CHEM 1984 **CHEMICAL PRINCIPLES** Fall 2013

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OFFICE HOURS: 10-11 MWF ,1-2 T and whenever you see me in the office or in a lab (and not teaching)

COURSE WEBSITE: [**http://web.alfredstate.edu/fongjd/chemprinciples1.htm**](http://web.alfredstate.edu/fongjd/ChemicalPrinciples1.htm)

TEXTS: *Chemistry: An Atoms First Approach*, Zumdahl and Zumdahl, 2012

*Laboratory Manual for Chemistry*, Amman, 2013

There is a study guide and solutions manual available in the bookstore

**Course Mechanics:**

Each Friday you’ll work a quiz covering material covered over the week in lecture including assigned reading and suggested homework.

A total of 5 Challenge/Marathon problems taken from the text or created by the instructor will be assigned over the term. These will be due a week from the assignment date. Exams will be based on quizzes, suggested homework and the many in-class exercises handed out during the class. A course website listed above serves as the repository for answers to the quizzes, marathon/challenge problems, exams and copies of in-class exercises. All Powerpoint lectures and other course documents are likewise accessible at the course website. Extra credit mole bucks are awarded for participation, astute questions, thoughtful commentary and when you catch me in a mistake during lecture or on a handout.

**Attendance and Student Conduct:**

Attendance is up to you. It’s your money and I am not an attendance cop. Not showing up, though, obviously takes you out of the extended conversation we’re to have about my obsession: Chemistry. I will be moving through something new and usually cool every lecture . I don’t review extensively, so try and catch the Chem 1984 show every time it’s playing to keep on top of the story. FYI- absences correlate strongly with poor grades. Please note that if you arrive to class **after** the quiz has been distributed you forfeit that quiz. If you cannot attend the day of an exam or quiz I will need a reason > 8 hours ***in advance*** of the class unless you have a verifiable medical excuse or legitimate personal emergency. Just an e-mail saying you’re `sick’ (=hung over), or, that your hamster died 10 minutes before class is not sufficient. If you do claim sickness, I’ll need definitive proof, not just your word.

I will be honest, civil and tolerant with all of you. I expect the same from you both towards me and your fellow classmates. Nothing kills learning quicker than bad manners and attitude. You will be ejected from class permanently with an Instructor Initiated Drop if you act with chronic and blatant disregard with the Alfred State code of behavior. This policy will be in particular force if you are caught cheating or acting unethically in any way. I detest cheaters.

Anything with a microchip processor is to be stowed and turned off during class, unless you are using some sort of electronic device to take notes.-and only that. I don’t want you `multitasking’. For each 50 minute lecture you’re mine. You’ll be asked to leave the lecture room for that day if you fail to abide by this rule. Facebook, Twitter and G-Chat have eviscerated student attention spans. I want it back.

Most critically, if you have question or problem on what we’re doing in lecture, **for pity’s sake raise your hand and sing out right away!** Nothing is better than spontaneous face-to-face , give and take in the classroom. I want it. Don’t be afraid you’ll `slow me down’ or your question is `dumb’. The sacred kernel of learning is for both teacher and student to be asking questions and discussing answers. This massively successful learning pattern goes right back to Socrates. Of course, if you don’t feel comfortable raising your question in class-see me about it later. My office hours are listed above. Talking with students about Chemistry is what I live for. I am **always** willing to drop whatever I’m doing to help a student.

**Grades/Evaluation:**

The various activities for which formal points are assigned are enumerated below. Extra credit points in the form of mole bucks can be earned as described in Course Mechanics above. 1 Mole $ = 1 point.

Activity points for each total points % of final grade

Quizzes (12, 2 dropped) 30 300 30

Challenge/Marathon problems 10 50 5

Exams (3) 100 300 30

Comprehensive Final 100 100 10

Lab (must pass)1 -- 250 25

Total 1000 100

1A failing grade in lab means you fail the entire course.

**Student Learning Outcomes (SLOs):** At the end of the course students will be able to:

1. Correctly select and and manipulate appropriate units of measurement and demonstrate proficiency in converting these units between various metric magnitudes.
2. Describe the structure of the atom and the relationship to spectrophotometric data.
3. Correctly write chemical formulas of molecular and ionic substances and name them using the Stock method.
4. Perform basic chemical calculations connected to mole-weight conversions; reaction stoichiometry and limiting yields.
5. Describe the intermolecular forces within a solid, liquid and gas, and how these influence their properties.

**SLOs (continued)**

1. Describe the energy exchange during a chemical reaction utilizing calorimetry, enthalpy and Hess' Law.
2. Use quantum numbers to describe the electronic structure of the atom and periodic trends of physical and chemical properties.
3. Demonstrate how ionic and covalent bonds are formed using Lewis rules.
4. Predict molecular geometry and polarity using VSEPR theory and electronegativities.
5. Develop skill in handling laboratory apparatus.
6. List appropriate laboratory regulations and safety procedures.
7. Record, interpret and apply experimental data in an organized fashion.

**Syllabus:**

The broad order of events will go so:

**Weeks Dates Chapters/pages topical coverage**

1-4 8/26-9/20 R, 1,2 review of basic measures; the atomic model

***5 Monday 9/23 Exam 1***

5-9 9/25-10/25 3,4,5 mole calculations; molecular bonding models

***10 Monday 1/28 Exam 2***

10-15 10/30-12/13 6,7,8 Reaction energies; Gas Laws ; Liquid/solid binding models

***15 Monday 12/9 Exam 3***

***16 tba Comprehensive Final***

**Some Final Remarks:**

I have a confession- I am usually far more detailed and specific about course syllabi than what’s above. It’s in my nature to have a well-thought out game plan for an entire semester. My problem is- I’m just not sure what to expect from you. The last time I taught Chemical Principles was 1998, before many of you were even entering kindergarten and phones still had dials. This is not to say that I’m not up to the task- I’ve been a professional chemist for nearly 40 years and have taught college freshmen at Alfred for 20 years- but it’s been a long time between innings for your particular course.

The hiatus has made me wary of being too doctrinaire about how I approach talking about Chemistry with you. You are a whole generation different than the last class of Chem 1984 students I tortured. To make matters worse, you should know that when I wrote *my* Ph.D thesis I did it on an electric typewriter since word processing hadn’t been invented.

All I do know is that you are supposed to be reasonably versed in chemistry from high school courses and are pre-disposed to either like physical sciences or at least are comfortable playing around with that species of concepts and thinking patterns. But that’s thin gruel to start deciding how to pitch an entire game.

So, for the first time that I can remember, I’m going to steam into a course without each week’s marching orders planned well in advance and in minute detail. I’m going to wander around you as a class for a bit to get a sense of what kind of hand I’ve been dealt. This means you have to be up front with me if what I’m doing makes no sense, seems too fast, or too slow. FYI I learn way more from student feedback about how to teach effectively than any teaching workshop or seminar I’ve ever attended. Know that I firmly check my ego and impatience at the classroom door, so you should feel free and unafraid to voice confusions, frustrations and vent if I’m not making things clear.

One more thing: it’s been my experience as both student and teacher that the most fun classes are those where there is free-wheeling give-and-take between students and the instructor. We are social creatures singularly designed to communicate with great facility and sophistication. Don’t punt your species’ edge and clam up. Dialogue not monologue is what we should all strive for every day as we ride in the chemistry bus together this semester.