

BIOCHEMISTRY II

Chem 6610 (CRN 18334), Chem 4610 (CRN 18333), Biol 4930 (18335)

Spring 2014

| | |
|---|---|
| Prerequisites: | Chem 1212K, 3410, 4600 (<i>grade of C or better in Organic II and Biochemistry I</i>) |
| Instructor: | Dr. Gigi B. Ray, 212 Courtland North, Tel. (404) 413-5540, gbray@gsu.edu |
| Lecture: | MW 4:00 pm – 5:15 pm in 205 Classroom South (3-credit hour course) <u>Students are expected to come to class having READ the material for that day and REVIEWED relevant topics from Biochemistry I</u> |
| Help Sessions Optional Strongly Recommended | <u>Wednesdays after class (5:30 – 6:15 pm) in PSC 362</u> The instructor will be available after class, once a week all semester for review sessions to answer questions on current material. Times and location subject to change. <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: | Wednesdays and Fridays 1:00 – 3:00pm 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 the day before and the day of exams. Students desiring to discuss career plans, etc., can request to schedule an appointment outside office hours. |
| Text (Required): (can use 6 th Ed, but has different page numbers and problems) | <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 Hardcover or ISBN 1-4292-7396-8 Looseleaf] <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> , Gumpert, R.I.; Deis, F.H.; Gerber, N.C.; Koeppe, R.E., (2012), W.H. Freeman: New York, NY. [Paperback] |
| Course Objectives: | A comprehensive and integrated review of modern biochemistry with emphasis on metabolism and biosynthesis of carbohydrates, fatty acids, lipids, amino acids, and nucleotides. Regulation and integration of metabolism will be explored, including signal transduction. DNA replication and recombinant DNA technology will be examined. Molecular basis for human diseases will be discussed, as well as applications of current techniques in biological chemistry. <u>Biochemistry I topics: Structure and Function of Proteins, Carbohydrates, Lipids, and Nucleic Acids, Enzyme Function and Glucose Catabolism, will be applied throughout (working knowledge is expected PRIOR to taking Biochemistry II).</u> |
| Learning Outcomes: | Course will focus on <i>developing an in-depth understanding of biochemical principles and processes that govern the structure, interactions, functions & transformations of biomolecules.</i> Upon successful completion of the course students will have the tools to be able to apply their knowledge of biochemistry to <i>understand the causes of human diseases</i> , as well as <i>applications of biochemistry in medicine and the environment.</i> |

| | |
|---|---|
| <p>Grading for Undergraduate Students: Chem 4610 Biol 4930</p> | <p>Undergraduates: There will be four class exams worth 100 points each and a comprehensive final exam worth 150 points. The final exam is mandatory and it will not be dropped under any circumstance. Exams will be partially multiple choice and partially essay questions.</p> <p>The class exam with the lowest grade will be dropped before totaling the remaining possible points out of 450 (this is 100% for undergraduates).</p> <p>Semester Grade = [(sum 3 best class exams + final exam) / 450] * 100</p> |
| <p>Grading for Graduate Students: Chem 6610</p> | <p>Graduates: There will be four class exams worth 110 points each and a comprehensive final exam worth 170 points. The final exam is mandatory and it will not be dropped under any circumstance. Exams will be partially multiple choice and partially essay questions. Graduate students will have an additional essay question on each exam.</p> <p>The class exam with the lowest grade will be dropped before totaling the remaining possible points out of 500 (this is 100% for graduates).</p> <p>Semester Grade = [(sum 3 best class exams + final exam) / 500] * 100</p> <p>Note: Graduates students need to receive a B or higher for the course to count towards their degree.</p> |
| <p>Grading Scale:</p> | <p>A+ 97% A 90% A- 87% B+ 84% B 80% B- 77% C+ 74% C 70% C- 67% D 60% F <60%</p> |
| <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 carefully READ and STUDY the day's topic in the textbook and lecture notes BEFORE coming to class, as well as reviewing relevant material from Biochemistry I in advance.</p> <p>2) <u>Attendance at all classes is crucial to the student's success in this course.</u> Students are encouraged to download the lecture notes from Desire2Learn before coming to class. Answers to blanks in notes will ONLY be available during class. Some class notes will be given on the board.</p> <p>3) Students are expected to know material covered in Biochemistry I, which will be quickly reviewed rather than discussed in detail. <u>Students are strongly encouraged to review Glycolysis and Citric Acid Cycle at home,</u> since these two pathways have a central role in metabolism. In particular, review text sections 16.1 and 17.2.</p> <p>4) Students are expected to already be familiar with the structure and function of bio-molecules: proteins, carbohydrates, lipids and nucleic acids (in chapters 2, 11, 12, 4), as well as enzymes (chapter 8 and sections 9.1 & 9.2) and bioenergetics (chapter 15).</p> <p>5) Chapter outlines will be posted specifying topics covered from text. 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 with explanations to all problems (including those in text) are available in the workbook.</p> <p style="text-align: center;"><u>The exam is not a good place to do problems for the first time!</u></p> <p>6) 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.</p> <p><u>Material from each class is often used in next class, so STUDY biochemistry DAILY!</u></p> <p>7) Announcements will be posted on Desire2Learn, so please check on a daily basis, and between class meetings.</p> |

