WELCOME TO

General Biochemistry

Fall - 2014

Class Times - MWF 10:00-10:50 AM    RDB 1100 (Law School Building)

Principles of STUDY

How to Prepare for Class

Laboratory Link

Instructor Email Phone Office hours
John Makemson makemson@fiu.edu 305-348-3097 OE 246/247: MWF Mornings after 11 AM + Afternoons before 4PM

Learning Biochemistry

Catalog Description: Chemistry of proteins, lipids, carbohydrates, and nucleic acids; principles of enzymology, metabolism and bioenergetics.

Student's Learning Objectives: Students will know the chemical structures and chemistry of biological polymers (proteins, carbohydrates, lipids and nucleic acids) and their monomers (amino acids, sugars, fatty acids and other lipid monomers, and nucleotides) as well as the roles of these biological molecules in living cells. Students will be able to solve amino acid sequences of protein, nucleotide sequences of nucleic acids from experimental data and how to determine structures of carbohydrates and lipids. Students will be able analyze enzyme kinetic data as well as the bioenergetics/thermodynamics of biochemical reactions. Students will know the reactions of major metabolic pathways: Central Metabolism (Glycolysis-Gluconeogenesis, Pentosephosphate Pathway, Citric Acid Cycle) and Respiratory Electron Transport System, Glyoxylate Cycle; Beta-oxidation of fatty acids and be able to analyze the regulation of these pathways.

Lecture (Narrated PowerPoint) Format: Narrated PowerPoints are in MP4 format that can be viewed on standard and laptop computers as well as tablets. These were made using the continually updated PowerPoints from the instructor's regular lectures. They usually last less than a full lecture (most are 30-40 min) because there is no interaction with an audience. A few "lectures" go longer than an hour, but each of these are used for two class periods. Each "lecture" is stored at a private YouTube site and the FIU Media Site. Please use the one that works best for you. The links are below in the schedule.

THE FLIPPED CLASS: the lectures here are narrated PowerPoints that you can view at any time you choose before class. The Power Points used in lecture can also be
downloaded to take notes on if you convert them to pdf and print them out. It is to your
distinct advantage to have the lecture pdf printed out so when you are viewing the
narrated PowerPoint because you can pause the narrated PowerPoint and take notes on
the pdf. If you went too slow, you can always back the lecture up and get to what you
missed. In other words: YOU HAVE TOTAL CONTROL of the LECTURE. This makes
learning paced to your ability to ACTIVELY LEARN. Further, you can go to the
"lecture" as many times as you like. Please do the selected End of Chapter problems
before class: the class will work on problems like these and Case Studies. Doing them
before class will pay off in higher Clicker grades (see below).

ADVANTAGES OF THE FLIPPED CLASS: Because each class is an active learning
experience, students have performed much better on the Exams, usually 10 to 20% better
than those using traditional lecture format. Additionally, student problem solving and
critical thinking skills improve. This has a distinct advantage when taking admission
exams for graduate schools (GRE) and any of those for health professions (MCAT, DAT,
etc.).

A Biochemistry MOOC (massive on-line open course): oli.cmu.edu/courses/free-
open/biochemistry-course-details This course was created at Carnegie-Mellon University.
It is free and you can use it as an additional resource. It has a slightly different structure,
but also has problem sets for each chapter.

Each Class Time has a Graded Component that REQUIRES you to have a working
iClicker for Each Class. Classroom work counts for 1/3rd of your grade. Last semesters,
the i-Clicker-Go app had wi-fi connection problems; the safest is the basic iClicker. New
and Used iClickers are available from the Bookstore. But you might get better deals
elsewhere. THE MOST IMPORTANT POINT: Get your iClicker REGISTERED to YOUR
NAME as it appears in PantherSoft. If you have a multi-word last name such as "de la
Vega", it has to be registered with underlines as "de_la_Vega" which makes it look like
one word at the iClicker database. This is the only way it will add your clicker points into
the gradebook. We will be testing your iClicker response during the first week with
non-graded material. Graded iClicker responses begin the 2nd week and proceed though
the rest of the course.

