COURSE ABBREVIATION: CHEM 1952

CREDIT HOURS: 3 Semester Hours

COURSE TITLE: Survey of Chemistry II

PREREQUISITES: CHEM 1151 and CHEM 1151L, CHEM 1951, or CHEM 1212 and CHEM 1212L, each with a "C" or better; OR satisfactory performance on an institutional placement exam; OR a score of 3 or higher on the Advanced Placement Chemistry exam.

CATALOG DESCRIPTION
Second course in a two-semester sequence covering elementary principles of general, organic and biochemistry designed for allied health majors. This course is CHEM 1152 without a laboratory component. It is intended for students in dental hygiene and other allied health sciences. Note that dental hygiene students and other allied health students planning to pursue a baccalaureate degree may need to enroll in CHEM 1152.

GENERAL COURSE PURPOSE
This course is designed to give students an understanding of the fundamental physical and chemical properties of organic functional groups in organic and biological molecules.

ENTRY LEVEL COMPETENCIES
Upon entering this course the student is expected to be able to:
1. Use the appropriate metric units and prefixes for mass, length, and volume and make conversions from one unit to another.
2. Use the periodic table as a tool to extract relevant information concerning atomic structure and to predict chemical behavior (including isotopes and the role of nuclear chemistry in medicine).
3. For any given atom or molecule/ionic unit:
   a. Predict the bond type.
   b. Draw Lewis Dot structures.
   c. Determine the number of bonds formed by hydrogen and the row two elements
   d. Determine the polarity and geometry of the molecule
   e. Determine the relationship between polarity and physical properties of a compound
   f. Write the formula from the name of a compound and vice versa
4. Balance chemical equations, solve simple stoichiometric problems, and identify the energy changes that accompany the reaction.
5. Describe solutions in qualitative and quantitative terms and solve concentration and
dilution problems used in clinical chemistry
6. State factors affecting the rate of a chemical reaction and use the concepts of chemical equilibrium to predict the direction and degree of completion of chemical reactions.
7. For acids and bases:
   a. Compare and contrast properties.
   b. State the role of buffers and their mechanisms for maintaining homeostasis in body fluids.
   c. Relate acid or base strength to the strength of its conjugate base or acid.
   d. Relate pka to the strength of an acid.

GENERAL EDUCATION OUTCOMES
I. This course addresses the general education outcome relating to communications as follows:
   1. Students develop their reading comprehension skills by reading the text and handout materials.
   2. Students develop their listening skills through lecture and small group problem solving. Lecture material is presented that is not included in the text or handout material and is included as part of the exams or test.
   3. Students develop their reading and writing skills through the use of problems and activities developed specifically to enhance their understanding of certain chemistry principles. Students provide written or oral solutions to these problems in both individual and group format. They must also deal with short-answer type questions on course exams.

II. This course addresses the general education outcome relating to demonstrating effective individual and group problem solving and critical thinking skills in a variety of situations as follows:
   1. Students learn individual and group problem solving and critical thinking skills by doing problems both in classroom settings and at home.
   2. Critical thinking skills are encouraged in many ways, one of which is by requesting student response to questions asked during the lecture.

III. This course address the general education outcome relating to recognizing and applying scientific inquiry in a variety of settings as follows:
   1. Students apply the scientific method in the set-up and solution of the problems designed to illustrate the chemical principle being thought.
   2. Students use models that explain the basic scientific phenomenon and relate it to everyday situations.
   3. Students use conceptual and physical models to explore theory and relate it to preexisting concepts.

EXPECTED EDUCATIONAL RESULTS:
Upon successful completion of this course, the student should be able to:
   1. Recognize organic functional groups from the structural formula
   2. Convert one functional group into another via the appropriate chemical reaction
   3. Given the structural formula, name common types of organic compounds or vice-versa
   4. Relate physical and chemical properties to molecular structure
   5. Determine whether an organic compound is optically active and describe the significance
of optical activity (especially as it applies to biological molecules)
6. Classify biological molecules according to their molecular structures and recognize their roles in biological systems.

COURSE CONTENTS

Topics
Organic Compounds; Alkanes
Unsaturated Hydrocarbons
Alcohols, Phenols, Ethers
Aldehydes and Ketones
Carboxylic Acids and Esters
Amines and Amides
Carbohydrates (Biochemistry)
Lipids (Biochemistry)
Proteins (Biochemistry)
Enzymes (Biochemistry)

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. Divisional Assessment
Chemistry 1952 is 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 using a process described in 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 1952 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 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 minimal level of performance?

EFFECTIVE DATE: August 2003              APPROVED DATE: May 2003

REVIEW DATE: March 2004