

## 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:
<b>A</b>	AA, AB
<b>B</b>	AC, AD, BA, BB, BC, CA
<b>C</b>	AE, BD, BE, CB, CC, CD, DA, DB, EA
<b>D</b>	CE, DC, DD, DE, EB, EC
<b>E</b>	AF, BF, CF, DF, ED, EE, EF, FA, FB, FC, FD
<b>F</b>	FE, FF
<b>NS</b>	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**

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|---|--|
| 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.   |