Chemistry 102 Summer, 2011 Course Guidelines

Instructor: Daniel Graham, Flanner Hall, Room 401 (office and voice-mail, 773-508-3169); Loyola Chemistry Office: 773-508-3100; FAX: 773-508-3086; email: dgraha1@luc.edu.

Office Hours: MWF 1130 - 1230 or by arrangement.

Class Hours: MWF 0830 - 1120, Flanner Hall 133 (large lecture hall)

Textbook: *Chemistry and Chemical Reactivity*, by Kotz, Treichel, and Townsend, Seventh Edition (This book will be referred to simply as KTT). KTT is the same text used at Loyola University this past academic year. Chemistry 101 during Fall of 2011 will introduce a new textbook: the latest edition in the Brown, LeMay, and Bursten (BLB) series.

The early bird section of summer 2011 Chem 102 will focus on essential material of Chapters 14 – 20, 23, and 24 of KTT. The topics will include:

1. Properties of solutions, mostly ideal ones (Chapter 14).

2. Chemical kinetics, reaction rates, and thermal effects (Chapter 15).

3. Chemical equilibrium states in gas and liquid phases (Chapter 16).

4. Acids and bases: equilibrium states in aqueous solutions (Chapter 17).

5. More aspects of liquid solutions and equilibrium states (Chapters 18).

6. Chemical Thermodynamics: The second law and applications (Chapter 19).

7. Electrochemistry: electrolyte solutions, voltaic, and electrolytic cells (Chapter 20).

9. Nuclear chemistry: reactions, kinetics, and energy considerations (Chapter 23).

10. Chemistry of coordination compounds (Chapter 22, if time allows).

Exams:

There will be three eighty-minute exams and one cumulative final exam. Each exam will consist of questions and problems representative of the text, lecture, and discussion material. All calculations, units, and essays will be entered in a standard blue book provided by the instructor. A calculator, periodic table, and a single page of notes (8.5 x 11 inches, both sides) may be used during each exam.

The single page of notes must be included with the blue book prior to hand-in. Blue books must be signed on the front, upper right-hand corner. Each signature will be taken as a statement of honest, independent work. Instances of academic dishonesty will warrant

immediate failure of the course plus referral to the Arts and Sciences Dean's office. All blue books must be handed directly to the instructor upon completion.

All blue books will be graded and returned as soon as possible, usually the following class period. All grading questions, points of clarification, and grading errors must be brought to the instructor's attention during office hours no later than one week after return of the exam.

Assignment of Grades:

The following scale will be used: 87% - 100% A-, A; 72% - 86% B-, B, B+; 59% - 71% C-, C, C+; 50% - 58% D, D+; < 50% F. Grades will be assigned according to the highest percentage computed the following three ways:

1. The average of the three eighty-minute exams, each weighted 1/3, plus completion of the final exam. Note that attendance and completion of the final exam are mandatory.

2. The average of the top two eighty-minute exams plus the cumulative final. The top two eighty-minute exams will each be weighted 1/4; the final exam will be weighted 1/2.

3. The three-hour final exam by itself. Completion of all three eighty-minute exams is mandatory.

An aim of the grading policy is to allow time and incentive for improvement. As with many subjects, chemistry is not easy to learn. The process, however, is rewarding if daily effort is made to master the fundamentals as they appear. Students are urged to contact the instructor to discuss problems before they become serious.

Assignments:

Multiple assignments will be emailed based on the text and lecture materials. Students are urged to work as many assigned problems as possible with the help of each other and the instructor. Completion and hand-in of each assignment will warrant one point of credit applied to the up-coming exam.

Chem Coaching:

The lecture hall is free for an hour or so after the MWF morning sessions. This offers office hour time and space for Q&A, diagnostics, practice problems, and litmus tests.

Other emails:

There will be multiple hand-outs during the semester. These will include assignments, old exams, and instructor work. Errors should be brought to everyone's attention as soon as possible.

Schedule:

The typical class day will feature lectures, discussion, and litmus tests with breaks somewhere in-between. Exam days will begin with the exam at 0830 followed by class sessions and breaks.

M   070411   **Day-After Independence Day Holiday** ☺ ♫

W   070611   First Day of Class. We will begin with Chapter 14 on Solution Properties.

F   071511   **Exam I at 0830:** Material of Chapters 14 - 16 will be emphasized.

W   072711   **Exam II at 0830:** Material of Chapters 16, 17 and 18 will be emphasized.

F   080511   **Exam III at 0830:** Material of Chapters 19 and 20 will be emphasized.

W   081011   Last lectures, discussion, i-dotting and t-crossing.

F   081211   **Cumulative Final Exam at 0830.** Attendance and completion of the final exam are mandatory.

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Ye Olde Chemistry 102 Assignment Number One
Handed Out: Wednesday, July 6, 2011
Due at Beginning of Class: Friday, July 8, 2011

Please...

> *Show all work clearly and thoroughly,*
> *Use a staple or paper clip for multiple pages,*
> *List collaborators and sources,*
> *Seek help when necessary.*

Please solve and write up the following textbook problems about solution properties. The problems begin in KTT on page 648.

14.1   basics and gotta' knows
14.3   ditto
14.5   working in the Flanner Hall stockroom
14.11   lithium ions are a resource of increasing value
14.23   every car has a radiator of some type
14.24   biology lab?
14.25   this problem is more challenging
14.26   tedious and probably boring but worth the effort
14.27, 14.31, 14.33, 14.36, and 14.37 all deal with chemical lab measurements of yesteryear.

The concepts are basic and gotta' knows.

As for **Chapter Fourteen** in general, let us focus on:

Section 14.1--both qualitatively and quantitatively

Section 14.2--qualitative aspects

Section 14.3--some other time, say, in Chem 303.

Section 14.4--We need to know Raoult's Law, boiling point elevation, and freezing point depression really well. Let's skip over osmotic pressure. The applications are more complicated than the book implies.

Section 14.5--Interesting, but let's skip this section for summer Chem 102 as well.

<p style="text-align:center">***</p>

Ye Olde Chemistry 102 Assignment Number Two
Handed Out: Friday, July 8, 2011
Due at Beginning of Class: Monday, July 11, 2011

Please...
> *Show all work clearly and thoroughly,*
> *Use a staple or paper clip for multiple pages,*
> *List collaborators and sources,*
> *Seek help when necessary.*

Please solve and write up the following textbook problems about solution properties. The problems begin in KTT on page 712.

15.1:   real basic and gotta know.
15.3:   ditto
15.5:   draw a picture and interpret it
15.7:   probably quick and easy, but the take-hope lesson is very important
15.9:   a typical kinetics Q; gotta know
15.11:   ditto. Real data, however, are never this clean
15.15:   typical problem. What units importantly attach to k????
15.17:   this is a kinetics problem with twist; gotta know it
15.19: H_2O_2 is a cheap low tech germicide, among other things.

Let's try a Doris problem: Doris discovers that molecule B dies via a reaction with rate constant k = 0.15 liters/mole-hour.

(a) What is the reaction rate when [B] equals 10.0 moles per liter?
(b) What is the reaction rate when [B] is 20.0 moles per liter?
(c) What is the differential rate law for molecule B?
(d) What is the integrated rate law?
(e) If the initial concentration of B is 2.50 moles per liter, how many seconds will it take for the concentration to drop to 0.750 moles per liter?