Foundations of Structural Biochemistry  
MCB 5012 - Fall 2015

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Meeting Times: Tuesdays and Thursdays 11 am -12:15 pm in TLS 301

Introduction to Biological Macromolecules (Chapter 1)  
Bonding and functional groups  
Molecular interactions

Biological Macromolecules  
Proteins (Chapter 4)  
Amino acid structure and chemistry  
Protein folding, motifs and stability

Carbohydrates (Chapter 3)  
Monosaccharide structure and chemistry  
Polysaccharides and glycoconjugates

Lipids (Chapter 3)  
Diversity, chemistry and physical properties  
Structural lipids in membranes

Nucleic Acids (Chapter 2)  
Double helical structures of DNA and RNA  
Structural and functional versatility of RNA

Energy and Intermolecular Forces  
Energy and Intermolecular Forces (Chapter 6)  
Thermodynamics  
Energetics of intermolecular interactions

Free Energy (Chapter 9)  
Free energy of biochemical reactions and transport  
Coupling mechanisms and work

Chemical Potential and the Drive to Equilibrium (Chapter 10)  
Chemical potential  
Equilibrium constants and acid-base equilibria

Molecular Interactions  
Molecular Recognition (Chapter 12)  
The thermodynamics of molecular interactions  
Drug Binding by proteins

Specificity (Chapter 13)  
Protein-protein interactions  
Protein-nucleic acid interactions

Allostery (Chapter 14)  
Ultrasensitivity of molecular responses  
Hemoglobin
Kinetics and catalysis

The Rates of Molecular Processes (Chapter 15)
- General kinetic principles
- Reversible reactions, steady states and equilibrium
- Factors that affect the rate constant

The Principles of Enzyme Catalysis (Chapter 16)
- Michaelis-Menten Kinetics
- Enzyme Inhibition
- Enzyme Mechanisms

Exam Dates: September 24, October 29, and Final Exam on December 15, 9:30-11:30. Students are required to be available for their final exam during the stated time. If you have a conflict with this time you must visit the Office of Student Services and Advocacy to discuss the possibility of rescheduling this exam.

Homework: There will be four homework assignments

Office Hours: By appointment

Course Textbook

Other Useful Texts / Background Information
- Proteins-Structures and Molecular Properties by Thomas E. Creighton

Academic Integrity and Community Standards
We will enforce the University of Connecticut policies regarding academic integrity and community standards. In particular, incidents of cheating or plagiarism will not be tolerated and will result in failure of the course. For definitions and policies regarding academic misconduct see: http://www.community.uconn.edu/academic_integrity.html