

Chemistry B11 – Principles of Inorganic, Organic and Biochemistry

Dr. Behrang Madani (Mrs. Jennifer Rattanaprasit: lab instructor)

Email: beh_madani@hotmail.com

Web page: <http://www2.bakersfieldcollege.edu/bmadani>

Fall 2009

Lecture: MW 5:30 – 10:09pm in SE-48

I. Course Description:

Principles of Inorganic, Organic and Biochemistry (5 units):

A systematic study of the principles of inorganic, organic and biochemistry using a qualitative and quantitative approach. Topics include physical principles of chemistry; inorganic compounds and reactions; a survey of organic chemistry-classification, composition, reactions, nomenclature; biochemistry-classification, composition, reactions in living organisms.

Prerequisite: Math BA with grade of C or equivalent. Reading Level 5 or 6.

II. Required Materials:

1. Textbook:

Introduction to General, Organic and Biochemistry, 8th edition, by Bettelheim et al.
(ISBN: 0-495-01197-5)

I suggest to use this textbook as reference: Chemistry: Introduction to General Organic & Biochemistry, 9th edition, by Karen Timberlake.

2. Laboratory Manual:

Chemistry, An Introduction to General, Inorganic and Biological Chemistry, Essential laboratory manual, 9th edition, by Karen Timberlake (ISBN: 0-8053-3023-2).

3. Scientific calculator:

Ti-30X (Ti-30X IIB or Ti-30X IIS) is recommended. You will need to use logarithms, functions, exponents, scientific notation, etc. **Bring this to all lecture and lab meetings.**

4. Lab apron, approved safety goggles and a padlock for lab:

The goggles must completely enclose the area around the eyes.

Note: Lab coat is optional. If you do not have a lab coat, wear a normal cloth (you will work with some materials that can ruin your cloths).

III. Student learning objectives:

1. Define chemistry and learn about the matters and energy. Illustrate how matter and energy are related (chapter 1& 2).
2. Describe the construction of an atom. Learn about the periodic table and the relationship between chemical and physical properties of elements (chapter 2).
3. Identify the different kind of chemical bonds (like ionic and covalent bonds) and naming the chemical compounds (chapter 4).
4. Discuss the different kind of chemical reactions (like single replacement reactions, double replacement reactions, combustion, redox reactions and etc.). Learn how balance a reaction (chapter 5).
5. Use appropriate gas laws to convert from given pressure, temperature, and volume into new P, T and V. Identify the states of matter and changes of state on a heating or cooling curve (chapter 6).
6. Define solute, solvent and solubility. Calculate the concentration of solution. Discuss the differences between a solution and a colloid (chapter 7).
7. Describe an acid and a base by Arrhenius and Bronsted-Lowry definitions. Learn about pH, titration and buffers (chapter 9).
8. Learn about Alkanes, Alkenes, Alkynes, Alcohols, Ethers and Thiols (structures, names and properties) (chapters 10-14).
9. Discuss the different kind of isomers and the meaning of chirality (chapter 15).
10. Learn about Amines, Aldehydes, Ketones, Carboxylic acids, Esters and Amides (structure, names and properties) (chapters 16 - 19).
11. Name and recognize the chemical structure of carbohydrates, lipids, proteins and enzymes. Describe the functions and properties of these classes of compounds (chapters 20, 21, 22, 23).
12. Define the processes of metabolism (the reactions that happens to carbohydrates, lipids and proteins in the mouth, stomach and small intestines to produce energy) (chapters 27 & 28).

IV. Attendance:

Regular attendance is an absolute necessity in this course. Students who do not regularly attend and participate are not successful. You may be dropped after missing 2

weeks of classes. This translates to 4 lecture and 4 laboratory absences (more than 18 hours of class total). If it is after the drop date you will no longer accumulate credit for work done and will likely get an F depending on when this occurs. If you should be absent for unavoidable reasons, you must check with me before.

