

Middlesex County College  
Edison, NJ 08818



**COURSE ID (DEPARTMENT AND COURSE NUMBER)**

Department of Natural Sciences

**COURSE NAME**

CHM 230/Analytical Chemistry

**CREDITS AWARDED FOR COURSE**

4

**PREREQUISITE OR COREQUISITE COURSES OR ACADEMIC STANDING**

CHM-122 and CHM-126 or equivalents ("C" or better)

**NEW OR MODIFIED COURSE**

This is a new course.

**SEMESTER AND YEAR COURSE WILL FIRST BE OFFERED** Fall, 2012

**NAME AND TELEPHONE NUMBER OR EMAIL ADDRESS OF DEPARTMENT CHAIR**

Dr. Donna Howell 732-906-2592

**DETAILED COURSE DESCRIPTION:**

Covers the theory relating to the quantitative techniques of volumetric, gravimetric, spectrophotometric, and chromatographic analysis. Topics include evaluation of measurements, concentration calculations, acid-base and precipitation equilibria, and the principles of chromatography. Laboratory experiments cover classical volumetric analysis, the use of visible spectrometers, and chemical separations.

**OUTLINE OF COURSE OBJECTIVES**

1. Demonstrate an understanding of the procedures and calculations for titrations such as acid/base, complexometric, and oxidation/reduction.
2. Perform statistical analyses on collected analytical data.
3. Demonstrate understanding of separation techniques such as ion exchange chromatography, gas chromatography and high performance liquid chromatography.
4. Analyze concentrations of various analytes using spectroscopy.
5. Utilize separations methods, such as gas chromatography and high performance liquid chromatography, for separation of mixtures.

**TEXTS, JOURNALS, AND OTHER MATERIALS USED IN COURSE**

Fundamentals of Chemical Analysis, by Skoog, West, Holler, and Crouch, Cengage Publishing

**SUGGESTED GRADING CRITERIA**

Lecture Exams (3)-40%  
Homework and Quizzes 10%  
Laboratory Reports and Notebook-35%  
Laboratory Exam and Practical-15%

**SCHEDULE OF TOPICS TO BE COVERED**

Week 1: What is Analytical chemistry? Review of calculations to be used in analytical chemistry  
Week 2: Statistics for analytical chemists  
Week 3: Titrations  
Week 4: Acid-Base Equilibria  
Week 5: Acid-Base titrations and buffers  
Week 6: Polyprotic Acids  
Week 7: EDTA and Redox titrations  
Week 8: Light, Spectroscopy, and Beer's Law  
Week 9: Atomic Absorption and Method of Standard additions

Week 10: Infrared Spectroscopy

Week 11: Chemical Separations

Week 12: Gas Chromatography

Week 13: High Performance Liquid Chromatography

Week 14: GC/MS and LC/MS

# Course Abstract

**Course ID and Name:** CHM 230, Analytical Chemistry

**Department:** Chemistry and Physics

Course Coordinator: Steven Rowley

E-mail Address: srowley@middlesexcc.edu

Telephone: x3311

**Prerequisites:** CHM 122 and CHM 126 (“C” or better) **Co-requisites:** None

## Course Description:

Covers the theory relating to the quantitative techniques of volumetric, gravimetric spectrophotometric, and chromatographic analysis. Topics include evaluation of measurements, concentration calculations, acid-base and precipitation equilibria, and the principles of chromatography. Laboratory experiments cover classical volumetric analysis, the use of visible spectrometers, and chemical separations.

## General Education Status:

**Credits:** 4

**Lecture Hours:** 2

**Lab Hours:** 4

## Learning Outcomes:

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3. Demonstrate understanding of separation techniques such as ion exchange chromatography, gas chromatography and high performance liquid chromatography.
4. Analyze concentrations of various analytes using spectroscopy.
5. Utilize separations methods, such as gas chromatography and high performance liquid chromatography, for separation of mixtures.

## Course Content Areas:

What is Analytical chemistry? Review of calculations to be used in Analytical Chemistry

Statistics for analytical chemists

Titration

Acid-Base Equilibria

Acid-Base titrations and buffers

Polyprotic Acids

EDTA and Redox titrations

Light, Spectroscopy, and Beer's Law

Atomic Absorption and Method of Standard additions

Infrared Spectroscopy

Chemical Separations

Gas Chromatography

High Performance Liquid Chromatography

GC/MS and LC/MS