

MODULE DESCRIPTOR

Module Title

Advanced Analytical Techniques

Reference	PL4601	Version	1
Created	October 2023	SCQF Level	SCQF 10
Approved	January 2005	SCQF Points	15
Amended	September 2023	ECTS Points	7.5

Aims of Module

To enable students to evaluate the principles, applications and limitations of a selection of advanced analytical science and statistical techniques.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Examine the principles and applications of selected advanced analytical/bioanalytical techniques.
- 2 Critique the advantages and disadvantages of selected advanced analytical/bioanalytical techniques.
- 3 Perform chemometric calculations and appraise statistical data effectively.

Indicative Module Content

Advanced Inorganic Analysis: advanced electrochemical methods, advanced ICP-OES, ICP-MS. Advanced Organic Analysis: Biosensors, immunodiagnostic techniques. Mass spectrometry: advanced ionisation methods, advanced MS analysers, Tandem MS. Other advanced chromatographic and spectroscopic techniques e.g. lasers, chemical speciation, IRMS. Chemometrics: Factorial Design, Simplex Optimisation, Pattern Recognition techniques, including Principal Components Analysis.

Module Delivery

This is a lecture based module supplemented by tutorials and computer-based workshops. Visiting speakers may be involved in the delivery of material.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	40	N/A
Non-Contact Hours	110	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	N/A
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type: Practical Exam Weighting: 100% Outcomes Assessed: 1, 2, 3
 Description: PowerPoint Presentation and oral assessment.

MODULE PERFORMANCE DESCRIPTOR**Explanatory Text**

Component 1 (Practical exam) comprises 100%. A minimum of a Grade D is required to pass the module.

Module Grade	Minimum Requirements to achieve Module Grade:
A	A
B	B
C	C
D	D
E	E
F	F
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	Successful completion of Stage 3 Forensic and Analytical Science or equivalent.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

- 1 BRERETON, R.G. Chemometrics: Data Analysis for the Laboratory and Chemical Plant. 2003. Wiley.
- 2 MONK, P. M. S. Fundamentals of Electroanalytical Chemistry. 2002. Wiley
- 3 GARDINER, W.P. Statistical Analysis Methods for Chemists: A Software-Based Approach. 1997. Royal Society Chemistry.
- 4 WATSON, J. T. and SPARKMAN, O.D. Introduction to Mass Spectrometry: Instrumentation, Applications and Strategies for Data Interpretation. 2008. Wiley.
- 5 MILLER, J. N. and MILLER, J.C. Statistics and Chemometrics for Analytical Chemistry. 2010. Prentice Hall.