

**Massasoit Community College**  
**Spring 2012**  
**General Chemistry II, CHEM 152-01**

**Instructor:** Kendra Twomey, PhD

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**Class Times:** M 9 – 10:50 am (lab)  
W 9 – 10:50 am (lecture)  
F 9 - 9:50 am (lecture)

**Office hours:** MW 8-9 am  
T 9 am -10 am  
F 10 am -11 am

**Course description:** This course is a continuation of General Chemistry I (CHEM151). Major topics covered include thermochemistry, thermodynamics, states of matter, solutions, chemical kinetics, chemical equilibrium, electrochemistry, acid and bases, and an introduction to organic chemistry. The laboratory includes classical and spectroscopic techniques. Lecture: 3 hours Laboratory: 2 hours

**Prerequisite:** C- or better in General Chemistry I (CHEM 151), or Permission of Instructor. **Pre/Corequisite:** College Algebra

**Textbook:** Burdge, Chemistry, 2<sup>nd</sup> ed.

Scientific calculator also needed. (No phones for calculators)

A lab notebook will be required. (**No spiral notebooks**)

**Course Objectives:**

- **Thermochemistry:** Know first law of thermodynamic; Differentiate between energy and enthalpy; Perform calculations with Hess's law; Free energy calculations; discuss entropy and state functions

- **Thermodynamics:** Know the second law of thermodynamics; Determine if reactions are spontaneous; Predict entropy signs as positive or negative; Perform standard entropy of reaction calculations; perform standard free energy of reaction calculation and determine the equilibrium constant
- **States of matter:** Determine if molecule is polar using VSEPR geometries and EN; Know the intermolecular forces; Using a phase change diagram, determine the enthalpy and entropy signs; perform calculations using the Clausius-Clapeyron Equation; Draw a phase diagram; Calculate the radius and density of metals using the info from the unit cell
- **Solutions:** Determine heat of vaporization and entropy of vaporization using free energy equation; Determine molarity, mole fraction, mass percent, and molality of a solution; Use Henry's law to determine solubility; Determine vapor pressures using Raoult's law; Calculate osmotic pressures; use and explain the freezing point depression and boiling point elevation;
- **Chemical Kinetics:** Calculate rate of reactions; Determine order of a reaction using various methods; Estimate half-life of a reaction; Draw an Arrhenius plot and determine unknown variables from the plot; reaction mechanisms; use the integrated first and second order rate equations
- **Chemical equilibriums:** Write equilibrium equations; Calculate equilibrium constants; Perform calculations to determine concentrations of reactants and products; Determine effect of catalysis on a system at equilibrium; Calculate rates of equilibrium reactions
- **Acid and Bases:** Determining acid, base, and conjugates; calculate concentrations of ions; calculate the pH and pOH of a solution; determine equilibrium values of acid and base reactions; use and explain the pKa and pKb values; solubility of salts; perform buffer calculations; explain titrations
- **Introduction to organic chemistry:** Name alkanes, alkenes, alkynes, aromatic compounds; identify functional groups
- **Electrochemistry:** Identify parts of a galvanic cell; write chemical equations; Calculate standard cell potentials; Use Nerst equation to calculate cell potentials

in nonstandard conditions; Determine pH of solutions; Calculate equilibrium constants from cell potentials

### **Teaching Procedures:**

- At the start of each lecture class, the previous class's homework will be discussed. New material will then be presented with problem examples. At the end of each class, homework will be assigned and due at the beginning of the next lecture class. Quizzes will be given at the start of the class.
- For the lab, a brief discussion of the experiment and safety issues will be discussed at the beginning of each lab period. Students will work in groups of 2. A lab notebook will be required. Lab reports will be due 1 week from the when the lab was finished.
- Before an exam, a problem session will be done in place of a lab. Problems will be handed out for practice and worked on during the lab period. **You must attend and stay for the full problem session to receive the full lab grade.**

### **Grading Policy**

**Quizzes (15 %):** There will be a total of 8 quizzes. The top 7 quizzes will be averaged together if all 8 quizzes are taken. *No makeups unless you have a written note to excuse you or you have talked to me ahead of time.*

**Homework (10 %):** The assignment will be given at the end of class, and due at the beginning of the next lecture class. **No late homework will be accepted.** If work is required of a problem, the work must be shown to receive credit for the homework. **Homework must be done by a majority of students for problems to be reviewed at beginning of class.**

**Labs (25 %):** Labs will be performed on Mondays. The lab reports will be due a week later. It must be typed. (Lab notebooks account for 10 %, lab reports 10 %, and lab participation 5 %) **Every day lab reports are late, 0.5 points will be deducted for every day it is late from the 10 points total.** Lab notebooks are required at every lab period. Notes must be written in the lab notebook during the lab. I will give a check at the end of each lab to verify that notes/data were recorded. If you are more than 15 min late to lab, the lab will be a zero.

**Exams (50 %):** There will a total of 4 exams (30 %) plus a cumulative final (20 %). *No makeups unless you have a written note to excuse you or you have talked to me ahead of time.*

### **Grading Policy**

The final grade will be based upon quizzes, exams, labs, and homework. If you have a 94, A or better at the end of semester, you will be excused from the final exam.

A	94-100
A-	90-93
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
D-	60-62
F	less than 60

**Attendance Policy:** Students are expected to attend all classes. You are responsible for the material you missed. Contact a fellow student for the material as soon as possible. Lateness to lab will not be tolerated as safety issues and labs procedures will be discussed during the first minutes of labs. If you are more than 15 minutes to late, you will receive a zero for the lab.

**Accommodations:** Students with disabilities who believe that they may need accommodations in the classroom are encouraged to contact a disability counselor as soon as possible. Students with learning disabilities should contact Andrea Henry, at extension 1805. Students with physical disabilities should contact Mary Berg, at extension 1425.

### **Additional Resources**

The Academic Resource Center (ARC), in the Student Union lower level, offers a full range of tutoring and academic support services. Free help either Walk-ins or by appointment.

**Additional Information:**

**NO TEXTING IS PERMITTED IN CLASS. It is very distracting for me and the rest of the class. I want everyone to be focused on the material we are covering. Please turn off cell phones or to vibrate. Do not text during lab either. Chemicals could be harmful to your phone.**

**Please to courteous to your fellow classmates and me.**