Liverpool John Moores University

Title:	ADVANCED INSTRUMENTAL ANALYSIS
Status:	Definitive
Code:	**6012CHACAP** (118239)
Version Start Date:	01-08-2012
Owning School/Faculty:	Pharmacy & Biomolecular Sciences
Teaching School/Faculty:	Pharmacy & Biomolecular Sciences

Team	Leader
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Academic Level:	FHEQ6	**Credit Value:**	24.00	**Total Delivered Hours:**	51.00
Total Learning Hours:	240	**Private Study:**	189		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	28.000
Practical	12.000
Seminar	4.000
Tutorial	4.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam	Examination	60.0	3.00
Portfolio	Portfolio	Practicals	40.0	

Aims

To develop knowledge and practical experience of advanced techniques for chemical analysis. Hands-on opportunities for the analysis of drugs of abuse, pharmaceuticals and environmental samples will be provided.

Learning Outcomes

After completing the module the student should be able to:

1 Make reasoned judgements regarding the quality of analytical data obtained from practical experience and, given appropriate information, determine whether an analytical method is fit for purpose.
2 Demonstrate an understanding of the principles and practice of atomic spectroscopy and its application to the analysis of drugs and other samples.
3 Demonstrate an understanding of the applications and uses of mass spectrometry with respect to chromatographic and plasma introduction.
4 Demonstrate an understanding of the application and principles of thermal methods of analysis and appreciate the type of information that they provide.
5 Select an appropriate analytical technique for a particular analyte/matrix separation.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

EXAM	1	2	3	4	5
Portfolio	1	2	3	4	5

Outline Syllabus

1) Analytical Quality Control: Fitness for purpose and sample preparation techniques commonly used in bioanalysis will be covered.

2) Coupled Chromatographic Techniques: Instrumentation, applications and function of GC-MS, LC-MS and tandem mass spectrometry (LC-MS/MS) for the use of unknown and target screening. Atmospheric HPLC-MS interfacing techniques including electrospray (ESI) will be explained. The use of multiple quadrupole instruments and their uses in improvement in chromatography data will be discussed.

3) Atomic Spectroscopy: Applications of ICP and ICPMS techniques to the determination of toxic metals in drugs and related samples. Where do they come from, why are they regulated, and what risk do they pose?

4) Thermal Analysis: Introduction to differential thermal analysis including differential scanning calorimetry, thermogravimetry and others. An emphasis is placed on relevance to the analysis of food, drug, industrial chemicals and forensics.

Learning Activities

Lectures, tutorials and practical sessions.

References

Course Material	Book
Author	R. Kellner, J.-M. Mermet, M. Otto and H. M. Widmer (Editors)
Publishing Year	1998
Title	Analytical Chemistry
Subtitle	
Edition	
Publisher	Wiley
ISBN	3527288813

Course Material	Book
Author	Lamert J.B., Shurvell, H.F., Lightner, D.A., Cooks, R.G.
Publishing Year	1998
Title	Organic Structural Spectroscopy
Subtitle	
Edition	
Publisher	Prentice Hall
ISBN	0132586908

Course Material	Book
Author	Harris, D.C.
Publishing Year	2003
Title	Quantitative Chemical Analysis
Subtitle	
Edition	6th
Publisher	WH Freeman
ISBN	0716744643

Course Material	Book
Author	Handley, A. J. and Adlard, E. R.
Publishing Year	2001
Title	Gas Chromatographic Techniques and Applications
Subtitle	
Edition	
Publisher	Sheffield Academic Press
ISBN	1841271187

Course Material	Book
Author	L. Ebdon, E. H. Evans, A. S. Fisher and S. J. Hill
Publishing Year	1998
Title	An Introduction to Analytical Atomic Spectrometry
Subtitle	
Edition	

Publisher	Wiley
ISBN	0471974188

Course Material	Book
Author	J. R. Chapman
Publishing Year	1996
Title	Practical Organic Mass Spectrometry
Subtitle	
Edition	
Publisher	Wiley
ISBN	0471927538

Course Material	Book
Author	M. F. C. Ladd and R. A. Palmer
Publishing Year	1986
Title	Structure Determination by X-ray Analysis
Subtitle	
Edition	
Publisher	Plrnum Press
ISBN	0306422956

Course Material	Book
Author	Haines, P.
Publishing Year	2002
Title	Principles of Thermal Analysis and Colorimetry
Subtitle	
Edition	
Publisher	RSC
ISBN	0854046100

Notes

The module is designed to provide students with the concepts and practical experience necessary either to pursue a career in analytical chemistry or to be aware of the limitations of analytical techniques upon which they may rely for information. Study includes in-depth treatment of selected current analytical techniques, developing many of the subjects and concepts introduced at Level 2. Lectures supported by practical experience, and tutorials/workshops.