

BIOCHEMISTRY I
Chem 4600 (CRN 85797) / HON Chem 4600 (CRN 89211)
Fall 2015

Prerequisites:	<i>Required: Chem 1212K, 2400, 3410 (grade of C or higher in Organic II)</i> <i>Recommended: Biol 3800 (Molecular Cell Biology)</i>
Instructor:	Dr. Gigi B. Ray, 212 Courtland North, Tel. (404) 413-5540, gbray@gsu.edu
Lecture:	MWF 8:30 am – 10:00 am, Library South 102 (5-credit hour course) <u>Students are expected to come to class having PREVIEWED topics for that day.</u>
Desire2Learn:	Class notes posted on Desire2Learn as Cross Listed Section: BIOCHEMISTRY I XLS GROUP VW FALL SEMESTER 2015 CO
Optional Weekly Tutorial Sessions Strongly Recommended	<u>Optional Review Session on Mondays 10 – 11 am, in PSC 362 (tentative time/place)</u> The instructor will be available once a week all semester for review sessions to answer questions on current material. <i>This is the best time to ask questions on specific homework problems and lecture topics.</i> Regularly work problems at home, come frequently with questions, and improve your understanding and skills in solving biochemistry problems.
Office Hours:	Mondays 1:00 – 3:00 pm and Wednesdays 12:00 – 3:00 pm in 212 Courtland North Instructor will be available to meet with students individually during office hours. Students must bring their textbook and lecture notes. <i>Students who wish to discuss exam absences or other individual concerns need to schedule an appointment outside of class time during office hours.</i> Office Hours are suspended the day of the Exam. No questions will be answered on the day of exams. Students desiring to discuss course advising, career plans, etc., can request to schedule an appointment outside of office hours.
Text (Required): <i>Homework will be assigned for 7th Edition</i>	<u>Textbook (required):</u> <i>Biochemistry, 7th Ed.</i> , 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>] <u>Workbook (strongly recommended):</u> Includes learning objectives, self-assessment problems with solutions, and expanded solutions to end-of-chapter textbook problems: <i>Biochemistry Student Companion, 7th Ed.</i> , Deis, F.H.; Gerber, N.C.; Gumpert, R.I.; Koeppe, R.E., (2012), W.H. Freeman: New York, NY. [ISBN 1-4292-3115-7 <i>Paperback</i>] 6th or 8th Edition of Textbook and Workbook can be used, but assigned homework question numbers will be different.
Learning Outcomes:	The course will focus on <i>developing an understanding of the biochemical principles and processes that govern the structure, interactions, functions & transformations of biomolecules</i> ; 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:	<p>A comprehensive and integrated review of modern biochemistry with emphasis on proteins, enzymes, nucleic acids, lipids, carbohydrates and metabolism.</p> <p>Will examine biomolecular structure-function relationships, concepts of enzyme function, regulation, bioenergetics, metabolism, gene expression, and characterizing biomolecules. Organization, transport and signaling in cells will also be examined.</p> <p><u>Principles of ORGANIC MECHANISMS, KINETICS and THERMODYNAMICS will be applied throughout (working knowledge is expected PRIOR to taking biochemistry).</u></p>
Grading for Undergraduate Students:	<p>Undergraduates: There will be four class exams worth 40 points each and a comprehensive final exam worth 60 points. The final exam is mandatory and it will not be dropped under any circumstance.</p> <p>Quizzes will collectively be worth 20 points. The lowest 2 quiz grades will be dropped. Each quiz has 10 questions. [Quiz Points = divide sum of best 8 quiz scores by 4]</p> <p>The class exam with the lowest grade will be dropped before totaling the remaining possible points out of 200 (this is the Undergraduate 100%).</p> <p>Semester Grade = [(sum 3 best class exams + quiz points + final exam) / 200] * 100</p>
Grading Scale:	<p>A+ 97% A 90% A- 87% B+ 84% B 80% B- 76% C+ 71% C 65%</p> <p>C- 59% D 50% F <50%</p>
Exams:	<p style="text-align: center;"><u>COURSE POLICIES</u></p> <p><u>1) NO MAKE-UP or RESCHEDULING OF EXAMS (before or after exam date & time) will be carried out under ANY CIRCUMSTANCE.</u></p> <p><u>If you miss a class exam for ANY reason, that is your dropped grade.</u></p> <p><u>The Final Exam must be taken Wed Dec 9th at 8:00 – 10:30 am.</u></p> <p>2) Exams and quizzes may cover material assigned in textbook or in PowerPoint notes, but not necessarily covered in class. Students are responsible for knowing all assigned reading material and homework problems.</p> <p>3) The Instructor reserves the right to seat or move students during exams.</p> <p>4) Students are <u>required to show (and leave) their student identification on the desk in order to take and submit an exam.</u> Exams will be collected and <u>graded ONLY if a student picture I.D. is shown (GSU ID card or driver's license).</u></p> <p>5) <u>Cell phones, calculators, ipods, iphones, tablets, laptops and all other electronic devices are NOT allowed out on classroom tables during exams.</u> Cell phones and anything with an on/off switch must be <u>OFF</u> during all exams and silent during class. If a phone rings during an exam, points may be deducted.</p> <p>6) <u>Students are responsible for checking their exam scores posted on Desire2Learn Scantrons can be viewed during scheduled times in instructor's office.</u> <u>Any discrepancies need to be addressed within 1 week after grades have been posted on Desire2Learn.</u> Changes will not be made at the end of the semester.</p> <p>7) <u>Tuesday Oct 13th is the last day to withdraw from the class and receive a "W".</u> You are responsible for withdrawing before the deadline if you need to do so. If <u>more than one exam is missed for legitimate reasons</u>, you should seek a hardship withdrawal or an incomplete. If you do not withdraw and miss the final exam, or miss 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"> 1. Give a WF to all those students who are on their rolls but no longer taking the class 2. Report the last day the student attended or turned in an assignment.

