

# CH915-10 Techniques in Quantitative and Qualitative Analysis

**20/21**

**Department**

Chemistry

**Level**

Taught Postgraduate Level

**Module leader**

Daniel Murdock

**Credit value**

10

**Module duration**

10 weeks

**Assessment**

100% coursework

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

This module will introduce practical fundamentals of qualitative and quantitative analysis. We will consider practical aspects of sampling and calibration techniques. The laboratory sessions will include quantitative analyses using volumetry, gravimetry, uv/visible spectroscopy, and state-of-the-art inductively coupled plasma spectroscopy (ICP) techniques (OES and MS).

[Module web page](#)

### Module aims

To introduce students from a range of different backgrounds to the laboratory techniques in Analytical Science.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

This module will allow students to combine their advanced analytical techniques knowledge which

they should obtain throughout the taught MSc programmes with hands-on experience in the laboratory and in practical workshops.

Topics covered will include:

- Applications of qualitative/quantitative analyses
- Performance characteristics of quantitative analytical methods
- Experimental error
- Sampling and how to deal with heterogeneous samples
- Measurement of mass and volume:
- Volumetric and gravimetric methods
- Optical spectroscopies
- Infrared spectroscopy
- Elemental Analysis
- Chiro-optical spectroscopy
- Modern instrumental methods: MS, NMR, X-ray, microscopies
- Data analysis and interpretation

## Learning outcomes

By the end of the module, students should be able to:

- To equip students from a range of different backgrounds with essential practical skills necessary for later modules.

## Indicative reading list

D.A. Skoog, D.M. West, and F.J. Holler, Crouch, Fundamentals of Analytical Chemistry, 9th Edition

D.C. Harris, Quantitative Chemical Analysis, 7th edition.

Holler, Skoog, Crouch, Principles of Instrumental Analysis, 6th Edition.

## Subject specific skills

Subject knowledge and understanding:

- Show an advanced understanding of the:
  - principles behind classical analytical and spectroscopic methods.
  - functions of various components in complex spectroscopic instrumentation.
- Discriminate between various analytical techniques, understanding the advantages, disadvantages and current applications of each.
- Demonstrate the ability to evaluate and interpret data from a variety of measurements.
- Display practical consideration for sources and treatment of experimental error.

### Key Skills

- Communicate scientific material verbally and in writing
- Demonstrate numeracy
- Independently use information technology: data-fitting software and spreadsheets
- Locate and evaluate relevant information from outside sources/literature research

- Manage time effectively
- Cognitive Skills:
- Critically analyse experimental data
  - Comprehensively assess errors in data
  - Test hypotheses using experimental data
  - Interpret results with aid of information from literature.
- Subject-Specific/Professional Skills:
- Follow good and safe practice in the laboratory.
  - Demonstrate sound laboratory and measurement skills.
  - Produce clearly written and original scientific reports.
  - Research and reference relevant literature.

## Transferable skills

TBC

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## Study

### Study time

Type	Required
Practical classes	16 sessions of 2 hours (32%)
Private study	68 hours (68%)
Total	100 hours

### Private study description

Self study, preparation and writeups: 68 hours

### Costs

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

### Assessment group A1

	Weighting	Study time
Written Laboratory Reports	100%	

Lab reports following each lab session

### **Feedback on assessment**

Written work will be annotated and returned to students. Feedback on laboratory and workshop performance will be provided verbally.

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## **Availability**

### **Post-requisite modules**

If you pass this module, you can take:

- CH936-28 Research Project: Chemistry

## **Courses**

This module is Core for:

- TCHA-F1PL Postgraduate Taught Molecular Analytical Science
  - Year 1 of F1PL Molecular Analytical Science
  - Year 1 of F1PL Molecular Analytical Science

This module is Core optional for:

- Year 1 of TCHA-F1PX Postgraduate Taught Analytical and Polymer Science

This module is Optional for:

- Year 1 of TCHA-F1PB MSc in Chemistry with Scientific Writing
- TCHA-F1PE Postgraduate Taught Scientific Research and Communication
  - Year 1 of F1PE Scientific Research and Communication
  - Year 1 of F1PE Scientific Research and Communication

This module is Core option list B for:

- Year 1 of TCHA-F1PY Postgraduate Taught Analytical Science and Instrumentation