MS943-15 Introduction to Genetics, Genomics and Molecular Science

26/27

Department
Warwick Medical School
Level
Taught Postgraduate Level
Module leader
Anthony Lyons
Credit value
15
Module duration
10 weeks
Assessment
60% coursework, 40% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

This module provides a foundational introduction to the principles of genetics, genomics, and molecular science. It covers the basic concepts of DNA, genetic inheritance, gene structure and function, and the molecular mechanisms that drive genetic variation. Students will explore how these genetic principles apply to human health, with a particular focus on the role of genomics in understanding complex diseases and hereditary conditions. The technologies and techniques used in modern genetic analysis, such as DNA sequencing, polymerase chain reaction (PCR), and genome-wide association studies (GWAS) will be explored.

Module aims

The purpose of this module is to provide students with an in-depth understanding of the human genome and the underlying principles of genetics and genomics. It aims to provide students with the knowledge and skills necessary to analyse genetic variation, and understand inheritance patterns.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

The module offers an in-depth exploration of the human genome, delving into fundamental concepts such as cell biology, meiosis, and mitosis, along with the structural and functional aspects of chromosomes. It investigates the mechanisms behind numerical and structural chromosomal abnormalities and their implications in genetic disorders. The module emphasises the structure and function of nucleic acids and the importance of understanding inheritance patterns, including autosomal dominant, autosomal recessive, and X-linked disorders. Additionally, it highlights current laboratory techniques used to analyse genetic variation.

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate a comprehensive understanding of nucleic acid and chromosome structure, function, and the molecular mechanisms underlying genetic and genomic alterations.
- Critically evaluate and apply the current nomenclature systems to describe genetic variations within the human genome.
- Apply advanced knowledge of inheritance patterns to assess and interpret Mendelian and non-Mendelian disorders in clinical contexts.
- Assess and critique the design, operation, and analytical performance of laboratory techniques used in genetic and genomic diagnostics, including PCR, sequencing, and chromosomal analysis.
- Describe the partnership of genetics and genomics with other clinical specialisms in the investigation and management of genetic and genomic disorders and the contribution to patient care.

Indicative reading list

Reading lists can be found in Talis

Subject specific skills

1. Gain the ability to analyse and interpret genetic data, including understanding gene structure, function, and the mechanisms of inheritance.
2. Learn to apply the correct nomenclature for describing the human genome.
3. Develop proficiency in various molecular techniques used in genetic analysis, such as PCR, DNA sequencing, and genotyping.

Transferable skills

1. Critical Thinking: Students will develop the ability to critically analyse complex problems, enhancing their decision-making skills.
2. Research Skills: Students will improve their ability to conduct literature reviews and synthesise information from scientific research.
3. Time Management and Organisation: Strong organisational skills through the management

of assessment deadlines, useful in both professional and entrepreneurial settings.
4. Effective Communication: Students will enhance their written communication skills.

Study

Study time

Type	Required
Seminars	16 sessions of 1 hour (11%)
Online learning (scheduled sessions)	4 sessions of 1 hour (3%)
Private study	70 hours (47%)
Assessment	60 hours (40%)
Total	150 hours

Private study description

Structured online activities via VLE (Moodle) including podcasts and other online resources, discussion forums, case reports – 70 hours Self-directed learning – 30 hours in preparation for each assessment.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group D

	Weighting	Study time	Eligible for self-certification
Assessment component			
Case Report on a topic from the module	60%	30 hours	Yes (extension)

The case report will require students to choose a specific topic, integrating knowledge of genetic principles, and considerations to propose a comprehensive management plan. This assessment will enhance students' ability to apply theoretical concepts to real-world scenarios while

	Weighting	Study time	Eligible for self-certification

developing critical thinking and analytical skills.

Reassessment component is the same

Assessment component

SAQ Examination with Clinical Vignette's	40%	30 hours	No

The SAQ examination for the module will assess students' understanding of key concepts in genetics, genomics, including the structure and function of nucleic acids. Questions will evaluate students' ability to apply theoretical knowledge to practical scenarios and current practices in genetic services.

Reassessment component is the same

Feedback on assessment

Assessments will be marked using clear grading criteria, ensuring transparency and consistency in feedback. Students will receive a breakdown of their performance across different assessment components. Detailed, structured comments will be provided on submitted assessments, highlighting strengths, areas for improvement, and suggestions for further development.

Past exam papers for MS943

Availability

There is currently no information about the courses for which this module is core or optional.