V. Special Needs:

Student with disabilities who believe they may need accommodation in this class are encouraged to contact Supportive Service (661-395-4334), FACE 16, as soon as possible to better ensure such accommodations are implemented in a timely fashion.

VI. Student evaluation and Grading:

Homework & problem sets	10 %
Laboratory experiments and assignments	30 %
Quizzes	10 %
Exams	35 %
Final exam	15 %

Note: You have 4 exams including the final exam (see your course schedule). Some practice exams will be made available before each exam.

Note: your lowest test grade, excluding the final test grade, will be dropped. If you are absent for a test, then the missed test will be test dropped.

Note: there is usually an extra credit problem on each test.

Note: There are 4 quizzes during the semester (see your course schedule). However; some other pop quizzes will appear throughout the course. You won't be announced in advance for these kinds of quiz, so be prepared before each class!!!

Your final grade will be assigned based on following manner:

90 – 100 %	A
80 – 89 %	B
70 – 79 %	C
60 – 69 %	D
Below 60 %	F

Cheating: It is not allowed in any form and such will earn the student an automatic zero. Copying homework from others or allowing others to copy your homework is also unacceptable and considered cheating (very similar versions of the same homework or lab reports will not be graded)

VII. Assignments:

Homework is due at the beginning of the class meeting following the day we finish discussing the chapter in lecture. I will be assigning many even and/or odd numbered problems. The goal is to give you sufficient practice to enable you to be successful on the examinations. The assigned problems have to be complete and correct (otherwise, you will not receive full credit). For each assignment, I will select five assigned problems randomly and I will give you the credit according to the correctness and the accuracy of these chosen problems. You must show all work for credit (you cannot simply copy the answers in the text) and the final answer must be circled or highlighted.

Note: Late homework, lab reports, projects, etc will not be accepted (except when absent in which you may only turn in work the day you return) and you will have earned zero for that work.

Note: always staple your multipage assignment together or point will be taken off.

VIII. Policies and remarks:

Arriving late or leaving early is disruptive for other students and will count as ½ hour absent for lecture and 1 hour absent for lab. This means every 3 lecture or 3 lab late equals 1 absence.

Cell phones should be off or placed in vibrate mode during class. The ringing of cell phones interferes with instruction and concentration of other students. The students should not use their cell phones in class or leave the class to answer the phone. In order to preserve a positive environment, the student will be asked to leave for the rest of period and she/he will be counted as absent for that day.

IX. Some important dates:

- **Sep. 7**
Labor day Holiday (No class)
- **Sep. 21**
Last day to drop from semester length classes without receiving "W" grades.
- **Nov. 2**
Last day to withdraw from semester length classes and receive "W" grades.
- **Nov. 11**
Veterans Holidays (No class)
- **Nov. 25**
Thanksgiving Holidays (No class)
- **Dec. 9**
Final Exam

Dates	Chapters	Lecture	Labs
Aug. 24		Syllabus & Prologue	Check in, Safely rules
Aug. 25	1	Matter, Energy & Measurements	Significant Figures Problem set
Inorganic Chemistry			
Aug. 31	2	Atoms	1
Sep. 2	2	continued	2
Sep. 7	No class	Labor Day Holiday	
Sep. 9	4	Chemical bonds	Dimensional Analysis Problem Set, Quiz 1
Sep. 14	4	continued	3
Sep. 16	5	Chemical Reactions	4, review 1- 4
Sep. 21	5	continued	Exam 1 – 4
Sep. 23	6	Gases, Liquids, and Solids	6
Sep. 28	6	continued	Nomenclature, problem set
Sep. 30	7	Solutions and Colloids	7
Oct. 5	7	continued	12C, Quiz 2
Oct. 7	9	Acids and Bases	Review 5 – 8
Organic Chemistry			
Oct. 12	10-13	Organic chemistry, Alkanes, Alkenes, Alkynes and Benzene	Exam 5 – 8
Oct. 14	10-13	continued	15A & B
Oct. 19	10-13	continued	15C, Problem set
Oct. 21	14, 15	Alcohols, Ethers, Thiols and Chirality	16, Lab Practical #1
Oct. 26	14 - 15	continued	ID Polymers, Quiz 3
Oct. 28	16 - 18	Amines, Aldehydes, Ketones and Carboxylic acids	Spec 20 Analysis
Nov. 2	16 - 18	Continued	17
Biochemistry			
Nov. 4	19, 20	Esters, Amides and Carbohydrates	Review 9 - 18
Nov. 9	19, 20	continued	Exam 9 – 18
Nov. 11	No class	Veterans Holidays	
Nov. 16	21	Lipids	19
Nov. 18	22, 23	Proteins and Enzymes	Field Trip
Nov. 23	22, 23	continued	22C & D
Nov. 25	No class	Thanksgiving Holidays	
Nov. 30	27, 28	Bioenergetics and Specific Catabolic Pathways	23A thru C – Quiz 4
Dec. 2	27, 28	continued	Lab Practical #2, Check out of lab
Dec. 7	Review for Final exam		
Dec. 9	Final exam		

