Administrative Unit: Science

Course Prefix and Number: CHEM 301

Course Title: Quantitative Analysis

Number of Credit Hours: 4 Lecture Hours: 3 Laboratory Hours: 1.5

Catalog Description: Standard quantitative chemical analysis covering sample treatment, data development, the basic principles of modern instrumental analysis, properties and theory. Laboratory work is included as part of the course. $20 Lab fee. Prerequisite: MATH 150 or higher. Offered even Fall.

Prerequisite(s)/Corequisite(s): MATH 150 or higher.

Text(s): Suggested Texts; current editions of:


Modern Analytical Chemistry. D. Harvey, McGraw-Hill.

Contemporary Chemical Analysis. J. Rubinson and K. Rubinson, Prentice Hall.

Course Objectives:

• To apply the chemical principles and methods by which the amount of a given substance in a sample can be determined.
• To demonstrate mathematical methods for analyzing analytical data.
• To employ modern instrumentation in chemical analysis.

Measurable Learning Outcomes

• Apply statistical methods to experimental data, such as significant figures, propagation of error, confidence intervals, student’s test mean, and standard deviation.
• Determine best-fit line through a set of data points.
• Utilize standards in quantitative analysis.
• Apply gravimetric analysis.
• Perform titrations.
• Construct and use electrochemical cells.
• Utilize spectrophotometry.
• Perform combustion analysis.
• Separate components of a sample using chromatography.

Topical Outline (major areas of coverage):

• Process
• Measurements
• Error and statistics
• Calibration methods
• Titrations
• Electrochemistry
• Spectrophotometry
• Atomic spectroscopy
• Chromatography
• Gravimetric Analysis

Material from this course may be tested on the Major Field Test (MFT) administered during the Culminating Experience course for the degree.

Recommended maximum class size for this course: 20

Library Resources: Online databases are available at http://www.ccis.edu/offices/library/resources.asp. You may access them from off-campus using your eServices login and password when prompted.

Prepared by: Frank Somer
Date: September 13, 2005

NOTE: The intention of the master syllabus is to provide an outline of the contents of this course, as specified by the faculty of Columbia College, regardless of who teaches the course, when it is taught or where it is taught. Faculty members teaching this course for Columbia College are expected to facilitate learning pursuant to the course objectives and cover the subjects listed in the topical outline. However, instructors are also encouraged to cover additional topics of interest so long as those topics are relevant to the course’s subject. The master syllabus is, therefore, prescriptive in nature but also allows for a diversity of individual approaches to course material. 

Office of Academic Affairs
12/04