San José State University
Chemistry Department
Chem 130B, Biochemistry (II), Section 01, Spring 2016

Course and Contact Information

Instructor: Alberto A. Rascón, Jr., Ph.D.
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Telephone: (408) 924-4969
Email: alberto.rascon@sjsu.edu (preferred means of contact)
Office Hours: Mon. 10:30-11:30, Wed. 10:30-11:30 (or by appointment)
Class Days/Time: Mon./Wed., 8:30-10:10
Classroom: DH 250
Prerequisites: Chem 112B, Chem 130A and Biol 1B (all with grades of “C” or better, “C-” not accepted)

eCampus Course Page

Copies of the course materials such as the green sheet, major assignment handouts, etc... may be obtained by logging on to Canvas at http://www.sjsu.edu/at/ec/canvas/index.html. You are responsible for regularly checking the course page for updates. NOTE: In case website is not functioning properly, materials and announcements will be emailed directly to the students.

Course Description

This is the second of a three-semester course sequence in biochemistry intended to provide a thorough introduction to this discipline. Major topics focus on various aspects of intermediary metabolism, including energetics, regulation, and anabolic and catabolic pathways of carbohydrates, lipids, amino acids and nucleotides. Control of flux of metabolites through the various pathways will be discussed in the context of efficient cellular physiology. Reference will be made throughout to the methodologies used to obtain information about the structure, function and interactions of biomolecules.

Learning Outcomes and Course Goals

Chem 130B covers Program Learning Objective #5 (Chemistry Program Learning Objectives): Demonstrate understanding of core concepts, methods and limits of scientific investigation to effectively solve problems in biochemistry.

The Course Goals for Chem 130B: Students will learn about bioenergetics, the nature of a variety of metabolic pathways, the regulation of these pathways and the mechanisms by which regulation is accomplished. They will also acquire an understanding of the experimental basis by which these mechanisms have been deduced.
Suggested Texts/Readings

Textbook

or


Other Readings
Papers from the scientific literature and educational videos may be suggested for additional information on certain topics.

Library Liaison (Interim)
Ann Agee (ann.agee@sjsu.edu)

Course Requirements

General
SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf.

Attendance Expectations

*NOTE* that University policy F69-24 at http://www.sjsu.edu/senate/docs/F69-24.pdf states that “Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading.”

*Attendance will be taken in the first three class meetings*, and although attendance will not be used as a criterion for grading, you are expected to attend class regularly. In class questions and activities will be given in order to help with understanding of the material.

Required Knowledge
In taking the course, the assumption is made that you have a comfortable understanding and knowledge of topics covered in Biochemistry I (Chem 130A), such as:

- the structures, properties of the 20 standard amino acids
- the structural features of proteins
- the basic structure-function relationship in proteins
- drawing and interpreting enzyme mechanisms
- basic enzyme Michaelis-Menten kinetics
- general features of metabolic pathways

Assignments and Grading Policy

In-Class Exercises
We will be doing small-group exercises based on the POGIL (Process Oriented Guided Inquiry Learning)
approach throughout the semester. The number of POGIL exercises is not set, yet, but the POGIL dates will be announced beforehand. These POGIL sessions are designed to promote and develop critical and logical thinking skills about the subject matter, as well as help with discussion and communication skills between students. The POGIL sessions will not be graded individually but will be used primarily as an assessment tool. To receive credit for the POGIL sessions, each student will have to: 1) be in attendance on the date(s) of the POGIL session; 2) actively participate in the POGIL session; and 3) submit any required documentation.

Homework/Assigned Problems
There are no assigned homework problems, but students are urged to work on problems that are suggested by the instructor. A large amount of cumulative material is covered in this course. It is imperative that each student stay up to date, read, and re-read the sections of the text on which the class lectures are based. Please do not be afraid to visit the instructor during office hours if you are having trouble with any of the concepts covered in lecture.

Exams
The midterm and final exams will be taken in class. THERE ARE NO MAKE-UP EXAMS. The final exam must be taken to pass the course. Any form of cheating is a serious violation of SJSU’s Academic Integrity Policy (see below). A student caught cheating on an exam will receive a zero score and may be subject to further administrative sanctions, including probation, suspension, or expulsion. No one may leave the room during an exam (except for an unforeseen emergency). No one may answer a phone call during an exam. If you suspect that someone is copying off of you during an exam, please ask the instructor to be moved to a different seat immediately.

Four exams are scheduled for the semester. The format of each exam will generally be a combination of multiple choice, problem solving and short/essay questions. Each of the semester exams will consist of material covered after each fourth or fifth week (see Course Schedule below). Important to note: The exams will not be comprehensive, but material from each section builds on previous covered material. The raw score for each exam will be the final score for that exam. However, the instructor reserves the right to scale the scores if the class average is reasonably far from the C+/B- range.

