

CH913-10 Real-World Analysis: From Theory to Application

26/27

Department

Chemistry

Level

Taught Postgraduate Level

Module leader

Lydia Barnes

Credit value

10

Module duration

2 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

This module requires students to work in teams to investigate a contemporary challenge with analytical science.

Students develop and implement analytical strategies, integrate multiple instrumental techniques, critically evaluate complex datasets and communicate their findings through professional reports and presentations.

The module provides a bridge between the taught curriculum and independent research practice, while developing the collaborative and project-management skills expected of analytical scientists.

The module prepares students for independent research projects and careers in academic, industrial and commercial environments.

[Module web page](#)

Module aims

The module aims to integrate analytical methodologies, experimental design and data analysis in

the investigation of complex analytical problems that mirror those encountered in industrial, commercial and research laboratories.

Working in teams of up to 5, students will implement knowledge gained throughout Terms 1 and 2 in the design, execution and evaluation of a hypothesis related to a real-world problem.

Essential skills developed and tested in this module are teamwork, project management, problem analysis, literature research, practical laboratory skills and scientific communication.

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.

Lecture: To introduce the problems and approaches that the students may wish to take.

Workshops/Tutorials: To support and direct student research and project planning.

Group Research project: Students will be placed in groups (of ca. 5). Each group will select a real-life challenge to work on and will have 2 weeks to identify/analyze the main scientific/technical problems, perform literature research, formulate a hypothesis and design and execute a series of experiments before presenting their results both orally and as a written report.

A wide range of possible projects could be undertaken based on theoretical, perceived or real problems.

This module will develop students' teamworking, science communication and project-management abilities.

Learning outcomes

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

- Formulate scientifically justified solutions to complex problems in analytical science.
- Critically evaluate and implement published methodologies
- Select and justify appropriate combinations of analytical techniques and develop appropriate experimental research strategies.
- Apply appropriate sample preparation techniques and assess their effectiveness and limitations.
- Acquire, manage, process, interpret and critically evaluate analytical datasets including the appropriate treatment of errors in analysis
- Demonstrate laboratory competence in instrumental analytical chemistry and safe laboratory practice.
- Collaborate effectively within a team environment, contributing proportionately to the planning, execution and delivery of shared project objectives.
- Manage time, resources and delegated responsibilities effectively to achieve project goals.
- Prepare publication-standard scientific reports and communicate data, methodologies and findings effectively to a scientific audience.
- Scrutinise and provide constructive feedback on the scientific methods, data, interpretations

and conclusions presented by others.

Research element

Students undertake a team-based investigative project involving literature review, experimental design, analytical method selection, data acquisition, interpretation and reporting.

Interdisciplinary

Cross-disciplinary team research project in analytical sciences

Subject specific skills

Knowledge & Understanding: analytical measurement science; method development and validation; data quality and uncertainty; sample preparation and analytical workflows.

Professional Skills: instrumental analytical techniques; experimental design; scientific reporting; data interpretation; laboratory safety and good laboratory practice.

Transferable skills

Teamworking and collaboration; project planning and management; scientific communication; literature evaluation; information literacy; problem solving; peer review; presentation skills.

Critical thinking; problem solving; teamwork; project management; professional communication; information literacy; digital literacy; organisational awareness; scientific reporting.

Study

Study time

Type	Required
Lectures	1 session of 1 hour (2%)
Tutorials	2 sessions of 6 hours (19%)
Practical classes	7 sessions of 7 hours (79%)
Total	62 hours

Private study description

No private study requirements defined for this module.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A3

	Weighting	Study time	Eligible for self-certification
Assessment component			
Group Report	30%	20 hours	Yes (extension)
Reassessment component is the same			
Assessment component			
Individual Report/Appraisal	20%	2 hours	Yes (extension)
Reassessment component is the same			
Assessment component			
Group Presentation	25%	15 hours	No
A 30-minute group presentation including Q&A.			
Reassessment component is the same			
Assessment component			
Project contribution	25%	1 hour	No
Contribution to project planning and delivery in tutorial and laboratory sessions			
Reassessment component is the same			

Feedback on assessment

Written feedback will be returned to students for the report submission and the oral presentation. Peer assessment is also included. Feedback on research plans and laboratory progress will be provided ad-hoc and verbally.

Availability

Courses

This module is Core for:

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

This module is Core optional for:

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

This module is Core option list B for:

- Year 1 of TCHA-F1PY Postgraduate Taught Analytical Science and Instrumentation
- Year 1 of TCHA-F1PX Postgraduate Taught Analytical and Polymer Science