

# Chemistry 11 – Inorganic, Organic and Biochemistry

Spring, 2005

CRN 31005 / 31006

**Class times:**

MW: 9:35–11 am (lec. both),

TTh: 7:55–11:00 am (lab ..05),

TTh: 12:50–3:57 pm (lab ..06)

Dr. Kenward Vaughan

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**Office hours:**

MW: 11–12:30, TTh: 11:00–12:00

My BC home page is at

## 1 Course Description

### 1.1 BC's catalog 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, compounds, reactions, nomenclature; biochemistry—classification, composition, reactions in living organisms. **Prerequisite:** MATH BA with a grade of C or equivalent. Reading Level 5 or 6. Hours: 54 lect, 72 lab. CCS: Liberal Arts and Sciences. Transferable: CSU and private colleges.

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

### 1.2 Texts and Materials

- Bettelheim, Brown, and March, "Introduction to General, Organic, and Biochemistry" (7<sup>th</sup> ed., Brooks/Cole)
- Study guide which accompanies the text, if it helps you.
- Timberlake, "Chemistry, An Introduction to General, Organic, and Biological Chemistry, **Essential laboratory manual**" (8<sup>th</sup> ed., Benjamin Cummings)
- Combination lock, lab apron, and bookstore-brand fully enclosed goggles (**an absolute must!**).

## 2 Learning outcomes you are expected to achieve

Chemistry 11 students are expected to show some proficiency in the following by the end of the course.

1. They should recognize the interwoven nature of matter and energy, in particular the role that energy plays in guiding matter's behavior.<sup>1</sup>

Throughout the course, students will be asked to explain various phenomena. Their answers will require relating the material changes occurring in those phenomena to the potential/kinetic energy changes of the system.

Homework, quizzes, and exam problems will address this.

2. They should acquire a fundamental knowledge of the building blocks of matter (subatomic particles and atoms) and why/how atoms bond together to form larger structures (molecules).

Students will be asked to identify subatomic particles *via* their properties, atoms *via* their subatomic particle composition, bond types *via* comparison of the involved atoms' electronegativities, and the shapes of the simpler molecular combinations based on a simple theory (VSEPR).

Labs, quizzes, homework, and exams will be the medium for this assessment.

3. They should present an understanding of how these molecules interact with one another and what influence this has on what we see macroscopically.

Students should demonstrate knowledge of the basis for intermolecular interactions (like/opposite charges), the existence of apparent charge in molecules (prediction of polarity and the nature of electron clouds), and the different levels of interactions possible (e.g. London forces vs. hydrogen bonds). They should be able to predict various observed properties for materials based on their understanding of these concepts (e.g. solubility or vapor pressure).

Assessments will include questions on homework and exam problems, and lab exercises working with models to predict both what interactions are possible, and molecular (dis)similarity between different substances (e.g. the relationship between acetylcholine and nerve agents).

4. They should recognize what constitutes physical and chemical change.

This will be assessed by classification of phenomena through direct observation or from a description, and also by the student defining these changes at the molecular level.

5. They should be able to characterize/identify several standard, ubiquitous chemical systems and behaviors.

A few examples are electrolytes, buffers, equilibria, and osmosis. These form a framework for later learning in the biological sciences.

Assessments for these will come in labs, quizzes, homework, and exams.

6. They should be able to characterize/identify several standard, ubiquitous chemical changes.

Oxidation/reduction reactions, acid/base reactions, condensation–dehydration reactions, hydrolyses reactions, and addition reactions are examples of ones frequently encountered in biochemistry.

Students will find practice and assessment of this outcome in all areas of their work.

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<sup>1</sup>It is important to learn that chemistry is a cumulative subject. Ideas you hear the first day about energy and matter will be on the final exam, despite the fact that the exam is not comprehensive.

This also means that these outcomes apply to all areas we will encounter in our studies, whether we are speaking about salt in water or large proteins in cells.

A number of specific (but older) objectives exist for the areas we will study (see my website); these can serve as one of the guides you should use in gaining these proficiencies. Do understand that assessing these outcomes is an ongoing process in the classroom which extends beyond any given chapter test!

