Module Descriptor

Title	Applied Forensic Biology and Chemistry		
Session	2026/27	**Status**	Published
Code	BIOL09044	**SCQF Level**	9
Credit Points	40	**ECTS (European Credit Transfer Scheme)**	10
School	**Health and Life Sciences**		
Module Co-ordinator	Jamie Whitelaw		

Summary of Module

This module provides an integrated, applied introduction to the biological and chemical principles underpinning modern forensic science. Students will follow the forensic evidence pathway from crime scene recovery, through laboratory analysis, to interpretation and presentation of results. The module focuses on three core forensic evidence types: DNA, controlled drugs and toxicology.

A major component of the module addresses forensic DNA analysis, one of the most powerful tools available for personal identification. Students will develop practical skills including DNA extraction and profiling. Core principles of DNA structure, organisation, and inheritance will be applied to the interpretation of DNA profiles using real world case studies. The reliability, limitations, and evidential value of DNA profiling will be critically evaluated, alongside consideration of emerging developments such as forensic DNA phenotyping.

The module also introduces forensic chemistry and toxicology, with emphasis on the identification and analysis of controlled drugs and toxic substances. Students will learn how seized materials suspected to contain illegal drugs are examined and definitively identified to support criminal investigations. Key classes of drugs of abuse and forensically important pharmaceuticals will be explored, together with the chemical techniques used for their identification and quantification.

Forensic toxicology content will examine the fate of drugs and poisons within the body, including the role of different biological matrices (e.g. blood, urine, tissues), and the impact of Phase I and Phase II metabolic processes on drug detection and interpretation. Through lectures and laboratory sessions, students will gain experience in the extraction of compounds from biological samples, instrumental analyses of drugs, poisons and alcohol, and the interpretation of toxicological findings, including post mortem case studies.

In addition, the module introduces the chemistry and physics of fires, including the fire triangle and fire tetrahedron, classes of fire, fire development, and the principles underpinning forensic fire investigation. Students will explore how chemical evidence from fires is examined and interpreted in a forensic context.

Module Delivery Method	On-Campus[1] ☒	Hybrid[2] ☐	Online[3] ☐	Work -Based Learning[4] ☐
Campuses for Module Delivery	☐ Ayr ☐ Dumfries	☒ Lanarkshire ☐ London ☐ Paisley	☐ Online / Distance Learning ☐ Other (specify)	

Terms for Module Delivery	Term 1	☐	Term 2	☐	Term 3	☐
Long-thin Delivery over more than one Term	Term 1 – Term 2	☒	Term 2 – Term 3	☐	Term 3 – Term 1	☐

Learning Outcomes	
L1	Outline the main classes of drugs of abuse and the techniques employed in their analysis and display a knowledge and understanding of the fate of drugs of abuse and alcohols within the body.
L2	Explain the principles, applications and ethics of DNA Profiling.
L3	Show understanding of various extraction and analytical techniques used in the analysis of selected compounds of forensic interest.
L4	Demonstrate an ability to review and evaluate toxicological data from a variety of sources including the toxicological literature and instrumental data.
L5	

Employability Skills and Personal Development Planning (PDP) Skills	
SCQF Headings	**During completion of this module, there will be an opportunity to achieve core skills in:**
Knowledge and Understanding (K and U)	**SCQF 9** Demonstrate a broad and integrated knowledge of controlled substances and the methods employed to analyse them and their fate within the body. Demonstrate a critical understanding of principal concepts and applications of DNA profiling.
Practice: Applied Knowledge and Understanding	**SCQF 9** Use the theoretical knowledge gained to perform appropriate techniques and analyse the results in the context of the theory.

[1] Where contact hours are synchronous/ live and take place fully on campus. Campus-based learning is focused on providing an interactive learning experience supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus contact hours will be clearly articulated to students.

[2] The module includes a combination of synchronous/ live on-campus and online learning events. These will be supported by a range of digitally-enabled asynchronous learning opportunities including learning materials, resources, and opportunities provided via the virtual learning environment. On-campus and online contact hours will be clearly articulated to students.

[3] Where all learning is solely delivered by web-based or internet-based technologies and the participants can engage in all learning activities through these means. All required contact hours will be clearly articulated to students.

[4] Learning activities where the main location for the learning experience is in the workplace. All required contact hours, whether online or on campus, will be clearly articulated to students

Generic Cognitive skills	**SCQF 9** Critically analyse the technique(s), implications including ethical issues of DNA profiling and controlled substances.
Communication, ICT and Numeracy Skills	**SCQF 9** Communicate effectively orally and in writing. Analyse and interpret data where appropriate.
Autonomy, Accountability and Working with Others	**SCQF 9** Working in teams to perform practical work and to research and present information will require time management, organisational skills and an understanding of professional practice.

