



ACADEMIC SERVICES

MODULE SPECIFICATION

Part 1: Basic Data					
Module Title	Forensic Analysis and Toxicology				
Module Code	USSJUR-30-3	Level	3	Version	1
UWE Credit Rating	30	ECTS Credit Rating	15	WBL module?	No
Owning Faculty	Health and Applied Sciences	Field	Analytical Science		
Department	Biological, Biomedical and Analytical Sciences	Module Type	Standard		
Contributes towards	BSc Forensic Science (with foundation year), BSc Forensic Science, MSci Forensic Science, MSci Forensic Science (with foundation year)				
Pre-requisites	USSKB9-15-2 Instrumental Analytical Science	Co- requisites	USSKBQ-30-3 Advanced Analytical Science		
Excluded Combinations	USSJUP-30-3 Forensic Biology and Genetics; USSKBF-30-3 Genomic Technologies	Module Entry requirements			
First CAP Approval Date	2 Feb 2016	Valid from	September 2016		
Revision CAP Approval Date		Valid from			

Review Date	September 2022
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Part 2: Learning and Teaching	
Learning Outcomes	<p>On successful completion of this module students will be able to:</p> <ul style="list-style-type: none"> demonstrate knowledge of the analytical techniques commonly applied to forensic scientific evidence (component A, components B1 and 2) evaluate methods of analysis for a wide range of forensic evidence (component B2) discuss the selection, preservation and analysis of specimens in forensic toxicology (components A and B1) demonstrate knowledge of the pharmacokinetics and metabolism of drugs of abuse to direct the appropriate choice of analyte for toxicological analysis (component A) interpret analytical results for presentation in a forensic context (components A and B1) undertake sample preparation and analysis of drugs and toxicological samples (component B1).
Syllabus Outline	<ul style="list-style-type: none"> Forensic Analysis: Issues relating to the use of GC, HPLC, FTIR, uv-vis spectrophotometry, X-ray analysis and mass spectrometry (including combined techniques) for a wide range of forensic evidence types. Electrochemical sensors/biosensors as applied to forensic analysis. Selection of method for a range of analyses considering analytes, matrices, sample size and concentration in a forensic context. Examples may include drugs, poisons, fire accelerants, explosives, firearms discharge residues, paint, glass, plastics, soil, inks, fibres, dyes. Key requirements for forensic

	<p>casework. Commonly encountered synthetic routes to poisons and drugs. Potential hazards of investigating illicit laboratories – principles and strategies. Elements of risk assessment.</p> <ul style="list-style-type: none"> • Forensic Toxicology: Pharmacokinetics and metabolism of drugs of abuse and other toxic substances, including synergistic and idiosyncratic effects. Ante-mortem and post-mortem testing for a range of metabolites. Selection of analyte and specimen type; evidence integrity and preservation. Quality control and regulatory aspects. Interpretation of toxicological results – research data, individual variation, multiple factors. • Sampling issues and sample preparation: Extraction and/or matrix matching. Presumptive testing of drugs. Optimisation of analytical methods, especially for chromatography, mass spectrometry and atomic spectroscopy. Derivatisation to improve compound stability and method sensitivity. • Interpretation of results: Evaluation of methods and results including appropriate statistical testing, valid comparisons and conclusions in context with reference to research literature and databases. Communication to a lay audience (jury in court). • Drugs legislation and national and international processes for monitoring drug supply and abuse. Legislation relating to driving under the influence of alcohol and drugs.
Contact Hours	<p>72 hours contact time as follows:</p> <ul style="list-style-type: none"> • Lectures – 36 hours • Tutorials – 18 hours • Laboratory practical sessions – 18 hours
Teaching and Learning Methods	<p>Scheduled learning – contact hours are as above – 72 hours in total. On 6 occasions students undertake a 3 hour practical exercise on drug or other forensic analysis, to include appropriate sample preparation. On the other 18 teaching weeks, 2 hours are primarily lecture-based with activities and problem solving exercises incorporated. The tutorials are focussed on the approach to a wide range of analytical problems with peer and staff review constituting formative feedback.</p> <p>Independent learning - 228 hours apportioned approximately as follows:</p> <ul style="list-style-type: none"> • Preparation for tutorials sessions – 36 hours • Practical report preparation for assessment, including statistical evaluation of results. 36 hours • Critical evaluation of methods for assessment. 36 hours • Independent reading of relevant research literature and key resource materials – 72 hours • Revision and preparation for the exam – 48 hours.
Key Information Sets Information	<p>Key Information Sets (KIS) are produced at programme level for all programmes that this module contributes to, which is a requirement set by HESA/HEFCE. KIS are comparable sets of standardised information about undergraduate courses allowing prospective students to compare and contrast between programmes they are</p>

Key Information Set - Module data				
Number of credits for this module				
				30
Hours to be allocated	Scheduled learning and teaching study hours	Independent study hours	Placement study hours	Allocated Hours
300	72	228	0	300

The table below indicates as a percentage the total assessment of the module which constitutes a -

