

MODULE SPECIFICATION FORM

Module Title: Analytical Methods	Level: 5	Credit Value: 20
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Module code: SCI509	Cost Centre: GAFS	JACS3 code: F100
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Semester(s) in which to be offered: 1	With effect from: September 2016
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Office use only: To be completed by AQSU:	Date approved: July 2013
	Date revised: July 2016 (updated to include BSc Chemistry with Education)
	Version no: 3

Existing/New: Existing	Title of module being replaced (if any):
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Originating School: Applied Science, Computing & Engineering	Module Leader: Dr Jixin Yang
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Module duration (total hours): 200	Status: core/option/elective (identify programme where appropriate): Core
Scheduled learning & teaching hours: 50	
Independent study hours: 150	

Programme(s) in which to be offered: BSc (Hons) Forensic Science BSc (Hons) Chemistry with Green Nanotechnology BSc (Hons) Chemistry with Education	Pre-requisites per programme (between levels): None
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Module Aims:

This module will introduce students to the main techniques used for the isolation and chemical analysis of trace materials, including general chemical separation and analysis, chromatographic methods, immunoassay and electrophoresis *etc.* and their applications in forensic field.

Expected Learning Outcomes:

At the end of this module, students should be able to:

Knowledge and Understanding:

- 1 Explain the principles of common chemical analyses and separation techniques.
- 2 Compare and contrast different chromatographic methods used in trace analysis.
- 3 Explain the principles of electrophoresis and immunochemical assays.
- 4 Evaluate the importance of chemical analysis in forensic science.

Transferable/Key Skills and other attributes:

- Literacy
- Numeracy
- Problem solving
- Time management
- IT skills
- Note Taking

Assessment:

Assessment 1: Course work of approximately 10 short questions on analytical chemistry knowledge and calculations plus a short research essay (50%)

Assessment 2: Exam (2 hours) (50%)

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting	Duration (eg, if exam or presentation)	Word count (or equivalent if appropriate)
1	1-4	Coursework	50%		1,500
2	1-3	Examination	50%	2 hours	

Learning and Teaching Strategies:

Methods of delivery:

Lectures

Problem solving workshops

Directed study *via* Moodle VLE

Student directed study

The basic factual material will be delivered by means of lectures. Lectures will be supported by workshops in which the students will be able to test their knowledge and understanding of the concepts covered. Students will further be able to develop their knowledge and understanding by reading additional course material and attempting problem sets and quizzes on Moodle VLE. Independent student-directed learning will enable students to delve more deeply into the subject material, enhancing their learning, while developing their IT skills.

Syllabus outline:

- Introduction to analytical chemistry
- Gravimetric analysis
- Volumetric analysis
- Extraction of trace materials
- Concentration of analytes
- Fundamental principles of chromatography
- Methods of chromatography, including TLC, HPLC and GC
- Fundamental principles of electrophoresis
- Gel electrophoresis and the separation of biomolecules
- Immunochemical methods
- Analytical methods specific to colorant materials such as dyes, inks and paints
- Chemical analysis of explosives
- Chemical analysis of polymers, such as hair and fibres
- Examples to the applications of all chemical separation and analysis techniques in forensic and environmental fields

Bibliography:

Essential reading:

Rubinson K.A. and Rubinson J.F. (1999) *Contemporary Instrumental Analysis*, Prentice Hall.

Higson, S.P.J. (2003) *Analytical Chemistry*, Oxford University Press.

Other indicative reading:

Bell, S. (2012) *Forensic Chemistry, 2nd Edition*, Pearson Prentice Hall.