

**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: 1**  
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, laboratory techniques, chemical reactions 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:****Advisory:**

ENGL 048 with a grade of "C" or better, or equivalent or Assessment Skill Level R5

ENGL 049 with a grade of "C" or better, or equivalent or Assessment Skill Level W5

**Limitation on Enrollment:**

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

**Prerequisite:**

MATH 096 with a grade of "C" or better, or equivalent or Assessment Skill Level M50

**Corequisite: Completion of or concurrent enrollment in:**

CHEM 152 with a grade of "C" or better, or equivalent

**FIELD TRIP REQUIREMENTS:** May be required**TRANSFER APPLICABILITY:** Associate Degree Credit & transfer to CSU and/or private colleges and universities CSU General Education IGETC UC Transfer Course List CHEM 100, 100L and 152, 152L combined: maximum credit, 4 units. No credit for 100, 100L or 152, 152L if taken after CHEM 200.**TOTAL LECTURE HOURS:****TOTAL LAB HOURS:** 48 - 54**STUDENT LEARNING OBJECTIVES:**

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

1. Demonstrate ability to work safely in a chemical laboratory.
2. Properly use standard laboratory equipment, 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 formal laboratory report.
6. Perform standard chemical techniques such as: gravimetric analysis, separation, titration, and solution preparation
7. Determine if a chemical reaction has taken place and predict the reaction products.
8. Use chemical nomenclature
9. Draw and use graphs to analyze data.
10. Perform standard chemical calculations such as: unit conversions, stoichiometry, mole calculations, molarity, and gas law calculations.

## **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.

- I. Safety
  - A. Equipment
  - B. Practice
- II. Record Keeping
  - A. Recording Data
  - B. Laboratory Reports
- III. Equipment
  - A. Glassware
  - B. Bunsen Burner
  - C. Instruments
- IV. Measurement
  - A. Significant Figures
  - B. Error
  - C. Units
- V. Data Analysis
  - A. Graphing
  - B. Problem Solving
    1. Dimensional Analysis
    2. Algebra
- VI. Standard Chemical techniques
  - A. Separations
  - B. Solution making
  - C. Titration
    1. Standardization
    2. Indicators
- VII. Reaction Chemistry
  - A. Experimental Evidence
  - B. Determination of Products
  - C. Writing and Balancing Equations

#### **B. Reading Assignments:**

Reading assignments are required and may include but, are not limited to, the following:

- I. College level Laboratory Manuals such as:
  - A. Fremland, R; Preparatory Chemistry Laboratory Manual; Aztec Publishing; San Diego, CA.; 2005 ISBN 0-7442-5226-1
  - B. Corwin, Charles, H; Prentice Hall Laboratory Manual for Introductory Chemistry; 3rd Ed; Upper Saddle River, NJ; Prentice Hall; 2002
  - C. Weiner, Susan A ; Introduction to Chemical Principles, A Laboratory Approach; 6th Ed; New York, NY; Thomson Publishing; 2005; ISBN: 0-534-40777-3
  - D. Pearson Custom Publishing, Catalyst; 2005 ISBN: 0-536-99462-5

### **C. Appropriate Assignments that Demonstrate Critical Thinking:**

Critical thinking assignments are required and may include, but are not limited to, the following:

- I. Analyze gathered data and determine the amount of substance in samples of unknown composition.
- II. Write a critical discussion of results. For example a student might discuss why multiple runs of an experiment gave different results.
- III. Compare relative physical properties of elements and their relationship to structure using the periodic table.
- IV. Prediction of the products of reactions.
- V. Complete exercises containing problems pertinent to the experiment. 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.

### **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 course objectives. Outside class assignments may include, but will not be limited to such activities as:
- II. Problem solving exercises from the lab manual and/or instructor packets. For example, 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. Written laboratory reports.
- IV. Using the Internet for finding information on chemicals using MSDS.

### **E. Writing Assignments:**

Writing assignments are required and may include, but are not limited to, the following:

- I. Maintenance of a well -organized and complete laboratory notebook.
- II. Completion of laboratory reports consisting of data, calculations and answers to the questions in the laboratory manuals/packets.
- III. A written discussion evaluating the results of each experiment.
- IV. A formal laboratory report. This includes items 2 and 3 above as well as a detailed background section and experimental procedures.

## **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. Successful and accurate completion of laboratory reports.
- II. Objective unit examinations [that reflect the material covered in that unit]. The examinations may ask both quantitative and qualitative questions and may include hands-on demonstrations by the student.
- III. A formal laboratory report.

## **3. METHODS OF INSTRUCTION:**

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

- \* Lecture Discussion
- \* Laboratory
- \* Other (Specify)
- \* Instructor lecture and demonstration
- \* Audio-visual
- \* Collaborative learning
- \* Use of the Internet.
- \* Hands-on laboratory work.

#### **4. REQUIRED TEXTS AND SUPPLIES:**

Textbooks may include, but are not limited to:

##### **TEXTBOOKS:**

1. Corwin, Charles, H.; Laboratory Manual for Introductory Chemistry, 3 ed. Prentice Hall, 2002, ISBN: 0130623334
2. Fremland, R. Preparatory Chemistry Laboratory Manual, 4 ed. Aztec, 2005, ISBN: 0744252261
3. Pearson. Catalyst, 1 ed. Pearson, 2005, ISBN: 0536994625
4. Weiner, Susan A.. Introduction to Chemical Principles, A laboratory Approach, 6 ed. Thomson, 2005, ISBN: 0534407773

##### **MANUALS:**

##### **PERIODICALS:**

##### **SOFTWARE:**

##### **SUPPLIES:**

1. Chemical splash goggles meeting ANSI Z-87 standards
2. Other Personal Protective Equipment
3. Scientific calculator.
4. Brain
5. Lock

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