Prerequisites	**Module Code**	**Module Title**
	Other	
Co-requisites	**Module Code**	**Module Title**

Learning and Teaching	
In line with current learning and teaching principles, a 20-credit module includes 200 learning hours, normally including a minimum of 36 contact hours and maximum of 48 contact hours. Core theory and concepts will delivered face to face using lectures, short videos, tutorials, case studies and discussions where student participation will be expected. The material will provide underpinning knowledge of DNA Profiling e.g. DNA structure, organisation and techniques used to collect and analyse DNA. Detailed discussion of the main groups of controlled substances, the testing regimens applied and the main analytical techniques used to generate the qualitative and quantitative evidence used to support forensic cases. Practical work will apply the theoretical knowledge and give the students practical experience of the techniques used to analyse controlled substances and DNA. Students will be introduced to quality assurance practices in forensic laboratories and these will be applied throughout the practicals. The learning and teaching strategies applied to this module contribute towards the development of UWS graduate attributes: Universal: Inquiring, analytical, research-minded Work Ready: Knowledgeable,problem solver, effective communicator Successful: Creative, driven	
Learning Activities During completion of this module, the learning activities undertaken to achieve the module learning outcomes are stated below:	**Student Learning Hours** (Note: Learning hours include both contact hours and hours spent on other learning activities)
Lecture / Core Content Delivery	48
Laboratory / Practical Demonstration / Workshop	24
Tutorial / Synchronous Support Activity	24
Independent Study	304

n/a	
n/a	
TOTAL	400

Indicative Resources
The following materials form essential underpinning for the module content and ultimately for the learning outcomes: Gill, P. (2020) Forensic practitioner's guide to the interpretation of complex DNA profiles [electronic book] / edited by Peter Gill [and 4 others]. London, United Kingdom. https://www.sciencedirect.com/book/monograph/9780128205624/forensic-practitioners-guide-to-the-interpretation-of-complex-dna-profiles#book-description Shewale, J.G., & Liu, R.H. (Eds.). (2013). Forensic DNA Analysis: Current Practices and Emerging Technologies (1st ed.). CRC Press. https://doi.org/10.1201/b15361 https://www.taylorfrancis.com/books/edit/10.1201/b15361/forensic-dna-analysis-ray-liu-jaiprakash-shewale Jamieson, A. and Bader, S. (2016) A guide to forensic DNA profiling [electronic book] / edited by Allan Jamieson, Scott Bader. Chichester, West Sussex, UK: Chichester, West Sussex, UK : John Wiley & Sons, 2016. https://www.vlebooks.com/Product/Index/750520?page=0&startBookmarkId=-1
(N.B. Although reading lists should include current publications, students are advised (particularly for material marked with an asterisk*) to wait until the start of session for confirmation of the most up-to-date material)

Attendance and Engagement Requirements
In line with the Student Attendance and Engagement Procedure, Students are academically engaged if they are attending and participating in all timetabled programme activities including on-campus and online teaching sessions, asynchronous online learning activities, placement, work-based elements, course-related learning resources, and complete assessments and submit these on time. **For the purposes of this module, academic engagement equates to the following:** Where a module has Professional, Statutory or Regulatory Body requirements these will be listed here: Attendance at synchronous sessions (lectures, workshops, lab practical and tutorials) , completion and submission of assessments to meet the learning outcomes of the module.

Equality and Diversity
The University's Equality, Diversity and Human Rights Procedure can be accessed at the following link: UWS Equality, Diversity and Human Rights Code. In line with current legislation (Equality Act, 2010) and the UWS Equality, Diversity, and Human Rights Code, our modules are accessible and inclusive, with reasonable adjustment for different needs where appropriate. Module materials comply with University guidance on inclusive learning and teaching, and specialist assistive equipment, support provision and adjustment to assessment practice will be made in accordance with UWS policy and regulations. Where modules require practical and/or laboratory based learning or assessment required to meet accrediting body requirements the University will make reasonable adjustment such as adjustable height benches or assistance of a 'buddy' or helper.
(N.B. Every effort will be made by the University to accommodate any equality and diversity issues brought to the attention of the School)

Supplemental Information

Divisional Programme Board	**Biological Sciences Health**
Overall Assessment Results	☐ **Pass / Fail** ☒ **Graded**
Module Eligible for Compensation	☒ **Yes** ☐ **No** **If this module is eligible for compensation, there may be cases where compensation is not permitted due to programme accreditation requirements. Please check the associated programme specification for details.**
School Assessment Board	Biology
Moderator	Gary Litherland
External Examiner	J Butcher
Accreditation Details	RSB
Module Appears in CPD catalogue	☐ **Yes** ☒ **No**
Changes / Version Number	1

Assessment (also refer to Assessment Outcomes Grids below)
Assessment 1
Three 2-hour class tests worth 50% of module mark.
Assessment 2
Coursework consisting of practical reports and case studies worth 50%
Assessment 3
(N.B. (i) Assessment Outcomes Grids for the module (one for each component) can be found below which clearly demonstrate how the learning outcomes of the module will be assessed. (ii) An indicative schedule listing approximate times within the academic calendar when assessment is likely to feature will be provided within the Student Module Handbook.)

Component 1							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Class test (written)	☒	☒	☒	☒	☐	50	6

Component 2							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
Portfolio of written work	☒	☒	☒	☒	☐	50	0

Component 3							
Assessment Type	**LO1**	**LO2**	**LO3**	**LO4**	**LO5**	**Weighting of Assessment Element (%)**	**Timetabled Contact Hours**
	☐	☐	☐	☐	☐		
Combined total for all components						100%	6 hours

Change Control

What	When	Who