

MIDDLESEX COLLEGE
EDISON, NEW JERSEY
DEPARTMENT OF NATURAL SCIENCES

Course ID and Name: CHM 125: General Chemistry I Laboratory

Department: Department of Natural Sciences

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Prerequisites:

Two years of high school algebra and geometry or MAT 014 and one year of high school chemistry or CHM 020 with a grade of “C” or better

Corequisites: CHM 121 General Chemistry I Lecture

Course Description:

The laboratory experiments in this course reinforce both theoretical and quantitative aspects of the CHM 121 lecture topics and provide for the opportunity to learn proper laboratory techniques. The experiments include techniques of separation, measurement of the number of moles of water of hydration in a hydrate, a variety of chemical reactions are performed, a multistep inorganic synthesis is carried out, redox reactions in acidic and basic solutions are performed, titrations are carried out, the enthalpy of reactions are measured and Hess’s Law is applied, spreadsheets are used to produce graphs, a stock solution is prepared and a series of dilute solutions are prepared from the stock solution, and pressures and temperatures of a gas are measured to establish Boyle’s Law and the Law of Gay-Lussac.

General Education Status: Science

Credits: 1 **Lecture Hours:** 0 **Lab Hours:** 3

Learning Outcomes:

Upon successful completion of this course, student will be able to:

1. Utilize the scientific method.
2. *Recognize the importance of safety in a chemistry laboratory and practice appropriate safety rules and policies whenever conducting an experimental investigation.*
3. Demonstrate the ability to perform a variety of measurements, using a variety of instruments and an awareness of the uncertainties inherent in any measurement.
4. Demonstrate the ability to perform a variety of basic procedures in the chemistry lab, including weighing samples, titrations, and measuring pressures, volumes, and temperatures.
5. Demonstrate the ability to collect, organize and analyze laboratory data.

Course Requirements:

Students must attend every laboratory session. Laboratory performance is measured by examinations, laboratory reports, quizzes and observation of student laboratory technique.

assessment tool	% of final grade
Laboratory Reports and Quizzes	60%
Laboratory Exams	40%

Grading Standard:

Upon completion of the course, grades will be assigned as follows:

92 – 100%	A
89 – 91%	A minus
86 – 88%	B plus
82 – 85%	B
79 – 81%	B minus
76 – 78%	C plus
70 – 75%	C
60 – 69%	D
Below 60%	F

Textbook for Course:

Author	Title	Publisher	Copyright
Steven P. Rowley	General Chemistry I Lab Manual (2019 Revision)	Kendall Hunt	2017

Laboratory Outline:

Week	Laboratory
01	Introduction, Laboratory Safety and Measurements Laboratory safe practices, mass, volume, length measurements, significant figures
02	Density and Specific Gravity Determination of densities for solids and liquids
03	Physical Separation of a Mixture Separation of a three-component mixture utilizing physical methodologies, data analysis, and conclusions
04	Hydrates Determination of the waters of hydration for known and unknown hydrates, data analysis, and conclusions
05	Preparation of Copper(I) Chloride Introduction to multiple-step synthesis techniques, percent yield determination
06	Types of Chemical Reactions Identification of different types of chemical reactions and balancing chemical equations
07	Laboratory Exam #1
08	Redox Reactions Execution of redox reactions, product determination via observed reactions, redox reaction balancing in acidic and basic solutions, activity series assessment, hypothesis testing, data analysis, conclusions
09	Titration Titration execution, calculations, and data analysis
10	Graphing with Spreadsheets Utilizing spreadsheets for data analysis and graphing
11	Hess's Law Utilizing calorimetry to apply Hess's Law to a series of chemical equations
12	Spectrophotometric Determination of Cobalt(II) Beer's Law, utilizing a spreadsheet for data analysis, graphical analysis, and conclusions
13	Boyle's Law and the Law of Gay-Lussac Combined gas law relationships, pressure vs. volumes and pressure vs. temperature, data collection, graphical analysis, and conclusions
14	Molecular Weight of a Vapor Molecular mass determination of a volatile liquid utilizing the Dumas method, data collection, analysis, and conclusions
15	Laboratory Exam #2