

<b>Module Code:</b>	SCI523
---------------------	--------

<b>Module Title:</b>	Analytical Methods
----------------------	--------------------

<b>Level:</b>	5	<b>Credit Value:</b>	20
---------------	---	----------------------	----

<b>Cost Centre(s):</b>	GAFS	<u>JACS3</u> <b>code:</b>	F100
------------------------	------	---------------------------	------

<b>Faculty:</b>	FAST	<b>Module Leader:</b>	Dr Jixin Yang
-----------------	------	-----------------------	---------------

Scheduled learning and teaching hours	30 hrs
Guided independent study	170 hrs
Placement	<a href="#">Click here to enter hours.</a> hrs
<b>Module duration (total hours)</b>	200 hrs

<b>Programme(s) in which to be offered (not including exit awards)</b>	Core	Option
BSc (Hons) Forensic Science	✓	<input type="checkbox"/>
BSc (Hons) Chemistry	✓	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>

<b>Pre-requisites</b>
None.

**Office use only**

Initial approval: March 2018

Version no:1

With effect from: 01/09/2018

Date and details of revision: 5/8/20 Temporary change to assessment for 2020/21 post Covid.

Version no:3

22/9/21 Temporary assessment change extended for 21/22

27/10/2022 Removal of temporary assessment

## 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.

## Intended Learning Outcomes

Key skills for employability

- KS1 Written, oral and media communication skills
- KS2 Leadership, team working and networking skills
- KS3 Opportunity, creativity and problem solving skills
- KS4 Information technology skills and digital literacy
- KS5 Information management skills
- KS6 Research skills
- KS7 Intercultural and sustainability skills
- KS8 Career management skills
- KS9 Learning to learn (managing personal and professional development, self-management)
- KS10 Numeracy

At the end of this module, students will be able to

Key Skills

At the end of this module, students will be able to		Key Skills	
1	Explain the principles of common chemical analyses and separation techniques.	KS1	KS10
2	Compare and contrast different chromatographic methods used in trace analysis.	KS3	KS5
3	Explain the principles of electrophoresis and immunochemical assays.	KS1	KS3
		KS5	
4	Evaluate the importance of chemical analysis in forensic science.	KS1	KS5
		KS6	KS8

## Transferable skills and other attributes

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

**Derogations**

N/A.

**Assessment:**

Indicative Assessment Tasks:

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

Assessment 2: Exam containing multiple choice, short-answer and problem-solving questions (50%)

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	1-4	Coursework	50		1500
2	1-3	Exam	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 polymers, such as hair and fibres
- Examples to the applications of all chemical separation and analysis techniques in forensic and environmental fields

**Indicative Bibliography:****Essential reading**

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

**Other indicative reading**

Bell, S. (2012), *Forensic Chemistry*. 2nd ed. Harlow: Pearson.

Rubinson, J.F. and Rubinson, K.A. (2000), *Contemporary Instrumental Analysis*. Upper Saddle River, NJ: PrenticeHall.