BIOC 205: BIOCHEMISTRY I
Fall 2014

Class Time and Location:
Room 108, Terrill Hall
Class Sessions: Mon, Wed, and Fri, 10:40 A.M. - 11:30 A.M.
Review Sessions & Exams: Tue, 7:00 P.M. – 9:45 P.M.

Instructor/Course Director:
Jay Silveira
C413 Given Building
Office Phone: 656-3101
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Office Hours: by appointment

Teaching Assistants:
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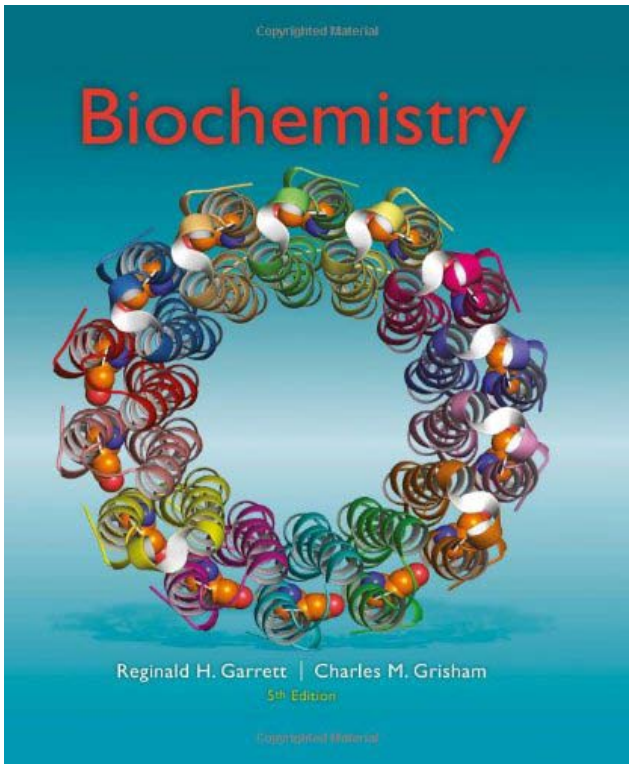
Megan Meuser – Email: mmeuser@uvm.edu

Course Description:
Biochemistry I is the first half of the Biochemistry I/II course series, and it introduces the chemistry of amino acids, proteins, carbohydrates and lipids. Chemical and thermodynamic principles are fundamental to the course, and will be used to understand the bases for enzymes and their mechanisms, as well as the bioenergetics of metabolic processes. This course introduces the core metabolic pathways of glycolysis, the citric acid cycle, and oxidative phosphorylation, while the remainder of the main metabolic pathways in humans, the integration of metabolism, and the structure, function, and metabolism of nucleic acids and information transfer is covered in Biochemistry II.

Prerequisites:
Two semesters of organic chemistry (CHEM 141/143 and CHEM 142/144) are required.



Textbook:
Biochemistry, 5th Edition, by R.H. Garrett & C. M. Griffin, 2013, Brooks/Cole, Cengage Learning, Belmont., CA, ISBN # 978-1-133-10629-3.

Textbook Reserve:
Two hardcover copies of the textbook are available on two-hour reserve in the Bailey/Howe Library.

Textbook Supplement:
We will be using UVM Blackboard (http://bb.uvm.edu) with this course. Copies of lecture slides and other handout material, as well as audio recordings of the lectures and review sessions will be available in the "Course Materials" section of Blackboard in individual folders organized by date. The course calendar and this introductory sheet, and any other relevant course information will be available in the "Course Information" section.

Evaluations and Grading:

The final grade for the course will be determined by the University percentage grade system shown in the table below.

Percentage	Grade	Grade Points
97 - 100	A+	4.00
93 - 96	A	4.00
90 - 92	A-	3.67
87 - 89	B+	3.33
83 - 86	B	3.00
80 - 82	B-	2.67
77 - 79	C+	2.33
73 - 76	C	2.00
70 - 72	C-	1.67
67 - 69	D+	1.33
63 - 66	D	1.00
60 - 62	D-	0.67
0 - 59	F	0.00

Participation & Preparation (10%): Class attendance is not taken in this course, but the iClicker system will be used to assess students' participation and preparation. At the start of each class, we'll have a question related to the assigned textbook material that students should have read to prepare for the lecture (see the course calendar for the assigned reading). Students will earn one point just for being present and submitting a response, and a second point will be earned for answering the question correctly. Additional clicker questions may be asked throughout the lecture, but these are generally in the interest of class interactivity and comprehension assessment, not for earning points. We will also have some occasional "written" daily questions on index cards (such as for drawing chemical structures), and these will also be incorporated into the credit for this section of the course.