## 3 Attendance and Grading

You are expected to attend all classes and all labs in their entirety. The general attendance policy for BC will be followed. This translates to a probable drop if you miss more than 18 hours of class total or 2 weeks of lecture.

### 3.1 Absences

If you should be absent for unavoidable reasons, you **must** check with me before I will consider allowing *any* make-up work. This includes tests, laboratory work, and announced quizzes. Lab reports will not count if you are absent from that lab.

### 3.2 Withdrawals

If you decide to discontinue the course for ANY reason, please make an *official* withdrawal. If you fail to officially withdraw from a class which you are no longer attending, you may receive an **F** on your permanent transcript. The Bakersfield College catalog says:

Students are responsible for officially withdrawing from any class or classes in which they no longer wish to be enrolled. Non-attendance does not release the student from this responsibility.

In addition,

Students who find it necessary to withdraw from the college are required to return check-out supplies (chemistry lab drawer) and pay all fines and debts (chemistry stockroom) owed the college.

**If you fail to check out** of your lab locker when you stop coming to class, you may be charged for their having to check the drawer out for you. If you owe money to the chemistry stockroom, you will be ineligible for future class registrations at BC until you settle the account with the stockroom.

### 3.3 Assessments and grades

#### 3.3.1 General policies

My policy concerning late work is as follows:

Up to one period late: 70% of grade awarded (e.g. an A- becomes a C+).  
Two periods late: 35% of grade awarded (e.g. an A- becomes a D ).  
Later than that: Forget it!

There are no make-ups for missed unannounced quizzes/assignments.

Unless otherwise noted, lab reports are due at the beginning of the second lab period following the last day we actually work on the lab in class. For example, if we do an experiment on a Thursday, those reports will be due the next Thursday (in a TTh lab).

### 3.3.2 Tests and other non-lab activities

There should be three major exams during the course. These exams are expected to be mostly multiple choice, short answer, and matching-type questions. You should expect to encounter a range of difficulties in these questions. Some practice exams will be made available.

Various quizzes and assignments will appear throughout the course.

### 3.3.3 Labs

The reports will be graded and returned as quickly as possible to you. Worksheets will accompany some labs. These worksheets will be due before you leave the laboratory on the day of the experiment.

#### The grading of labs/homework

We will have a large number of labs, quizzes, and homework. This makes a full assessment of every paper from every student nearly impossible. So I use a modified system which works as follows.

Approximately 50% of all labs assessed will be “fully” graded using the rubric I have available on my website (<http://www2.bc.cc.ca.us/kvaughan/>). Which labs are graded will *not* be announced ahead of time, for obvious reasons. The average of these graded labs forms the basis for all other report grades.

Other labs will initially be credited with either this average grade or an average C (whichever is higher). They then will be assessed using a less rigorous guide: is the lab *complete* (required parts answered)? is the work merely cursory in nature or did the student put some obvious effort into it? are the answers to a few select questions appropriate and/or totally correct? The credited grade will be adjusted up or down by as much as 1 grade under normal circumstances, but extreme cases may lead to further adjustment (e.g. no lab equals a zero).

There are several labs which I never grade (ones which are “purely experiential”).

Do remember that lab reports won’t count if you aren’t there to do the work!

### 3.3.4 The final

**The final is mandatory.** You must take it to **successfully** pass the course *regardless of prior work*.

The final is essentially a fourth test. The lowest of the four grades will be replaced with the next one up (if there is a tie for last, only one will get shifted up). Suppose you earn a B+, a B, a C+, and a D– (bad hair day?). The D– will get replaced by the C+ at the end of the semester. Your exam average would change from a C+ to a B–. I expect this will help a number of people!

There is no practice exam for the final.

Did I remember to say that the final is mandatory?

### 3.3.5 Grading scale

Grades are assigned as a modified GPA score. It’s not hard to understand, and will be discussed the first day of class. The GPA scale used within this class is F: 0.00–0.99, D: 1.00–1.99, C: 2.00–2.99, B: 3.00–3.99, and A: 4.00–5.00. So if you see a 2.50 on your test, you received an average C.

