CHEMISTRY 341: INTRODUCTION TO BIOCHEMISTRY

Term:

Fall, 2009.

Prerequisites:

One semester of Organic chemistry (CHEM 201 or equivalent), with a minimum grade of C.

Class time:

10.00 a.m. - 11.15 a.m. Mondays and Wednesdays.

Class location:

MARK 101.

Instructor:

S. Jayasinghe (Jay), Ph.D.

Inst. Office:

Sci II, 115.

Inst. Office hours:

Monday and Wednesday from 11:30 a.m. - 12:30 p.m. or by appointment.

Inst. Phone:

760-750-8075

Inst. E-mail:

E-mail communication will be via WebCT. E-mails sent to the instructor's campus e-mail address will NOT be returned (unless in the case of an emergency). Use the instructor's campus e-mail (*sjayasin@csusm.edu*) only in the case of an emergency.

Course Objective:

Intended for the science major the object of this one semester course is to introduce students to the fundamental concepts and language of biochemistry. The areas covered are (but not limited to): basic thermodynamics of biological systems, properties of amino acids, protein structure, introduction to enzyme kinetics, inhibition and regulation, nomenclature and structure of carbohydrates and lipids, the structure of biological membranes and membrane transport, the structure of nucleic acids, and an introduction to metabolism.

Student Learning Outcomes:

Upon completion of this course students should be able to demonstrate their knowledge regarding:

(1). the basic language of biochemistry

(2). the structure of the important biological macromolecules: proteins, carbohydrates, lipids nucleic acids.

(3). the relationship between structure and function in the biological macromolecules.

(3). the basic chemical reactions involved in the synthesis and degradation of the biological macromolecules.

(4). the biochemistry involved in the regulation of cellular metabolism.

These are general learning outcomes. Students are responsible for everything we discuss in class and available to you through your textbook or class notes.

Textbook (Required):

Biochemistry: A Short Course by J.L Tymoczko, J.M. Berg, and L. Stryer, 1st Edition, Freeman publishing (or equivalent biochemistry textbook published within the last 3 years).

WebCT:

The course website can be accessed via the campus WebCT system. The following will be available or done through the WebCT site:

1. Posting of all assignments (including the term paper).
2. Submission of all assignments and the return of graded assignments (*also see below*).
3. E-mail communication with the instructor and receiving notices from the instructor.
4. A calendar tool indicating important course/assignment dates.
5. The syllabus.
6. Lecture slides (*also see below*).
7. Links to worthwhile biochemistry related web sites.

If you are not already familiar with the use of WebCT (version 6) please consult the IITS help desk or the instructor as soon as possible.

Lecture Notes:

PDF files of lecture slides are available online via webCT. It is highly suggested that you print a copy of these files and bring it to class with you. Some lectures contain upwards to 40-50 slides ,and therefore, it may be beneficial to print more than one slide per page (4-6 slides per page works well).

These lecture notes should NOT be considered as a substitute for attending class. These slides are not comprehensive lecture notes. They are intended to serve as a starting point for taking your own notes. ***You will notice that the notes contain more figures and questions than text and answers.***

Topic List:

Unless otherwise noted all chapters refer to the course textbook. Given below is the topic list for CHEM 341 for the fall semester of 2009. Although every attempt will be made to adhere to this list the instructor reserve the right to adjust the time spent on each topic as well as the order of the topics. **Read the relevant chapters in the textbook before the lecture.**

