METROPOLITAN STATE COLLEGE *of* DENVER
Office of Academic Affairs

REGULAR COURSE SYLLABUS

School of: Letters, Arts & Sciences

Department: Chemistry

CIP Code: 40.0502

Prefix & Course Number: CHE 3010 **Crosslisted With*:** _____

Course Title: Analytical Chemistry Laboratory

Check All That Apply: Required for Major: x Required for Minor: x Specified Elective: _____

Required for Concentration: x Elective: _____ Service Course: _____

Credit Hours: 2 (0+4)

Total Contact Hours per semester (assuming 15-16 week semester):

Lecture _____ Lab 60 Internship _____ Practicum _____ Other (please specify type and hours):_____

Schedule Type(s): A **Grading Mode(s)**: L

Variable Topics Courses (list restrictions, including the maximum number of hours that can be earned**):

____

** **NOTE: This information must be included in the course description.**

Restrictions (Variable Topics Course): None

Prerequisite(s): CHE 1800, CHE 1810, CHE 1850

Corequisite(s): CHE 3000

Prerequisite(s) or Corequisite(s): _____

Banner Enforced:
Prerequisite(s): x
Corequisite(s): x
Prerequisite(s) or Corequisite(s): x

Catalog Course Description:

This course introduces laboratory methods in analytical chemistry, including techniques of gravimetric, volumetric, potentiometric, and spectrophotometric analyses.

APPROVED:
Charles A Tindall — 11/7/05
Department Chair ~~OR Program Director~~ — Date

Hal Lamb — 11/18/05
Dean **OR** Associate Dean — Date

Linda S. Curran — 2/6/06
Associate VP, Academic Affairs — Date

*If crosslisted, attach completed Course Crosslisting Agreement Form

Prefix and Course Number: CHE 3010

Required Reading and Other Materials will be equivalent to:
Exploring Chemical Analysis, Harris, 3rd Edition WH Freeman & Co, 2005.

Specific, *Measurable* Student Behavioral Learning Objectives:
Upon completion of this course the student should be able to:

1. Weigh a sample using an electronic analytical balance.
2. Perform a quantitative transfer of a solid or solution.
3. Dry a precipitate to constant weight.
4. Choose optimum conditions for a precipitation.
5. Perform a volumetric transfer using a Mohr pipet.
6. Perform a dilution using a volumetric flask.
7. Perform a titration using a buret.
8. Measure an absorbance spectrum using a single beam spectrophotometer.
9. Perform a quantitative analysis using a single beam spectrophotometer.
10. Perform a quantitative analysis using an atomic absorption instrument.
11 Prepare a Beer's Law plot using a single beam spectrophotometer.
12. Recognize sources of experimental error in the analyses performed.
13. Demonstrate the end-point in a titration using an indicator.
14. Calibrate a pH meter.
15. Measure the pH of a solution using a pH meter.
16. Perform a potentiometric titration using a pH meter.
17. Prepare a titration curve.
18. Recognize an equivalence point on a titration curve.
19. Perform the stoichiometric calculations incident to gravimetric, volumetric, potentiometric, and spectrophotometric analyses.

Detailed Outline of Course Content (Major Topics and Subtopics) **or Outline of Field Experience/Internship (experience, responsibilities and supervision)** (format: I, A, 1, a, etc.):
I. Gravimetric Analysis
II. Volumetric Analysis
III. Potentiometric Titration
IV. Spectrophotometry

Evaluation of Student Performance (format: 1, a, i, ii, etc.):
Students will be given mixtures of compounds to determine the percent composition of one of the compounds in the mixture. The results of the analysis of the mixture will be graded on the basis of accuracy and precision. In addition, to the analyses students will be required to write and run a computer program to do linear regression on a set of data required in the fourth analysis. A written final exam will be given. The final grade will be determined by averaging the eight grades accumulated during the course.