

Chemistry 160b
Metabolism and Regulation of Biological Systems
Spring 2016

Instructor: Dr. Katherine McReynolds

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Office Hours: M: 10-10:50 AM, 4-4:45 PM; W: 12-1:45 PM

Class Meets: SQU 456 9-9:50 AM MWF

Website: <http://www.csus.edu/indiv/m/mcreynoldsk/>

Required Textbooks:

- *Fundamentals of Biochemistry, Life at the Molecular Level*, 4th Edition, by Voet, Voet and Pratt.
- *The Organic Chemistry of Biological Pathways*, 2nd Edition, by McMurry and Begley

Required Online Homework: WileyPlus (See homework section for more information).

Course Description: Describes the bioenergetics and regulation of anaerobic and aerobic metabolic pathways. Major topics include glycolysis, Krebs's cycle, fatty acid and amino acid oxidation, lipid biosynthesis and photosynthesis. Particular emphasis is given to pathway regulation and integration.

Course Prerequisite: Successful completion (C- grade or better) of Chemistry 160a, one year of organic chemistry.

Grading:

Three exams @ 100pts.	300
Best 4 of 5 quizzes @ 25 points ea.	100
Group research material (2 @ 5 pts ea.)	10
Metabolic chart (due 05/06/15)	50
Metabolic Disease Presentation	75
Sapling Homework (80% completion)	50
Participation points	15
Final exam (Cumulative x 2 semesters)	<u>200</u>
	800 pts. total

Letter grades will be assigned based on a range of:

A:	90% and up
A-:	88-89.9%
B+:	86-87.9%
B:	80-85.9%
B-:	78-79.9%
C+:	76-77.9%
C:	68-75.9%
C-:	66-67.9%
D:	55-65.9%
F:	Below 55%

Attendance: Attendance of the lecture is not required, but is *highly* recommended.
Please see the current University catalog for the class drop policy

Course Etiquette: Students are expected to be on time to class. It is very disruptive to both the instructor and the other students in the course to come in late. Cell phones must be turned **completely off** during class time. Failure to do so may result in confiscation of the cell phone until the end of class. Repeat offenders may be subject to loss of points in the course, which may impact the student's final grade in the course.

Exam Day Rules: On exam days, please place your backpack, including cell phone (turned off), in the front of class by the instructor. No hats are to be worn on exam day. The only items allowed at your desk are: pencil/pen, eraser, Scantron form, basic calculator (no cell phones, no graphing calculators). If you only have a graphing calculator, or forgot your calculator, you may check one out for \$ 0.50 at the 4th floor stockroom in Sequoia Hall **before the exam begins**. You will not be permitted to leave the room during an exam for any reason, including needing to go to the restroom/get a drink of water. If you do leave the classroom during an exam, your exam is over and must be turned in.

Homework: Homework will be assigned from each chapter through WileyPlus and will be announced in class. It is worth 50 points total for the semester, and your score will be scaled based on your % correct. It is **highly** recommended that the homework be completed for each chapter, as many of the quiz/exam questions will be based on skills learned by doing the assigned problems.

Instructions for WileyPlus:

1. Go to www.wileyplus.com
2. Enter the course code: 496435
3. Register and get access to course materials. There is a 14 day grace period for paying for the access code, and your work will be saved, so if you need more time, this is a good option to get started right away.
4. If you need technical support for WileyPlus, beyond what I can help you with, please contact www.wileyplus.com/support. They will be far more likely to help you with issues that come up in a timely fashion.

Once you have registered and enrolled, you can log in at any time to complete or review your homework assignments.