The final course grade will be determined as follows:

<table>
<thead>
<tr>
<th>Percent Average</th>
<th>Final Course Grade</th>
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<tbody>
<tr>
<td>97-100</td>
<td>A+</td>
</tr>
<tr>
<td>94-96</td>
<td>A</td>
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<tr>
<td>90-93</td>
<td>A-</td>
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<td>87-89</td>
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<td>70-73</td>
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<td>60-63</td>
<td>D-</td>
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</table>
Calculation of Final Grade

The final grade will be calculated as follows:
1. The POGIL exercises will count for 5% of the final grade.
2. The highest score of the four semester exams will count for 30% of the final grade.
3. The 2nd highest score will count for 25% of the final grade.
4. The remaining exams will each count for 20% of the final grade.
5. The final grade will be calculated based on the formula below:

\[
\text{Final Grade Percentage} = (\text{POGIL Exercises} \times 0.05) + (\text{Highest Exam Percentage} \times 0.30) + (\text{2nd Highest Exam Percentage} \times 0.25) + (\text{3rd Highest Exam Percentage} \times 0.20) + (\text{4th Highest Exam Percentage} \times 0.20)
\]

Examination Materials

Each student is allowed to have a stand-alone calculator, writing utensils, erasers and \textit{NOTHING} else! The calculator function on a smartphone is not allowed, neither is a graphing calculator, unless the memory has been erased in the presence of the instructor. No other electronics are allowed to be out during the exams.

Disputing Grades

The student has \textit{7 calendar days from the date they have received the exam} to bring to my attention any perceived errors in grading. However, in doing so, I have every right to review the entire exam, re-grade and adjust the grade accordingly, whether it is to your advantage or disadvantage. \textit{Only one re-grade per exam is allowed and the score given on the re-grade is FINAL!} Important to note that no re-grade will be accepted or considered after the 7-day period.

To request a re-grade, the student should:
1. On a separate sheet paper, note the question(s) or problem(s) that the student wants to the instructor to review (keeping in mind that I have the right to review the entire exam).
2. Include your justification for the re-grade (what do you think is the problem with the way the question or problem was graded?) Include any supporting information such as a page from the lecture, slides, or textbook, etc…
3. Submit all of the necessary information to the instructor 7 days from the date the exam was received.

\textit{It is important to note:} Re-grade requests based on another student’s graded exam (for example, “Another student answered the same question the same way I did and received more points”) will require that both exams be submitted for a re-grade so that both may be adjusted, if necessary. Errors in adding scores is not considered a re-grade, so submitting an exam for this type will not be checked otherwise.

How to Study for This Course

1. \textit{STUDY AND REVIEW FREQUENTLY}!!
2. \textit{DO NOT GET BEHIND}!! Doing so will put you in a situation where it will be nearly impossible to recover.
3. Work hard and diligently to fully understand the core concepts and principles in each section. Subsequent topics will be built on core concepts and principles.
4. \textit{Try to understand as opposed to memorize!} Some memorization is required, but try not to make that the primary approach.
5. **STUDY AND REVIEW FREQUENTLY!!**

6. Look for the logic. Everything discussed should make sense. If it does not, try to determine if you are misunderstanding a concept or if a topic is not explained clearly. **LET ME KNOW so that I can clarify!**

7. Use all of your resources! The lectures and in-class materials are the primary source of information, but use the textbook to help describe details for you. You may use the internet and other people, but take caution. Wikipedia is a good starting point, but should not be the sole source of information.

8. Study with other students! Science is collaborative, and best learned and understood through collaboration with others.

9. **STUDY AND REVIEW FREQUENTLY!!**

**University Policies**

**General Expectations, Rights and Responsibilities of the Student Policy**

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU’s policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See [University Policies](http://www.sjsu.edu/senate/policies/) at [http://www.sjsu.edu/senate/policies/](http://www.sjsu.edu/senate/policies/). More detailed information on a variety of related topics is available in the SJSU catalog at [http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html](http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html). In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

**Dropping and Adding**

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s Catalog Policies section at [http://info.sjsu.edu/static/catalog/policies.html](http://info.sjsu.edu/static/catalog/policies.html). Add/drop deadlines can be found on the current academic year calendars document on the [Academic Calendars webpage](http://www.sjsu.edu/provost/services/academic_calendars/). The Late Drop Policy is available at [http://www.sjsu.edu/aars/policies/latedrops/policy/](http://www.sjsu.edu/aars/policies/latedrops/policy/). Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the [Advising Hub](http://www.sjsu.edu/advising/).

**Consent for Recording of Class and Public Sharing of Instructor Material**

University Policy S12-7, [http://www.sjsu.edu/senate/docs/S12-7.pdf](http://www.sjsu.edu/senate/docs/S12-7.pdf), requires students to obtain instructor’s permission to record the course.

**Academic integrity**

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at [http://www.sjsu.edu/studentconduct/docs/S07-2.pdf](http://www.sjsu.edu/studentconduct/docs/S07-2.pdf) requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at [http://www.sjsu.edu/studentconduct/](http://www.sjsu.edu/studentconduct/).

