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Class Schedule:

Lecture: D-block
M 9:30-10:20;
T, Th, 10:30-11:20
Barnum 008

Textbook & Supplements:

Text:

Biochemistry with a Human Focus, 1st edition, R.H. Garrett & C.M. Grisham, 2002
ISBN-13: 978-0-03-097369-7

Study Guide:

Student Study Guide & Problem Book for Biochemistry with a Human Focus, D.K. Jemiolo & S.M. Theg
ISBN-10: 0-03-097371-6.

Course Description:

The overall goal of Bio 152 is to provide students with a solid understanding of the central energy-producing pathway of eukaryotic cells – glycolysis through oxidative phosphorylation – and other related pathways, their integration in the context of the human body, and the response of the body to disease and starvation. Topics covered will include (but are not limited to) enzyme structure and function, enzyme kinetics, thermodynamics, membrane transport, anabolism and catabolism of sugars and fats, and signal transduction. One semester of organic chemistry and introductory biology courses are pre-requisites for Bio 152.

NOTE 1: If you are considering a **major in Biochemistry**, you should enroll in the year-long biochem course offered through the chemistry department (Chem 171/172 – crosslisted as Bio 171/172). Bio 152 will not fulfill course requirements for the biochemistry major.

NOTE 2: Since we focus on the central energy-yielding pathway, we will *not* be covering nucleic acid structure or function; the phosphogluconate shunt; photosynthesis; amino acid metabolism; or the urea cycle. If you need to know this material for standard exams, you will have to review it on your own.

Course Objectives:

At the end of this course students should be able to:

- solve problems involving pH, buffers, thermodynamics, kinetics, and redox potentials
- explain how eukaryotic cells synthesize carbohydrates and derive energy from carbohydrates and fats
- explain regulation of metabolic pathways (in general and specifically for pathways covered in the course)
- explain how signals (both extracellular and intracellular) activate and repress metabolic pathways
- reproduce (chemical structures, cofactors, enzymes names) the glycolytic pathway
- apply knowledge & concepts to novel problems

Evaluation: Grading will be determined by three in-class exams, six homework problems, three optional extra-credit opportunities, and classroom participation. All of these items are voluntary (you can choose to hand them in or not based on your own priorities) – but please be aware that opting out of graded assignments will result in a grade of zero for that assignment.

Three hour exams: 100 pts each	300	} Total 370 pts
6 Homework problems: 10 points each	60	
Attendance score for last class	10	
3 Extra credit opportunities	up to 15 pts	

Trunk site: (<http://trunk.tufts.edu>)

If you are registered for this course you can gain full access to this site. Trunk updates to SIS daily

Syllabus – available on Trunk as well as on the departmental website.

Resources

Course Information – syllabus & Biochemistry core competencies document

Faculty Information – listing of office hours of the instructors and teaching assistants

Course Documents – additional background information

Assignments – information and instructions for all assignments

Slides – Powerpoint slides will be posted as pdf files (1 slide-per-page format). To print, click the Printer icon on the tool bar. On Page scaling, you can select the number of pages (slides) you want to print per sheet of paper.

Tests – 2010 and 2011 tests plus answers (in separate files)

Biochemist's Toolbox – background information on certain techniques used by biochemists

External Links – links to a number humorous sites and to sites with useful background information and/or animations

Forums – Rather than e-mailing questions on the course material directly to us, we would appreciate if all questions could be posted to the Trunk site. We will attempt to answer these questions as quickly as possible and post the replies to this site. In this way, everyone can benefit from these discussions. Also, feel free to answer each other's questions.

