GEORGIA PERIMETER
DIVISION OF SCIENCE
COMMON COURSE OUTLINE
REVISION DATE: January 2005

COURSE ABBREVIATION CHEM 1152L

CREDIT HOURS 1 Semester Hour

COURSE TITLE Survey of Chemistry Laboratory II

PREREQUISITES CHEM 1151L with a "C" or better
COREQUISITE CHEM 1152

CATALOG DESCRIPTION
Laboratory exercises supplement the lecture material of CHEM 1152.

GENERAL EDUCATION 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 development 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 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 develops organizational skills through transcription of procedural outlines to a personal laboratory notebook. Laboratory reports require tabulation and summarization skills to developments the Data, Calculations, Results, and Conclusions sections of the laboratory notebook successfully.

II. This course address 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.

III. This 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.

ENTRY LEVEL COMPETENCIES

1. Recognize and state the use of appropriate laboratory apparatus.
2. Define accuracy, precision and significant digits as related to laboratory measurements.
3. Given appropriate measuring devices and lab apparatus, determine physical properties of substances using appropriate significant figures.
4. Define and use appropriately methods of separating known components of mixtures based on chemical and physical properties.
5. Where appropriate, calculate percent error of experimental results relative to standards.
6. Upon carrying out chemical reactions in the lab and given appropriate reference materials (i.e., polyatomic ion formulas, periodic table, activity series and solubility rules) convert observable laboratory reactions to balanced equations.
7. Given a set of data related to a specific experiment.
   a. Identify all measurable quantities.
   b. Recognize sources of error.
   c. Identify limitations of measuring devices in order to state the uncertainty in measurements.
   d. Come to a valid conclusion based on the data.

EXPECTED EDUCATIONAL RESULTS

Upon successful completion of Chemistry 1152 Lab, the student will be able to:

1. Use physical properties and chemical properties (solubility and density) to identify an unknown hydrocarbon.
2. Compare the chemical reactivity of an alkane, an alkene and an aromatic compound.
3. Demonstrate understanding of extraction technique to isolate a natural product.
4. Calculate the percent yield of a reaction.
5. Use characteristic chemical reactions of alcohol's and phenols to identify unknown samples of alcohol's and/or phenols.
6. Use chemical characteristics of aldehydes and ketones in simple tests to distinguish between examples of aldehydes and ketones.
7. Recognize an equation for an esterification reaction and a hydrolysis reaction.
8. Demonstrate knowledge of the reducing or non-reducing nature of carbohydrates and the enzyme-catalyzed and acid-catalyzed hydrolysis of acetal groups.
9. Given a molecular formula, demonstrate an understanding of isomers.

COURSE CONTENT

Note: During the first meeting of the course, instructors should acquaint students with safety in the laboratory.

Chem 1152L Topic list

Mandatory Topics
Structure and Isomers of Alkanes
Melting Point, Density
Extraction
Chromatography
Synthesis
Tests for Alcohols & Phenols and Aldehydes & Ketones
Tests for Carbohydrates
Lipids

Optional Topics
Enzyme Kinetics
Preparation of Soap
Unknown Identification
Steam Distillation

ASSESSMENT OF EXPECTED EDUCATIONAL RESULTS

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, evaluation of lab reports, evaluation of lab notebook, and a final exam. Graded activities are designed to measure students' ability to use the process skills of science (i.e., observing, measuring, collecting data, analyzing data, testing hypothesis, controlling variable). A comprehensive final exam is required. The exam must count for no more than 25% of the course grade.
B. Divisional Assessment
   Chemistry 1152 Lab will be assessed every 5 years in the winter. The committee will develop a time-line to monitor the assessment process during the five-year cycle to ensure
   that assessment activities are occurring in order to have sufficient data to undertake a formal assessment at the end of the cycle. Assessment will consist of:
   a. An attitudinal survey addressing students' career and professional goals and perceptions of the quality and usefulness of the course
   b. A set of objective test items keyed to expected learning outcomes. These items will be balanced with respect to content and level of cognitive demand; for more information refer to the document Designing Assessment Instruments: A Guide for Georgia Perimeter College Faculty.
   c. A pilot administration of the objective assessment instrument. The results of the pilot assessment will be used to determine how well the test items are functioning in terms of discrimination, difficulty, and test reliability. The information obtained from item

analysis will be used to eliminate or rewrite test items not functioning properly.

d. The revised assessment instrument will be administered during the assessment cycle at a time established by the committee.

C. Use of Assessment Findings

The Chemistry 1152L Assessment Committee will analyze the results of the pilot testing and the formal assessment data as well as the attitudinal survey. 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. On which learning outcomes are students' performances acceptable or above average?
3. On which learning outcomes are students' performances below the minimal level of performance?
4. What factors are contributing to student performance on those learning outcomes below the minimal level of performance?
5. What changes are modifications in course content or instructional strategies are needed to help improve student performance on learning outcomes below the minimal level of performance?

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