Problem Sets (10%): Working problems and thinking about the material consistently is one of the best paths toward mastering biochemistry, so to ensure that students have ample opportunity to work problems in the course and earn points for doing it, graded problem sets will be assigned each week. These problem sets will be available on Blackboard each Friday, and paper copies of the completed problem sets will be due the following Friday at the beginning of class. The problem sets will typically contain two to four questions, and one of them will be selected for grading by the teaching assistants following whatever rubric and scoring they decide is appropriate for that question. *You can use any and all resources for completing these problem sets, including your classmates.* So indeed you may work on these problem sets together, however, each individual must turn in their own copy of the completed problem sets, not photocopies of their classmates' work. While simply copying over your classmates' answers for the problem sets and handing them in is possible, and indeed even permitted, this is obviously not the recommended approach to the assignment. Since these questions, or more likely variations of them, are going to be found on the exams, it behooves one to actually work and understand the problems to ensure preparation for the exams. Note that there are also recommended problems from the book provided for each session on the course calendar. Although these are not required, they again are likely to be similar to problems found on the exams, so it is again very helpful to work these problems. The teaching assistants will be available to help you with these problems in the evening review sessions and during their office hours.

Exams (80%): The remaining 80% of one's course grade will be obtained from the four examinations given at roughly equal intervals throughout the semester (see the course calendar for dates). The exams are not specifically cumulative, but there will be concepts covered throughout the course that will be built upon in subsequent sections, so there is a cumulative nature to each of the exams. And, if students perform poorly on a certain question from a previous exam, it may come up again on a subsequent exam. Thus, *it is important to go over your exam and make sure you understand what you got wrong and why*, so that you can answer it correctly if asked again. While the fourth exam will certainly focus on the metabolism covered in the last quarter of the course, it will also have some cumulative concepts and other integrated information. It will be the most cumulative of all the exams, so it has also been labeled as the "Final".

Overall Grading: To determine the overall grade for the course, the three main assessment sections above will be broken down as follows:

Participation & Preparation	10%
Problem Sets	10%
Exam 1	18%
Exam 2	16%
Exam 3	18%
Exam 4 (Final)	28%
Total	100%

The weighting of the percentages for each exam is initially broken down by the number of lectures and amount of content in that exam; however, it is further adjusted by progressively weighting the exams higher as the course proceeds. This process reduces the weight on early exams while the students are becoming familiar with the exam format, and increases the weight of later exams, at which point the students should be well versed in the instructor's style and expectations.

Participation, Preparation, and Problem Set Grading: Although these sections of the course are offered to help students keep up a consistent pace of learning, there are also here to offer relief from assessment by examinations only. They are for the students' benefit, and as such, there is leeway in the scoring - one does not need to earn all the points in either of these sections to receive the full 10% credit. The scores for the Participation/Preparation and Problem Set sections of the course will each be calculated individually according to the rubric below.

% of available points earned	*% added to course*
80-100	10%
70-79.9	9%
60-69.9	7%
50-59.9	5%
40-49.9	3%
30-39.9	2%
0-29.9	1%

Because we know that students have a number of obligations such as interviews, professional meetings, family emergencies, etc. the rubric is designed to allow students to miss a certain number of classes or problem sets without any penalty. I would still appreciate knowing if you have to miss class, because at the end of the semester, if a student is on the edge of getting a certain amount of points, a demonstration that they have made an effort to be conscientious in their participation and assignments can be helpful in making a decision on a close score.

Extra Credit: Opportunities for extra credit may come up throughout the course in the form of extra questions on exams, extra clicker questions, or other avenues.

Rules for use of iClickers and portable electronic devices:

Each student is expected to enter their own response using their registered iClicker remote or mobile device with iClicker Go. If students are found entering responses using their classmates' remotes or mobile devices, each student will lose ALL Participation & Preparation points for the semester. Students may use electronic devices such as laptops and tablets in class for taking notes if they wish, and electronic PDF copies of the day's slides will be available by the start of each class session. The use of portable electronic devices in class for non-class activities is discouraged, however, as adults, you will be allowed to make your own decisions with regard to the investment of your time, and your ability to multi task and effectively focus on the material being delivered. Although we will not be specifically policing the use of electronic devices for non-class activity, one's ability to take in the material and engage in class activity certainly goes down with other distractions, and any disruption of class due to the use of electronic devices will not be tolerated.

