NOTE:
This syllabus is really just last year’s syllabus for my course. Last year it was second session, this time it’s first session. Also, this year we will be fully online.

Things I plan to do are make available lots of information to you via CANVAS, including all pre-recorded lectures which I did at my school all last fall in front of a live class. I will keep you on your toes by following a schedule. I will find ways to encourage “community” in the class by having you meet each other in small groups over zoom; I will also have online homework as usual. There will be live zoom sessions during the week, full of Q and A which I will record in case people are not able to be there during the time.

Finally, I may do a different kind of live quizzing/testing rather than large-scale testing. There usually is one test per week more or less… This summer, we may have some kind of quiz/evaluation every class. I’m still working on that aspect. I do need to measure your comprehension and mastery of the material somehow. Maybe short answer questions.

Look over this syllabus below to see what the content is of the course, and realize it will be presented in a very different way. Some will like it more, some less. In the end if you do all the work, you will gain a good understanding of biochemistry at a broad and introductory level.

Biochemistry and Cellular Metabolism
BIO 0152 – Summer Session II – Tufts University
July 2- Aug 8, 2019
Meeting in Robinson 253 (Auditorium) Tues/Thurs 6:00 – 9:30 PM
Office Hours From 5:00-6:00 before class in classroom
Dr. Craig M. Story
craig.story@gordon.edu ← best way to reach me

OBJECTIVES:
1. To become familiar with the structure and function of the components of living matter at a molecular level; to study the relationship of biological function to chemical structure.
2. To study metabolism, the chemical reactions that occur in living organisms.
3. To study the connections between biochemical reactions and function of organs of the body.

Note: this is a general biochemistry survey course. The course is not narrowly focused on reaction mechanisms, biophysics, or any other single aspect of the broad field of biochemistry. We will discuss many topics covered in an introductory biology class, yet in far greater detail. Please look over the syllabus closely and make sure you know what to expect. Do not be disappointed if it follows the text quite closely; it is a very good text. Note: maximal learning will be achieved through your own study efforts, and working the problems, not by merely listening to very long class lecture sessions at night. Whenever possible, various activities, questioning, discussion, etc., will be substituted for lecture.

PREREQUISITES: Recommended – Introductory Biology (BIO 13L). Organic Chemistry I (CHEM 51 and 53), or the equivalent intro biology course. Organic chem will help and is recommended but not absolutely required for success in the course.

COURSE MATERIALS:
**Required:**
1. *Lehninger Principles of Biochemistry* 7th Edition by David Nelson and Michael Cox, 2017. Several text versions are available; electronic (see 2 below), loose-leaf, etc.

2. Sapling Learning online homework/e-text bundle. This can be purchased online. See separate instructions below. One idea if you want a “real” text, purchase a past edition for a savings, or renting is one of the many options.

**Instructions for Sapling Plus (homework and e-text site).**

Please follow this link:


Note that if you want to rent a text copy along with the SaplingPlus (which includes e-text) there is a tab “Packages” with many different options. Just the Sapling Plus e-version costs $72 for 6 months or $103 for two years of access.

**Recommended:** but honestly you will probably not have time to use it in the summer course!


4. Campbell-Reece’s *Biology* text is recommended as a supplementary text (or another basic biology text, but you should have already taken basic cell biology and have this in your library. Am I right?)

**HOMEWORK AND QUIZZES:** The online Sapling Learning homework will take the place of quizzes I have given in class in previous years. At the start of class we can discuss any problems that were challenging. Work to keep up with the homework. Note: do it on your own for maximal benefit.

To encourage attendance, there may be quick writing exercises at the start of class that are designed to get you in the mood for learning, and help me to get to remember your names (and provide a record of attendance, and quiz you about something you should know, possibly).

**PHILOSOPHY OF LEARNING:** Experts agree that lecture format is far from an ideal way to learn and retain information, although a well-done lecture can be stimulating and useful. Also, research shows that your best learning will occur when you struggle and interact with the material yourself, and spend the necessary time with the book and doing your own further study using web resources. Working through and puzzling over problems is one way that a great deal of learning can occur. Also, studies have shown that working in groups and discussing the material is very effective. Students who study in isolation often (but not always) do not do as well, unless you know you learn well on your own, try to find a study partner.

