

CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM: BIOLOGICAL AND PHYSICAL SCIENCES

1. **Catalog Description of the Course.** *[Include the course prefix, number, full title, and units. Provide a course narrative including prerequisites and corequisites. If any of the following apply, include in the description: Repeatability (May be repeated to a maximum of ___ units); time distribution (Lecture ___ hours, laboratory ___ hours); non-traditional grading system (Graded CR/NC, ABC/NC). Follow accepted catalog format.]*

CHEM 251. QUANTITATIVE ANALYSIS LABORATORY (2)

Six hours of laboratory per week.

Prerequisite: CHEM 122 with a grade of C or better.

Corequisite: CHEM 250

A laboratory course designed to provide students with an exposure to the techniques used in the quantification of inorganic, organic, and biological species from samples using gravimetric and volumetric analyses, potentiometric titrations, atomic absorption spectrometry, UV-visible spectroscopy, GC, and GC/MS. Lab fee required.

2. **Mode of Instruction.**

| | Units | Hours per Unit | Benchmark Enrollment |
|------------|-------|----------------|----------------------|
| Lecture | | | |
| Seminar | | | |
| Laboratory | 2 | 3 | 18 |
| Activity | | | |

3. **Justification and Learning Objectives for the Course.** (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements) *[Use as much space as necessary]*

Quantitative Analysis is the study of the analysis of chemical compounds using commonly used laboratory techniques. This course is the laboratory portion that is concurrently taken with the lecture (CHEM 250). These two courses are required for Environmental Science and Resource Management major, whose emphasis is Environmental Science.

Students who successfully complete this course will be able to:

- Quantitatively determine the statistical relevance and error of data determined in the chemistry laboratory
- Describe the scientific method and how it is used to approach the study of chemical data obtained from the laboratory
- Analyze chemical samples based on commonly used titration methods based on acid-base, solubility, and oxidation-reduction chemistry
- Explain the elements of basic spectroscopic techniques used in chemical analysis
- Evaluate the limitations of analytical techniques based on information obtained by the technique and error associated with the measurement
- Describe the fundamentals behind separation analysis of chemical species
- Identify the latest technology available which uses the fundamentals of the techniques used in laboratory

4. **Is this a General Education Course** YES **NO**

5. **Course Content in Outline Form.** *[Be as brief as possible, but use as much space as necessary]*

Introduction to Quantitative Analysis
Statistical Analysis and Error in Analytical Data
Gravimetric Methods of Analysis
Titrimetric Methods of Analysis

Acid-Base Titrations
Complex Formation Titrations
Solubility Equilibria and Precipitation Titrations
Oxidation-Reduction Titrations
Potentiometric Methods of Analysis
Spectroscopic Techniques
Spectrophotometry
Emission Spectroscopy
Separations
Solvent Extraction
Gas-Liquid Chromatography
Liquid Chromatography

6. References. [Provide 3 - 5 references on which this course is based and/or support it.]

Day, R.A., Jr.; Underwood, A.L., Jr., *Quantitative Analysis: Laboratory Manual*, 6th Ed., 1991
De Levie, R.; *Aqueous Acid-Base Equilibria and Titrations*, 2000
Weissberger, A.; Rossiter, B.W.; *Physical Methods of Chemistry*, Vol. 1, 1972

7. List Faculty Qualified to Teach This Course.

Dr. Simone Aloisio

8. Frequency.

a. Projected semesters to be offered: Fall X Spring _____ Summer _____

9. New Resources Required.

None.

10. Consultation.

Attach consultation sheet from all program areas, Library, and others (if necessary)

11. If this new course will alter any degree, credential, certificate, or minor in your program, attach a program modification.

Philip Hampton
Proposer of Course

1/8/03
Date