The approximate formula for one’s grade is as follows:

$$\text{GPA} = (0.50 \times \text{GPA}_{\text{tests+final}}) + (0.30 \times \text{GPA}_{\text{lab}}) + (0.05 \times \text{GPA}_{\text{quizzes}}) + (0.15 \times \text{GPA}_{\text{HW}})$$

Each part of your grade shown above is an average of all your work in that area. For example, your  $\text{GPA}_{\text{lab}}$  is an average of what you get on all lab reports.

Did I remember to say that the final is mandatory?

### 3.3.6 Cheating and other forms of dishonesty

I have no tolerance for cheating in any form. Such will earn the student an automatic zero.

## 4 Help for the needy

I am primarily interested in helping you to understand and learn a subject which is both complicated and important for people heading into the allied health fields. Don't be surprised to hear me egging you on to be prepared for classes, to study harder for exams, and to learn how to study. I do not bite and my bark is pretty minimal, so I hope dearly that you all ask questions and attend some office hours. Please come by if you need help!

Additionally, BC does have tutoring services as well as a series of study-skills classes *every* semester. I **strongly** recommend that every student go to the classes, and seek out a tutor if needed. Don't let pride or anxiety keep you out of these classes... Problems you may have will only get worse as the semester goes on if you **don't** get the help when it's available.

I cannot overemphasize how helpful these skills classes can be for everyone!

## 5 Computer use

You definitely should get a computer account at BC. **It costs nothing** and is very easy to acquire. Head over to the library and go downstairs into the computer commons area. Go catty-corner to the farthest kiosk, and use one of the computers there to set up your account. Someone will be there to help you if needed.

Like many other BC instructors, I now have very few handouts for class because of the budget issues we face. Nearly all of what I provide the class is through the Internet on my home page (<http://www2.bc.cc.ca.us/kvaughan>). Homework, announcements, changes in plans, etc., are all placed there, often before I say them in class. **All practice exams are made available solely off of my web site.** Having a school account gives you access to that information while you are here. For a lot of people, it is the only access available except through the local libraries.

Additionally, there are actually some good things to be found on the Internet (somewhere in the morass of junk...), and some of our work will involve your heading out there. If you have an account, you also can work anywhere on campus and be able to access your saved work from any other place on campus. If you have Internet access at home, then you can send your work home via email. No more floppies to carry around!

## 6 Class Calendar

Coverage of lecture topics will proceed at the approximate rate of one chapter every  $4\frac{3}{8}$  days. The following schedule is tentative; it is recognized that this is subject to change as circumstances dictate. The labs, in particular, are undergoing revision. Please keep yourself updated by visiting the web site and noting the assignments for each week!

### Schedule for Dr. Vaughan's chem 11 class, Spring, 2005

	Week	Lecture	Labs	Notes
	1/24	Chapter 1	Exp. #??, 2+3	1st lab = check-in, safety rules, etc.
	1/31	1, 2	2+3, H1	H1=O <sup>3</sup>
	2/7	2, 3	4, 6	2/4 = last day to withdraw, no W
	2/14	3, 4	H2, 7	H2=vap. P with structural studies
5	2/21	4	8, H2 (cont.)	holiday Monday
	2/28	5	exam 1 (ch. 1–4), H3	H3=equilibria
	3/7	6	H3, 14	
	3/14	8	15, H4	H4=buffers
	3/21			Spring break! :-)
	3/28	10–13	exam 2 (5–8), 16	
10	4/4	14, 17	17	4/8 = last day to withdraw with W
	4/11	15	19	
	4/18	16, 18, 19, 20	18, 20 or 21	
	4/25	21, 22, 23	23 (or equiv.), exam 3 (10–18)	
	5/2	26, 27	24, computer lab	
15	5/9	24, 25	computer lab, check-out	check-out in lab on last day
	5/16		Final exams	

Did I remember to say that the final is mandatory?