Quizzes: Five quizzes will be given over the course of the semester. It is possible that a take-home quiz, or an online quiz in Sapling will be given instead of an in-class quiz. Take home quizzes will be due in the following class period and online quizzes will be open for a 24 hour period (announced in class). **You are not to work with your classmates, or anyone else on take-home/online quizzes.** In class quizzes will occur at the beginning of class and will be unannounced. There are no make-up quizzes/early quizzes given. Since one score is dropped, if you miss a quiz, it will be omitted from your grade. Subsequent missed quizzes will count as a zero. These quizzes will test you on the current topics covered in class for the week prior and will help to keep you up to date with the material and prepare for the exams by giving you practice at working problems under a time limit (15 minutes). The lowest score for the semester will be

dropped from your final grade, and as such, there will be no make-up quizzes. The format of the quizzes can be anything (multiple choice, essay, short answer, mathematical problems, etc.).

Exams: Exams will be based on the lecture, assigned reading, handouts, and homework. The format is the same as for quizzes, but the questions will be more challenging, as you will have had more time to study the material than you have for a weekly quiz. Some questions will also require that you can put multiple lecture concepts together to answer them correctly. **Attendance is required!!** If you must miss an exam for a good reason (ie. Illness) a doctor's note or other evidence of a valid excuse will be required **within one week of the missed exam**. There will be no make up exams. A student with an excused absence will make up the points on that material from the final exam. If an unexcused absence occurs, the exam score will be counted as a zero.

Final Exam: The final exam for this course will be a standardized (multiple choice) exam from the American Chemical Society (ACS). This exam will cover the content from **both** Chem 160a and Chem 160b.

How to Prepare for Quizzes and Exams:



- Attend class every day.
- Come to class prepared. This means reading ahead in the textbook. Take notes as you read, this will help you to formulate questions later, and also helps you to better retain the information.
- After class, recopy your notes (within *hours*, not *days*). Add in additional information gleaned from your reading to make the notes more comprehensive.
- Do the assigned homework.
- Read the chapter summaries. Do you understand everything?
 - You might want to check out all of the resources available on Wiley Plus. It contains a lot of useful study tools and some molecular viewing programs.
- Get into groups to study. You will get different benefits from this than from exclusively studying alone. You will also find that you will have different strengths and weaknesses than other students, so it is mutually beneficial to all.
- Come to office hours and get help when you need it. I won't know what you are having difficulties with unless you say something (or until exam time rolls around...).

Grading Policy: Extreme care will be taken with the grading of your quiz/exam materials in this course. One page is graded at a time for all students, ensuring the utmost in consistency for partial credit assignment. If you detect a mistake in the grading, such as an addition error, please bring it to my attention immediately, and it will be resolved. If, however, you feel that you deserve a greater amount of partial credit than what you were given, I reserve the right to re-grade the entire exam, which may result in a lower overall score.

Cheating: Cheating in any form will not be tolerated. Cheating involves having extraneous notes, in written form or stored in a programmable calculator, looking at someone else's exam paper, or alteration of a graded question(s) with submittal for a re-grade. If a student is caught cheating, I will deal with them in the harshest manner possible, given the nature of the offense. At the bare minimum, the score for the assignment the student was caught cheating on will become a zero and will count towards their final grade. At the maximum, the student will be reported to the Office of Student Affairs, where they may face sanctions against them, such as probation, or expulsion from

the University. It is up to my discretion as to which path I will take in dealing with an incidence of academic dishonesty.

Group Work: For particular metabolic pathways (announced 1 week in advance) you will work in groups on an assigned reaction from the pathway. Before beginning the group work, you must locate and retrieve an appropriate scientific journal article (can be a review or a primary research paper) relating to your reaction, or to the pathway. You will then read this article in advance of the group activity and be prepared to share the information with your group such that you can answer the assigned questions. I will check off these papers for appropriateness. You will receive a maximum of 5 points per paper.

Metabolic Chart: A metabolic chart will be constructed (**due 05/06/16**) whereby all metabolic pathways covered over the course of the semester will be connected together and summarized. The following elements are required: All steps for all pathways need to be shown and color-coded, enzymes for each step clearly indicated (please mark regulated enzymes with a *), cofactor/coenzyme requirements included, and regulatory molecules (hormones, nucleotides, etc.) for appropriate steps clearly shown using an  to represent activation, and an  to indicate inhibition.

