

#### MODULE DESCRIPTOR

#### **Module Title**

Genetics and Molecular Biology

| Reference | AS2903      | Version     | 4      |
|-----------|-------------|-------------|--------|
| Created   | August 2021 | SCQF Level  | SCQF 8 |
| Approved  | May 2011    | SCQF Points | 30     |
| Amended   | August 2021 | ECTS Points | 15     |

#### **Aims of Module**

To provide students with the ability to discuss the significance and fundamental aspects of genetics and molecular biology.

### **Learning Outcomes for Module**

On completion of this module, students are expected to be able to:

- Apply the principles of genetic inheritance to predicting phenotypic outcomes of inherited characteristics and disorders.
- 2 Understand and discuss the role of molecular biology in genetic investigations, gene screening and gene therapy techniques.
- Describe the processes required for and the factors affecting gene expression in prokaryotes and eukaryotes.
- 4 Explain in detail the methods employed for nucleic acid analysis and constructing recombinant DNA.
- Using safe and effective practice, perform a range of molecular biology techniques and experimental procedures.

#### **Indicative Module Content**

Genetic inheritance patterns, autosomal and sex-linked genes, pedigree analysis, blood group inheritance, population genetics, cytogenetics. chromosomal abnormalities, multifactorial inheritance, genetic screening, gene therapy. Genomes, nuclear DNA, mitochondrial DNA, chloroplast DNA. Gene expression, gene structure and gene regulation in prokaryotes and eukaryotes. Mutation and mutagens. Epigenetics. Nucleic acid analysis: DNA and mRNA extraction, cDNA synthesis, PCR, restriction digestion, sequencing, hybridisation, gene cloning, gel electrophoresis. The laboratory programme will consist of core molecular biology experiments used for DNA analysis. Application of genetics and molecular biology in the context of forensic science, biomedical science and nutrition.

### **Module Delivery**

This is a lecture based module supplemented with tutorials and practical laboratory classes.

Module Ref: AS2903 v4

| Indicative Student Workload   | Full Time | Part Time |
|---|-----------|-----------|
| Contact Hours   | 65        | N/A       |
| Non-Contact Hours   | 235       | N/A       |
| Placement/Work-Based Learning Experience [Notional] Hours             |           | N/A       |
| TOTAL   | 300       | N/A       |
| Actual Placement hours for professional, statutory or regulatory body |           |           |

#### ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

## **Component 1**

Type: Examination Weighting: 70% Outcomes Assessed: 1, 2, 3, 4

Description: Closed book written examination

**Component 2** 

Type: Practical Exam Weighting: 30% Outcomes Assessed: 5

Description: Lab knowledge and conduct are assessed

#### MODULE PERFORMANCE DESCRIPTOR

### **Explanatory Text**

The first grade represents Component 1 (EX1) weighted as major and the second, Component 2 (PE1), weighted as minor. A minimum module grade of D is required for a pass, with compensation of grade E in Component 1 or Component 2 permitted. Non-submission of either component will result in an NS grade.

| Module Grade | Minimum Requirements to achieve Module Grade:                                  |
|--------------|--|
| Α            | AA, AB   |
| В            | AC, AD, AE, BA, BB, BC, CA   |
| С            | BD, BE, CB, CC, CD, DA, DB   |
| D            | CE, DC, DD, DE, EA, EB, EC   |
| E            | AF, BF, CF, DF, ED, EE, EF, FA, FB, FC, FD                                     |
| F            | FE, FF   |
| NS           | Non-submission of work by published deadline or non-attendance for examination |

# **Module Requirements**

Prerequisites for Module Successful completion of Stage 1 of the course or equivalent.

Corequisites for module None.

Precluded Modules None.

# INDICATIVE BIBLIOGRAPHY

- 1 GRIFFITHS, A.J.F. et al *An Introduction to Genetic Analysis*. Current Edition. W H Freeman.
- 2 LEWIS, R. Human Genetics: Concepts and Applications. Current Edition. McGraw-Hill Higher Education
- 3 BROWN, T.A. Gene Cloning and DNA Analysis: an Introduction. Current Edition. Wiley-Blackwell.