

# BIOCHEMISTRY I

## Chem 4600

Fall 2016

Prerequisites:	Chem <b>1212K</b> , 2400, <b>3410</b> ( <i>grade of C or better in Organic II</i> )
Instructor:	<b>Dr. Victoria Mariani</b> , 214 Courtland North, Tel. (404) 413-5542, <a href="mailto:vmariani@gsu.edu">vmariani@gsu.edu</a>
Lecture:	<b>MWF 5:30 pm – 7:00 pm, (5-credit hour course) LS 101</b>
Optional Tutorial Sessions	<b><u>Randomly after class approximately 7:00 – 7:45 pm</u></b> The instructor will be available in the classroom, 1 time/week for review sessions to answer questions on current material. Times and location subject to change.
Strongly Recommended	<b><i>This is the best time to ask questions on specific homework problems and lecture topics.</i></b> Regularly work problems at home, come frequently with questions, and improve your understanding and skills in solving biochemistry problems.
Office Hours:	<b>TBA 216 Courtland North.</b> Instructor will be available to meet with students individually during office hours. <b><u>Office Hours are suspended the day of the Exam.</u></b> No questions will be answered on the day of exams.
Text (Required):  <i>You can use either the 7<sup>th</sup>, or 8<sup>th</sup> Edition</i>	<b><u>Textbook (required):</u></b> <b><i>Biochemistry, 8th Ed.</i></b> , Berg, J.M.; Tymoczko, J.L.; Gatto, G.; Stryer, L., (2012), W.H. Freeman: New York, NY. [ISBN 1-4641-2610-0 <i>Hardcover</i> or 1-4641-8801-7 <i>Looseleaf</i> ] <b>Or</b> <b><i>Biochemistry, 7th Ed.</i></b> , Berg, J.M.; Tymoczko, J.L.; Stryer, L., (2012), W.H. Freeman: New York, NY. [ISBN 1-4292-2936-5 <i>Hardcover</i> or ISBN 1-4292-7396-8 <i>Looseleaf</i> ] <b><u>Workbook (strongly recommended):</u></b> <b><i>Biochemistry Student Companion, 7th Ed.</i></b> , Gumpert, R.I.; Deis, F.H.; Gerber, N.C.; Koeppe, R.E., (2012), W.H. Freeman: New York, NY. [ <i>Paperback</i> ]  Includes learning objectives, self-assessment problems with solutions, and expanded solutions to end-of-chapter textbook problems
Learning Outcomes:	The course will focus on <b><i>developing an understanding of the biochemical principles and processes that govern the structure, interactions, functions &amp; transformations of biomolecules</i></b> ; this will help students rationalize biochemical facts and solve problems. Upon successful completion of the course students will have the tools to be able to apply their knowledge of biochemistry to understand the causes of human diseases, as well as applications of biochemistry in medicine, agriculture and the environment.
Course Objectives:	A comprehensive and integrated review of modern biochemistry with emphasis on proteins, enzymes, lipids, carbohydrates and metabolism.  Will examine <b>biomolecular structure-function relationships</b> , concepts of enzyme function, regulation, bioenergetics, metabolism, characterizing biomolecules, as well as organization, transport and signaling in cells.

	<b><u>Principles of ORGANIC MECHANISMS, KINETICS and THERMODYNAMICS will be applied throughout (working knowledge is expected PRIOR to taking biochemistry).</u></b>
Grading for undergraduate Students:	<p><b>There will be four class exams worth 40 points each.</b> The class exam with the lowest grade will be dropped before totaling the remaining <b>possible points out of 200.</b></p> <p><b>There will be a comprehensive final exam (Dec 12 4:15pm) worth 60 points. The final exam is mandatory</b> and it will not be dropped under any circumstance.</p> <p><b>Quizzes will collectively be worth 20 points.</b> There will be 5 quizzes and the lowest quiz grade will be dropped. This will make 4 quizzes for a total of 80 points. <b>Bonus points are added to quiz total.</b> Quiz Points = divide quiz total points by 4</p> <p><b>Semester Grade = [(sum 3 best class exams + quiz points + final exam) / 200] * 100</b></p>
Grading Scale:	<b>If you get this % you are guaranteed: A+ 97% A 93% A- 89% B+ 85% B 80% B- 76% C+ 71% C 65% C- 59% D 50% F &lt;50%</b>
Exams:	<p style="text-align: center;"><b><u>COURSE POLICIES</u></b></p> <p><b>1) NO MAKE-UP or RESCHEDULING OF EXAMS</b> (before or after exam date &amp; time) will be carried out. If you miss a class exam for any reason, that is your dropped grade. The final exam must be taken.</p> <p>2) The Instructor reserves the right to seat or move students during exams.</p> <p>3) Students are required to show (and leave) their student identification on the desk in order to take and submit an exam. <b>Exams will be collected and <u>graded ONLY if a student picture I.D. is shown (GSU ID card or driver's license).</u></b></p> <p><b>4) <u>Cell phones, calculators, ipods, iphones and all other electronic devices are NOT allowed out on classroom tables during exams.</u></b> Cell phones and anything with an on/off switch must be <b>OFF</b> during all exams and during class. If phones ring during an exam, points may be deducted.</p> <p>5) Class notes posted on "desire to learn" website.</p> <p>6) Students are responsible for checking their exam scores posted on course website. <b>Scantrons can be viewed in my office</b> and any discrepancies need to be addressed within <b>1 week after grades have been posted.</b> Changes will <b>not</b> be made on website but in my grade book. No changes will be made at the end of the semester.</p> <p><b>7) Oct 11th is the last day to withdraw from the class and receive a "W".</b>  You are responsible for withdrawing before the deadline if you need to do so. If <b><u>more than one exam is missed for legitimate reasons,</u></b> you should seek a <b><u>hardship withdrawal.</u></b> If you do not withdraw and miss the final exam, or more than one class exam, then zeros will be assigned for these grades.</p> <p>The University requires that faculty members must, on a date after the mid-point of the course to be set by the Provost (or his designee):</p> <ol style="list-style-type: none"> <li>1. Give a WF to all those students who are on their rolls but no longer taking the class</li> <li>2. Report the last day the student attended or turned in an assignment.</li> </ol>
Suggestions for how to do well in	<p style="text-align: center;"><i>Biochemistry cannot be learned overnight, do NOT wait till the end to study.</i></p> <p><b>1) Students are strongly encouraged to <u>download the lecture notes from website before coming to class.</u> <u>Attendance at all classes is crucial to the student's</u></b></p>

