Module specification

When printed this becomes an uncontrolled document. Please access the Module Directory for the most up to date version by clicking on the following link: Module directory

Refer to the module guidance notes for completion of each section of the specification.

Module code	SCI338
Module title	Maths and Experimental Design
Level	3
Credit value	20
Faculty	FAST
Module Leader	Dr Ian Ratcliffe
HECoS Code	100265
Cost Code	GAFS

Programmes in which module to be offered

Programme title	Is the module core or option for this programme
BSc Forensic science (with Foundation Year)	Core
BSc Biochemistry (with Foundation Year)	Core
BSc Biomedical science (with Foundation Year)	Core
FdSc Applied Animal Behaviour, Welfare and Conservation (with Foundation Year)	Core
BSc (Hons) Animal Behaviour, Welfare and Conservation Science (with Foundation Year)	Core
BSc (Hons) Equine Science and Welfare Management (with Foundation Year)	Core

Pre-requisites

N/A

Breakdown of module hours

Learning and teaching hours	36 hrs
Placement tutor support	0 hrs
Supervised learning e.g. practical classes, workshops	4 hrs
Project supervision (level 6 projects and dissertation modules only)	0 hrs
Total active learning and teaching hours	**0** hrs
Placement / work based learning	0 hrs
Guided independent study	160 hrs
Module duration (total hours)	200 hrs

For office use only	
Initial approval date	04/02/2021
With effect from date	01/09/2021
Date and details of revision	
Version number	1

Module aims

The aim of this module is to equip students with essential skills that will enable them to:

(i) design and carry out experiments or surveys in the laboratory and field, and
(ii) collect, process and interpret experimental data collected.

To achieve these aims the module will explore the principles of experimental design and teach students to critically review experiments and data.
Students will also be introduced to ways in which the scientific community communicate numerical data, and key mathematical concepts that underpin it.

Module Learning Outcomes - at the end of this module, students will be able to:

1	Design and successfully execute a simple laboratory or field experiment, with due regard to safety and ethics.
2	Use graphical and statistical techniques in interpretation of scientific data.
3	Present experimental data orally to an audience with support of appropriate presentation software.
4	Solve number-based problems of relevance to the natural and physical sciences.

Assessment

Indicative Assessment Tasks:

This section outlines the type of assessment task the student will be expected to complete as part of the module. More details will be made available in the relevant academic year module handbook.

Assessment One: A 10 minute presentation based on a short experiment designed and executed by the student. It will contain elements of data analysis and interpretation of evidence collected during the experiment.

Assessment Two: Coursework: completion of a number of worksheets comprising mathematical problems aligned with natural and physical science topics, word count: 1500 words.

Assessment number	Learning Outcomes to be met	Type of assessment	Weighting (%)
1	1-3	Presentation	50
2	4	Coursework	50

Derogations

None

Learning and Teaching Strategies

The experimental design component of the course will be delivered by means of lectures and
workshops and incorporate laboratory sessions where students will first develop their experimental procedures and then carry them out.

The maths component will be delivered by lectures supported by tutorial sessions and directed study.

Formative assessment involves tutorial questions and summative assessment is by coursework assignments and presentation.

Indicative Syllabus Outline

- Use of theories and models to explain observations and cause and effect in science
- Experimental design
- Dependent and independent variables
- Accuracy and precision
- Sampling
- Replication
- Reproducibility
- Data analysis
- Producing and interpreting graphs
- Numbers, scientific notation and significant figures.
- Algebra and manipulation of algebraic expressions.
- Powers, indices, exponentials and logarithms.
- Use of statistics in experimental analysis
- Use of ICT in data analysis

Indicative Bibliography:

Please note the essential reads and other indicative reading are subject to annual review and update.

Essential Reads

Ruxton, G.D. and Colegrave, N. (2016), *Experimental Design for the Life Sciences*. Oxford: Oxford University Press

Neill, H and Johnson, T. (2010), Mathematics: A Complete Introduction: The Easy Way to Learn. London: Hodder Education

Other indicative reading

Lobban, C. and Schefter, M. (2017), *Writing Undergraduate Lab Reports*. Cambridge: University Printing House

For Forensic Science students:

Thompson, R.B. and Fritchman Thompson, B. (2012), *Illustrated Guide to Home Forensic Science Experiments: All Lab, No Lecture (Diy Science*). San Francisco: Maker Media, Inc

Employability skills – the Glyndŵr Graduate

Each module and programme is designed to cover core Glyndŵr Graduate Attributes with the aim that each Graduate will leave Glyndŵr having achieved key employability skills as part of their study. The following attributes will be covered within this module either through the content or as part of the assessment. The programme is designed to cover all attributes and each module may cover different areas. Click here to read more about the Glyndwr Graduate attributes

Core Attributes
Engaged
Enterprising
Creative
Ethical

Key Attitudes
Commitment
Curiosity
Confidence
Adaptability

Practical Skillsets
Digital Fluency
Organisation

Leadership and Team working
Critical Thinking
Communication