

CHEM 151: Applied Chemistry

Instructor:

Lecture: Daniel A. Kleier, 414 Stratton Hall, tel. 215 895-1861; email: dak48@drexel.edu
Office Hours: Thursday from 10:30 AM to 1:00 PM

Laboratory Instructors:

Ms. Ying-ying Dong

(Sect 061 on Wed at 9:00 AM, Sect. 065 on Tue at 10:00 AM,)

Mr. Andreas Mylonakis

(Sect 063 on Wed at 3:00 PM, Sect 064 on Tue. at 1:00 PM)

Mr. Neil Mukherjee

(Sect 062 on Fri at 11:00 AM, Sect. 066 on Mon. at 11:00 AM, Sect. 67 on Mon. at 3:00 PM)

Ms. April Holcomb

(Sect. 069 on Thursday at 1:00 PM)

Required Textbooks and Materials: -

- (1) "The Chemistry of Everything" by Kimberley Waldron; Pearson-Prentice Hall, 2007, Upper Saddle, New Jersey and
- (2) "Experiments in General Chemistry Laboratory Manual", by Sally Solomon and Susan Rutkowsky; Wiley; 2006, New York and
- (3) Safety Glasses (book store)

Objective: Covers physical and chemical properties of substances used in consumer products. Provides qualitative introduction to required principles, including atomic structure and the elements, bonding and compounds, and the chemistry of carbon compounds and polymers. Uses examples from the areas of food and nutrition, pharmacology, and the petrochemical industry.

Exams and Grade Breakdown

Coverage on exams will be announced in lecture.

Any material included on an hour exam will have been covered either in lecture or in homework problems.

	Time	Date	Room(s)	Contribution to final grade
Exam 1	7:55 AM	Wed., Apr. 25	Nesbitt 111	20%
Exam 2	7:55 AM	Wed., May 23	Nesbitt 111	20%
Final	TBA	TBA		35%
Lab				25%

NO MAKE UP WILL BE GIVEN FOR ANY EXAMS.

THE SCORE FOR A MISSED EXAM WILL BE REPLACED BY YOUR SCORE ON THE FINAL EXAM.

STUDENTS MUST BE PRESENT FOR THE FINAL EXAM.

THE FINAL EXAM WILL BE CUMULATIVE.

LABORATORY ATTENDANCE IS MANDATORY (See below for details).

Tentative grading scheme

A+ = above 96, A = 92 to 96, A- = 88 to 92,
B+ = 84 to 88, B = 80 to 84, B- = 76 to 80,
C+ = 70 to 76, C = 64 to 70, C- = 58 to 64,
D+ = 54 to 58, D = 50 to 54,
F = below 50.

Graduating senior exam policy: Averages for seniors will be calculated at the end of the 9th week. This average will include the two mid-term exams and eight labs. The exams will be weighted as 75% of the grade and the labs as 25%. If this estimated average is passing, a graduating senior will have the option of accepting the grade and being exempt from the final. Otherwise, graduating seniors will take an early final during tenth week of course.

The last day to withdraw from CHEM 151 is Friday of the sixth week of classes (May 11th).

SCHEDULE OF LECTURE TOPICS, RELATED TEXT MATERIAL AND HOMEWORK ASSIGNMENTS

Unless otherwise indicated in class the following chapters and sections will be covered. Problems listed appear at the end of each chapter. Work and understand them all! You must be more than a spectator to do well in the course. You will see problems like those in the homework on the exams.

CHAPTER 1: "Everything"; Sections 1 – 4, and 6
Probs: 2 3 4 6 9 10 12 15 20 21 24 28 39 48

CHAPTER 2: "Dirt", Sections 1 through 5
Probs: 3 4 5 10 11 12 14 15 17 18 22 24 25 32 34 35 43

CHAPTER 3: "Diamonds", Section 1 through 8;
Probs: 1 4 5 7 15 18 22 24 26 32 35 37 38

CHAPTER 4: "Salt"; Sections 1 – 4, 6 and 7
Probs: 5 7 8 9 14 19 20 22 29 32 39 43

CHAPTER 5: "Film", Sections 1 - 3 and 6 - 8;
Probs: 1 5 7 10 12 14 17 20 24 27 28 40

CHAPTER 9: "Explosives"; Sections 1 - 5
Probs: 1 2 3 5 10 12 17 18 20 23 28 30 33 45

CHAPTER 10: "Chains I"; 1 - 3
Probs: 2 4 6 8 17 19 25 28 36

CHAPTER 11: "Chains II"; Sections 1 - 3;

Probs: 1 2 6 8 11 12 17 18 25 34 39

CHAPTER 12: "Groceries"; Section 4 only;

Probs: 1 24 19a,d 25

CHAPTER 13: "Drugs I" ; Section 1 - 3;

Probs: 2 5 6 7 8 9 17 19 26

CHAPTER 14: "Drugs II"; Sections 1 and 5.