Biochemistry:	<p><b><u>success in this course.</u></b></p> <p><b>2) Students are strongly encouraged to carefully READ and STUDY the day's topic in the lecture notes and textbook BEFORE coming to class.</b></p> <p><b>3) Specific problems will be assigned for each chapter from the <u>workbook self-test questions &amp; problems</u>, and the <u>text end-of-chapter problems</u>.</b> It is recommended that problems be tried in this sequence for each chapter. Solutions to all problems (including those in text) are available in the workbook. <b>Practice exams</b> will also be posted for each class exam.</p> <p style="text-align: center;"><b><u>The exam is not a good place to do problems for the first time!</u></b></p> <p><b>4) Students are strongly encouraged to keep up with the material, read the text, review the notes, and do homework problems regularly after class and prior to the next class, as well as attend reviews often and ask questions.</b></p> <p><b><u>Material from each class is often used in next class, so STUDY biochemistry DAILY!</u></b></p> <p><b>5) Weekly quizzes</b> will be assigned <b>online, starting on Fridays about 5:00pm</b>; quizzes will be due <b>before the start of the next class</b> meeting (Monday approx. <b>2:45pm</b>).</p> <p><b>6) Announcements</b> will be posted on course website, so please check on a daily basis, and between class meetings.</p>
Cheating:	<p>All tests and quizzes taken must represent your individual, unaided efforts. To <b>receive or offer</b> information during an examination is cheating. The use of unauthorized supplementary materials or any electronic device during tests is also cheating.</p> <p><b><u>A student who cheats on an exam will receive a zero for that exam, which cannot be dropped as the lowest grade.</u></b> Any suspected offenses may also be referred to the Department Chair for appropriate action.</p> <p>The Department of Chemistry follows the university policy on academic honesty published in the "Faculty Affairs Handbook" and the "On Campus: The Undergraduate Co-Curricular Affairs Handbook."</p>

## TENTATIVE CLASS SCHEDULE (Subject to change)

Dates	Chapters	Topics Covered
<b>Aug 22 – Sept 14</b>	1.1, 1.3, 2.1 -2.6, 4.1 -4.3, 3.1 -3.2, 7.1- 7.2,	Review: intermolecular interactions, acid/base chemistry (buffers, pK <sub>a</sub> ), aqueous biochemistry, amino acid structures, properties and reactivity, pI and peptide charge, peptide bonds, 3D protein 2°, 3° and 4° structure, thermodynamics of protein folding (hydrophobic effect), protein purification, separation techniques, DNA structure and function, hemoglobin structure and oxygen transport, Hemoglobin cooperativity & allostery
<b>Sept 16</b>		<b>Exam 1</b>
<b>Sept 19 – Oct 5</b>	8.1 - 8.6, 8-ap 9.1, 10.1 - 10.4, 11.1- 11.2,	enzymes, classes of enzymatic reactions, Michaelis-Menten kinetics, enzyme Inhibition, catalytic strategies, Carboxypepsidase and Chymotrypsin Mechanism, enzyme regulation, allosteric enzymes, carbohydrates structure and reactivity
<b>Oct 7</b>		<b>Exam 2</b>
<b>Oct 10 – Nov 2</b>	15.1- 15.3, 16.1 -16.4, 17.1 – 17.4	reactions of metabolism, glycolysis reaction mechanisms, glycolysis regulation, fermentation reaction, gluconeogenesis overview, pentose phosphate pathway overview, transition reaction and regulation, citric acid cycle reactions and mechanisms, citric acid cycle regulation
<b>Nov 4</b>		<b>Exam 3</b>
<b>Nov 7 – Nov 30</b>	18.1 – 18.6, 21.1 – 21.5, 22.1 – 22.2, 13.2, 14.1, 14.2	biochemical oxidation-reduction reactions (redox review), electron transport chain & proton pumping, proton pumping & oxidative phosphorylation, regulation of ETC, membrane transport and shuttles, glycogen breakdown & regulation, glycogen synthesis and regulation, overview fatty acid catabolism, signal transduction: gPCRs and phosphorylation cascades
<b>Dec 2</b>		<b>Exam 4</b>
<b>Dec 5</b>		Review
<b>Dec 12</b>		<b>Final Exam 4:15</b>

## TENTATIVE QUIZ SCHEDULE (Subject to change)

Quiz no.	Date opened @~7PM	Date due @ ~5PM
1	Friday Sept 9	Monday Sept 12
2	Friday Sept 30	Monday Oct 3
3	Friday Oct 28	Monday Oct 31
4	Friday Nov 18	Monday Nov 28
5	Friday Dec 2	Monday Dec 12

## Exam Dates (Subject to change)

<u>no.</u>	<u>Date</u>
1	Friday Sept 16
2	Friday Oct 7
3	Friday Nov 4
4	Friday Dec 2
F	Monday Dec 12