

# CHEM 3001 ADVANCED ANALYTICAL CHEMISTRY

**Credit Points** 10

**Legacy Code** 300925

**Coordinator** Andrew Shalliker ([https://directory.westernsydney.edu.au/search/name/Andrew Shalliker/](https://directory.westernsydney.edu.au/search/name/Andrew%20Shalliker/))

**Description** This subject builds on Analytical Chemistry 2 and focuses more on instrumental analysis, isolation and cleanup techniques and aspects of quality control and quality assurance in an analytical laboratory and in manufacturing are discussed. The instrumental methods covered include atomic spectroscopy (for example, atomic absorption and emission, x-ray fluorescence), molecular spectroscopy (for example, UV-Vis, IR, fluorometry, mass spectrometry), chromatography, electrochemistry, thermal methods and automated methods. The theory of the instrumental methods, their construction, operation and applications are covered. The theory and application of isolation and cleanup techniques in inorganic and organic residue analysis are given.

**School** Science

**Discipline** Chemical Sciences, Not Elsewhere Classified.

**Student Contribution Band** HECS Band 2 10cp

Check your fees via the Fees ([https://www.westernsydney.edu.au/currentstudents/current\\_students/fees/](https://www.westernsydney.edu.au/currentstudents/current_students/fees/)) page.

**Level** Undergraduate Level 3 subject

**Pre-requisite(s)** CHEM 2001

**Equivalent Subjects** CHEM 3006 - Analytical Chemistry 3 CHEM 3002 - Advanced Chemical Analysis

**Restrictions**

Successful completion of 120 credit points

## Learning Outcomes

On successful completion of this subject, students should be able to:

1. Explain the role of analytical chemistry, classification of quantitative analytical methods, measurement of mass and volume, laboratory safety, laboratory notebook keeping, and the application of concentration units.
2. Explain the theory, instrumentation and application of: Atomic spectroscopy ? examples may be selected from flame and non flame atomic absorption spectroscopy, inductively coupled plasma (ICP) optical emission spectroscopy, ICP-mass spectroscopy, arc/spark emission spectroscopy, x-ray fluorescence. Molecular spectroscopy ? examples selected from UV-Vis spectroscopy, IR spectroscopy, molecular fluorescence. Potentiometric and coulometric methods - examples may be selected from voltametry and polarography, ion selective electrodes and biosensors. Overview of automatic instruments and instrumentation, flow injection analysis.
3. Explain the theory, instrumentation and application of chromatographic analysis focusing on liquid and gas chromatography. Other branches of chromatography may also be discussed.
4. Explain the theory, instrumentation and application of thermal methods which may include examples from: Thermogravimetric

methods, differential thermal analysis, differential scanning calorimetry, thermometric titrations.

5. Demonstrate understanding and explain selected topics covered from: the analysis of air, gases, water, soil, geological materials, ceramics, biological materials, metals and alloys, forensic toxicology and pesticide residues.
6. Explain the application of quality assurance and good manufacturing practice in industry and quality control in a registered laboratory. Application of analytical method development and validation as part of quality control. Implications of some analytical results reported.

## Subject Content

1. Fundamental Aspects of Analytical Chemistry  
- role of analytical Chemistry, Classification of quantitative analytical methods, measurement of Mass and volume, laboratory safety, laboratory notebook, Revision of concentration units.
2. Spectrochemical Analysis
3. Chromatographic Analysis  
- theory, instrumentation and application of chromatographic analysis focusing on liquid and gas chromatography. other branches of chromatography may also be discussed.
4. Automated Methods of Analysis  
- Overview of automatic instruments and instrumentation, flow injection analysis.
5. Specialised Methods of Analysis  
- A more detailed Discussion of Topics which may be selected from The Analysis of Air, gases, water, soil, geological materials, ceramics, Biological materials, metals and alloys, forensic toxicology and pesticide residues.
6. Aspects of Quality Assurance  
- application of quality assurance and good manufacturing practice in industry and quality control in A registered laboratory. application of analytical method development and validation as part of quality control.

## Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

| Type      | Length | Percent | Threshold | Individual/<br>Group Task |
|-----------|--------|---------|-----------|---------------------------|
| Practical |        | 40      | N         | Individual                |
| Quiz      | 1 hour | 60      | N         | Individual                |

Teaching Periods

## Spring (2024)

### Parramatta - Victoria Rd

#### On-site

**Subject Contact** Andrew Shalliker ([https://directory.westernsydney.edu.au/search/name/Andrew Shalliker/](https://directory.westernsydney.edu.au/search/name/Andrew%20Shalliker/))

View timetable ([https://classregistration.westernsydney.edu.au/even/timetable/?subject\\_code=CHEM3001\\_24-SPR\\_PS\\_1#subjects](https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=CHEM3001_24-SPR_PS_1#subjects))