STATE UNIVERSITY OF NEW YORK
COLLEGE OF TECHNOLOGY
CANTON, NEW YORK

COURSE OUTLINE
CHEM 100- INTRODUCTION TO CHEMISTRY LABORATORY

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SCHOOL OF SCIENCE, HEALTH, AND CRIMINAL JUSTICE
SCIENCE DEPARTMENT

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CHEM 100- INTRODUCTION TO CHEMISTRY LABORATORY

I. **TITLE:** Introduction to Chemistry Laboratory

II. **COURSE NUMBER:** CHEM 100

III. **CREDIT HOURS:** 1 credit hour

IV. **WRITING INTENSIVE COURSE:** No

V. **COURSE LENGTH:** 15 weeks

VI. **SEMESTER(S) OFFERED:** Fall/Spring

VII. **HOURS OF LABORATORY:** Two laboratory hours per week.

VIII. **CATALOG DESCRIPTION:** This is a laboratory course to accompany CHEM 101. The activities and experiments in this course are hands-on applications of the concepts covered in CHEM 101. It is designed for those students who have had little or no chemistry laboratory experience. Students must enroll in both CHEM 101 and CHEM 100 simultaneously, unless they have previously passed one of the courses. Students must also pass both CHEM 101 and CHEM 100 to receive Natural Science General Education credit.

IX. **CO-REQUISITE:** CHEM 101

X. **GOALS (STUDENT LEARNING OUTCOMES):** By the end of this course, the student will be able to:

Course Objective	*Institutional SLO*
a. Solve quantitative and qualitative chemical problems, using mathematical equations, dimensional analysis and principles of chemistry.	2. Crit. Thinking 3. Prof. Competence
b. Employ the scientific method to perform laboratory analyses safely and accurately, extract appropriate information and analyze experimental results to reach correct conclusions.	2. Crit. Thinking 3. Prof. Competence

XI. **TEXTS:**
Protocols available on Angel and are adapted from:
Washburn, B. & Labban, W. *Laboratory Exercises for Introduction to Chemistry*, 2012

XII. **REFERENCES:**
Zumdahl, S. & Decoste, D. *Introductory Chemistry: A Foundation*, Eighth Edition, Houghton-Mifflin Publishers, 2015.

XIII. **EQUIPMENT:** Supplied by the university as part of a technology enhanced classroom.

XIV. **GRADING METHOD:** A-F

XV. **MEASUREMENT CRITERIA:** Graded Laboratory Assignments, Pre-Laboratory Assignments, and Participation.

XVI. **DETAILED TOPIC OUTLINE:**

I. Scientific Method
   a. Accuracy and precision
   b. Statistical analysis

II. Physical Measurement and Density
   a. Determination of the volume of a solid
      i. Rectangular
      ii. Cylindrical
   b. Using graduated cylinders to determine the volume of a liquid
   c. Evaluation of the precision of glassware
   d. Identifying an unknown metal by calculating its density

III. Unit Conversions
   a. Metric-metric conversions
   b. Metric-English conversions

IV. Elements and Spectroscopy
   a. Observation of the properties of elements
   b. Flame tests

V. Heat of Solution
   a. Using calorimetric calculations to determine the heat of a solution
   b. Classifying dissolution processes as exothermic or endothermic

VI. Double Replacement Reactions
   a. Classifying double replacement reactions as
      i. Precipitation reactions
      ii. Acid-base reactions
      iii. Gas-forming reactions
   b. Balancing chemical equations

VII. Percent Water of Hydration
   a. Determining the experimental percent water of hydration of hydrated magnesium sulfate
   b. Calculating the theoretical percent water of hydration of hydrated magnesium sulfate
   c. Calculating the percentage error

VIII. Detection of Ions by Chemical Means
   a. Ammonium
   b. Chloride
   c. Carbonate

d. Sulfate
e. Phosphate

IX. Preparation and Properties of Gases
   a. Preparations performed by instructor:
      i. Nitrogen Dioxide
      ii. Chlorine
   b. Preparations and testing performed by students:
      i. Oxygen
      ii. Hydrogen
      iii. Carbon dioxide

X. Graphical Determination of Absolute Zero
   a. Collection of data using a gas pressure apparatus
   b. Using a graphing software to determine absolute zero

XI. Determination of the Value of the Ideal Gas Law Constant
   a. Using the ideal gas equation to calculate R
   b. Calculating the percent error

XII. Separation of a Mixture by Fractional Crystallization
   a. Separating a mixture of potassium nitrate and hydrated copper II nitrate
   b. Evaluation of the separation process

XIII. Preparation of Solutions
   a. From solid solute
   b. By dilution

XIV. pH and Acid/Base Titration
   a. Using universal pH paper to determine the pH values of common household solutions.
   b. Determination of the molarity of an unknown acid solution using strong acid-strong base titration.