

Module Title Advanced Analytical Techniques	Reference AS4040 SCQF SCQF Level 10 SCQF Points 15 ECTS Points 7.5 Created June 2002 Approved January 2005 Amended May 2011 Version No. 4
Keywords Chemometrics, advanced mass spectrometry, chromatography, electrochemistry, biosensors, lasers, immunodiagnostic techniques	

This Version is No Longer Current

The latest version of this module is available [here](#)

Prerequisites for Module

AS2040, AS2041 and AS3040 or equivalent

Corequisite Modules

None.

Precluded Modules

None.

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,

Mode of Delivery

The module will be delivered by lectures and tutorials. including visiting speakers. Chemometrics will involve the use of appropriate software packages in computer-based workshops.

Assessment Plan

	Learning Outcomes Assessed
Component 1	2
Component 2	1

Component 1 is a critical appraisal of advanced analytical/bioanalytical techniques.

Component 2 is a

students are expected to be able to:

1. Perform chemometric calculations and appraise statistical data effectively.
2. Discuss the principles, applications, advantages and disadvantages of selected advanced analytical/bioanalytical techniques.

Indicative Module Content

Chemometrics: Factorial Design, Simplex Optimisation, Principal Components Analysis, Pattern Recognition.

Advanced Inorganic Analysis: Advanced electrochemical methods, Advanced ICP-OES, ICP-MS, TIMS.

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.

Indicative Student Workload

<i>Contact Hours</i>	Full Time
Lectures	33
Tutorials/Workshops	6

Directed Study

Directed Study	53
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computer-based statistics exercise.

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.

Private Study

Private Study

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