

Biological Sciences 220, Biochemistry I (BSCI220)

Fall 2006, Monday, Wednesday, Friday 10:10-11:00 am Room MRBIII/BSB 1220

Instructors: *Classes 1 to 23*

Dr. Andrzej M. Krezel office MRBIII/BSB 5270A, 5th floor
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office hours: Tuesday 1:00-4:00 pm. Appointments can be made, but are not required during these hours.

Classes 24 to 42

Dr. Daniel Kaplan office MRBIII/BSB 5280, 5th floor
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office hours: Tuesday 1:00-4:00 pm. Appointments can be made, but are not required during these hours

Course Description: BSCI220 is a course requiring knowledge of college level organic chemistry and biology. This course will serve as an excellent introduction to biochemistry for students pursuing a career in medicine or biological research. BSCI220 covers the chemical and physical properties of all classes of biological molecules and their assemblies. Higher order structures and functions of proteins, nucleic acids, carbohydrates, and lipids are analyzed quantitatively, followed by the introduction to mechanistic enzymology and enzyme kinetics. The cellular energy generating pathways (glycolysis, TCA, electron transport and oxidative phosphorylation) and their physiological manifestations are covered in detail. The mechanisms and significance of degradation and synthesis of carbohydrates, fatty acids, and amino acids are also discussed in depth. The application of biochemistry to human disease and medical therapy will be illustrated with recent examples. The overall goal of this course is for students to learn the universal characteristics of biologically catalyzed reactions, their specificity, speed and capacity for regulation. We hope to accomplish this on the level of a single reaction, an intracellular metabolic pathway as well as the physiology of an organism.

Required text: *Biochemistry* (3rd ed.) by Garrett & Grisham. ISBN 0534490336.

The reference chapters and pages are listed for each class period. The most important topics will always be identified in class.

Course web page: see OAK on Vanderbilt web page - syllabus and other useful information.

Help sessions: Problem solving sessions will be held in BSB 1220 on Thursdays at 5:30 pm.

Grading: Each of the four examinations will count 25%. Each exam will emphasize material covered since the prior exam. However, because of the cumulative nature of the subject, material covered in later exams will require knowledge of topics covered earlier in the course. Excused absences from exams (participation in University-sponsored sports events or debates) must be arranged at the beginning of the semester, by September 8. Other make-up exams will not be given, except in the case of a true, documented emergency. There will be many chemical structures discussed in the course. All line-bond structures shown on slides will be required on the exams, unless specifically excluded by the instructor.

Final exam is on Wednesday Dec 13, 9:00-11:00 am, and there will not be an alternate final exam.

Regrading: Requests for reevaluation should be submitted within 10 days after the date graded exams were returned in class. They have to include the original graded exam without any erasures, corrections, changes, edits and/or comments. Areas of question should be described on a separate page. We reserve the option of regrading the entire exam.

Classroom etiquette: During class all cell phones should be in the “off” position. Use of cell phone during class, sending or receiving, is unacceptable. Although not encouraged, it is acceptable to bring drinks to class in non-spill containers (coffee, water, etc), eating during class is unacceptable.

The Vanderbilt Honor Code governs the four exams, including any make-up exams, on which no assistance may be given or received. Uncertainty concerning application of the honor code does not excuse a violation.

<u>Class</u>	<u>Date</u>	<u>Subjects</u>	<u>Chapters</u>	<u>Pages</u>
1	W Aug 23	Introduction, water, pH, buffers	Ch. 1, 2	2-28,31-49
2	F Aug 25	Amino acids - nomenclature, properties, stereochemistry	Ch. 4	76-95
3	M Aug 28	Proteins - chemistry	Ch. 5	103-111, 131-136
4	W Aug 30	Proteins - functions	Ch. 5	137-144
5	F Sep 1	Proteins - secondary structure	Ch. 6	153-165
6	M Sep 4	Proteins – tertiary structure, folding	Ch. 6	166-193
7	W Sep 6	Proteins – quaternary structure	Ch. 6	194-200
8	F Sep 8	Lipids	Ch. 8	247-263
9	M Sep 11	Biological membranes - composition	Ch. 9	267-276
10	W Sep 13	Biological membranes - proteins	Ch. 9	277-284
11	F Sep 15	Biological membranes - functions	Ch. 9	284-305
12	M Sep 18	1st MIDTERM EXAMINATION	25%	
13	W Sep 20	Enzymes	Ch. 13	405-412
14	F Sep 22	Enzymatic kinetics	Ch. 13	412-421
15	M Sep 25	Enzymatic kinetics	Ch. 13	421-432
16	W Sep 27	Enzymatic catalysis	Ch. 13,14	433-437, 442-453
17	F Sep 29	Enzymatic catalysis	Ch. 14	453-471
18	M Oct 2	Enzyme regulation	Ch. 15	475-485
19	W Oct 4	Enzyme regulation	Ch. 15	486-504
20	F Oct 6	Nucleotides; nomenclature, properties, stereochemistry	Ch. 10	309-317
21	M Oct 9	Nucleic acids	Ch. 10	317-328
22	W Oct 11	Higher order structures of DNA and RNA	Ch. 11	341-358, 362-369
23	F Oct 13	2nd MIDTERM EXAMINATION	25%	
24	W Oct 18	Carbohydrates	Ch. 7	203-224
25	F Oct 20	Carbohydrates	Ch. 7	225-246
26	M Oct 23	Metabolism – An Overview	Ch. 17	538-557
27	W Oct 25	Metabolism – An Overview	Ch. 17	558-577
28	F Oct 27	Glycolysis	Ch. 18	578-597
29	M Oct 30	Glycolysis and Tricarboxylic Acid Cycle	Ch. 18,19	598-618
30	W Nov 1	Tricarboxylic Acid Cycle	Ch. 19	619-639
31	F Nov 3	Electron Transport and Oxidative Phosphorylation	Ch. 20	640-655
32	M Nov 6	Electron Transport and Oxidative Phosphorylation	Ch. 20	656-673
33	W Nov 8	3rd MIDTERM EXAMINATION	25%	
34	F Nov 10	Gluconeogenesis, Glycogen Metabolism, & Pentose Phosphate Pthwy	Ch. 22	705-720
35	M Nov 13	Gluconeogenesis, Glycogen Metabolism, & Pentose Phosphate Pthwy	Ch. 22	721-737
36	W Nov 15	Fatty Acid Catabolism	Ch. 23	738-762
37	F Nov 17	Lipid Biosynthesis	Ch. 24	763-785
38	M Nov 27	Lipid Biosynthesis	Ch. 24	786-808
39	W Nov 29	Nitrogen Acquisition and Amino Acid Metabolism	Ch. 25	809-830
40	F Dec 1	Nitrogen Acquisition and Amino Acid Metabolism	Ch. 25	831-852
41	M Dec 4	Metabolic Integration and Organ Specialization	Ch. 27	879-896
42	W Dec 6 W Dec 13	Review FINAL EXAMINATION 9:00-11:00AM	25%	