

MODULE DESCRIPTOR

Module Title

Instrumental Analytical Sciences

Reference	ASM019	Version	2
Created	August 2021	SCQF Level	SCQF 11
Approved	February 2018	SCQF Points	30
Amended	August 2021	ECTS Points	15

Aims of Module

To effectively problem-solve and critically evaluate analytical techniques such as Chromatography, Electroanalysis, Microscopy and Spectroscopy.

Learning Outcomes for Module

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

- 1 Critically evaluate and appraise a range of advanced analytical instrumentation.
- 2 Critically appraise and discuss conventional techniques for the solution of a given analytical problem.
- 3 Demonstrate critical professional competence in oral presentations and data handling skills for the solution of a given analytical problem.

Indicative Module Content

The principles, applications and limitations of:- Spectroscopy - atomic spectroscopy (emission and absorption), x-ray fluorescence; molecular spectroscopy - UV/Vis, FTIR, fluorescence, raman, mass spectrometry, phosphorescence, lifetime TRF, derivative spectroscopy, NIR, FIR, NMR; Chromatography - GC, HPLC, UPLC, CZE and higher modes, HILIC, SCFC, green chromatography, GC-GC, affinity chromatography, LC-MS. Microscopy - TEM, SEM/EDXA Electroanalysis - ISE's, potentiometry, voltammetry, biosensors.

Module Delivery

The module is delivered through a series of lectures and tutorials. Some guest lectures. The separate laboratory programme also affords students the opportunity to develop and extend the material in a practical context.

Indicative Student Workload	Full Time	Part Time
Contact Hours	48	48
Non-Contact Hours	252	252
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	300	300
<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: Examination Weighting: 60% Outcomes Assessed: 1
 Description: Component 1 is a closed book examination.

Component 2

Type: Examination Weighting: 40% Outcomes Assessed: 2, 3
 Description: Component 2 is a PowerPoint Presentation and oral assessment which appraises critical problem solving skills with respect to data analysis from a given analytical application.

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

The first grade represents Component 1 (EX1) weighted as major and the second, Component 2 (CW1), weighted as minor. A minimum module grade of D is required for a pass, with compensation of grade E in Component 1 or Component 2 permitted. Non-submission of either component will result in an NS grade.

Module Grade	Minimum Requirements to achieve Module Grade:
A	AA, AB
B	AC, AD, BA, BB, BC, CA
C	AE, BD, BE, CB, CC, CD, DA, DB, EA
D	CE, DC, DD, DE, EB, EC
E	AF, BF, CF, DF, ED, EE, EF, FA, FB, FC, FD
F	FE, FF
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	None in addition to the course entry requirements.
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

- 1 SKOOG, D.A., HOLLER, F.J. and CROUCH, S.A. Principles of Instrumental Analysis. Current Edition. Belmont, CA: Thomson Higher Education.
- 2 MILLER, J.N. and MILLER, J.C. Statistics and Chemometrics for Analytical Chemistry. Current Edition. Essex, UK: Pearson Education Limited.
- 3 POOLE, C.F., Gas Chromatography. Current Edition. Electronic resource.
- 4 LAJUNEN, L.H.J. and PERAMAKI, P. Spectrochemical Analysis by Atomic Absorption and Emission. Current Edition. Cambridge, UK: The Royal Society of Chemistry.
- 5 SCHMIDT, W. Optical Spectroscopy in Chemistry and Life Sciences. An Introduction. Current Edition. Weinheim, Germany: Wiley-VCH.
- 6 BRETT, C.M.A. AND BRETT, A.M.O., Electroanalysis, Oxford Chemistry Primers, Current Edition. Oxford University Press.
- 7 LANGMAN, L.J., LC-MS in Drug Analysis, Electronic Resource; Current Edition. Methods and Protocols.
- 8 LEVINSON, R. More Modern Chemical Techniques. Current Edition. London, UK: The Royal Society of Chemistry.