

# CHM 451: Capstone Laboratory Experience

## York College of PA

Instructor: Dr. William H. Steel

Office: C-212 (815-6485)

Office Hours: Monday, Wednesday, and Friday 9 – 10 am

Tuesday and Thursday 12:15 – 1:15 pm

(also available by appointment)

Semester: Spring 2011

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### Textbook

No text is required for this course. Handouts of reading material will be made available as needed.

### Description

This is an advanced laboratory course that will review and expand upon several experimental characterization techniques covered in previous chemistry courses as well as introduce new synthetic procedures and characterization methods.

**Prerequisites:** Students in this course should have successfully completed or be concurrently enrolled in CHM 346 and CHM 338.

### Objectives

It is the goal of this course to simulate the environment present in a graduate school research group or industrial lab in order to prepare students for the challenges they will face there. Students will improve their problem-solving and record-keeping skills. Students will learn how to effectively collaborate with one another. Students will learn how to integrate their own knowledge of the various sub-disciplines within chemistry to solve more general problems posed by the instructor.

### Attendance Policy

It will be essential for you to attend class regularly. Class attendance will be used as a criterion for evaluating your performance. If you are absent from class, it will be your responsibility to contact me before the start of the next class meeting to receive information about topics covered or important announcements that you may have missed.

### Techniques

This class will meet once a week for a three hour period. A portion of the time will spent at the beginning of each class reviewing the experimental procedures to be used for that day. Most of the remaining time will be spent in the laboratory collecting or analyzing data.

### Safety Information

Your instructor will discuss information on proper handling and disposal of chemicals and general laboratory safety at the first class meeting. A quiz will be taken by all students at the second class meeting to verify that the rules are understood. No laboratory work can begin until students have a perfect score on this quiz. Consult the Material Safety Data Sheets for each of the chemicals used in the experiments if you have additional questions about appropriate use and the known hazards. These are available online (see links from the course webpage). Remember that the MSDS's are typically available for the most concentrated or purest form for the chemical. If the chemical is used in the laboratory in a diluted form (or in a solution, instead of as a solid) some of the safety hazards are less than as listed on the MSDS. However, the MSDS's are the standard form for communicating hazard information, and we will use them and make note of the differences.

### Laboratory Conduct

You are responsible for the equipment and chemicals used during the semester. Be sure to clean all work areas and return all of the equipment when you finish the work for the day. We supply safety glasses or goggles. **YOU MUST WEAR THEM AT ALL TIMES IN THE LAB**, even if you wear prescription glasses. The safety glasses should be returned to the instructor for sterilization after each use. Sandals are not permitted in the laboratory. Many times chemical waste cannot be flushed down the drain. Pay attention to the specific directions for each experiment. The balances used in the lab are quite expensive and should be used with care. **USE CAUTION TO AVOID SPILLS WHICH MAY PERMANENTLY DAMAGE THE BALANCE.** Please keep the balance area clean (there is a small brush nearby to remove spilled solids from the balance area).

### **The Notebook**

Students must purchase a bound laboratory notebook and maintain it for the duration of the course. This will contain a log of all activity (notes, objectives, hypotheses, data, analyses, conclusions). All entries need to be dated and signed. Students should write in this notebook as they are completing the laboratory tasks, not at some later point. Records should be complete and in ink. If errors are discovered, they need to be struck out with a single diagonal line (so that the original can still be read). Computer analyses or data from an instrument (such as spectra) may be printed out and pasted into the pages of the notebook. These ought to fit within the margins of the notebook or be reduced in size so that they do. Pages should all be numbered. A table of contents should be kept on the first page. Material for a given experiment can be dispersed throughout the notebook, but when there are jumps, a note at the bottom of the page (“project continues on page xx”) must appear.

### **The Grade**

A course grade will be determined based on the submitted laboratory notebook and the following rubric:

- 4 Lab work is complete (all necessary data has been collected). Analyses and conclusions are all correct. If errors exist, they are minor and do not influence the basic results. Lab time is properly documented. Attendance, punctuality, and participation are excellent.
- 3.5 Lab work is complete (all necessary data has been collected). Analyses and conclusions are complete, but one or two serious errors or omissions exist. Lab time is properly documented. Attendance and punctuality are excellent and participation is meaningful.
- 3 Lab work is complete (all necessary data has been collected). Analyses and conclusions are complete, but serious errors or omissions exist in three or more places. Lab time is properly documented. Attendance is excellent, punctuality is an issue, and participation is meaningful.
- 2.5 Lab work is complete (all necessary data has been collected). Analyses and conclusions suffer from major errors or omissions in many places. Documentation is somewhat complete and easy to follow. Attendance has become an issue, punctuality is poor, and/or participation is sparse.
- 2 Lab work is complete (all necessary data has been collected). Analyses and conclusions have been attempted, but much of it is incorrect or incomplete. An attempt was made to maintain adequate records, but they are not complete or are not properly formatted. Attendance and punctuality are both poor, and participation is sparse.
- 1 Lab work is nearly complete (most if not all necessary data has been collected), but little to no analysis has been performed. Attendance and punctuality are both poor, and participation is sparse.
- 0 Lab work is far from complete (several pieces of necessary data have not been collected). Attendance and punctuality are both poor, and participation is sparse.

### **Academic Standards**

As upperclassmen, by now you are well aware that any work you submit for this course must be your own. Academic dishonesty will not be tolerated at York College. Academic dishonesty refers to actions such as, but not limited to, cheating, plagiarism, fabricating research, falsifying academic documents, etc., and includes all situations where students make use of the work of others and claim such work as their own. When an instructor believes that a student has committed an act of academic dishonesty, the instructor must provide written notification to the student, the Department Chair, and the Dean of Academic Affairs of the charge and the sanction. Documentation related to instances of academic dishonesty will be kept on file in the student’s permanent record. If the academic dishonesty is the student’s first offense, the instructor will have the discretion to decide on a suitable sanction up to a grade of 0 for the course. Students are not permitted to withdraw from a course in which they have been accused of academic dishonesty. More than one instance of academic dishonesty is usually grounds for dismissal from the college. See the Student Handbook for more details concerning this policy.

### **Writing Standards**

As recommended by the Faculty Senate and stated in the College Faculty Manual: “York College recognizes the importance of effective communication in all disciplines and careers. Therefore students are expected to competently analyze, synthesize, organize, and articulate course material in papers, examinations and presentations. In addition, students should know and use communication skills current to their field of study, recognize the need for revision as part of their writing process, and employ standard conventions of English usage in both writing and speaking. Students may be asked to further revise assignments that do not demonstrate effective use of these communication skills.”

**ALL DETAILS OF THIS SYLLABUS ARE SUBJECT TO REVISION BY THE INSTRUCTOR**