CIC Approval: 10/23/2003
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STATE APPROVAL:
EFFECTIVE TERM: Fall 2003

SAN DIEGO COMMUNITY COLLEGE DISTRICT
CITY, MESA, AND MIRAMAR COLLEGES
ASSOCIATE DEGREE COURSE OUTLINE

SECTION I

SUBJECT AREA AND COURSE NUMBER: Chemistry 152L

COURSE TITLE: Introduction to General Chemistry Laboratory

Units: -
Letter Grade or Pass/No Pass Option

CATALOG COURSE DESCRIPTION:

Chemistry 152L is a one-semester laboratory course intended as the companion course for Chemistry 152. Topics include chemical measurement, significant figures, laboratory safety, and stoichiometry. An emphasis is placed on problem solving, data analysis and chemical calculations. It is intended for those students majoring in one of the natural sciences, engineering or related curricula who do not meet entrance requirements of Chemistry 200.

REQUISITES:

Corequisite:
CHEM 152

Advisory:

ENGL 051 with a grade of "C" or better, or equivalent or Assessment Skill Level W5
&
ENGL 056 with a grade of "C" or better, or equivalent or Assessment Skill Level R5
&
MATH 096 with a grade of "C" or better, or equivalent or Assessment Skill Level M50

Limitation on Enrollment:

This course is not open to students with previous credit for CHEM 151L

FIELD TRIP REQUIREMENTS:
May be required

TRANSFER APPLICABILITY:
Associate Degree Credit & transfer to CSU IGETC UC Transfer Course List CHEM 100, 100L and 152, 152L combined: maximum credit, 4 units. No credit for CHEM 100, 100L or 152, 152L if taken after CHEM 200. CSU General Education

CID:

TOTAL LECTURE HOURS:

TOTAL LAB HOURS:

STUDENT LEARNING OBJECTIVES:

Upon successful completion of the course the student will be able to:

1. Work safely in a chemical laboratory.
2. Properly use standard laboratory glassware, safety equipment and instruments.
3. Record and manipulate measurements using the correct number of significant figures.
4. Analyze and critically discuss data.
5. Write a laboratory report.
6. Keep and maintain accurate records of laboratory data.
7. Perform standard chemical techniques such as: gravimetric analysis, separation techniques, titration, spectrophotometry, and measurement of pH.
8. Determine if a double replacement or single replacement reaction has taken place and identify the products.
9. Draw and use graphs to analyze data.

SECTION II

1. COURSE OUTLINE AND SCOPE:

A. **Outline Of Topics:**
The following topics are included in the framework of the course but are not intended as limits on content. The order of presentation and relative emphasis will vary with each instructor.

Safety Equipment Practice Record Keeping Laboratory Notebook Recording Data Laboratory Reports Equipment Glassware Bunsen Burner Safety Equipment Instruments analytical balance spectrophotometer pH meter Measurement Use of equipment Significant Figures Error Absolute Percent Graphing Data Analysis Significance of error Problem Solving Dimensional Analysis Algebra Standard Chemical techniques Separations Filtration Decantation Evaporation Spectrophotometry Principles Use of spectrophotometer Solution making Titration Standardization Indicators Determination of an unknown pH Calibration of pH meter Measurement of pH Acidity and basicity Buffers Reaction Chemistry Single Replacement Reactions Experimental Evidence Determination of Product Activity Series Double Replacement Reactions Experimental Evidence Determination of products Writing and balancing reactions Ionic equations Graphing Axes Label Scale Plot points Determine equation for linear data Interpolate and Extrapolate

B. **Reading Assignments:**
Reading assignments are required and may include but, are not limited to, the following:

I. 1. College level Laboratory Manuals such as:
II. Fremland, R; Preparatory Chemistry Laboratory Manual; Aztec Publishing; San Diego, CA.; 1998
III. Corwin, Charles, H; Prentice Hall Laboratory Manual, Introductory Chemistry; 2nd Ed; Upper Saddle River, NJ; Prentice Hall; 1999
IV. Weiner, Susan A and Peters, Edward I; Introduction to Chemical Principles, A Laboratory Approach; 5th Ed; New York, NY; Saunders College Publishing; 1998

C. **Writing Assignments:**
Writing assignments are required and may include, but are not limited to, the following:

I. 1. Maintenance of a well -organized and complete laboratory notebook. This consists of a theory section, detailed procedures and well-organized data tables for each experiment.
II. 2. Completion of laboratory reports. These consist of completing data, calculation and questions pages in the laboratory packets.
III. 3. A written discussion of the results of each experiment.
IV. 4. A formal laboratory report. This includes items 2 and 3 above and also a detailed background section and procedures.

D. **Appropriate Outside Assignments:**
Outside assignments may include, but are not limited to, the following:

I. For the course, a minimum of one hour of outside preparation time for every one hour of class time will be needed per week to satisfactorily meet the objectives. Outside class assignments may include, but will not be limited to such activities as:

II. 1. Problem solving exercises from the lab manual and/or instructor packets. For example, exercises such as advanced multi-step unit conversions such as stoichiometry problems involving a limiting reagent, gas law problems using the ideal gas equation, predicting products of chemical equations, titration problems, writing ionic equations would be appropriate.
III. 2. Written laboratory reports.

E. **Appropriate Assignments that Demonstrate Critical Thinking:**
Critical thinking assignments are required and may include, but are not limited to, the following:

I. 1. Students will analyze gathered data and determine the amoundt of substance in unknowns of unknown composition.
II. 2. For each experiment, students will have a critical discussion of results. For example a student might discuss why triplicate runs of an experiment gave different results.
III. 3. Compare relative physical properties of elements and there relationship to structure using the periodic table.
IV. 4. Prediction of the products of single and double replacement reactions.
V. 5. As part of each experiment, there are problem sets containing problems similar to those encountered in the experiment. There are also critical thinking problems. For example, in an experiment where a student determines the density of solid, a student might be asked to predict what may happen to the results if the volume of the substance was determined errantly low.

2. METHODS OF EVALUATION:

A student's grade will be based on multiple measures of performance unless the course requires no grade. Multiple measures may include, but are not limited to, the following:

I. A student's grade will be on multiple measures of performance and will reflect the level of the objectives set forth above. A final grade of "C" or better should indicate the student has the ability to successfully apply the principles and techniques taught in this course in subsequent courses and can, therefore, perform satisfactorily without notes or instructor assistance. The assessments will also measure critical thinking skill. These methods may include, but are not limited to the following: Successful and accurate completion of laboratory reports. Objective unit examinations that reflect the material covered in that unit. The examinations will ask both quantitative and qualitative questions. A formal laboratory report.

3. METHODS OF INSTRUCTION:

Methods of instruction may include, but are not limited to, the following:

* Lecture
* Audio-Visual
* Collaborative Learning
* Other (Specify)
* 1. Instructor lecture and demonstration
* 2. Videotape
* 3. Collaborative learning
* 4. Use of the internet.

4. REQUIRED TEXTS AND SUPPLIES:
Textbooks may include, but are not limited to:

TEXTBOOKS:

MANUALS:

PERIODICALS:

SOFTWARE:

SUPPLIES:
1. Laboratory Manual
2. Study guides or solution manuals to accompany textbooks.
3. Supplementary packets prepared by instructors.
4. Scientific calculator.
5. Brain

ORIGINATOR: Robert (Rob) Fremland
ORIGINATION DATE: 11/10/1999
PROPOSAL ORIGINATOR: Daphne Figueroa
CO-CONTRIBUTOR(S)
PROPOSAL DATE: 03/14/2003