CHEM 1711/1811

EXPECTATIONS FOR INCOMING STUDENTS

“What does my professor expect me to know, already?” This is a valid concern for any student in any area, but a particularly meaningful one in chemistry. We expect that you have a background in chemistry, mathematics and physics from high school, but recognize that you may have forgotten some specifics or never studied certain details. You will sometimes find it necessary to review topics, or even learn topics from scratch. Your chemistry text will review a few of these in its appendices, or you may want to borrow an appropriate text from the library. If you are struggling with the understanding of a topic, please come to us for guidance.

Below is a list of the more important areas in which we expect you to be skilled to do well in the course.

MATHEMATICS: understanding quantitative relationships, not just memorizing equations (see Appendix A, pp. A1 - A7)

- **Algebraic manipulations**: knowing how to rearrange an expression (e.g., \( y = mx + b \)) to solve it for each parameter
- **Direct and inverse proportions**: expressing relationships algebraically and graphically (A.3)
- **Fractions and percentages**: definition, relative units, how to use them in calculations
- **Linear relationships**: the physics behind the relationship, stating it algebraically \( (y = mx + b) \) and graphically, calculating slopes and intercepts, determining units and meaningfulness
- **Logarithms and exponents**: handling log algebra (A.2), natural and common logs, manipulating scientific notation (A.1)
- **Calculator use**: During quizzes, exams, and lab experiments, you will not be allowed to use a graphing calculator, but, rather, a scientific calculator. Learn to enter and calculate exponents, logs, antilogs and simple statistics functions. Check your instruction manual for help.

PHYSICS: knowing the physical significance of concepts, not necessarily the algorithmic relationships

- **Mechanics**: mass, length, time, velocity, acceleration, force, pressure, kinetic energy, potential energy
- **Wave properties**: light, wave-particle duality, frequency, wavelength, velocity of propagation
- **Electricity and magnetism**: electric charges, charge attraction and repulsion, coulomb’s law, electric current, magnetic fields
- **SI units**: handling the units, prefixes, and quantities in SI (pp. 19 - 29); the names, symbols and values of prefixes

CHEMISTRY: some background terms and nomenclature, basic skills in problem solving, and manipulating concepts

- **Names and symbols of the elements**: We will expect you to know the properly spelled names and corresponding symbols for the elements up to \( Z = 92 \) (uranium).
- **Names of polyatomic ions**: (table 2.5 of the text) know name, corresponding formula with charge
- **Fundamental chemical concepts**: have a working familiarity with the following concepts: atom, element, molecule, formula unit, symbol, chemical formula, acid, base, salt, oxidizing agent, reducing agent, mole, nucleus, proton, neutron, electron, molar mass, atomic number, mass number, isotopes, periodic table, stoichiometry
- **Balancing reaction schemes to generate equations**: (pp. 71-74) writing balanced chemical equations

FINAL CONSIDERATIONS: learning how to learn chemistry

- **Time management**: Study the material one to two hours a day, rather than periods of several hours once a week. Review notes daily in preparation for the next lecture. Read a section of the chapter and, then, do the associated homework problems. Don’t wait until the chapter is finished to do the homework. Correlate in-class discussion with chapter sections. Your lecturer may be covering the material in a different order than the text.
- **Active, versus passive, learning**: Make summaries, highlight notes, do associated problems, derive associated expressions from fundamentals, get involved with your studying. Don’t try to read your text or notes while doing something else (TV, e-mail, etc.).
- **Get active help**: If you do not understand a concept or how to set up a given problem, ask a colleague, a tutor, or (best choice) your instructor. You will discover that we can usually generate several different ways to describe a concept, but only present one in class. During office hours we can help you understand by using alternate explanations. Use our office hours wisely and frequently.
- **Organization**: Keep related materials together by having a notebook for lecture, a separate notebook for homework problems, your lab notebook for in - lab procedures and data collection, and your lab manual for pre-lab lecture notes. A folder for lab reports is also useful.