

Module Code:	SCI722
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Module Title:	Forensic Analytical Chemistry
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Level:	7	Credit Value:	20
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Cost Centre(s):	GAFS	<u>JACS3</u> code:	F180
		<u>HECoS</u> code:	100413

Faculty	FAST	Module Leader:	Dr Jixin Yang
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Scheduled learning and teaching hours	21 hrs
Guided independent study	179 hrs
Placement	0 hrs
Module duration (total hours)	200 hrs

Programme(s) in which to be offered (not including exit awards)	Core	Option
MRes Analytical & Forensic Chemistry	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Pre-requisites
SCI509 Analytical Methods SCI512 Instrumental Analysis <i>Or equivalent</i>

Office use only

Initial approval: 07/05/2019	Version no:1
With effect from: 01/09/2019	
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 allows the students to explore and consolidate the concepts of analytical chemistry and its applications in forensic investigation. It will cover a wide range of knowledge and skills in this field, including the sample preparation, instrumental analysis methods and protocols, data processing and interpretation, and quality control/management *etc.* The module contains a number of case studies and will be highly linked to the real-life practice of forensic chemists.

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	Critically evaluate and apply chemical techniques and instrumental methods used during forensic investigation.	KS1	KS3
		KS5	KS8
		KS9	
2	Achieve in-depth understanding of sample preparation techniques, instrumental protocols and quality standard management.	KS3	KS5
		KS7	KS8
3	Interpret and critically assess the data from sample analysis in forensic analytical chemistry.	KS1	KS3
		KS5	KS10
4	Apply advanced laboratory skills to complete practical tasks within a forensic context.	KS2	KS8
5	Present the written report in sector prescribed format for forensic chemical analysis with critical thinking and discussion.	KS1	KS3
		KS4	KS5
		KS6	KS10

Transferable skills and other attributes

- Numeracy.
- Time management skills.
- Interpretation and presentation of written scientific information.

Derogations

N/A

Assessment:

Indicative Assessment Tasks:

Assessment 1: Lab report (50%) based on the literature search and outcomes of the laboratory session of forensic chemical analysis.

Assessment 2: Unseen written examination (50%) focusing on knowledge and applications of the chemical analysis techniques in a forensic context.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration or Word count (or equivalent if appropriate)
1	3-5	Report	50	1500
2	1-3	Examination	50	2 hours

Learning and Teaching Strategies:

Students will attend online lectures and formal timetabled workshops and practical sessions (in the fashion of block delivery) during the study of this module. VLE will be used to support students' learning in distance. Students will research case studies and carry out guided self-learning.

Syllabus outline:

- Preparation of chemical samples including separation and purification.
- Application of chromatographic techniques in forensic investigation.
- Application of spectroscopic techniques in forensic investigation.
- Case studies on the analyses of drugs, explosives, blood, fibres *etc.*
- Quantitative errors and statistical analysis.
- Quality standards, control and management, including method validation and laboratory accreditation in forensic science.
- Laboratory sessions on forensic chemical analysis.

Indicative Bibliography:**Essential reading**

- Bell, S. (2014) *Forensic Chemistry, Pearson new international second edition*, Pearson Prentice Hall

Other indicative reading

- Harris, D.C. (2015) *Quantitative Chemical Analysis, 9th Edition*, Palgrave.
- Stuart B. H., (2013) *Forensic Analytical Techniques*, Wiley.

Journals in forensic chemistry, such as:

- Forensic Science International (2002-current)
- Talanta (2002-current)
- Journal of Forensic Research (open access)
- Open Forensic Science Journal (open access)