# Module Definition Form (MDF)

| Module code: MOD009084 | **Version:** 3 **Date Amended:** 10/Jul/2025 |
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| 1. Module Title |
|---|
| Advanced Forensic Genetics |

| 2a. Module Leader |
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| Nathalie Zahra |

| 2b. School |
|---|
| School of Life Sciences |

| 2c. Faculty |
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| Faculty of Science and Engineering |

| 3a. Level |
|---|
| 6 |

| 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:** | None | | |

## LEARNING, TEACHING AND ASSESSMENT INFORMATION

### 6a. Module Description

Following on from the Introduction to Forensic Genetics module, in this module you will further develop your knowledge and experience by applying the genetics techniques to practical applications. You will also develop more knowledge and understanding of the latest technologies that are used for genetic analysis, such as real-time PCR, DNA sequencing and next generation sequencing, use of genetic data for forensic phenotyping and genetic genealogy. In addition, you will learn about the wider context of genetics and its application in cases of paternity and kinship analysis, complex cases and forensic DNA phenotyping, mass fatality incidents and disaster victim identification.

During this module, you will develop a variety of scientific, statistical and computational skills. As we go through historical and more recent cases, you will learn how DNA and technology were used in practical applications and contributed to the outcome of the case. You will learn the statistical calculations related to DNA data interpretation and presentation. You will also be taught bioinformatic/computational skills for the interrogation of DNA databases to locate, handle, and evaluate DNA sequences in search for genetic markers.

The knowledge and the skills that you gain through the lectures, practicals/workshop and tutorials, can support you during your research project and future employment in the field of genetics.

### 6b. Outline Content

• Overview of the basic principles of forensic genetics (genetic markers, methodology and analysis)

• Profile interpretation – single source and mixture and associated statistical calculations (match probabilities and likelihood ratios)

• Paternity cases and calculations

• Epigenetics

• Body fluid identification

• DNA sequencing including Next Generation Sequencing

• Mass fatality incidents and victim identification

• Genetic genealogy

• Forensic DNA phenotyping

• Forensic genetics and society.

• Bioinformatics and genetic markers identification

• Case work evaluation

### 6c. Key Texts/Literature

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

### 6d. Specialist Learning Resources

None

| 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 | Critically evaluate specific laboratory techniques used to generate genetics data for a variety of forensic applications |
| 2 | Knowledge and Understanding | Critically evaluate and interpret DNA data to fulfil forensic investigation and reporting requirements. |
| 3 | Intellectual, practical, affective and transferrable skills | Competently follow standard procedures for the interrogation of databases, collection and process of DNA samples to be used in forensics |
| 4 | Intellectual, practical, affective and transferrable skills | Evaluate, interpret and report upon the data generated by genetic analysis techniques |

| 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 | 22 | 1-4 | 11 x 2 hrs lectures/active learning |
| Other teacher managed learning | 15 | 1-4 | 4 x 1hr Tutorial; 3 x3hrs practical/workshop; 1 x2hrs in-class test. |
| Student managed learning | 113 | 1-4 | Background reading, online activities, preparation for lectures and practicals, 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 | 3-4 | 40 (%) | Fine Grade | 30 (%) |
| **Report and Case related task (1250 words equivalent)** | | | | | |

| Assessment No. | Assessment Method | Learning Outcomes | Weighting (%) | Fine Grade or Pass/Fail | Qualifying Mark (%) |
|---|---|---|---|---|---|
| 011 | Coursework | 1-2 | 60 (%) | Fine Grade | 30 (%) |
| **In-class test 2 hours (1750 words equivalent)** | | | | | |

**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]**