Date	Topic	Readings	Suggested Homework
8/31/09-9/02/09	Chapter 1 – Biochemistry and the Unity of Life. Chapter 2 – Water, weak bonds, and the generation of order out of chaos.	Chapters 1 and 2	1.2, 1.4 2.2, 2.3
9/7/09	**No Class – Campus Closed – Veteran's Day**		
9/11/09	**Faculty Furlough day***		
9/09/09-9/14/09	Chapter 3 – Amino acids Chapter 4 – Protein three-dimensional structure	Chapters 3 and 4	3.1, 3.2, 3.3, 3.6 4.1, 4.2, 4.6, 4.8, 4.13 4.15, 4.19, 4.20
9/16/09-9/23/09	Chapter 5 – Basic concepts of enzyme action Chapter 6 - Kinetics and Regulation Chapter 7 – Mechanisms and inhibitors	Chapters 5,6 and 7	5.3, 5.4, 5.7, 5.11, 5.12 6.1, 6.6, 6.7, 6.8, 6.9 7.2, 7.3, 7.8
Time permitting	Chapter 8 – Hemoglobin an allosteric protein	Chapter 8	8.4, 8.5, 8.6, 8.8, 8.9, 8.11, 8.14
9/28/09	**Catch up and Review**		
9/30/09	**First Mid-Semester Examination**		
10/05/09	Chapter 9 - Carbohydrates	Chapter 9	9.1, 9.3, 9.5, 9.11, 9.12
10/07/09	Chapter 10 – Lipids Chapter 28 – Lipid synthesis, storage lipids, phospholipids, and cholesterol	Chapter 10 Chapter 28 – Section 28.4, 28.5	10.2, 10.3, 10.5, 10.6, 10.7, 10.9, 10.11, 10.13 28.9, 28.14
10/12/09-10/14/09	Chapter 13 - Digestion: Turning a meal into cellular biochemicals Chapter 14: Metabolism: Basic concepts and design.	Chapters 13 and 14	13.1, 13.3, 13.4, 13.6 14.3, 14.5, 14.10, 14.15
10/16/09	**Faculty Furlough day***		
10/19/09-10/21/09	Chapter 15 – Glycolysis	Chapter 15	15.1, 15.3, 15.8, 15.16
10/26/09	**Catch up and Review**		
10/28/09	**Second Mid-Semester Examination**		
11/02/09-11/04/09	Chapter 17 – Preparation for the cycle Chapter 18 – Harvesting electrons from the cycle	Chapters 17 and 18	17.1, 17.4, 17.6 18.1, 18.3, 18.5, 18.7
11/09/09-11/16/09	Chapter 19 – The electron transport chain Chapter 20 – The proton motive force **11/11/09 No Class – Veteran's Day Campus Closed.**	Chapters 19 and 20	19.6, 19.8, 19.10 20.1, 20.3, 20.11, 20.14, 20.18
11/13/09	**Faculty Furlough day***		
11/18/09	Chapter 26 - Fatty acid degradation	Chapter 26	26.1, 26.2, 26.4, 26.8, 26.10
11/23/09	**No Class – Faculty Furlough Day***		
11/24/09	**Faculty Furlough day***		
11/25/09	**No Class – Faculty Furlough Day***		
11/30/09	**Third Mid-Semester Examination**		
12/02/09	Chapter 31 – Amino acid degradation and the urea cycle	Chapter 31	31.1, 31.6, 31.8, 31.10

12/07/09	Chapter 11 – Membrane Structure and Function	Chapter 11	11.2, 11.5, 11.7, 11.10, 11.11, 11.13, 11.14
12/09/09	Chapter 12 – Signal transduction pathways	Chapter 12	12.1, 12.2, 12.3, 12.6, 12.10, 12.15
12/10/09	**Faculty Furlough day***		
12/18/09	**Faculty Furlough day***		

* **A note on faculty furlough days:** *The California budget crisis has resulted in a significant reduction in funding to the California State University (CSU) system. These budget cuts would have resulted in a significant number of faculty and staff layoffs, would have significantly reduced the number of classes, would have increased class size, would have reduced the quality of instruction at the CSU, and would have unduly impacted your education. In order to reduce, as much as possible, the impact of budget cuts, the faculty and staff of the CSU agreed to take a 9.2 % reduction in pay necessitating that faculty and staff take 9 furlough days per semester (2 days per month, on average). A furlough is an unpaid day off on a faculty member's regularly-scheduled workday. As part of this process I have been instructed to identify 9 furlough days for the fall 2009 semester. In order to satisfy legal and ethical requirements of the California Labor Code, I am required to submit formal certification that I will not work on my furlough days. I am prohibited from teaching, conducting scholarly research, consulting with students, responding to email or voicemail, providing assignment feedback, or participating in any CSU work-related activities on my furlough days. Furlough dates vary by professor; I have identified the following 9 days as my furlough days:*

- *28th August 2009*
- *11th September 2009*
- *16th October 2009*
- *13th, 23rd, 24th, and 25th November 2009*
- *10th and 18th December 2009*

Within the furlough context, I will make every effort to support your educational experience at CSUSM. Visit CSUSM Budget Central [http://www.csusm.edu/budgetcentral/] to learn about the state budget crisis and how it impacts your educational opportunities. To avoid the continued loss of higher education availability in California, exercise your right to voice an opinion. Contact information for state legislators and the governor are provided at Budget Central.

Furlough plans may be altered after the beginning of the semester as a result of administrative actions or other emergencies.

Homework: **Suggested homework problems are given alongside the topic list.** These problems will not be collected nor graded. It is, however, highly suggested that you do these problems.

Exams:

There will be three (3) mid-semester exams and a final examination. The mid-semester exams will be one hour in length. The three mid-semester exams are scheduled as follows:

1st mid-semester exam – Wednesday, September 30, 2009
2nd mid-semester exam – Wednesday, October 28, 2009
3rd mid-semester exam – Wednesday, November 30, 2009

The final exam is comprehensive. The final exam is scheduled for **Wednesday December 16, 2009 from 9:15 a.m. to 11:15 a.m.** Note that the final exam is scheduled for a time that is different from the normal class time.