Written Exam: Unseen written exam, open book written exam, In-class test

Coursework: Written assignment or essay, report, dissertation, portfolio, project

Practical Exam: Oral Assessment and/or presentation, practical skills assessment, practical exam

Please note that this is the total of various types of assessment and will not necessarily reflect the component and module weightings in the Assessment section of this module description:

Total assessment of the module:	
Written exam assessment percentage	50%
Coursework assessment percentage	50%
Practical exam assessment percentage	0%
	100%

Reading Strategy

All students will be encouraged to make full use of the print and electronic resources available to them through membership of the University. These include a range of electronic journals and a wide variety of resources available through web sites and information gateways. The University Library's web pages provide access to subject relevant resources and services, and to the library catalogue. Many resources can be accessed remotely. Students will be presented with opportunities within the curriculum to develop their information retrieval and evaluation skills in order to identify such resources effectively.

This guidance will be available either in the module handbook, via the module information on Blackboard or through any other vehicle deemed appropriate by the module/programme leaders.

Indicative Reading List

The following list is offered to provide validation panels/accrediting bodies with an indication of the type and level of information students may be expected to consult. As such, its currency may wane during the life span of the module specification. However, as indicated above, CURRENT advice on readings will be available via other more frequently updated mechanisms.

Indicative reading list

Aspects of the syllabus are covered in the most recent editions of books such as:

- Bell, S. *Forensic Chemistry*, Pearson.
- Flanagan, R.J. *Fundamentals of Analytical Toxicology*
- Harris D, *Quantitative Chemical Analysis*, Freeman
- Jickells, S., Negrusz, A. (Eds) *Clarke's Analytical Forensic Toxicology*, Pharmaceutical Press.
- Moffat, A C; Osselton, M.D. Widdop, B. *Clarke's Analysis of Drugs and*

	<p><i>Poisons</i>, Pharmaceutical Press.</p> <ul style="list-style-type: none"> • Poole, C F. <i>The Essence of Chromatography</i>, Elsevier • Skoog D, Holler F, Nieman T, <i>Principles of Instrumental Analysis</i>, Saunders • Snyder, L R, Kirkland, J J., Dolan, J W. <i>Introduction to modern liquid chromatography</i>, Wiley <p>and in journals including:</p> <p>Analytical Abstracts Analytical Chemistry Forensic Science International Journal of Analytical Toxicology and Bioanalysis Journal of Chromatography A and B Science and Justice</p>
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Part 3: Assessment	
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Assessment Strategy	<p>The problem-solving approach in tutorial sessions and laboratory exercises enables students to reflect on and refine their knowledge, understanding and skills throughout the programme of study. Informal formative feedback is given throughout these learning situations, enabling students to evidence their achievements in the summative assessments.</p> <p>Students work in pairs in laboratory sessions but work individually on the written report. The report is based on results obtained in the laboratory and the evaluation and presentation of these is evidence of independence of working.</p> <p>A separate piece of coursework requires students to individually research appropriate analytical methods that can be employed for selected types of forensic evidence and evaluate the advantages and disadvantages of each.</p> <p>The controlled component is an unseen written exam. The exam is 3 hours duration which is consistent with the Department's assessment strategy for level 3 modules. This assessment allows students to demonstrate both their ability to research, prioritise information and produce a structured, evidence based answer. A written exam is the appropriate summative assessment of knowledge and understanding and cognitive skills relating to major aspects of the syllabus.</p> <p>All work is marked in line with the Department's Generic Assessment Criteria and conforms with university policies for the setting, collection, marking and return of student work. Assessments are described in the module handbook that is supplied at the start of module and detailed marking schemes for elements of coursework, where appropriate, are provided in advance.</p> <p>The summative assessments comprise 3 elements:</p> <ol style="list-style-type: none"> 1. A detailed practical report on a laboratory analysis undertaken, requiring research into possible and preferred methods, statistical evaluation of findings and appropriate communication in a legal context. (1500 words) 2. A critical evaluation of different analytical methods that can be employed for the analysis of a range of forensic evidence. (1500 words) 3. A 3 hour unseen written exam.
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Identify final assessment component and element		
% weighting between components A and B (Standard modules only)	A:	B:
	50	50
First Sit		
Component A (controlled conditions) Description of each element	Element weighting	
1. Unseen exam (3 hours)	100%	
Component B Description of each element	Element weighting	
1. Practical report with statistical evaluation. (1500 words)	50%	
2. Critical evaluation of analytical methods. (1500 words)	50%	
Resit (further attendance at taught classes is not required)		
Component A (controlled conditions) Description of each element	Element weighting	
1. Unseen exam (3 hours)	100%	
Component B Description of each element	Element weighting	
1. Practical report with statistical evaluation of data provided. (1500 words)	50%	
2. Critical evaluation of analytical methods. (1500 words)	50%	
If a student is permitted a retake of the module under the University Regulations and Procedures, the assessment will be that indicated by the Module Description at the time that retake commences.		