Course Policies:

1. **Cell phone, blackberries, etc. must be turned off during lectures, reviews, and exams.**
2. **Attendance** in lecture will not be recorded. However, students who attend lecture generally perform better than those who do not.
3. **The lecture schedule** should be used to determine when an assignment should be read.
4. **Office hours** of the instructors and the teaching assistant are listed on Trunk. Use these office hours to clear up any questions about the lectures or homework problems as they arise. Do **not** wait until after the first test.
5. **Tests:** The test schedule is posted below and on the Trunk web site.
 - a. Excluding verifiable illness or serious family emergency, all students are expected to take tests on the days that they are given. Illness must be verified ***in writing*** by Health Service or a licensed physician (on letter-head stationery); a family emergency must be verified ***in writing*** by the Dean.
 - b. If an exam is missed (see a. above) arrangements for a make-up test must be made within ***three school days*** of the missed test.
 - c. **If you receive additional time** on tests, please provide documentation ***at least two weeks prior to the first exam*** so that arrangements can be made.
 - d. Errors in marking of exams (including addition errors) must be brought to the instructor's attention within ***four school days*** of the test's return to class. Put no marks of any kind on a returned test; attach a note. Keep in mind, if an exam is returned for re-grading, we reserve the right to re-grade the entire exam.
 - e. No electronic device more complex than a simple calculator that cannot display graphs or text can be used during a test. No wireless device can be handled during a test.
 - f. There will be three tests with values of 100 points each. There is NO final exam.
6. **Academic Honesty:** We expect all students to know and abide by the University's policy on academic integrity. To find the pdf document "Academic Integrity for graduate and undergraduate students, 2010-2011" go to the student services site – <http://uss.tufts.edu/studentaffairs/judicialaffairs/index.asp> – and follow the hotlink under **Academic Integrity**. Students who cheat will be referred to the Dean of Students for disciplinary action and will receive a grade penalty following the disciplinary guidelines.

Class	Date	Day	Topic	Chapter
1	1/19	Thurs	Water, pH, and buffering	2
2	1/23	Mon	Amino acids	4 (<i>not</i> sections 4.5, 4.8, or 4.9) Cover 4.11-4.12 on your own
3	1/24	Tues	Peptides and proteins	4/5
4	1/26	Thurs	Protein secondary structure	5
5	1/30	Mon	Tertiary and quaternary structure	
6	1/31	Tues	Enzyme kinetics	10.1-10.5, 10.7
7	2/2	Thurs		
8	2/6	Mon	Enzyme catalysis	11
9	2/7	Tues		
10	2/9	Thurs	Enzyme regulation	10.8-10.11
11	2/13	Mon		
12	2/14	Tues	Enzyme regulation: Hemoglobin	12: pp 398-411
13	2/16	Thurs	EXAM 1	
	2/20	Mon	No class	
14	2/21	Tues	Lipids and membranes	6.8-6.11 Cover 6.1-6.7 on your own
15	2/23	Thurs (9:30)	Membranes and transport	6.8-6.11
16	2/27	Mon	Membranes and transport	
17	2/28	Tues	Thermodynamics	3
18	3/1	Thurs	Thermodynamics and ATP	
19	3/5	Mon	Carbohydrates	7: pp 205-224
20	3/6	Tues	Introduction to metabolism	14
21	3/8	Thurs	Glycolysis and fermentation	15
22	3/12	Mon	Citric acid cycle	16
23	3/13	Tues	Regulation of pathways	15/16
24	3/15	Thurs	Primary literature paper 1	
25	3/26	Mon	Reduction potential & ETC	17
26	3/27	Tues	ETC and Oxidative phosphorylation	
27	3/29	Thurs	EXAM 2	
28	4/2	Mon	Regulation of Ox - Phos.	17
29	4/3	Tues	Fatty acid oxidation	20.1-20.3, 20.6
30	4/5	Thurs	Gluconeogenesis	19.1-19.2
31	4/9	Mon	Glycogen metabolism & Regulation	19.3-19.5
32	4/11	Tues	Integration of metabolism-1	22
33	4/12	Thurs	Integration of metabolism-2	19/22
	4/16	Mon	No class	
34	4/17	Tue	Obesity	22
35	4/19	Thurs	Signal Transduction-1	26
36	4/23	Mon	Signal Transduction-2	26
37	4/24	Tues	Calorie restriction and aging	22/26
38	4/26	Thurs	EXAM 3	
39	4/30	Mon	Primary literature paper 2	ATTENDANCE REQUIRED!

3/19-3/23/12 Spring break

There will be three in-class exams and no final

Text: *Principles of Biochemistry with a Human Focus*, Garrett and Grisham (Brooks/Cole 2002)

NOTE: We will do our best to follow the course syllabus – however, we reserve the right to make modifications as needed during the semester.