Module Definition Form (MDF)

Module code: MOD005797	**Version:** 6 **Date Amended:** 10/Jul/2024

1. Module Title
Forensic Spectroscopy Techniques

2a. Module Leader
Leesa Ferguson

2b. School
School of Life Sciences

2c. Faculty
Faculty of Science and Engineering

3a. Level
5

3b. Module Type
Standard (fine graded)

4a. Credits
15

4b. Study Hours
150

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:	BSc (Hons) Forensic Science BSc (Hons) Forensic Science (extended) BSc (Hons) Forensic Science (sandwich)		

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

Much of the routine work of the practising forensic scientist involves the identification of substances such as drugs, explosives, fibres, paint pigments and many others. You will develop an understanding of the different types of electromagnetic (EM) radiation and the analytical techniques that utilise EM radiation to excite samples in order to obtain qualitative information. You'll learn the theory that underpins Infrared (IR) spectroscopy, Raman spectroscopy, UV/Vis spectroscopy, NMR spectroscopy, X-ray Diffraction (XRD) and other x-ray analysis techniques including X-ray Fluorescence (XRF) and Scanning Electron Microscopy Energy Dispersive X-ray (SEM-EDX) spectroscopy. You'll also learn about the design and configuration of the analytical instruments that are used. In addition, you'll gain confidence in the interpretation of spectroscopic data. The taught sessions include lectures and tutorials. The employability skills gained through this module include problem solving, self-management, critical thinking, communication, resilience and numeracy. Together with the academic and interpretation of data skills gained, you'll be equipped for a variety of careers including forensic science, analytical science and scientific research.

6b. Outline Content

The underlying physical principles of Raman spectroscopy, infrared spectroscopy UV/Vis spectroscopy, NMR spectroscopy and x-ray analysis techniques such as x-ray diffraction and scanning electron microscopy with appropriate detectors.

The design, construction, and operation of dispersive and Fourier transform spectrometers, x-ray diffractometers, and UV/Vis spectrometers and NMR spectrometers.

The interpretation of infrared spectroscopy, Raman spectroscopy, UV/Vis spectroscopy and NMR spectroscopy data.

The application of the above techniques to the solution of forensic problems (e.g. identification of drugs and other forensic evidence).

The critical evaluation of the techniques for the analysis of forensic evidence.

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources

Specialist analytical instrumentation and electronic and journal data bases.

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Understand the theory underpinning a range of spectroscopic techniques
2	Intellectual, practical, affective and transferrable skills	Critically evaluate various spectroscopic techniques for the analysis of forensic evidence.
3	Intellectual, practical, affective and transferrable skills	Interpret the data from various spectroscopic techniques.
4	Intellectual, practical, affective and transferrable skills	Report the results from the spectroscopic analysis of forensic evidence in an appropriately written format.

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	36	1-4	12 x 3 hrs lectures/ tutorials (active learning)
Other teacher managed learning	0	None	None
Student managed learning	114	1-4	Background reading, online activities, completing tutorial questions, preparation for lectures and completion of assessments
TOTAL:	150		

9. Assessment for the above Module Occurrence

The assessment for some modules includes a presentation (see below for details on how this particular module is assessed). We recognise that presenting, especially to a large group, can cause significant anxiety or distress for some students. If this may affect you, please contact your Module Leader or the Disability and Neurodiversity Service as early as possible. We will work with you to consider appropriate reasonable adjustments. Depending on your individual needs, these might include, for example, presenting to a smaller group or presenting only to a member of academic staff.

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	1-4	50 (%)	Fine Grade	30 (%)
1500 words (practical report)					

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
011	Examination Cambridge	1-3	50 (%)	Fine Grade	30 (%)
Exam (1.5 hours)					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]