

LAST REVIEW: 2010-2011

(i.e. 2006-2007)

NEXT REVIEW: 2015-2016

(i.e. 2011-2012)

STATUS: A

(A, I, D)

COURSE TITLE: Introduction to Chemistry Laboratory

COMMON COURSE NUMBER: CHM 1025L

CREDIT HOURS: 1

CONTACT HOUR BREAKDOWN

(Per 16 week term)

CLOCK HOURS:

(Voc. Course ONLY)

Lecture:

Lab: **32**

Clinic:

Other:

PREREQUISITE(S): MAT 0024

COREQUISITE(S): CHM 1025

PRE/COREQUISITE(S):

COURSE DESCRIPTION *(750 characters, maximum):* **Laboratory experiments to accompany CHM 1025. Special fee charged.**

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): 4C Area

General Education Requirements – Associate in Science Degree (AS), meets Area(s): 4 Area

General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

- 1. Laboratory and Safety Rules**
- 2. Reading and Writing in the Chemistry Laboratory**
- 3. Laboratory Calculations**
- 4. Laboratory Skills**

*** Complete the following only if course is seeking general education status ***

GENERAL EDUCATION Competencies and Skills *:

In the box to the right of the Competency/Skill, enter all specific **student learning outcome** unit numbers, as indicated in the course outline (i.e. 1.1, 2.7, 4.2, 4.0 and 5.12) that apply.

Course must include <u>all</u> of the following:	
1. Read with critical comprehension**	1.4, 2.1, 2.2, 4.1
2. Write clearly and coherently**	2.1, 2.3, 3.1, 3.5, 4.1, 4.9
3. Demonstrate literacy as appropriate within a given discipline**	b) 2.2, 2.4, 4.3, 4.5 e) 2.1, 2.3, 3.1, 3.2, 3.4, 3.5, 3.6, 3.7 f) 2.1, 2.3, 3.5, 3.7, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9
4. Apply problem solving skills or methods to make informed decisions in a variety of contexts**	2.1, 2.2, 2.3, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.1, 4.7, 4.8, 4.9
Course must include at least <u>one</u> of the following:	
5. Differentiate between ethical and unethical behavior	
6. Demonstrate an understanding of the physical, biological, and social environments and how individual behaviors impact this complex system.	1.2, 1.4, 4.4
7. Demonstrate an understanding of and appreciation for human diversities and commonalities.	
8. Speak and listen effectively.	

**General Education Competencies and Skills endorsed by 2010-2011 General Education Task Force*

****Required Competencies**

1) Read with critical comprehension.

The student will be introduced to the basic texts, concepts, vocabulary, and methods necessary for developing an understanding of the discipline and meeting the required benchmarks as stated in the course outline.

2) Write clearly and coherently.

The student will demonstrate an understanding and mastery of subject matter in a variety of ways, including writing. Writing activities may include both graded and ungraded essays, short answer quizzes, summaries, reactions, journals, and various other reports.

3) Demonstrate and apply literacy across all the disciplines (indicate which ones apply).

- a) **Information literacy** means understanding how to locate needed information, using the appropriate technology for the task, managing and evaluating the extracted information and using it effectively and ethically.
- b) **Technology literacy** is the ability to responsibly and effectively use appropriate technology to access, manage, integrate, or create information, and/or use technology to accomplish a given task.
- c) **Workplace literacy** is having the appropriate knowledge and skills to communicate and work with others effectively and perform job duties, whether it is through the use of computers and/or other technology.
- d) **Cultural literacy** is recognizing, understanding, and appreciating the similarities and differences between one's own culture and the cultures of others through a study of the arts, customs, beliefs, values, and history that define a culture.
- e) **Quantitative literacy** is having the ability to formulate, solve and interpret mathematical/statistical operations and graphical/tabular representations to make informed decisions.
- f) **Scientific literacy** means understanding the methodology and application of the scientific process, the physical and biological worlds, and recognizing that scientific knowledge is continuously updated or revised as new information is discovered.

g) Environmental literacy is creating a context within which environmental issues can be viewed, imparting knowledge to enhance one's ability to analyze the issues, make the connections between humans' decisions and actions and the challenges facing the environment, and instilling the desire to sustain the environment through ethical practices in both one's professional and personal lives.

4. Apply problem-solving skills or methods to make informed decisions in a variety of contexts.

The student will use acquired skills or methods to recognize, analyze, adapt, and apply critical thinking to solve problems and make informed decisions.

EVALUATION:

In the box to the right of the Methods of Assessment, enter all specific learning outcome numbers (i.e. 1.1, 2.7, 4.0, 4.2 and 5.12) that apply.