4, 5, 9, 21

You are responsible for all material covered in the lectures. Any material covered in a lecture may be the subject of an exam question. Some of the material covered in lecture may not appear in either the text, or on Vista Blackboard postings. Students who regularly attend class should thus experience an advantage on exam questions that cover this material.

Laboratory

Required: Safety Goggles and "Experiments in General Chemistry Laboratory Manual" by Solomon and Rutkowsky (both are at the Book Store)

You may also find the indicated sections of the Waldron text to be of value in understanding the conceptual background for many of these experiments.

Safety Glasses must be worn at all times in the laboratory.

LABORATORY ATTENDANCE IS MANDATORY.

All lab reports must be turned in to instructors.

Week Experiments

- 1 No labs the first week of classes. Lab begins second week of classes
- 2 #1 Density Experiment and average thickness of aluminum foil (handout)
- 3 #2 Boyle's law(Lab report must include 2 graphs of volume(Y-axis) versus 1/pressure and 2 graphs of pressure versus volume, and calculations of the Boyle's law constant (using a spread sheet for the calculations and the computer to make the graph and to get the slope will save time; you may use graph paper).
- 4 #6 Beer's Law (Lab report must include a graph of absorbance (y-axis) versus wavelength and a graph of absorbance (y-axis) versus concentration as well as calculations: also determine the concentration of the unknown cobalt solution from the absorbance versus concentration graph)
- 5 #10 Titration of acetic acid in vinegar (Lab report must include a graph of pH (y-axis) versus volume of sodium hydroxide used as well as calculations: the % concentration of acetic acid in the vinegar; compare this % value to the value on the bottle of vinegar (a hand out will be given for calculations and changes) Experiment # 10 parts A and C using vinegar as modified.
- 6 #19 Analysis of phosphorous in plant food (calculations are required and a handout will be given for this; compare your answer to the value on the box of the plant food).
- 7 #20 Preparation of salicylic acid from aspirin: Parts A and B
- 8 #20 & #12 Continue last week's lab part D (Lab report: record mass of all products and answer questions) and Voltaic cell (batteries). In anticipation of Memorial Day holiday, Monday labs will also have demonstration of soap preparation.
- 9 H Preparation of soap from fat (Lab report: record mass of the soap and observations of reactions; allow soap to dry over the week and note its appearance) - A handout.
- 10 #25 Water of hydration in copper sulfate -- a hand out (Lab report: calculations to be done in Lab) Turn in reports at end of this lab and any late lab reports

Some lab reports will be completed in the lab and turned in the day of the experiment. Other lab reports are due the week following the completion of the experiment at the next lab as announced by the instructors. A late penalty of 15% off will be assessed for late lab reports. All lab reports must be "turned in" by the last lab period of the term for your section. Failure to turn in lab reports will result in a 50% for that lab period. **Each student is to turn in their own lab report with calculations and graphs.**

Every week the instructor is to sign or initial you data sheets for the data collected that day.

Roll will be taken each week and your attendance will be recorded. You must show up for lab on time. Lab attendance is required.

If you fail the lab you fail the entire course even if you are passing the lecture. A 60% or higher lab average is required to pass the lab.

You will be able to drop your lowest lab grade. Your lab grade will be calculated on the best 8 grades out of 9. Each week counts as a lab period and a grade; if you miss either half of a two week experiment you must still do the other half of the experiment. A missed lab period counts as a zero and would be your lowest grade. Therefore missing 2 labs will result in a much lower grade because the second zero lab will be averaged into your grade.

There are no make up labs. Missing 4 or more lab periods will result in failure of the entire course. Unless one has a proven medical excuse or other valid excuse for missing the labs, you will have to complete the labs another term.

Lab sections: All labs meet in Disque Hall 309.

Note: Snow closing: phone 215-895-melt, Drexel Web page, the day snow closing number is 103 for KYW Radio (2103 for night school)