Lecture Slides and Lecture Audio:
Paper copies of the lecture slides will be provided for each class period – these slides will lack some information so that you can answer questions and make your own notes on your slides during lecture. Full versions of the slides with all the material and notes that the instructor has added will be available on Blackboard after class. The audio from each lecture will be recorded in mp3 format and this will also be available on Blackboard after class. These audio files are not meant to be a replacement for coming to lecture! They are meant for those who are auditory learners, those that would like to listen to the lecture again and refine their notes, those that miss class, or those that want to use it in any way that enhances their understanding of the material. Please note that while we try to record every lecture, it is not an automated process, so we may forget and there can be technical difficulties. It's possible that a lecture may not get recorded for various reasons, so don't rely on them as a substitute for attending lecture.

Review Sessions:
Review sessions will be held by the teaching assistants in every Tuesday evening session in which there is not an exam. During these sessions, they can work book problems, review problems from the problem sets, daily clicker questions, or exams, provide general review, or engage in other activities to help students with the course material. We will also make an effort to record the audio from these sessions as deemed appropriate by the teaching assistants.

Academic Integrity:
With respect to examinations, the use of iClickers, and any relevant course activities, we tightly adhere to the University's policy on academic integrity. Please review it at:
http://www.uvm.edu/~uvmppg/ppg/student/acadintegrity.pdf

Missed Classes and Exams: Any student who will miss an exam must contact the instructor BEFORE the exam is scheduled to begin. If this is done, a make-up exam can often be arranged. If the instructor is not contacted by the time the exam begins, an excuse from your Dean's office or other documentation will likely be required. Students are expected to attend all regularly scheduled classes, except for those occasions warranting an excused absence under the University of Vermont Attendance Policy.[1] For the specific cases of absence indicated below, students should make arrangements with their instructor to make up missed work:

Illness: Students need to submit appropriate documentation from the Center for Health and Wellbeing or another medical professional when exams are missed due to illness. This documentation needs to be presented to the Instructor as soon as possible, and no later than one week following the absence.

Religious Holidays: Students should submit to their instructor in writing their documented religious holiday schedule for the semester by the end of the second full week of classes.

Athletic Academic Conflicts: A "Notice of Class Absence Due to Competition" memo should be submitted by the end of the second full week of classes.

Other absences may be excused on a case-by-case basis.

Grade Appeals: Adjustments in exam scores must be made within one week following the release of the grades. With regard to appeals on overall course grades, students should contact the instructor as soon as possible, and no later than the tenth day of instruction of the semester following the assignment of the grade in question, as per the University of Vermont's policy:

http://www.uvm.edu/~uvmppg/ppg/student/gradeappeals.pdf

1 http://www.uvm.edu/academics/catalogue2013-14/?Page=allpolicies.php&SM=policymenu.html&category=academic_policies&policy=Rights%20and%20Responsibilities%20of%20Undergraduate%20Students

BIOC 205 - Biochemistry I - Course Calendar - Fall 2014

Lectures (Terrill Hall, Room 108): Mon/Wed/Fri @ 10:40 A.M. – 11:30 A.M.
Review sessions and Exams (Terrill Hall, Room 108): Tue @ 7:00 P.M. – 9:45 P.M.
Course Director/Instructor: Jay Silveira
Teaching Assistants: Nikolas Moring, Addi von Eynern, & Megan Meuser
Textbook: Garrett & Grisham Biochemistry, 5th Edition