Make up examinations will only be given if the student has a valid excuse (severe illness, death in the family, etc.) and notifies the instructor prior to test time (if possible). No make-up examination will be given unless the instructor is notified of the emergency within two (2) days of the test.

Exams will contain multiple choice, short answer, and essay type questions. **Please bring a scantron.**

Reading-based Assignment:

You will be given a number of 5-minute in-class writing assignment. Your task will be to answer one question based on the reading material. You will be given 5 minutes to write as much as you can in answer to the given question.

These assignments will be given at the beginning of class, the day following the conclusion of each chapter.

Each assignment is worth 2 points. Each completed assignment will be awarded full points *as long as the answer pertains to the question given*.

No make-up assignments will be given.

Grading (points):

Type of Assessment	**Points**	**Percentage of Total**
3 mid-semester examinations	150	60
Reading-based assignments	20	8
Take home guided inquiry assignments	15	6
Final examination	65	26
Total	250	100%

Letter grades:

Letter grades will be assigned based on the following cutoff values:

Percentage	**Grade**
90% and above	A
88 – 89.9%	B+
82.1 – 87.9%	B
80 – 82%	B-
78 – 79.9%	C+
72.1 – 77.9%	C
70 – 72%	C-
68 – 69.9%	D+
62.1 – 67.9%	D
60 – 62%	D-
59.9% and below	F

Writing Requirement:

The University Writing Requirement will be satisfied upon completion of the Reading-based assignments and the take home guided inquiry assignments.

Students with Disabilities:

Students with disabilities who require accommodation must be approved by the Office of Disabled Student Services (DSS). Please contact this office as soon as possible and should meet with the instructor during office hours (or at some other mutually agreeable time). The DSS office is located in Craven hall 5205. Their telephone number is (760) 750-4905 or TTY (760) 750-4909.

Academic Honesty:

All students are expected to maintain academic honesty. This is especially true with regards to the completion of all writing assignments. **All submitted work must be your own and must be written in your own words.**

All students should be familiar with the university policies and procedures concerning academic honesty as detailed in the university catalog. An online version of these polices and procedures can also be found at: http://lynx.csusm.edu/policies/procedure_online.asp?ID=187

Cheating, plagiarism, and other forms of academic dishonesty will not be tolerated. If you are caught cheating on an exam you will receive a grade of zero. All cases of academic dishonesty will be reported to the dean of students for appropriate action.

Use of Plagiarism Detection Software:

Where appropriate the instructor will use software (TURNITIN) for the detection of plagiarism. All writing assignments submitted via webCT are automatically checked for plagiarism.

Plagiarized work will not be graded (also see above).

Classroom Behavior and Student Code of Conduct:

Students are expected to respect and follow standards of student conduct while in class and on the campus. As your instructor, I have the following expectations concerning your behavior in this class:

1. Promote a courteous learning atmosphere by exhibiting mutual respect and consideration of the feelings, ideas, and contributions of others.
2. Practice consideration for others by maintaining a clean and orderly classroom.
3. Recognize everyone's opportunity to contribute information in a relevant and meaningful manner by not monopolizing discussions, interrupting, interjecting irrelevant, illogical or inappropriate questions or comments.
4. Do not dominate class discussion—give others a chance to contribute!
5. If you must eat in class do so discreetly.

Use of Electronic Devices:

The use of cell phones, PDAs, or any other electronic device during exams is not allowed. Scientific calculators are permitted.

Use of Cellular Phones:

All cellular phones must be set to the silent mode. Please refrain from using your cellular phone during class. If you must answer your phone, due to an emergency, please leave the classroom.

HOW TO STUDY CHEMISTRY IN ORDER TO EARN A GRADE OF A, B, OR C.

1. **Take good lecture notes**. You are responsible for everything that I write or project on the board (except videos). Make use of the PDF files of my slides (see above) to reduce the amount of writing you have to do in class.

2. Make flash cards of definitions, concepts, reactions, structures, and nomenclature that are covered in lecture notes.

3. Use your lecture notes/flash cards as a guide to your **reading in the textbook**. Read the relevant chapter (or chapter section) before coming to the lecture and after attending the lecture (yes, twice).

4. **Solve the homework problems**. Some of the answers are in the back of the textbook. One of the best ways of learning is to find a study partner or to form a study group and work on the problems together. Doing the homework problems is how you develop the analytical/critical thinking skills to do well on exams.

5. **Attend class.**

6. **If you have questions, ask**. Make use of the instructor's office hours.