| | |
|-----------|---|
| Exams: | <p style="text-align: center;">COURSE POLICIES</p> <p>1) <u>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 Monday May 5th at 1:30 – 4:00 pm.</u></p> <p>2) The Instructor reserves the right to seat or move students during exams.</p> <p>3) Students are <u>required to show (and leave) their student identification on the desk</u> in order to take and submit an exam. Exams will be collected and graded ONLY if a student picture I.D. is shown (GSU ID card or driver's license).</p> <p>4) Cell phones, calculators, ipods, iphones and all other electronic devices are NOT allowed out on classroom tables during exams. Phones must be OFF during all exams and during class. If phones ring during an exam, points may be deducted.</p> <p>5) Class notes for all sections will be posted on Desire2Learn at: BIOCHEMISTRY II XLS GROUP SR SPRING SEMESTER 2014 CO Some class notes will also be given on the board during class.</p> <p>6) <u>Students are responsible for checking their exam scores posted on D2L.</u> Any discrepancies need to be addressed within 1 week after grades have been posted on D2L. Changes will not be made at the end of the semester.</p> <p>7) Tuesday March 4th is the last day to withdraw from the class and receive a "W".</p> <p>You are responsible for withdrawing before the deadline if you need to do so. If more than one exam is missed for legitimate, non-academic reasons, you should seek a hardship withdrawal or an incomplete. 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"> 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. |
| Cheating: | <p>All tests and coursework must represent your individual, unaided efforts. 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> |

BIOCHEMISTRY II : Chem6610/4610/Bio4930 TENTATIVE CLASS SCHEDULE (Subject to change) *REVIEW

| Date | Day | Chapter | <i>Studying Proteins, Immunology, Signal Transduction</i> | No. |
|-----------------|-------------|----------|---|-----------|
| Jan 13 | M | 3 | Introduction to Course, Exploring Proteins (review Protein Structure - Chapter 2 at home) | 1 |
| Jan 15 | W* | 34 | Immunology: Antibodies, MHC, T-cell Receptors | 2 |
| Jan 20 | M | | Martin Luther King Holiday, no class | |
| Jan 22 | W* | 14 | Signal Transduction, G-protein Coupled Receptors (GPCR), Adenylate Cyclase (review Membranes - Chapter 12 at home) | 3 |
| Jan 27 | M | 14 | Receptor Tyrosine Kinase & Insulin, Phosphoinositide Cascade | 4 |
| Jan 29 | W* | 13, 14 | Ion Transport thru Membranes, Ion Channel Linked Receptors | 5 |
| Feb 3 | M | | Exam 1 (Material from Chapters 3, 13, 14, 34) | 6 |
| | | | <i>Carbohydrate Metabolism and Regulation</i> | |
| Feb 5 | W* | 11,15,16 | Carbohydrate Structure, Glycolysis and Bioenergetics (review Chapters 11, 15, and section 16.1 at home) | 7 |
| Feb 10 | M | 16 | Gluconeogenesis, Galactose Metabolism | 8 |
| Feb 12 | W* | 10, 16 | Enzyme Regulation, Allosteric Control of Glucose Metabolism | 9 |
| Feb 17 | M | 21 | Glycogen Metabolism and Regulation | 10 |
| Feb 19 | W* | 20 | Pentose Phosphate Pathway: NADPH, Ribose | 11 |
| Feb 24 | M | 18, 26 | Reactive Oxygen Species (ROS), Cytochrome P450 | 12 |
| Feb 26 | W | | Exam 2 (Material from Chapters 10, 11, 16, 20, 21) | 13 |
| | | | <i>Lipid Metabolism and Regulation</i> | |
| Mar 3 | M | 17 | Pyruvate Dehydrogenase Complex (review Citric Acid Cycle - text section 17.2 at home) | 14 |
| Mar 4 | Tues | | Last day to Withdraw and possibly receive a W | |
| Mar 5 | W* | 17, 18 | Citric Acid Cycle Regulation and Mitochondrial Shuttles | 15 |
| Mar 10 | M | 22 | Fatty Acid Catabolism and Ketone Bodies | 16 |
| Mar 12 | W* | 22 | Fatty Acid Biosynthesis and Regulation | 17 |
| Mar17-21 | M-F | | Spring Break, no class | |
| Mar 24 | M | 26 | Cholesterol Synthesis and Regulation | 18 |
| Mar 26 | W* | 26 | Cholesterol Transport, Bile salts and Steroid Hormones | 19 |
| Mar 31 | M | | Exam 3 (Material from Chapters 17, 18, 22, 26) | 20 |
| | | | <i>Nitrogen Metabolism: Amino Acids, Nucleotides, DNA</i> | |
| Apr 2 | W* | 23 | Protein Turnover, Nitrogen Transport and Urea Cycle | 21 |
| Apr 7 | M | 23 | Amino Acid Catabolism and Regulation | 22 |
| Apr 9 | W* | 24 | Amino Acid Biosynthesis: SAM, and Glutathione | 23 |
| Apr 14 | M | 25 | Nucleotide Biosynthesis and Deoxyribonucleotides (DHFR) | 24 |
| Apr 16 | W* | 4, 28, 5 | DNA Replication, Retroviruses, DNA Sequencing (review DNA structure - Chapter 4 at home) | 25 |
| Apr 21 | M | 5, 9 | Recombinant DNA Technology: PCR, Restriction Enzymes, and Gene Expression | 26 |
| Apr 23 | W | | Exam 4 (Material from Chapters 23, 24, 25, 28, 4, 5) | 27 |
| Apr 28 | M* | 27 | Integration of Metabolism – Diabetes Mellitus Semester Review | 28 |
| Apr 30 | W | | Optional Final Exam Review | |
| May 5 | M | | Biochemistry II – Comprehensive Final Exam Time: 1:30 pm – 4:00 pm | |