Date	Lecture	Topic	Textbook Reading	Recommended Problems
8/25 (M)	1	Introduction / Biomolecules	1.2-1.3 (pp. 4-10)	Ch 1: 5a-d
8/27 (W)	2	Bonding	1.4 (pp.10-17)	Ch 1: 7-10
8/29 (F)	3	Water	2.1 (pp. 30-37)	
9/1 (M)		LABOR DAY – NO CLASS		
9/3 (W)	4	pH	2.2 (pp. 37-43)	Ch 2: 1,3-8
9/5 (F)	5	Buffers	2.3 (pp. 43-47)	Ch 2: 10,13,16,21,23
9/8 (M)	6	Amino Acids Overview	4.1 (pp. 77-78) 4.3-4.6 (pp. 86-93)	Ch 4: 13
9/10 (W)	7	The Amino Acids Part I	4.1-4.2 (pp.79-86)	
9/12 (F)	8	The Amino Acids Part II	4.1-4.2 (pp.79-86)	Ch 4: 2,4-9,14,16,18,19
9/15 (M)	9	Proteins – 1º Structure	4.7 (pp. 93-97) 5.1 (pp. 101-105)	Ch 4: 15
9/17 (W)	10	Proteins – 2º Structure	6.1-6.3 (pp. 141-153)	Ch 6: 1,4,8,9
9/19 (F)	11	Proteins – 3º Structure	6.4 (pp. 153-180)	Ch 6: 10,11
9/22 (M)	12	Proteins – 4º Structure	6.5 (pp. 180-188)	Ch 5: 1
9/23 (T)		**EXAM 1 (Lectures 1-12)**	**7:00 P.M. – 9:45 P.M. Terrill 108**	
9/24 (W)	13	Protein Purification	5.2 (pp. 105-111)	Ch 6: 7
9/26 (F)	14	Protein Analysis	5.3-5.4 (pp. 112-123)	Ch 5: 2-5
9/29 (M)	15	Enzyme Kinetics	13.1-13.2 (pp.407-414) 13.6 (pp.435-436)	
10/1 (W)	16	Michaelis-Menten	13.3 (pp. 414-423	Ch 13: 1-3,9-12,16
10/3 (F)	17	Inhibition of Enzymes	13.4 (pp. 423-429)	Ch 13: 4,5,7
10/6 (M)	18	Regulation of Enzymes	15.1-15.4 (pp. 481-492) S.F. (pp. 497-509)	Ch 15: 1,2,7,10,12,15
10/8 (W)	19	Enzyme Mechanisms	13.5 (pp. 429-435)	
10/10 (F)	20	Catalytic Mechanisms I	14.1-14.5 (pp. 447-462)	Ch 14: 11-18
10/13 (M)	21	Catalytic Mechanisms II	14.6 (pp. 463-476)	Ch 14: 1,3,5,9,11
10/14 (T)		**EXAM 2 (Lectures 13-21)**	**7:00 P.M. – 9:45 P.M. Terrill 108**	
10/15 (W)	22	Monosaccharides	7.1-7.2 (pp. 193-204)	Ch 7: 1,5
10/17 (F)	23	Polysaccharides	7.3-7.4 (pp. 204-217)	Ch 7: 4,14,17,18
10/20 (M)	24	Lipids	8.1-8.7 (pp. 233-249)	Ch 8: 2-6
10/22 (W)	25	Thermodynamics – Laws & ΔG	3.1-3.4 (pp. 51-59)	Ch 14: 10, Ch 3: 1,3,5,6,15
10/24 (F)	26	ATP Hydrolysis	3.5-3.8 (pp. 59-70	Ch 3: 8, 10,11
10/27 (M)	27	Metabolism Overview I	17.1-17.2 (pp.551-557)	Ch 17: 1-3
10/29 (W)	28	Metabolism Overview II	17.3 (pp.557-565)	Ch 17,4-9,12,15
10/31 (F)	29	Introduction to Glycolysis	18.1-18.2 (pp. 577-580) 18.5 (pp. 595-598)	
11/3 (M)	30	Reactions of Glycolysis I	18.3 (pp. 580-588)	
11/4 (T)		**EXAM 3 (Lectures 22-28)**	**7:00 P.M. – 9:45 P.M. Terrill 108**	
11/5 (W)	31	Reactions of Glycolysis II	18.4 (pp. 588-595)	Ch 18: 1-5,7-9,11-13,15-17,21
11/7 (F)	32	Pyruvate Dehydrogenase	19.1-19.2 (pp. 609-618)	Ch 19: 4,9
11/10 (M)	33	Citric Acid Cycle Reactions	19.3-19.4 (pp. 618-625)	Ch 19: 1,7,10,16,17
11/12 (W)	34	Citric Acid Cycle Integration	19.5-19.7 (pp. 625-631)	
11/14 (F)	35	Citric Acid Cycle Regulation	19.8 (pp. 632-635)	Ch 19: 21
11/17 (M)	36	Free Energy & Redox Reactions	3.9 (pp. 70-73)	Ch 20: 1,2
11/19 (W)	37	Electron Transport Chain I	20.1-20.2 (pp. 643-651)	
11/21 (F)	38	Electron Transport Chain II	20.2-20.3 (pp. 652-661)	Ch 20: 7,14,15,18
11/24 (M)		THANKSGIVING HOLIDAY		
11/26 (W)		THANKSGIVING HOLIDAY		
11/28 (F)		THANKSGIVING HOLIDAY		
12/1 (M)	39	ATP Synthase	20.4 (pp. 661-670)	Ch 20: 5,6,8-13,17,20
12/3 (W)	40	Ox Phos (Course Evals)	20.5-20.6 (pp. 670-674)	
12/5 (F)		**EXAM 4 (Lectures 29-40)**	**7:30 A.M. – 10:15 A.M. Terrill 108**	