Prerequisites: General Biology - BSC 1010 & BSC 1011 and Organic Chemistry - CHM 2210 &
CHM 2211 all with grades of C or Better.

Text: Principles of Biochemistry, Lehninger, Sixth Edition (Nov. 2012) - Should Be Available in
Three Different Formats: Hardbound Text
Loose-leaf Text (10:1-4641-1-1064-6, 13:978-1-461-1) , and e-book. The latter two cost significantly less
than the Hardbound Text. The loose-leaf form (you don't have to carry the whole thing around each
week) was ordered for the Bookstore. The e-book is at: http://ebooks.bfwpub.com/lehninger6e or at
http://www.Chegg.com (which also has rental books).
New and used copies (of the 6th Edition) of the textbook are available at the FIU Bookstore in the Graham Center. The bookstore sells them at highest possible price. You can save by using the web: new and used are discounted at half.com, abebooks.com, and Amazon. International editions are at about half the price: check out amazon.co.uk and others. The international editions are usually paper back, but otherwise are identical to the very costly book in the bookstore (probably ~$210). Be careful about ordering the text and not the study guide. **NOTE: Answers to all of the End of Chapter Problems are in the end of the text; and Solutions to the End of Chapter Problems are Present as pdf files from this syllabus.**

**Texbook Learning Aid:** The textbook's BiochemPortal website (courses.bfwpub.com/lehninger6e), has Practice Quizzes in the "LearningCurve" for Each Chapter, they are a valuable learning experience to practice before classes and exams. If you got a used text, there is a small charge to use the site, otherwise it is part of the text.