<p>Suggestions for how to do well in Biochemistry:</p>	<p><u>Biochemistry cannot be learned overnight, do NOT wait till the end to study.</u></p> <p>1) Students are strongly encouraged to download the lecture notes from uLearn before coming to class. <u>Attendance at all classes is crucial to the student's success in this course.</u> Answers to blanks in notes will ONLY be available during class.</p> <p>2) PREVIEW: students are strongly encouraged to carefully READ and STUDY the day's topic in the lecture notes and textbook BEFORE coming to class.</p> <p>3) Chapter outlines will be posted listing text topics and reading. Specific problems will be assigned for each chapter from the <u>workbook self-test questions & problems</u>, and the <u>text end-of-chapter problems</u>. It is recommended that problems be tried in this sequence for each chapter. Solutions to all problems (including those in textbook) are available in the workbook. Practice exams will also be posted for each class exam.</p> <p style="text-align: center;"><u>The exam is not a good place to do problems for the first time!</u></p> <p>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 REVIEW SESSIONS often & ASK QUESTIONS.</p> <p><u>Material from each class is often used in next class, so STUDY biochemistry DAILY!</u></p> <p>5) <u>Weekly quizzes</u> will be assigned online using Desire2Learn, starting on Fridays; quizzes will be due before the start of the next class meeting (Monday).</p> <p>6) Announcements will be posted on Desire2Learn, so please check on a daily basis, and between class meetings.</p>
<p>Cheating:</p>	<p>All tests and quizzes taken must represent your individual, unaided effort. To receive or offer information during an examination is cheating. The use of unauthorized supplementary materials or any electronic device during tests is also cheating.</p> <p><u>A student who cheats on an exam will receive a zero for that exam, which cannot be dropped as the lowest grade.</u> 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) * indicates after class REVIEW Q = start of quiz

