

General Biochemistry 115:403/503

Lecture and Exam Schedule, Fall

Instructor: Peter C. Kahn (PCK)

Class Meeting	Subject	Chapter
1	Course policies; Introduction to Biochemistry.	1
2	Note: Monday classes this day. Weak interactions. Water in biological systems. Introduction to thermodynamics; hydrophobic effect. Buffers.	1,2
3	Buffers; amino acids, titration of ampholytes; pI; electrophoresis & ion exchange	2,3
4		
5	Proteins & peptides: covalent structure, sequence analysis, synthesis. Intro. to molecular evolution.	3
6	3D Structure description: secondary, tertiary, quaternary structure; families of tertiary folds. Protein folding: thermodynamics, kinetics; chaperonins; molecular diseases, a.a. substitution, designer proteins.	4
7		
8	First order reaction kinetics & half-lives. Enzyme assays & Michaelis-Menten kinetics. Competitive, noncompetitive & uncompetitive inhibition. Use of theory & mathematical modeling.	6
9	FIRST EXAMINATION	
10	Mechanism of enzyme action.	6
11	Allostery & regulation of enzyme activity; ligand binding.	5, 6
12	Nucleotides, nucleic acid and chromosome structure, sequence determination, oligonucleotide synthesis	8,9
13		
14		
15	Introduction to bioinformatics, genomics & proteomics	9
16	Carbohydrates: structure, analysis, properties.	7
17	SECOND EXAMINATION	
18	Carbohydrates: structure, analysis, properties, continued	7
19	Lipids & membranes: structure, analysis, properties.	10, 11
20		
21		
22	Signaling I	12
23	Introduction to metabolism. Bioenergetics.	13
24	Introduction to metabolism. Bioenergetics, continued.	13
	No class this day. Friday classes instead.	
25	THIRD EXAMINATION	
26	Carbohydrate metabolism I: glycolysis, pentose phosphate shunt, gluconeogenesis, glycogen metabolism; Controls.	13, 14,
27		
28		15

Text: Nelson & Cox, *Lehninger: Principles of Biochemistry*, Sixth Edition, W. H. Freeman & Co., 2013.
(Note the availability of three versions which differ in price.)

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General Information and Course Policies

Learning Goals: Over the next two semesters, students will gain a fundamental understanding of what makes living systems tick at the molecular level and gain an understanding of the experimental methods which give rise to biochemical knowledge. The course will impart a thorough grasp of the relationship between biochemical structure and function.

By the end of the semester the students will have a thorough understanding of:

1. Thermodynamics and the influence of water on biochemical reactions
2. The role of pH, pKa and buffers in biochemical systems
3. The relationship between structure and function of biological molecules
4. Enzyme kinetics
5. The biochemical mechanisms of nucleotide (DNA/RNA) structure and metabolism
6. The biochemical processes underlying cellular membrane transport.

Welcome to the first semester of General Biochemistry, a one year integrated survey of biochemistry. I hope you come to enjoy the subject as I do, and I will do everything I can to make your experience of it agreeable. To that end, should you have a problem or wish to explore a topic in greater depth than possible in class, please feel free to contact me. I hold open office hours, which I invite you to attend, and I will be pleased to make appointments with those who cannot come at the scheduled times. The hours and office are on the Cook campus. The location is:

Office: 120 Lipman Hall Telephone: 848-932-5618 Email: kahn@aesop.rutgers.edu
Hours: Monday, 1:30 – 2:45 P.M. and by appointment
(Most class days I will meet with students in the Food Science building lobby immediately after class.)

There are several course policies of which you should be aware. The lecture schedule on the reverse side of this page gives an indication of the topics to be covered, but it is not a complete list. The chapter numbers are intended as a guide to where to *begin* your reading in the text, but material in each lecture topic may be found in other chapters, as well. **Use the index and the table of contents!** Some lecture material is not in the text at all, and supplementary readings will be suggested as appropriate.

The policy with respect to material for which you may be held responsible is that **(a) if it is covered in lecture, you are responsible for it, and (b) if a section of the text or if another source is specifically assigned to be mastered, you are responsible for it even if it is not covered in lecture.** There will not be many of these. The text is thus a supplement to the lectures; read as much of it as you find necessary. Use whatever other sources you may find in the library, including other texts, as well.

Grading: there will be three hour examinations during the term plus a cumulative final. There will also be a set of self-paced self-teaching tutorials in structural biology, which you must do, and there will be problem sets. Each hour examination represents 15% of the grade. The set of tutorials and the problem sets constitute a single assignment with the tutorials counting for 20% of the grade, while the problems will be 5%. The final counts for 30%. Copies of the last two year's exams will be published on the course's Sakai web site. The structural biology tutorials are described in a separate memorandum.

The Learning Resource Center provides supplementary instruction (SI). The SI instructors have taken General Biochemistry and done well in it. The instructors will offer regular review sessions. Their

hours will be posted within the next week or two. **You are urged to take advantage of this help as well as that of the faculty.** Course related material will be found at <https://sakai.rutgers.edu/portal>.

If you are unsure whether your training has prepared you adequately for General Biochemistry, please see me forthwith.

Peter Kahn