1. Portfolio	
2. Short essays	
3. Research Papers	
4. Group projects	2.1, 2.2, 2.3, 4.3, 4.4, 4.7, 4.8
5. Discussions (In class and online)	
6. Multiple Choice tests	1.1, 1.2, 1.3, 1.4, 2.2, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8
7. Presentations	
8. Service Learning Projects	
9. Quizzes (pop, announced, etc.)	1.1, 1.2, 1.3, 1.4, 2.2, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8
10. Take-home tests	1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8
11. Summaries, critiques, and analyses	
12. Reaction papers	
13. Surveys	
14. Performance	
15. Short answer tests	1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.4, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8
16. Classroom debates and colloquia	
17. Blogs, wikis, web pages	
18. Other (Please explain)	Submission of written lab reports

Common Course Number: CHM 1025L

UNITS

Unit 1: Laboratory and Safety Rules

General Outcome:

- 1.0 The students shall be able to: (1) conduct a chemistry experiment using proper safety procedures, (2) recognize and respond appropriately to potentially hazardous situations, and (3) recognize the necessity of safe laboratory practices.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 1.1 List the safety rules as provided by the instructor.**
- 1.2 Explain the importance of the safety rules to maintain a safe environment for students and faculty.**
- 1.3 Locate and describe the use of safety equipment such as fire extinguishers, fire blanket(s), eye wash station, safety shower, first aid kit, spill clean-up kites, utility shutoff valves, etc.**
- 1.4 Conduct scheduled experiments in accordance with the listed safety rules.**

Common Course Number: CHM 1025L

Unit 2: Reading and Writing in the Chemistry Laboratory

General Outcome:

2.0 The student shall be able to clearly communicate in writing information derived from course related readings about the major concepts and themes in the chemical laboratory.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 Demonstrate in writing the ability to analyze, evaluate, compare, and/or extract data relevant to each chemistry experiment.**
- 2.2 Evaluate the validity of information obtained in the laboratory by comparing it to information obtained from electronic, print sources, and/or data bases.**
- 2.3 Demonstrate with the use of diagrams, drawings, outlines, concept maps, and/or other methods the connections among chemical concepts.**
- 2.4 Demonstrate the ability to use the appropriate technology to carry out course requirements.**

Common Course Number: CHM 1025L

Unit 3: Laboratory Calculations

General Outcome:

- 3.0 The students shall be able to apply appropriate mathematical tools to accurately determine calculated results from experimental data.**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 3.1 Set up problems and perform calculations related to the chemical concepts in this laboratory: measurements, spectroscopy, calorimetry, stoichiometry, solution concentration, electrolytes, acid/base chemistry, gas laws, and redox chemistry.**
- 3.2 Apply the rules for the use of significant figures and rounding values as they apply to laboratory data.**
- 3.3 Demonstrate by proper use the relationship between accuracy and precision.**
- 3.4 Average laboratory data correctly**
- 3.5 Construct graphs, graph laboratory data, and evaluate the results.**
- 3.6 Calculate a percentage yield and percentage error from experimental data.**
- 3.7 Evaluate the results of a laboratory calculation in terms of reasonableness.**

Common Course Number: CHM 1025L

Unit 4: Laboratory Skills

General Outcome:

- 4.0 The students shall be able to demonstrate laboratory skills in the performance of an experiment**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the students shall be able to:

- 4.1 Discuss the theoretical background for each experiment by reading the material provided and answering assigned open-ended questions and/or solving related problems before each lab.**
- 4.2 Identify common laboratory glassware, select the appropriate glassware for a procedure, and use it properly and safely to perform a given laboratory task.**
- 4.3 Properly assemble laboratory apparatus as required for the experiments performed in this laboratory based on the following topics: measurements, spectroscopy, calorimetry, stoichiometry, solution chemistry, acid/base chemistry, gas laws, and redox chemistry.**
- 4.4 Select, dispense, measure, properly use, dilute, and dispose of laboratory chemicals safely and properly.**
- 4.5 Operate specific pieces of laboratory equipment including balances, Bunsen burners, burets, pipettes, thermometers, barometers, etc.**
- 4.6 Perform specific laboratory procedures including determining melting point and boiling point, titrations, filtrations, crystallizations, etc.**
- 4.7 Distinguish between objective observation and subjective interpretation.**
- 4.8 Perform chemical and physical tests to identify an unknown compound by drawing logical conclusions from observed data.**
- 4.9 Complete required laboratory reports including proper representation of data, analysis of data, and discussion of results.**