Poster Presentations: Two primary journal articles relating to a metabolic disorder must be chosen with my consent (**by 04/01/16**). Each student will then conduct further research on the topic as needed, and give a poster presentation on the subject (more detailed information will be given in class). These presentations will be given in class on 5/4, 5/9, 5/11 and 5/13. The assignment is worth 75 points, and will be graded using instructor and peer evaluation of the presentation. Additionally, there will be 15 possible participation points to the students in the audience for providing constructive feedback in the peer evaluations to each student presenter.

The university provides poster printing services to students on campus to print a maximum of one poster per semester. More information is provided at <http://www.csus.edu/irt/stc/printing/>. Alternatively, students may choose to print their poster on better quality paper at FedEx Office for a fee (<http://www.fedex.com/us/office/poster-printing.html>). The closest FedEx Office is at 5600 J Street.

Tentative Lecture Schedule:

Week of:	Monday	Wednesday	Friday
1/25 (1)	Introduction & Ch 14-1	Ch 14-1,2 (VVP)	Ch 14-3 (VVP)
2/1 (2)	Ch 14-4 (VVP) Glycolysis group work	Ch 15-1,2 (VVP) Ch 4-2 (MB)	Ch 15-2,4 (VVP) Ch 4-2 (MB)
2/8 (3)	Ch 15-2,4 (VVP) Ch 4-2 (MB)	Ch 15-2,4 (VVP) Ch 4-2 (MB)	Ch 15-3,5 (VVP) Ch 4-3 (MB)
2/15 (4)	Ch 15-6 (VVP) Ch 4-6 (MB)	Ch 15-6, 16-4 (VVP) Ch 4-5 (MB)	Ch 16-4 Ch 4-5 (MB)
2/22 (5)	Ch 16-2,3(VVP)	Ch 16-2, 3 (VVP)	Ch 16-1, 2, 3 (VVP)
2/29 (6)	Ch 16-1,3 Ch 17-1 (VVP) CAC group work	Ch 17-2,3,4 (VVP) Ch 4-4 (MB)	Exam #1: Ch 14-16 (100 points)
3/7 (7)	Ch 17-3,4 (VVP) Ch 4-4 (MB)	Ch 17-3,4,5; Ch 18-1 (VVP) Ch 4-4 (MB)	Ch 18-1,2 (VVP)
3/14 (8)	Ch 18-2 (VVP)	Ch 18-2,3 (VVP)	TBA
3/21	Spring Break	Spring Break	Spring Break
3/28 (9)	Ch 18-3,4 (VVP)	Ch 20-1 (VVP) Ch 3-1 (MB)	Ch 20-2 (VVP) Ch 3-3 (MB)
4/4 (10)	Ch 20-2 (VVP) Ch 3-3 (MB)	Ch 20-4 (VVP, E3 material) Ch 3-4 (MB, E3 material)	Exam #2: Ch 17, 18, 20 (100 points)
4/11 (11)	Ch 20-4,5 (VVP) Ch 3-4 (MB)	Ch 20-7 (VVP) Ch 3-6 (MB)	Ch 21-1 (VVP)
4/18 (12)	Ch 21-2,3 (VVP) Ch 5-1,2 (MB)	Ch 21-3,4 (VVP) Ch 5-2,3 (MB)	Ch 21-4 (VVP) Ch 5-3 (MB)
4/25 (13)	Ch 21-5 (VVP) Ch 5-4,5 (MB)	Ch 19-1 (VVP) Ch 4-7 (MB)	Ch 19-2 (VVP) Ch 4-7 (MB)
5/2 (14)	Ch 19-2,3 (VVP) Ch 4-7 (MB)	Student Presentations	Exam #3: Ch 19, 20, 21 (100 points) Metabolic Charts due
5/9 (15)	Student Presentations	Student Presentations	Student Presentations
5/16	Final Exam Week	Final: 8-10 AM Cumulative (2 semesters)	Final Exam Week