MD1A1-15 Foundational Laboratory Skills & Computing Skills

26/27

Department
Warwick Medical School
Level
Undergraduate Level 1
Module leader
Andrew Bowman
Credit value
15
Module duration
4 weeks
Assessment
20% coursework, 80% exam
Study location
University of Warwick main campus, Coventry

Description

Introductory description

MD1A1-15 - Foundational Laboratory Skills & Computing Skills. The module aims to equip students with essential core skills in molecular biology and scientific computing. This will function to bring students up to speed with the course philosophy and prepare them for the main modules that will follow.

Module web page

Module aims

The purpose of this module is for the students to learn basic coding theory, understand data structure and handling and the associated mathematics principles behind these. This will be contrasted with data flow in biological systems, and the principles of molecular biology. Principle techniques learnt in the classroom will be reinforced in the laboratory session, which will see the students introduced to a modern, working molecular biology lab.

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.

MD1A1 is comprised of two complementary components in preparing Integrated Natural Sciences students for their first year of the course. In one component, students will learn how to operate safely in a scientific laboratory, how to operate basic scientific equipment (such as the micro pipette and the centrifuge) and use these skills to follow a predefined protocol to perform a molecular biology experiment. This practical course is supported by a series of lectures and tutorials covering the basics of modern molecular biology. In a second component, students will be introduced to a coding language. You will learn what coding is through a series of lectures covering basic concepts and reinforce these through short programming tasks designed to aid your learning.

Learning outcomes

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

- Use coding techniques to process data from experiments in molecular cell biology and relevant physical sciences.
- Demonstrate experimental skills in basic molecular cell biology and relevant physical sciences.
- Explain the principles of information flow in molecular biology from DNA to RNA to protein.
- Explain how DNA can be manipulated to produce recombinant organisms.
- Operate safely within a laboratory environment.
- Demonstrate relevant writing / reporting / collaborative working skills including the ability to succinctly summarise scientific information.
- Accurately record experimental data in a laboratory setting.
- Demonstrate ability to correctly structure and comment code to achieve a defined programming goal.

Indicative reading list

Reading lists can be found in Talis

Specific reading list for the module

Interdisciplinary

Students will learn to solve scientific problems in molecular biology by integrating concepts from computing and contrasting them with the information flow in biological systems.

Subject specific skills

Demonstrate the ability to accurately summarise a scientific experiment. Estimate quantitative solutions to scientific problems. Outline the principles of the major techniques of modern molecular biology.

Transferable skills

Demonstrate relevant writing / reporting / collaborative working skills including the ability to succinctly summarise scientific information. Demonstrate competency in writing python scripts to solve basic computing problems.

Study

Study time

Type	Required
Lectures	12 sessions of 1 hour (8%)
Tutorials	12 sessions of 1 hour (8%)
Practical classes	8 sessions of 3 hours (16%)
Private study	53 hours (35%)
Assessment	49 hours (33%)
Total	150 hours

Private study description

53 hours of self-directed study based on material covered in class, in the laboratory and further reading from the module reading list.

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 D2

	Weighting	Study time	Eligible for self-certification
Assessment component			
Assessment of laboratory skills	20%	36 hours	No

	Weighting	Study time	Eligible for self-certification

Assessing the proficiency in laboratory techniques, observing good laboratory practice, engagement and contribution to group experiments.

Reassessment component

Laboratory Skills			No

A written examination testing knowledge of practical laboratory skills, use of laboratory equipment, basic calculations, experimental procedures and good laboratory practice. Examination questions are reflective of what a student would have learnt during the laboratory practicals, with the theoretical knowledge being present in Laboratory Handbook and the Lab Protocol.

Assessment component

Written examination	80%	13 hours	No

A written examination consisting of short answer questions encompassing topics covered in the lecture and practical sessions.

Reassessment component is the same

Feedback on assessment

Laboratory reports - submission annotated and returned, general comments/'what was good'/'what could be improved' alongside marking rubric.

Assessment of laboratory skills - at the end of each two-week laboratory session, block leads will provide comments on proficiency, Good Laboratory Practice (GLP) and engagement/group contribution that arise. Due to the volume of feedback, stock phrases will be provided to the block leads, which may be amended or expanded at the lead's discretion. Further verbal feedback will be given to students on request.
In terms of practicalities, following GLP, executing the laboratory protocol, attaining proficiency in techniques taught and engaging/contributing to group activities (where required) will be based at 62 on the 20-point University scale. Exceptional attainment/contributions will grade higher, whereas disengagement, not observing GLP, and an unwillingness to acquire lab proficiency will score lower. Marks will not take into account whether a student achieved a desired experimental result or not. The block lead will work with the laboratory technician in observing and recording these across the cohort. Feedback will be provided biweekly at the end of each block.

Past exam papers for MD1A1

Availability

Courses

This module is Core for:

- Year 1 of UMDA-CF10 Undergraduate Integrated Natural Sciences (MSci)