

MODULE SPECIFICATION FORM

Module Title: Laboratory Instrumental Analysis	Level: 5	Credit Value: 20
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Module code: SCI513	Cost Centre: GAFS	JACS3 code: F100
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Semester(s) in which to be offered: 2	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 Scheduled learning & teaching hours: 70 Independent study hours: 130	Status: core/option/elective (identify programme where appropriate): Core
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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 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.

Expected Learning Outcomes:

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

Knowledge and Understanding:

- 1 Formulate experimental methods for chemical analysis and design appropriate experimental set-ups.
- 2 Demonstrate the sample preparation and operational skills using the advanced analytical instruments.
- 3 Acquire and critically assess experimental results with comparison to standards or databases.

Transferable/Key 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

Assessment:

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 (eg, if exam or presentation)	Word count (or equivalent if appropriate)
1	1-3	Portfolio	100%		3,500

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:

The following instrumental analysis techniques will be covered in this module. Each laboratory session includes an introductory talk and close supervision from the tutor.

- 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

Bibliography:

Essential reading:

Dean, J.R., Jones, A.M., Holmes, D., Read, R, Weyers, J, Jones, A. (2002) *Practical Skills in Chemistry*, Prentice Hall.

Lobban C.S. (1992) *Successful Lab Reports: A Manual for Science Students*, Cambridge University Press.

Other indicative reading:

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

Skoog, D.A., Holler, F.J. and Nieman, T.A. (1998) *Principles of instrumental analysis*, Orlando: Harcourt Brace College Publishers.