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism will result in a failing grade and possible sanctions by the University. An online tutorial on Plagiarism may be found at [http://tutorials.sjlibrary.org/tutorial/plagiarism/index.htm](http://tutorials.sjlibrary.org/tutorial/plagiarism/index.htm).
Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_97-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

SJSU Counseling Services

The SJSU Counseling Services is located on the corner of 7th Street and San Fernando Street, in Room 201, Administration Building. Professional psychologists, social workers, and counselors are available to provide consultations on issues of student mental health, campus climate or psychological and academic issues on an individual, couple, or group basis. To schedule an appointment or learn more information, visit Counseling Services website at http://www.sjsu.edu/counseling.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics, Readings, and Activity</th>
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<tbody>
<tr>
<td>1</td>
<td>February 1&lt;sup&gt;st&lt;/sup&gt; – 3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Intro to Course; Regulatory Enzymes; Intro to Metabolism  &lt;br&gt;Glycolysis</td>
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<td>2</td>
<td>February 8&lt;sup&gt;th&lt;/sup&gt; – 10&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Glycolysis  &lt;br&gt;The Citric Acid Cycle</td>
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<td>3</td>
<td>February 15&lt;sup&gt;th&lt;/sup&gt; – 17&lt;sup&gt;th&lt;/sup&gt;</td>
<td>The Citric Acid Cycle  &lt;br&gt;Biological Redox Reactions; Electron Transport Chain</td>
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<td>4</td>
<td>February 22&lt;sup&gt;nd&lt;/sup&gt; – 24&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Electron Transport Chain and Oxidative Phosphorylation  &lt;br&gt;&lt;strong&gt;Midterm Exam 1 (Feb. 24&lt;sup&gt;th&lt;/sup&gt;) – (Weeks 1 – 4) &lt;/strong&gt;</td>
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<td>5</td>
<td>February 29&lt;sup&gt;th&lt;/sup&gt; – March 2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Glycogen Metabolism  &lt;br&gt;Gluconeogenesis</td>
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<td>6</td>
<td>March 7&lt;sup&gt;th&lt;/sup&gt; – 9&lt;sup&gt;th&lt;/sup&gt;</td>
<td>The Pentose Phosphate Pathway  &lt;br&gt;Lipid Metabolism: Fatty Acid Oxidation</td>
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<td>7</td>
<td>March 14&lt;sup&gt;th&lt;/sup&gt; – 16&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Ketone Bodies, Fatty Acid Biosynthesis and Regulation  &lt;br&gt;Cholesterol and Eicosanoid Metabolism</td>
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<td>8</td>
<td>March 21&lt;sup&gt;st&lt;/sup&gt; – 23&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Phospholipid and Glycolipid Metabolism  &lt;br&gt;&lt;strong&gt;Midterm Exam (Mar. 23&lt;sup&gt;rd&lt;/sup&gt;) – (Weeks 5 – 8) &lt;/strong&gt;</td>
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<td>9</td>
<td>March 28&lt;sup&gt;th&lt;/sup&gt; – April 1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Spring Recess (No classes)</td>
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<td>10</td>
<td>April 4&lt;sup&gt;th&lt;/sup&gt; – 6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Amino Acid Metabolism: Amino Acid Deamination, the Urea Cycle  &lt;br&gt;Metabolic Breakdown of Amino Acids</td>
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<td>11</td>
<td>April 11&lt;sup&gt;th&lt;/sup&gt; – 13&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Amino Acids as Biosynthetic Precursors  &lt;br&gt;Amino Acid Biosynthesis, Nitrogen Fixation</td>
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<td>12</td>
<td>April 18&lt;sup&gt;th&lt;/sup&gt; – 20&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Energy Metabolism: Integration and Organ Specialization  &lt;br&gt;Energy Metabolism continued</td>
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<td>13</td>
<td>April 25&lt;sup&gt;th&lt;/sup&gt; – 27&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Midterm Exam (Apr. 25&lt;sup&gt;th&lt;/sup&gt;) – (Weeks 10 – 12)  &lt;br&gt;Nucleotide Metabolism: Synthesis of Purine Ribonucleotides</td>
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<td>14</td>
<td>May 2&lt;sup&gt;nd&lt;/sup&gt; – 4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Synthesis of Pyrimidine Ribonucleotides  &lt;br&gt;ATCase and Feedback Inhibition</td>
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<td>15</td>
<td>May 9&lt;sup&gt;th&lt;/sup&gt; – 11&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Formation of Deoxyribonucleotides  &lt;br&gt;Nucleotide Degradation</td>
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<td>16</td>
<td>May 16&lt;sup&gt;th&lt;/sup&gt;</td>
<td>Biosynthesis of Nucleotide Coenzymes  &lt;br&gt;&lt;strong&gt;Final Exam Review Session &lt;/strong&gt;</td>
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<tr>
<td>Final Exam</td>
<td>May 18&lt;sup&gt;th&lt;/sup&gt; Wednesday</td>
<td>Final Exam (May 18&lt;sup&gt;th&lt;/sup&gt;) at 7:15 am – 9:30 am in DH 250</td>
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