

Liverpool John Moores University

Title: Fundamentals of Scientific Research
Status: Definitive
Code: **4501YAUGEN** (127940)
Version Start Date: 01-08-2021

Owning School/Faculty: Biological and Environmental Sciences
Teaching School/Faculty: Biological and Environmental Sciences

Team	Leader
Rachael Symonds	Y

Academic Level: FHEQ4 **Credit Value:** 20 **Total Delivered Hours:** 41
Total Learning Hours: 200 **Private Study:** 159

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	20
Workshop	20

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	MCE	Exam MCE	40	1
Report	Report	Report	60	

Aims

In this module, you will be introduced to key skills that you will need as a scientist. Science is a process in which the scientist (you) makes a hypothesis about how the world works, devises a way to test that hypothesis and by these experiments either disproves or does not disprove that hypothesis. As well as doing experiments, you must interpret the results, consider them in the context of other scientific results and report them in a formalised way.

Therefore, the fundamentals of scientific research include:-Thinking about

something, asking questions in a 'scientific' way, making hypotheses-Doing scientific experiments and analysing experimental data-Interpreting results-Reporting experiments and results This module will introduce you to these elements of being a scientist.

You will get the most benefit from this module by trying to make links between what you do here and what you cover in other, more subject-specific, modules. What you learn in this module will be relevant to your entire degree course.

For example, learning how to do statistical data analysis here will lay the foundations for more complex data analysis in future years of study and you will actually have to apply these analyses when you do your research project in your final year. Learning how to communicate your science (in writing or graphs) will be useful for every future module that requires you to read scientific papers (i.e. all of them), write a report of experimental work and of course your research project.

Learning Outcomes

After completing the module the student should be able to:

- 1 Recognise scientific approaches and how to apply them in order to solving problems.
- 2 Perform independent research and present the results using appropriate techniques, such as graphing, mapping, tables or text.
- 3 Convert raw data to results by arranging them into meaningful subsets, applying appropriate descriptive or statistical tests and correctly interpreting and reporting the results of these analyses.
- 4 Develop a range of transferable skills in order to fully exploit learning opportunities in the field of scientific research at University and beyond by identifying and reflecting upon the following aspects of personal development: strengths and weaknesses, motivations and values, ability to work with others.

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Multiple Choice Exam	1		
Scientific Report	2	3	4

Outline Syllabus

Syllabus Structure

Fundamentals of Scientific Research is taught in three parts:

Scientific Writing and Reporting: Students will learn about the fundamentals of scientific writing in this module. They will learn how to find scientific information, how to read and write scientific material including correct formatting and plagiarism. They

will also learn how to design experiments, think critically and present the data correctly.

Data Handling and Statistical Analysis: Students will learn how to collect data, how to analyse it statistically and how interpret their findings.

Mini Research Project: In this module students will apply their knowledge of scientific writing and statistical and data analysis that they have gained in the previous two modules. They will propose a hypothesis, investigate a problem, collect data and present their results using an appropriate scientific reporting style.

Learning Activities

The module content will be delivered through lectures and computer based workshop activities.

Theoretical lectures will provide appropriate subject knowledge to support computer workshop applications.

Notes

In this module students will apply their knowledge of scientific writing and statistical and data analysis. They will propose a hypothesis, investigate a problem, collect data and present their results using an appropriate scientific reporting style and assist individuals to develop an understanding of how to work with data sets, process raw data and apply the correct statistical tests.