

**Chemistry 122 – Elementary Chemistry Lab II**  
*Spring 2009 Syllabus*

**Instructor:** Dr. Randy J. Arnold  
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**Office hours:** Tues. 11:15-12:15; Thurs. 1:15-2:15 PM in SI120C  
**Lecture:** Tues. 10:10-11:00 AM in CH 001  
**Laboratory:** Thurs. 4:00-7:00 PM in CH 027  
**Website:** <http://courses.chem.indiana.edu/c122/default.asp>

**Associate Instructor:** Tim Tatge  
**Office:** Chemistry 641  
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**Office hours:** Thurs. 3:00-4:00 PM in CH 046 – or by appointment

**Required Materials:** “IU Chemistry Laboratory Notebook” published by Hayden-McNeil (a 100-page carbonless set laboratory notebook)  
Lab descriptions will be available on the course website  
Lab safety goggles  
Calculator

**Course Objectives:** To learn fundamental laboratory skills in organic chemistry and biochemistry and develop analytical and problem solving skills.

<b>Grading:</b>	
Best 10 of 11 experiments @ 100 points each	1000 points
Midterm exam	200 points
<u>Final exam</u>	<u>200 points</u>
Total	1400 points

Grading scale:

A+	1358-1400	B+	1218-1259	C+	1078-1119	D+	938-979
A	1302-1357	B	1162-1217	C	1022-1077	D	882-937
A-	1260-1301	B-	1120-1161	C-	980-1021	D-	840-881

**Experiments:** Each experiment will be worth a total of 100 points. Ten to twenty points can be earned by correctly completing the prelab assignment. The remaining points can be earned by submitting the completed laboratory report from your lab notebook.

**Laboratory Makeup Policy:** There will be no make-up labs offered. For this reason, the lowest lab grade is automatically dropped. This policy allows students to miss a lab period without a grade penalty.

No other labs will be dropped for any reason.

Failure to complete three (3) or more of the eleven (11) laboratory experiments will result in an automatic grade of F for the course.

**Due Dates:**

The prelab assignment is **due prior to the beginning of the lab period** when you will be performing the lab.

The laboratory report must be completed and turned in to your AI **one week** after completing the experiment. Questions for the report are given in the laboratory manual. **Twenty (20) points** will be deducted for each day the report is late.

**Student Policies:**

Students can find policies regarding drop/adds, incompletes, drop dates, and student etiquette at the **Policies for Students** link on the course homepage.

**Academic Misconduct:**

You are advised to read the *Code of Student Rights, Responsibilities and Conduct*, a document from the Student Ethics Office located at 705 E. 7<sup>th</sup> Street. Essentially, it is the instructor's decision, based on evidence and student interviews, whether misconduct has occurred. The sanctions made against a student committing academic misconduct may range anywhere from deduction of points to awarding of a failing grade for the entire course. In this course, a grade of zero (which cannot be dropped) will be given for plagiarism on a laboratory report, fabricating data for a lab, or cheating on an exam. Any "repeat offenses" will result in the maximum penalty – a failing grade for the course – being enforced. All cases of academic misconduct will be immediately reported to the Dean of Students as well as the dean or director of the student's school.

**Laboratory Rules:****1. Attire**

- Safety goggles must be worn at all times in the laboratory. You will receive a 10-point deduction from your laboratory report score each time your AI sees you without your goggles on during the lab. If you forget your goggles, go back and get them or buy a new pair. The stockroom does not loan goggles.
- Contact lenses should not be worn in the laboratory.
- Long pants, shirts with sleeves and closed toed shoes must be worn in the laboratory. No miniskirts or bare midriiffs are allowed.

**2. Tardiness**

- If you are more than 10 minutes late to lab, 10 points will be deducted from your lab report. It is important to be on time because the AI outlines lab procedures and safety measures at the beginning of each lab period. If you are more than 20 minutes late to lab, you must work on the experiment without a partner. You will not be permitted to use another student's data to finish the experiment.