Date	Day	Chapter	<i>Amino Acids, Proteins and Hemoglobin Function</i>	Lecture No.
Aug 24	M*	1	Introduction to Course, Review: Intermolecular Interactions and Acid-Base Chemistry (pK _a)	1
Aug 26	W	1	Aqueous Biochemistry (Buffers) and Amino Acids	2
Aug 28 Q1	F	2	Amino Acid Structures, Properties (pI) and Reactivity	3
Aug 31	M*	2	Peptide Bonds and Secondary Structure	4
Sept 2	W	2	3D Protein Structure (3° & 4°)	5
Sept 4 Q2	F	7	Hemoglobin Structure & Oxygen Transport	6
Sept 7	M		Labor Day Holiday, no class	
Sept 9	W*	7	Hemoglobin Cooperativity	7
Sept 11 Q3	F	7	Hemoglobin Allostery: Fine Tuning O ₂ Binding Affinity	8
Sept 14	M*	3	Protein Purification & Protein Folding	9
Sept 16	W		Exam 1 (Material from Chapters 1, 2, 7, 3)	10

TENTATIVE CLASS SCHEDULE (Subject to change) * indicates after class REVIEW Q = start of quiz

Date	Day	Chapter	Enzymes: Kinetics, Catalytic Mechanisms and Regulation	Lecture
Sept 18	F	3	Protein Sequencing	11
Sept 21	M*	8	Introduction to Enzymes	12
Sept 23	W	8	Enzymes: Michaelis-Menten Kinetics	13
Sept 25 Q4	F	8	Enzymes: Inhibition	14
Sept 28	M*	9	Catalytic Strategies and Serine Proteases	15
Sept 30	W	9	Chymotrypsin Mechanism and Specificity	16
Oct 2 Q5	F	10	Enzymes: Regulation	17
Oct 5	M*	9	Chymotrypsin Regulation & Carbonic Anhydrase Mechanism	18
Oct 7	W		Exam 2 (Material from Chapters 8, 9, 10, 3)	19
			Carbohydrate Metabolism: Glycolysis and Glycogen	
Oct 9	F	11	Carbohydrates: Structure and Reactivity	20
Oct 12	M*	11, 15	Complex Carbohydrates, Energy and Metabolism	21
Oct 13	T		Last day to Withdraw and possibly receive a W	
Oct 14	W	15	Bioenergetics	22
Oct 16 Q6	F	15, 16	Reactions of Metabolism and Glycolysis	23
Oct 19	M*	16	Glycolysis Reactions and Enzyme Mechanisms	24
Oct 21	W	16	Glycolysis Reactions and Regulation	25
Oct 23 Q7	F	11, 21	Polysaccharides and Introduction to Glycogen Metabolism	26
Oct 26	M*	16	Gluconeogenesis and Metabolism Review	27
Oct 28	W		Exam 3 (Material from Chapters 10, 11, 15, 16, 21)	28
			Energy Metabolism: Citric Acid Cycle, ATP & Fatty Acids	
Oct 30	F	17	Pyruvate Dehydrogenase Complex and Citric Acid Cycle	29
Nov 2	M*	17	Citric Acid Cycle (TCA)	30
Nov 4	W	12, 13	Membrane Structure and Transport Across Membranes	31
Nov 6 Q8	F	18	Biochemical Oxidation-Reduction Reactions	32
Nov 9	M*	18	Electron Transport Chain: Q-cycle & Proton Pumping	33
Nov 11	W	18	Oxygen Reduction Coupled to ATP Synthesis	34
Nov 13 Q9	F	22	Introduction to Fatty Acid Catabolism: Beta Oxidation	35
Nov 16	M*	17, 16	Energy Output and GLUT Transporters	36
Nov 18	W	14	Signal Transduction: Hormonal Regulation of Metabolism	37
Nov 20	F		Exam 4 (Material from Chapters 17, 18, 22, 12, 13, 14)	38
Nov 23-27	M – F		Thanksgiving Break, no class	
			DNA Replication & Gene Expression, Integration of Metabolism	
Nov 30	M*	4	DNA Structure and Function	39
Dec 2	W*	28	DNA Replication and Gene Expression	40
Dec 4 Q10	F	30	Protein Synthesis: Translation in Prokaryotes	41
Dec 7	M*		Integration of Metabolism & Final Exam Review	42
Dec 8	**T		Optional Final Exam Review (time & location TBA)	**optional
Dec 9	W		Cumulative Final Exam – All Chapters Covered Time: 8:00 am - 10:30 am (includes Chapters 4, 28, 30)	