

CHEM 000: Laboratory Teaching Methods

Syllabus for Fall 2011

Instructor: Holly D. Bendorf

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Meeting Time: Mondays from 10:15 – 11:05 am in room 209, plus 3 – 5 hours of practical experience per week.

Office Hours: By appointment or drop-by.

Course Description: This course provides students with practical experience in laboratory teaching. Students in this course are paired with a faculty mentor and help supervise labs, deliver prelab lectures, assist in ordering chemicals and help prepare laboratory experiments. Students will complete a project that integrates the chemical education literature, classroom instruction materials, laboratory safety and chemical procurement, storage and disposal.

Text: There is not a formal textbook for this course. Rather, we will make use of the chemical education literature such as the *Journal of Chemical Education* and American Chemical Society publications, such as *Chemical Safety for Teachers and Their Supervisors, Grades 7-12*.

Learning Goals: At the conclusion of this course, the student should be able to:

- Use the chemical education literature to find laboratory experiments for use in class
- Adapt experiments from the literature for use in class
- Prepare prelab lectures and other materials as needed for laboratory instruction
- Identify and order equipment and chemicals needed for experiments
- Prepare solutions and reagents for use in class
- Determine the appropriate methods of chemical storage and disposal
- Demonstrate a thorough knowledge of laboratory safety.

Grading Criteria:

Chemistry Competency Exam	Passing grade required
Laboratory Instruction Project	20%
Prelab lecture*	20%
Evaluation of work as a teaching assistant*	20%
Lab Preparation Quiz	15%
Laboratory Safety Quiz	15%
Attendance*	<u>10%</u>
	100%

* Grades assigned in consultation with the laboratory instructor.

Final Grade	Final Average	Interpretation
A	>90%	Student has demonstrated mastery of the concepts and the application of the concepts to new problems. Exceptional work.
B	80-90%	Student has demonstrated mastery of the concepts at a high level. Above average work.
C	70-80%	Student has demonstrated satisfactory knowledge of the material. Average work.
D	60-70%	Student has demonstrated rudimentary knowledge of the course material.
F	<60%	Unsatisfactory performance in course. A failing grade in the course may also result from academic dishonesty or from excessive unexcused absences.

Chemistry Competency Exam: This exam is required of all seniors, as part of their capstone experience (CHEM 000, 449, 470, or 490). The exam is intended to assess whether a student has the fundamental skills that would be expected of a college graduate who has completed a major in chemistry. A passing grade on the exam is a requirement for satisfying the capstone requirement. Students will have three opportunities to take and pass the exam. The first opportunity will be on Friday, September 2 at 3:15 pm. The second and third exams will be given in January and March of 2012. If a student does not pass the first exam, she/he will receive a grade of incomplete for the course. The grade will convert to a letter grade when the student passes the competency exam.

Laboratory Instruction Project: This project will guide you through the planning and preparation involved in introducing a new lab experiment to the curriculum. In this project, you will search the chemical education literature for a published experiment for use in a high school laboratory, identify the learning goals/objectives of the experiment, generate classroom materials for the experiment (prelab lecture, handouts, lab response sheets, etc.), determine the chemicals and equipment needed, and address chemical storage, lab safety and disposal considerations. Drafts of each section will be submitted during the semester. A final draft of the entire project is due at the last class meeting.

Prelab Lecture: Each student will deliver at least one prelab lecture during the semester, chosen in consultation with the laboratory instructor. Class time will be reserved for practice talks. Prelab lectures are evaluated using the following criteria:

- Content
- Organization and clarity
- Appropriate use of demonstrations, props, and/or a/v equipment
- Delivery

Evaluation of work as a teaching assistant: Teaching assistants will be evaluated on performance in the areas listed below. A detailed list of TA guidelines and expectations will be provided in class.

- Preparation for lab
- Attendance and punctuality
- Professionalism in and out of lab
- Safety
- Grading

Lab Preparation Quiz: This quiz will cover solution preparation, mole calculations and other relevant quantitative skills that are reviewed in class. A non-programmable calculator can be used on this quiz. Web-enabled devices and cell phones may not be used as calculators.

Laboratory Safety Quiz: This quiz will cover safety in the chemical laboratory and will be based on the assigned reading.

Attendance: Attendance at all lab periods and CHEM 000 meetings is mandatory. Arriving late or missing a lab or class meeting will result in a significant deduction from the attendance grade.

Academic Integrity: Be aware that in accordance with the College's policy on academic honesty, any work you submit must be your own. Any instances of plagiarism will be severely penalized.

Course Schedule:

Week of:	Topic	Preparation for Class*
8/29	1	Course Overview, discussion of TA responsibilities
9/5	2	Giving Prelab lectures Meet with lab instructor to choose prelab lecture
9/12	3	Prelab lecture practice Due: prelab lecture outline and copy of lab
9/19	4	Searching the Chemical Education Literature
9/26	5	Lab preparation, preparation of solutions Review concentration units and calculations
10/3	6	Ordering chemicals and equipment Due: learning goals of experiment
10/10	7	Lab preparation quiz Bring a non-programmable calculator
10/17	8	Preparing class materials Due: chemical and equipment order
10/24	9	Laboratory Safety Due: draft of written course materials
10/31	10	Chemical storage and disposal Due: list of safety considerations for the experiment
11/7	11	Meet to discuss progress on project Due: statement addressing chemical storage and disposal issues related to the experiment
11/14	12	Laboratory Safety Quiz
11/21	13	Thanksgiving Break
11/28	14	Meet to discuss progress on project Due: outline of prelab lecture topics for experiment
12/5	15	Laboratory Instruction Project Due

***All assignments due at the start of our weekly meeting (assignments can be submitted by e-mail, when appropriate). Late assignments will be penalized 10% per day. No work will be accepted after the last class meeting.**