Keep in mind that detailed solutions are also available for all homework in the supplementary (recommended) text workbook. The purpose of the class sessions is to reinforce ideas that you have fairly well worked out in advance from your personal time investment. It will take a lot of time and effort to become familiar with the amount of material covered in the course. Class time should help you see what is the most critical information, and make connections, and clear up points of confusion. *It is my sincere hope that you will not see this course as a drudgery of facts to be memorized, but rather, that you will gain a greater enthusiasm for the way cells work, and a desire to learn more.* Many students have observed that Biochemistry was the course that
helped them connect the dots from other intro courses into a coherent big picture. Some students will finally get an intuitive grasp of how chemical equilibrium works in this course, for example.

**DISABILITIES:** Students with disabilities who may need academic accommodations are asked to speak with the professor within the first week of class. Students are also responsible for making sure documentation of the disability is on file with the University. I will do whatever I can to help students with such needs to be successful in the class.

**ATTENDANCE and EVALUATION:** Needless to say, with just 11 meetings, it is vitally important that you attend all classes.

Exam 1 22%
Exam 2 22%
Exam 3 22%

note: your grade will be
Final Exam 22% (includes a bonus section)
updated online at Homework 10%
http://canvas.tufts.edu Attendance/quiz 2%

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Total= 100%

All final grades will be based on the following. (Minimum %, letter grade):
93% A 90% A- 86.7% B+ 83.3% B 80% B- 76.7% C+
73.3% C 70% C- 66.7% D+ 63.3% D 60% D- < 60% F

**ANTICIPATED COURSE SCHEDULE:**

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<td>July 2</td>
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| Jul 11| Exam 1: Chapters 1-6 ****************************************** |
| Thurs | 7       | Carbohydrates and Glycobiology (yup, after exam!) |

| Jul 16| 8       | Nucleotides and Nucleic Acids (skip Ch 9) |
| Tues  | 10      | Lipids |
|       | 11      | Membranes and Transport |

| Jul 18| 12      | Biosignaling (yup, lecture BEFORE exam) |
| Thurs | Exam 2: Chapters 7,8,10,11,12 ****************************************** |
Jul 23 13 Bioenergetics- Thermodynamics, Phosphate Transfers
Tues Also read intro material. Good stuff!
14 Glycolysis

Jul 25 15 Glycogen and Glucose use in Animals
Thurs 16 Citric Acid Cycle

Jul 30 Exam 3: Chapters 13-16
Tues 17 Fatty Acid Catabolism (selected essentials)
18 Amino Acid Oxidation Urea Cycle (part 1-2, skim 3)

Aug 1 19-5,10 Ox Phos: Electron Transfer and ATP Synthesis
Thurs 21 Lipid Biosynthesis (selected essentials)

Aug 6 22 Biosynthesis of AA, NT and related molecules
Tues for chapter 22, focus on pathways in the Powerpoint not memorizing all of them! Also, look into glutathione
23 Hormonal Control of Metabolism
(making lots of connections plus supplemental reading on gut microbes)

Aug 8 6-7:00 review session (optional)
Thurs 7-9:00 Final Exam on Chapter 17,18,19,21,22,23, parts covered and...
…see note below about the final exam.

MISCELLANY:

Final exam info:
Note: the final exam will include a handful of key comprehensive questions on things you should remember from earlier in the course, such as pH, myoglobin, hemoglobin, amino acids, pKa, etc. but most of the final will be on the material covered since exam 3. You will be further rewarded for remembering earlier material with 25 points worth of optional comprehensive bonus questions that you should do well on if you have really internalized the material throughout the course. As a student, I always liked bonus questions, don’t you?

General info about exams:
In general, exams are about 80% multiple choice or matching questions, with a some short answers. These questions are not easily guessable—you have to know your stuff. I will keep the number of questions low, so you can focus on really thinking through each question without rushing. Remember Murphy’s Law: "The thing you don’t study will be the thing that is on the exam," so study everything! Study guide sheets for each chapter are posted online to help guide you. Student who perform poorly often think they know the material well, when in fact it is only familiar to them; or it makes sense when they read it but they have not really internalized the
material sufficiently. Spend the time to actually write out responses to the review questions, without using the book, to show you have gained a good understanding. Also, when you do the homework, do it AFTER attempting to really study and learn the material. If you just search for the information to get a good homework score, you will not have learned it as well.

2019 Syllabus v 1.1  modified 6/21/19