

**GEORGIA PERIMETER COLLEGE**  
**DIVISION OF SCIENCE**  
**COMMON COURSE OUTLINE**  
**REVISION DATE: May 2005**

<b>COURSE ABBREVIATION</b>	CHEM 1212L
<b>CREDIT HOURS</b>	1 semester hour
<b>COURSE TITLE</b>	PRINCIPLES OF CHEMISTRY LABORATORY II
<b>COREQUISITES</b>	CHEM 1212

**CATALOG DESCRIPTION**

Laboratory exercises supplement the lecture material of CHEM 1212.

**EXPECTED EDUCATIONAL RESULTS:**

Upon successful completion of a laboratory course in chemistry, the student should be able to:

1. carry out, properly record and interpret quantitative experiments.
2. identify patterns in a set of observations.
3. design a data table which summarizes a set of experimental data.
4. organize data from experiments into graphs or charts in order to illustrate and determine patterns.
5. express as a graph a set of data containing two variables.
6. use experimental results to draw a reasonable conclusion which can be extrapolated to the results of similar situations.
7. express a mathematical relationship in the form of a written statement.
8. use standard reference books to compare experimental results with accepted values.
9. relate the data acquired in the lab to theory, drawing conclusions about the relationships studied.
10. demonstrate with appropriate safety precautions, the correct use and handling of laboratory equipment and chemicals.

**GENERAL EDUCATIONAL OUTCOMES**

- I. This course addresses the general education outcome relating to communications as follows:
1. The student must become proficient in the comprehension of technical text. Using a laboratory manual, class handouts, and instruction sheets for laboratory equipment meets this goal.
  2. The student will develop discriminatory listening skills to efficiently process the pre-laboratory lecture information. These sessions provide details that either the laboratory or lecture texts do not address. Further, students must often talk with peers in informal problem solving sessions.
  3. The student develops his or her ability to transcribe learned ideas to the written form as assessed by written solutions to problem sets, written laboratory reports and responses to computerized laboratory reports.

4. The student will develop organizational skills through transcription of procedural outlines to a personal laboratory notebook. Laboratory reports require tabulation and summarization skills to develop the Data, Calculations, Results, and Conclusions sections of the laboratory notebook successfully.
- II. This course addresses the general education outcome of mathematical idea usage and applies the scientific method as follows:
- III. This course addresses the general education outcome relating to showing the effective individual and group solving and critical thinking skills in a variety of ways:
1. The student is encouraged to resolve questions in the laboratory by discussion with the instructor and with peers. The group formulates possible solutions, yet the student is ultimately responsible for the decision made.
  2. Written evaluations employ both objective and subjective questions that require the student to apply the newly learned ideas to a similar situation.
  3. Instructors sometimes conduct weekly Oral evaluations in these sessions to assess the level of the student's understanding of procedural and theoretical ideas and to evoke deeper reflection by the student on the work here.
- IV. This course addresses the general educational outcome relating to recognizing and applying scientific inquiry in a variety of settings as follows:
1. The student is encouraged to identify theoretical sources of procedural error for each experiment. They must identify and analyze these parameters for their effects upon the outcome of the experiment and any conclusions that may be drawn.
  2. The experiments chosen give the student a concrete and tactile means of investigating mere abstract theoretical ideas introduced in the lecture.
  3. Weekly quizzes and the final exam require the student to synthesize many related theories and apply them to a new situation.

#### **LABORATORY EXPERIMENTS (10 OF THESE 12)**

Determination of Molar Mass by Freezing Point Depression  
 Lewis Acids and Bases  
 Qualitative (Ionic) Analysis of an Unknown  
 Equilibrium  
 Kinetic Study of a Chemical Reaction  
   -Determination of Reaction Order and Rates  
   -Determination of Activation Energy  
 Determination of Dissociation Constants  
 Thermodynamics  
 Thermochemistry  
 Oxidation-Reduction and Electrochemistry  
 Optional: Molecular Modeling and Thermodynamic Evaluations

## **ASSESSMENT OF EXPECTED EDUCATIONAL OUTCOMES**

### **A. Course Grade**

The course grade will be determined by the individual instructor (under the guidelines of the division) using a variety of methods such as quizzes, homework, group projects and exams. Graded activities are designed to measure students' abilities to use higher order thinking skills in their understanding and applying of chemical concepts. A comprehensive final exam is required. This exam must count for no more than 25% of the course grade.

### **B. Program Assessment**

The General Chemistry Program (lecture and laboratory) will be assessed every 3 years in the fall and spring semesters. The committee will monitor the results of the assessment during non-assessment years and make curriculum revisions as necessary. For this program assessment.

- a. Key learning outcomes will be tested using an assessment tool such as the ACS examination for the lecture course
- b. The laboratory course will also be assessed in conjunction with the lecture course using either a standardized tool or one composed by the General Chemistry faculty which has been piloted in previous semesters.

### **C. Use of Assessment Findings**

The Chemistry Curriculum Committee will analyze the assessment data.. The committee will use assessment results to determine the effectiveness of the course by seeking answers to the following questions:

1. Are students performing at a pre-determined minimal level of performance on:
  - a. the course as a whole?
  - b. on individual learning outcomes?
2. Which learning outcomes are students' performance acceptable or above average?
3. Which learning outcomes are student's performance below minimal level of performance?
4. What factors are contributing to student performance on those learning outcomes below minimal level of performance?
5. What changes or modifications in course content or instructional strategies are needed to help improve student performance on learning outcomes below minimal level of performance?

April 11, 2005