

**BIOL/CHEM 5312:                      Physical Biochemistry**  
Spring 2015  
WedFri 11:00-12:20, 130 Dedman Life Sciences Building

Instructor: Steven Vik  
Office: 236 DLS  
Office Hours: Tuesday 1:00-2:00, or by appointment  
Telephone: 214-768-4228  
Email: [svik@smu.edu](mailto:svik@smu.edu)  
Website: <http://faculty.smu.edu/svik>

The text for this course:

*Principles of Physical Biochemistry*, 2nd Edition, 2005 (Prentice-Hall)

by van Holde, Johnson, and Ho

Lectures will be available in pdf form in advance of class on Blackboard.

There will be four exams during the semester, each covering 2 chapters in the text book. There will be no final exam. There will be 8 homework assignments, each generally covering one chapter. A final project will be due at the end of the semester. It includes both a written paper (1600-2000 words) and an oral presentation (10-15 minutes). The topic will be chosen in consultation with the instructor from a list that will be published on Blackboard, and on the course website. Students will be required to locate background material to their topics using the online search [PubMed](#). Students will be required to submit a rough draft, or detailed outline, of their paper about three weeks in advance of the due date. It will be returned with comments from the instructor. The paper must include background material to introduce the topic, a description and evaluation of one or two key experiments, and a bibliography. The bibliography must include at least two relevant scientific articles, one of which must be a review article. The paper is due Wednesday May 6 at 3:00 PM. The presentations will be scheduled during the last week of classes, and must be submitted, *e.g.*, as a powerpoint file, to the instructor 24 hours in advance.

Grading will be done on the following basis:

Homework (total points)	40%
Exams (10% each)	40%
Review Paper/ Presentation	20%

If you need to schedule an exam at an alternate time, it must be done in advance. If you are unable to attend an exam, e.g. due to illness, you must contact me by telephone or email in advance. Be aware that the preceding schedule is subject to change.

**Course Objectives:** During this course students will be able to do the following,

**Student Learning Outcomes:**

Upon successful completion of this class, students will be able to:

1. Understand and apply the basic principles of physical biochemistry
2. Analyze a research paper and make a presentation to the class
3. Understand and explain several key research techniques used in biochemical research

**Writing Proficiency:**

Through multiple opportunities supervised and/or directed by a professor, an editor or other authority, students will demonstrate proper use of language through completion of a substantial amount of purposeful writing appropriate for a specific or targeted audience.

**Oral Communication:**

1. Students will be able to select, organize and use appropriate evidence or information to suit a specific or targeted audience.
2. Students will be able to use appropriate vocal and visual cues to deliver a presentation to a specific or targeted audience.

**Information Literacy:**

1. Students will be able to select and use the appropriate research methods and search tools for needed information.
2. Students will be able to evaluate sources for quality of information for a given information need.

## Tentative Schedule

Wednesday	Friday
	Jan 16 Lecture 1, Ch. 1 <i>Introduction, Macromolecules, Interactions</i>
Jan 21 Lecture 2, Ch. 1 <i>Structure of Proteins</i>	Jan 23 No class
Jan 28 Lecture 3, Ch. 1 <i>Structure of Nucleic Acids</i>	Jan 30 Lecture 4, Ch. 2 <i>Thermodynamics, Part I</i>
Feb 4 Lecture 5, Ch. 2 <i>Thermodynamics, Part II</i>	Feb 6 Lecture 6, Ch. 3 <i>Modeling Macromolecular Structure</i>
Feb 11 Lecture 7, Ch. 3 <i>Stabilizing Interactions in Macromolecules</i>	Feb 13 Ch.1, 2 <b>Exam I</b>
Feb 18 Lecture 8, Ch. 3,4 <i>Modeling Nucleic Acids &amp; Intro to Statistical Mechanics</i>	Feb 20 Lecture 9, Ch. 4 <i>Structural Transitions in Macromolecules</i>
Feb 25 Lecture 10, Ch.4 <i>Structural Transitions in Nucleic Acids/Random Walks/Simple Exact Models</i>	Feb 27 Lecture 11, Ch.5 <i>Diffusion and Intro. To Sedimentation</i>
Mar 4 Lecture 12, Ch. 5 <i>Interpreting the Sedimentation Coefficient/ Zonal Sedimentation</i>	Mar 6 Ch. 3, 4 <b>Exam II</b>
Mar 11 <b>Spring Break</b>	Mar 13 <b>Spring Break</b>
Mar 18 Lecture 13, Ch. 5 <i>General Principles of Electrophoresis</i>	Mar 20 Lecture 14, Ch.5, 13 <i>Electro. cont'd and Solution Thermodynamics</i>
Mar 25 Lecture 15, Ch. 13 <i>Chemical Potential/Osmotic Pressure/ Sedimentation Equilibrium</i>	Mar 27 Lecture 16, Ch. 14 <i>Chemical Equilibria involving Macromolecules</i>
Apr 1 Lecture 17, Ch. 14 <i>Binding of Small Ligands to Macromolecules</i>	Apr 3 <b>Holiday</b>
Apr 8 Ch. 5, 13 <b>Exam III</b>	Apr 10 Lecture 18, Ch. 14 <i>Cooperativity in Binding/Proton Binding</i>
Apr 15 Lecture 19, Ch. 14, 15 <i>Binding to Nucleic Acids, Viscosity, and Introduction to Mass Spectrometry</i>	Apr 17 Lecture 20, Ch. 15 <i>Mass Spectrometry</i>
Apr 22 Lecture 21, Ch. 11 <i>Fluorescence Spectroscopy</i>	Apr 24 Lecture 22, Ch. 16 <i>Single Molecule Analysis</i>
Apr 29 Ch. 14, 15, 11 <b>Exam IV</b>	May 1 <i>Student Presentations</i>
	Wednesday May 6 (Finals date) <b>Paper due 3:00 PM</b>

**HONOR CODE:** It is expected that students have read sections of the 2014-2015 University Bulletin (p.105-107, or <http://www.smu.edu/StudentAffairs/StudentLife/StudentHandbook/HonorCode> ) concerning university regulations and academic honesty. In matters of homework, it is permitted to consult your classmates or others for assistance, but the work submitted must be your own.

**Disability Accommodations: Disability Accommodations:** Students needing academic accommodations for a disability must first be registered with Disability Accommodations & Success Strategies (DASS) to verify the disability and to establish eligibility for accommodations. Students may call 214-768-1470 or visit <http://www.smu.edu/ALEC/DASS> to begin the process. Once registered, students should then schedule an appointment with the professor to make appropriate arrangements.

**Religious Observance:** Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. (See University Policy No. 1.9.)

**Excused Absences for University Extracurricular Activities:** Students participating in an officially sanctioned, scheduled University extracurricular activity will be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (University Undergraduate Catalogue)