**Tentative Syllabus (Likely to Change During the Semester)**

**See Below About Practice Exams**

<table>
<thead>
<tr>
<th>Aug</th>
<th>PowerPoint of &quot;Lecture&quot; Download and Convert to pdf  to Use as NotesWhen Doing the Narrated Power Point Lecture</th>
<th>Narrated Power Point &quot;Lecture&quot; KNOW WELL, BEFORE CLASS</th>
<th>DO THESE BEFORE CLASS: End Of Chapter Problems to Solve Solutions to the Selected EOC Problems are in Word format. Abbreviated Solutions following page 1198 in the textbook: Best Source!</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 M</td>
<td>Introduction the Flipped Class</td>
<td>YouTube FIU Media Site</td>
<td></td>
</tr>
<tr>
<td>27 W</td>
<td>Introduction to Biochemistry</td>
<td>Ch1 Ch1MS</td>
<td>1, 3, 5, 8, 11, 12 Ch01SelectedSolutions</td>
</tr>
<tr>
<td>29 F</td>
<td>Water, pKa, Buffers</td>
<td>Ch 2 Ch2MS</td>
<td>1-5, 8, 11-18, 20, 26 Ch02SelectedSolutions</td>
</tr>
<tr>
<td>1 M</td>
<td>Labor Day Holiday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 W</td>
<td>Amino Acids and Proteins</td>
<td>Ch3a Ch3aMS</td>
<td>1-7 Ch03Pt-1Selected Solutions</td>
</tr>
<tr>
<td>5 F</td>
<td>Protein Purification</td>
<td>Ch3b Ch3bMS</td>
<td>8-11, 13, 15, 16 Ch03Pt-2 Selected Solutions</td>
</tr>
<tr>
<td>8 M</td>
<td>Protein Sequencing</td>
<td>Ch3c Ch3cMS</td>
<td>18, 19, 21, 22 Ch03Pt-3 Selected Solutions</td>
</tr>
<tr>
<td>10 W</td>
<td>EXAM 1</td>
<td></td>
<td>50 points. Please bring a calculator (non-graphing). This exam integrates material from Chapters 1-3</td>
</tr>
<tr>
<td>12 F</td>
<td>Proteins Structure Part 1</td>
<td>Ch 4a Ch4aMS</td>
<td>1-4 Ch04 Selected Solutions</td>
</tr>
<tr>
<td>15 M</td>
<td>Protein Structure Part 2</td>
<td>Ch 4b Ch4bMS</td>
<td>8-12</td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Chapter</td>
<td>Problems/Assignments</td>
</tr>
<tr>
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<tr>
<td>17 W</td>
<td><strong>Protein Function</strong>: Binding</td>
<td>Ch 5</td>
<td>1, 3, 5-7. <strong>Chapter 5 Selected Solutions</strong></td>
</tr>
<tr>
<td>19 F</td>
<td>Enzymes Part 1</td>
<td>Ch 6a</td>
<td>1-6, 9, 11, 13. <strong>Chapter 6 Selected Solutions-Both Classes</strong></td>
</tr>
<tr>
<td>22 M</td>
<td>Enzymes Part 2</td>
<td>Ch 6b</td>
<td>12, 19.</td>
</tr>
<tr>
<td>24 W</td>
<td>Carbohydrates</td>
<td>Ch 7</td>
<td>15, 17-20, 23, 27. <strong>Chapter 7 Selected Solutions</strong></td>
</tr>
<tr>
<td>26 F</td>
<td>EXAM 2</td>
<td></td>
<td>50 points. Please bring: No 2. Pencils, Simple Scientific Calculator+ Straight Edge (ruler). This exam integrates material from Chapters 4, 5, 6 and 7.</td>
</tr>
<tr>
<td>29 M</td>
<td>Nucleic Acids Part 1</td>
<td>Ch 8a</td>
<td>1-3, 5, 8, 10. <strong>Chapter 8 Selected Solutions-Both Classes</strong></td>
</tr>
<tr>
<td><strong>Oct</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 W</td>
<td>Nucleic Acids Part 2</td>
<td>Ch 8b</td>
<td>12-15 and another in the Solns using pBR322.</td>
</tr>
<tr>
<td>3 F</td>
<td>Lipids</td>
<td>Ch 10</td>
<td>1, 2a, 2c, 7-13, and 3 if you can cook. <strong>Chapter 10 Selected Solutions</strong></td>
</tr>
<tr>
<td>6 M</td>
<td>Membranes Structure</td>
<td>Ch 11a</td>
<td>3, 5, 6. <strong>Chapter 11 Selected Solutions</strong></td>
</tr>
<tr>
<td>8 W</td>
<td>Membranes: Transport</td>
<td>Ch 11b</td>
<td>10-13, 15, 16, 19, 22</td>
</tr>
<tr>
<td>10 F</td>
<td>More membrane in class work</td>
<td></td>
<td>Bring a straight edge.</td>
</tr>
<tr>
<td>13 M</td>
<td>EXAM 3</td>
<td></td>
<td>50 points, integrates material from Chapter 3 and 6 into Chapters 8, 10 and 11. Be sure to bring your calculator.</td>
</tr>
<tr>
<td>15 W</td>
<td>Biosignaling</td>
<td>Ch 12</td>
<td>1, 4, 5, 7, 13. <strong>Chapter 12 Selected Solutions-Both Classes</strong></td>
</tr>
<tr>
<td>17 F</td>
<td>Biosignaling, continued</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 M</td>
<td>Bioenergetics</td>
<td>Ch 13</td>
<td>6, 9, 12, 14, 19-21, 24-27. <strong>Chapter 13 Selected Solutions-Both Classes</strong></td>
</tr>
<tr>
<td>22 W</td>
<td>Bioenergetics, con't</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 F</td>
<td>Glycolysis</td>
<td>Ch 14a</td>
<td>1, 2, 4-7, 9, 10, 14, 16. <strong>Chapter 14 Selected Solutions-Both Classes</strong></td>
</tr>
<tr>
<td>27 M</td>
<td>Gluconeogenesis and PPP</td>
<td>Ch 14b</td>
<td>21-24, 26, 27.</td>
</tr>
<tr>
<td>29 W</td>
<td>More Problems/Case Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 F</td>
<td>EXAM 4</td>
<td></td>
<td>50 points, bring your calculator. Integrates material from Chapters 12, 13 and 14.</td>
</tr>
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<td><strong>Nov</strong></td>
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<tr>
<td>3 M</td>
<td>Citric Acid Cycle</td>
<td>Ch 16</td>
<td>1-9, 15, 18, 19, 30-32. <strong>Chapter 16 Selected Solutions-Both Classes</strong></td>
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<td>6/26/2014 10:31 PM</td>
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<td>Last Day to Drop.</td>
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Course Policies

1. **Exams**: There will be six exams over the course of the semester - each worth 50 points plus the cumulative Final Exam (100 points).

