130 ***Biophysical Chemistry: The Molecules of Life***
Instructors: John Kuriyan and David Savage
Lecture Schedule and Course Outline

	Date	Lecturer	Topic	Textbook Reading
1	August 28, Thursday	JK-1	The genetic code. Introduction to protein and DNA structure. Qualitative description of intermolecular forces.	Chapter 1
2	September 2, Tuesday	JK-2	Principles of protein structure. How secondary structures form. Structural motifs of soluble proteins. Lipids and membrane proteins. Domain architecture of proteins.	Chapter 4
3	September 4, Thursday	JK-3		**Problem Set PS 1 due, 9/4**
4	September 9, Tuesday	JK-4	Continue protein structure. Sequence-structure comparisons. Diversity in protein structure.	Chapter 4
5	September 11, Thursday	JK-5	BLOSUM matrix and evolution of proteins	Chapter 5 **PS 2 due**
6	September 16, Tuesday	DS-1	Principles of nucleic acid structure. Various forms of the double helix. Base pairing. RNA folds. Introduction to carbohydrates.	Chapter 2 Chapter 3
7	September 18, Thursday	DS-2		**PS 3 due**
8	September 23, Tuesday	JK-6	Purification of biological molecules. Start discussion of energy.	Chapter 6.
-	September 24, Wednesday	-	**MIDTERM 1 (evening) 7 - 9 PM in 1 Pimentel**	**PS 4 due at start of exam. 9/24**
9	September 25, Thursday	JK-7	Energy. The first law of thermodynamics.	Chapter 6
10	September 30 Tuesday	JK-8	Heat capacity. Introduction to the Boltzmann Distribution. Molecular Energy function	Chapter 6

	Date	Lecturer	Topic	Textbook Reading
11	October 2 Thursday	JK-9	Entropy. Calculation of multiplicity of coin tosses. Entropy is the logarithm of the multiplicity. The second law of thermodynamics.	Chapter 7
12	October 7, Tuesday	JK-10	Energy Levels and Entropy.	Chapter 8
13	October 9, Thursday	JK-11	More on the Boltzmann Distribution. Temperature and heat flow.	**PS 5 due 10/9**
14	October 14, Tuesday	DS-3	Free Energy, predicting spontaneous reactions, relationship to work	Chapter 9
15	October 16, Thursday	DS-4	Chemical Potential, concentration dependence, equilibrium	Chapter 10 **PS 6 Due 10/16**
16	October 21, Tuesday	DS-5	Equilibria, Temperature dependence, protein unfolding, acid/base equilibria	Chapter 10
**	October 22, Wednesday	-	**MIDTERM 2** (**evening**) 7 - 9 PM in 1 Pimentel	**PS 7 due at start of exam. 10/22**
17	October 23, Thursday	DS-6	Equilibria, continued.	Chapter 10
18	October 28, Tuesday	DS-7	Chemical Kinetics, rate laws, time dependence of concentrations, mechanisms	Chapter 15
19	October 30 Thursday	DS-8	Chemical Kinetics, complex mechanisms, factors determining rates, activation energy, catalysis	Chapter 15
20	November 4, Tuesday	DS-9	Ligand Binding, importance in drug-target interactions	Chapter 12
21	November 6, Thursday	JK-12	Allostery	**PS 8 Due 10/30**
22	November 13, Thursday	JK-13	Enzyme Kinetics, the Michaelis Menten model	Chapter 16

	Date	Lecturer	Topic	Textbook Reading
23	November 18, Tuesday	JK-14	Enzyme kinetics, continued.	
**	November 19, Wednesday	-	**MIDTERM 3 (evening)** 7 - 9 PM in 1 Pimentel	**PS 9 Due at start of exam 11/20**
24	November 20, Thursday	DS-10	Enzyme mechanisms, cooperativity, inhibition	Chapter 16
25	November 25, Tuesday	DS-11	Oxidation-reduction reactions, electrochemical measurements 1	Chapter 19
-	November 27	--	Thanksgiving break	
26	December 2, Tuesday	DS-12	Oxidation-reduction reactions, electrochemical measurements 2	Chapter 11
27	December 4, Thursday	DS-13	Concentration gradients, membrane potentials and free energy	Chapter 11 **PS 10 Due 12/4**
** *	December 16, Tuesday	3-6 PM	comprehensive **FINAL EXAMINATION**	full course reading