### C122 Laboratory Schedule – Spring 2009

Week Starting	Lecture (Tues)	Laboratory (Thurs)
Jan. 12	Introduction	Introduction / Check-in / Lab Safety
Jan. 19	Molecular Modeling	Expt 1: Molecular Models
Jan. 26	Geometric Isomers	Expt 2: Geometric Isomers
Feb. 2	Vitamin C Analysis	Expt 3: Vitamin C Analysis
Feb. 9	Esters	Expt 4: Esters
Feb. 16	Combinatorial Analysis of Antibiotics	Expt 5: Combinatorial Synthesis of Antibiotics
Feb. 23	Gas Chromatography I	Expt 6: Gas Chromatography I
Mar. 2	Gas Chromatography II	Expt 7: Gas Chromatography II
Mar. 9	Midterm exam	No lab
Mar. 16	SPRING BREAK	
Mar. 23	Bioanalytical Spectroscopy I	Expt 8: Bioanalytical Spectroscopy
Mar. 30	Bioanalytical Spectroscopy II	Expt 9: Applications of Bioanalytical Spectroscopy
Apr. 6	Blood Hemoglobin	Expt 10: Blood and Hemoglobin
Apr. 13	DNA Purification and Analysis	Expt 11: DNA Purification and Analysis
Apr. 20	Review	No lab
Apr. 27	Final Exam	No lab

## Laboratory Reports for C122

### GENERAL INFORMATION

- Lab reports are due at the beginning of the next laboratory after the experiment is performed.
- If you know you will miss lab, e-mail your AI to set up a time to turn in the lab report that is due prior to missing the lab.
- A 20% penalty will be taken for each day a lab report is turned in late.
- Lab reports consist of the following:
  - 1) Purpose or question. What is the goal of this lab?
  - 2) Procedure (adapted from your lab handout, with additions as needed)
  - 3) Results and Observations
  - 4) Answers to the questions posed in the lab description, including calculations
  - 5) Discussion

### PURPOSE

- A brief statement or two describing the experiment and why it is being done.

### PROCEDURE

- Written in your own words, this section describes the experiment in enough detail for someone else with the same materials to produce the same result.

### RESULTS AND OBSERVATIONS

- In your laboratory notebook, use the Results and Analysis section to record procedures, data and analysis.
- All entries must be made in **permanent ink**.
- At no time should original data be altered, erased, or covered using white out. Errors in calculations or observations may be noted by drawing a single line through the mistakes. (This way you can later remember and learn from mistakes).
- Enter all data and answers in a clear and organized manner.
- Clearly label all entries, **including units!**
- Attach all plots, spectra, or additional pages to the Results and Analysis section before submitting your report.

### DISCUSSION

- This section provides an overview of the experiment and a very brief summary of the results. The discussion addresses whether the objectives of the experiment were met.
- **Make sure all your claims are supported with data.**
- The accepted standard for scientific papers is use of third person (**do not use “I” or “we”**) and past tense (since the experiment was already completed!).
  - I weighed out 25.0 grams of NaOH. (incorrect)
  - 25.0 grams of NaOH was weighted out. (correct)
- Writing quality: points will be deducted if your writing lacks clarity, grammatical correctness, punctuation, or contains misspelled words.
- References: If you are asked to compare your results to literature sources, be sure to **cite all sources** you use whether it is a textbook, lab handout, internet, or journal articles.

## NOTES ON PLAGIARISM

Again, remember that your lab report **must be your own work**, even though you worked with a partner during the laboratory period. Each student must complete all calculations and submit reports on his or her own, and any evidence of copying or cheating will invoke the strict penalties found in the syllabus.

## Discussion for a Hot Pack/Cold Pack experiment

### Bad Discussion:

This was a fun lab. We used a coffee cup to determine if various salts would make a good hot pack or a good cold pack. First I added the different salts to a coffee cup with water in it. My lab partner and I then took the temperature of 15 minutes. Lithium bromide and ammonium acetate would be good cold packs and potassium nitrite and magnesium sulfate would be good hot packs.

### Good Discussion:

When metal salts dissolve in water they will either release heat or absorb heat. In lab, four salts were tested to determine if they would be useful in making a hot or cold pack. The experiment setup consisted of a coffee cup containing room temperature water, a lid for the coffee cup and a temperature probe. After the salt was added to the coffee cup, temperature readings were taken for 15 minutes. The temperature change that occurred was determined by extrapolating the final temperature from a plot of temperature versus time. A positive change in temperature indicated that the dissolved salt released heat, an exothermic reaction. A negative change in temperature indicated that the dissolved salt absorbed heat, an endothermic reaction. From the resulting data, Magnesium sulfate (change in temp = +3.4 °C) and potassium nitrate (change in temp = +6.4 °C) would be excellent salts to use in hot packs since they both released heat into the surrounding. Lithium bromide (change in temp = -10.6 °C) and ammonium acetate (change in temp = -2.8 °C) both absorbed heat from the surrounding, so they should be selected for cold packs.