The EXAMS ANSWERS requiring a written answer will be chemical structures to construct or problems to solve. There will be multiple choice questions. There will be different FORMS of the Exam.

- You will be required to bring #2 pencils with at least one eraser, for some exams you will need a straight-edge ruler to construct a graph.
- You will need a simple scientific calculator (<$20, you will need to use log functions and In functions).
- NO Graphing Calculators, Handheld computers and Tablets, Cell Phones, or other electronic devices. THESE are NOT ALLOWED.
- **SHARING a Calculator IS NOT ALLOWED**, if that occurs, both students get an automatic ZERO for the exam.
- You will be required to bring your FIU student ID to every exam.
- **PRACTICE EXAMS** (actual Fall-2012 exams): Exam 1, Exam 2, Exam 3, Exam 4, Exam 5.

Nov 27-Dec 1 Thanksgiving Holiday

Dec

1 F EXAM 6 50 points. Integrates material from Chapters 18, 19 and 20

3-5 Catch Up/Review

8-12 FINALS WEEK

8 M Final EXAM 9:45 - 11:45 AM RDB 1100 Comprehensive. 100 points. After: the graded Exam can be picked up from OE 246. There will be a key and grade distribution on Blackboard.
Exam 6.

- **PRACTICE EXAM KEYS:** [Exam 1 to 6 Keys](#)

Wearing brimed hats or baseball caps during exams is not permitted, classroom lighting does not require hats. Make-Up Exams will be given only to students providing valid documentation of a medical or other serious problem. NO EXAM IS DROPPED. All portions of the course are extremely IMPORTANT. Answers to the exams will be posted on the course Blackboard site in a timely fashion.

2. **Each class will have a graded activity = of 2 to 15 points.** Missed class activities can be made up with a written medical, legal or other valid excuse.

3. **Final Grade:** Exams 1-6 + Final Exam = 400 points
   
   - Class iClicker Grade = 200 points (or more)
   
   - Total Possible Points = 600 points

4. **Class Clicker Points:** at least 200, the class activities are constantly being improved, the actual number has come to more than 200. But is not the same from semester to semester. They ALL get counted into your total-final points.

CONVERTING POINTS TO LETTER GRADE AT THE END OF THE SEMESTER: Total points attained on all exams and classes are curved. If necessary the curve will not allow the lowest C (passing for majors) to go below 50% of the total.

4. **Make-Ups (Classes and Exams), Extra Credit.**

If you miss a class or exam, please contact the instructor within 24 hours of the exam or class, if possible. Missed classes and exams can be made up **only if you have a valid written medical or legal excuse.** Make-Up Exams have no multiple choice questions. If you foresee that an unavoidable prior commitment that will prevent you from attending an exam or class, contact the instructor at least 2 days prior to the scheduled exam time to discuss alternative = taking a make up exam or making up class iClicker questions.

There is NO EXTRA CREDIT, each student's grade comes exclusively from iClicker points and exam points.

5. **Cheating**

CHEATING WILL NOT BE TOLERATED!!!

Students caught cheating during an examination will be ejected from the exam and given an "F" for the course.

6. **Incompletes for the course**

The FIU policy on incompletes is: An incomplete grade is a temporary symbol given at the discretion of the instructor for work not completed because of serious interruption not caused by the student's own negligence. An incomplete must be made up as quickly as possible but no later than two semesters or it will automatically default to the grade that the student earned in the course. There is no extension to the two semester deadline. The student must not register again for the course to make up the incomplete.

Incompletes will require written documentation (doctor's note, accident report, etc) of the underlying condition that impedes student progress. A form will need to be signed by the student detailing the procedure and agenda for completing course-work.
Students who receive an incomplete grade and have applied for graduation at the end of that term, must complete the incomplete grade by the end of the fourth week of the following term. Failure to do so will result in a cancellation of graduation. The student will need to reapply for graduation.