

Module Code:	SCI527
---------------------	--------

Module Title:	Laboratory Instrumental Analysis
----------------------	----------------------------------

Level:	5	Credit Value:	20
---------------	---	----------------------	----

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

School:	Applied Science, Computing & Engineering	Module Leader:	Dr Jixin Yang
----------------	---	-----------------------	---------------

Scheduled learning and teaching hours	48 hrs
Guided independent study	152 hrs
Placement	0 hrs
Module duration (total hours)	200 hrs

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

Pre-requisites
None.

Office use only

Initial approval: Mar 18 – validation of BSc Chemistry

Version no: 1

With effect from: Sept 18

Date and details of revision:

Version no:

Module Aims

This module aims to introduce students to the spectroscopic and chromatographic techniques and provide them with hands-on experience of laboratory instrumental analysis, further developing the practical skills gained in the Laboratory Chemical Analysis module.

This module also aims to provide training to the students on the research methodology and skills, e.g. literature survey, experimental design, data acquisition, result analysis and report writing-up, which will pave the way for their final year research project.

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	Formulate experimental methods for chemical analysis and design appropriate experimental set-ups.	KS5	
2	Demonstrate the sample preparation and operational skills using the advanced analytical instruments.	KS2	KS8
3	Acquire and critically assess experimental results with comparison to standards or databases.	KS1	KS3
		KS5	KS6
		KS8	KS10
4	Expand the knowledge in the applications of instrumental techniques and appreciate their advantages and limitations.	KS5	KS6

Transferable skills and other attributes

- Safe-working laboratory practices
- Observation, recording and presenting complex scientific data
- Numeracy, literacy, IT and Information management
- Time management
- Problem solving skills
- Literature search, data processing and academic writing skills
- Team working

Derogations

N/A

Assessment:

Indicative Assessment Tasks:

Students will submit a portfolio of their lab reports, including introduction, methodology, experimental results together with a reflective commentary *etc.* All the external information should be properly referenced.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)	Duration (if exam)	Word count (or equivalent if appropriate)
1	1,2,3,4	Portfolio	100		3500

Learning and Teaching Strategies:

Methods of delivery:
Laboratory Experiments Directed study via Moodle VLE
Student directed study

Students will gain hands-on practical skills in the laboratory. Directed self-study will guide students through the development of presentation skills and give students the opportunity to broaden their knowledge and understanding in areas of specific interest to them.

Syllabus outline:

- Thin Layer chromatography
- Gas chromatography
- High-performance liquid chromatography
- UV-vis spectroscopy
- IR spectroscopy
- Fluorescence spectroscopy
- Atomic absorption spectroscopy
- Scanning electron microscopy
- Extended study using virtual chemistry lab software

Indicative Bibliography:
Essential reading
Dean, J.R. <i>et al.</i> (2017), <i>Practical Skills in Chemistry</i> . 3rd ed. Harlow: Pearson Education. Lobban C.S. and Scheffer M. (2017), <i>Writing Undergraduate Lab Reports: A Guide for Students</i> . Cambridge: Cambridge University Press.
Other indicative reading
Higson, S.P.J. (2003), <i>Analytical Chemistry</i> . Oxford: Oxford University Press. Skoog, D.A., Holler, F.J. and Nieman, T.A. (2007), <i>Principles of Instrumental Analysis</i> . 6th ed. Belmont, CA: Thomson Brooks/Cole.