

CHEM-100L: EVERYDAY CHEMISTRY LABORATORY

Cuyahoga Community College

Viewing: CHEM-100L : Everyday Chemistry Laboratory

Board of Trustees:

May 2019

Academic Term:

Fall 2021

Subject Code

CHEM - Chemistry

Course Number:

100L

Title:

Everyday Chemistry Laboratory

Catalog Description:

Intended for non-science majors. Exercises on measurements, separation and synthesis methods, reaction rates, water analysis, household chemistry, forensic and environmental issues, and other related chemistry topics. Laboratory activities complement and enrich related lecture course.

Credit Hour(s):

1

Lecture Hour(s):

0

Lab Hour(s):

3

Other Hour(s):

0

Requisites

Prerequisite and Corequisite

CHEM-1000 Everyday Chemistry or concurrent enrollment; or PSCI-1020 Chemistry or concurrent enrollment.

Outcomes

Course Outcome(s):

Apply laboratory safety and fundamental laboratory skills to everyday life and other scientific studies.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Demonstrate familiarity with common laboratory measuring devices and for the degree of uncertainty associated with scientific data collection.
2. Determine physical and chemical properties of substances.
3. Compare the properties of different substances.
4. Utilize basic chemistry skills in the laboratory.
5. Measure the effect physical conditions on chemical reactions.
6. Discuss safety procedures and techniques utilized in the laboratory and employ these procedures and techniques when working in the laboratory.

Course Outcome(s):

Apply chemical principles to laboratory studies.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Collect, graph, and interpret scientific data and write laboratory reports.
 2. Write balanced chemical equations.
 3. Explain observations on a molecular level.
 4. Perform different kinds of chemical analyses and discuss the significance of results.
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Methods of Evaluation:

1. Laboratory reports
2. Unit examinations and/or quizzes
3. Written library research reports
4. Individual class presentations
5. Cooperative class projects
6. Homework assignments
7. Computer assignments/games/simulations
8. Field trip activities/assignments
9. Other or some combination of the above

Course Content Outline:

1. Safety in the laboratory
 - a. Student responsibilities in the laboratory
 - i. Appropriate eye and body protection
 - ii. No unauthorized experiments
 - iii. Knowledge of safety policy and procedures
 - iv. Laboratory techniques
 - v. No food/drink in laboratory
 - b. Review of physical facilities including safety protocols
 - i. First-aid: eye washes, burns, etc.
 - ii. Fire extinguishers and fire blanket
 - iii. Electrical power and circuit breakers
 - iv. Emergency exits
 - c. Review types of safe laboratory techniques and how safe laboratory practices prevent accidents
 - i. Broken glassware
 1. Demonstrate safe practices with glassware including handling of beakers, graduated cylinders, and other breakable glassware
 2. Explain how broken glassware should be handled in the laboratory
 - ii. Behavior in the laboratory
 1. Explain expected behavior in the laboratory and how careless behavior is dangerous
 2. Eye protection
 - a. Demonstrate safe laboratory goggle usage
 - b. Explain the types of eye injuries that can occur if safe practices are not followed
 3. Exposure to vapors or gases
 - a. Demonstrate safe handling of volatile substances
 - b. Explain unsafe technique and how unsafe practices are dangerous
 2. Measurements in the laboratory
 - a. Mass (weight)
 - i. Balances
 1. Analytical
 2. Top loader
 - ii. Weighing techniques
 1. Taring
 2. Significant numbers
 - iii. Volume

1. Graduates
2. Burettes
- iv. Other metric quantities
- b. Graphing experimental results
3. Physical and chemical properties
 - a. Physical
 - i. Observation
 - ii. Measuring
 - iii. Separation methods
 - b. Chemical
 - i. Exothermic
 - ii. Endothermic
 - iii. Law of Conservation of Mass
4. Optional exercises in chemistry (at least 12 experiments should be completed)
 - a. Drug identification/analysis
 - b. Preparation of cosmetics
 - c. Agricultural chemistry
 - d. Photochemistry experiments
 - e. Chemistry of the earth
 - f. Atomic structure/chemical bonds
 - g. Oxidation/reduction reactions
 - h. Polymer chemistry
 - i. Air quality analysis
 - j. Chemistry of fuels
 - k. Acid/base chemistry
 - l. Thin layer chromatography of medicines, amino acids, inks, or other substances
 - m. Separation of mixtures using evaporation, distillation, filtration, or other techniques
 - n. Nutritional content of food/drink
 - o. Spectrophotometric analysis of solutions
 - p. Construction of conductivity meter
 - q. Analysis of conductivity of solutions to determine the relationship between electrolytes and conductivity
 - r. Isolation of DNA
 - s. Mass measurements of gases
 - t. Determination of density experiments
 - u. Molecular structure or modeling experiments

Resources

Tripp, J., McKenzie, L.C. *Chemistry in Context: Applying Chemistry to Society (Laboratory Manual)*. 9th ed. New York, NY: McGraw-Hill Higher Education, 2017.

E-Science. *Chemistry laboratory Kit and Manual*. E-Science,

Instructional Services

OAN Number:

Ohio Transfer 36 TMNS

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