Assignments:

Chapter 1: 16, 17, 18, 21, 23, 24, 25, 27, 36, 37, 47, 48, 57, 58, 66

Chapter 2: 9, 22, 24, 26, 33, 41, 43, 44, 48, 49, 51, 53, 59, 68

Chapter 4: 17, 18, 22, 26, 30, 32, 38, 40, 42, 44, 46 (write the name), 48, 56, 68, 72, 78

Chapter 5: 18, 20, 26, 30, 42, 44, 48, 52, 54, 56, 57, 66, 70, 88, 92

Chapter 6: 12, 14, 16, 32, 34, 40, 56, 58, 59, 66, 72, 90, 91

Chapter 7: 16, 20, 22, 24, 30, 32, 33, 36, 38, 40, 46, 48, 52, 61, 64

Chapter 9: 20, 24, 28, 31, 34, 36, 39, 44, 45, 52, 58, 60, 65

Chapter 11-13: 11.13, 11.14, 11.23 (a,b,c), 11.24 (a,b,c,d,f), 11.42 (a,c,d,e), 11.52 (a,b,c,d,e,f), 12.20 (a,c,f), 12.22, 12.39, 12.43 (a,b), 12.44, 12.46 (a,d), 13.12 (a,b,e,h), 13.13 (a,b,c,f), 13.16, 13.18, 13.46 (a,b)

Chapter 14-15: 14.11 (a,b,c,d), 14.12 (c,d,e), 14.20, 14.22, 14.26, 14.32, 14.36, 14.41 (a,b), 14.44, 14.58 (no name), 14.60, 14.62, 15.10, 15.12, 15.18

Chapter 16-18: 16.9, 16.10 (a,c,f), 16.12, 16.16, 16.40 (a,b,e,f), 16.42, 17.12, 17.17 (a,c,d,f), 17.20 (a,c,d), 17.24, 17.36 (a,b,d), 17.58, 17.59 (a,b,c,f), 18.6, 18.8(a,b,c), 18.22 (a,b), 18.33, 18.42, 18.43 (a,c)

Chapter 19-20: 19.5 (b,c,d,e,f), 19.6, 19.36, 19.39, 19.41, 19.42, 20.15, 20.18, 20.26, 20.38, 20.40, 20.44, 20.48

Chapter 21: Assigned homework

Chapter 22-23: 22.8, 22.10, 22.16, 22.20, 22.31 (plus: Alanyltryptophan & Glycylalanylvaline), 22.32, 22.35 (plus: Thr-Leu-Phe), 22.47, 22.76, 23.8, 32.10, 23.14, 23.16, 23.18, 23.25, 23.70, 23.75

Chapter 27-28: 27.2, 27.8, 27.18, 27.20, 27.22, 27.24, 27.30, 27.32, 27.44, 27.70, 28.10, 28.12, 28.22 (a), 28.32, 28.34