STUDENT AND ACADEMIC SERVICES

MODULE SPECIFICATION

	Part 1: Information		
Module Title	Scientific Skills		
Module Code	USSJRW-30-1	Level	Level 4
For implementation from	2020-21		
UWE Credit Rating	30	ECTS Credit Rating	15
Faculty	Faculty of Health & Applied Sciences	Field	Applied Sciences
Department	HAS Dept of Applied Sciences		
Module type:	Standard		
Pre-requisites	None		
Excluded Combinations	None		
Co- requisites	None		
Module Entry requirements	None		

Part 2: Description

Educational Aims: See Learning Outcomes.

Outline Syllabus: The syllabus includes:

Data Collection:
Practical methods in analytical science, including:

General aspects of analysis

Spectroscopy: instrumentation and applications of UV-vis absorption, infrared and NMR spectroscopy and atomic spectroscopy

Chromatography: thin layer chromatography, gas chromatography and high performance liquid-chromatography

Electrophoresis and electrochemical methods of analysis

Data Analysis:

Scientific equations and formulae

Linear relationships and regression

Exponential and logarithmic functions. Equations of growth and decay

Use of EXCEL to display and analyse scientific information

Data Assessment:

Descriptive statistics. Confidence intervals.

Hypothoses testing t-test, F-test, Chi-squared test contingency tests

Probability and introduction to Bayesian statistics

Binomial, normal and Poisson distributions

Communicating scientific information:

Activities may include: organising a poster display, giving a spoken presentation, general aspects of scientific writing, writing essays, reporting practical and project work, writing literature surveys and reviews

Teaching and Learning Methods: This is a module about developing skills and so a variety of teaching and learning approaches will be employed that include lectures, tutorials, laboratory work and computer practical tutorials.

A significant proportion of this module covers the development of problem solving numeric and data analysis skills and communicating scientific information. Technology enhanced learning is therefore essential to support the teaching of these skills. The module will be delivered using a mixture of whole group and small tutorial group
sessions. Support for student learning will be given through weekly tutorials which will be integrated with the online self-assessment tests and online video support to ensure focussed help can be given to those students who need help in the particular areas. This introduces students to the concept of using technology to enhance learning (TEL). Students will develop IT and data analysis skills through computer-based workshops.

The development of laboratory skills will be supported through a combination of lectures, tutorials, which will require preparation and follow-up work to be done by the student and laboratory practicals where students will get valuable hands on experience of laboratory techniques, data collection and analysis.

Student learning will be supported through the University's E-Learning Environment, Blackboard.

Students are expected to spend 72 hours on scheduled learning and 228 hours on independent learning.Independent learning will take the following forms with an approximate indication of time required for each:

Essential reading to support acquisition of knowledge and completion of problem solving and laboratory skills exercises relating to lectures and practical classes – 132 hours

Preparation and submission of assignment based on practical work– 4 hours

Preparation and submission of maths coursework – 20 hours

Revision and preparation for exam, including support tutorials – 72 hours

Scheduled learning includes lectures, tutorials, practical computer classes and laboratory

workshops.

Independent learning includes hours engaged with essential reading, assignment preparation and completion.

The contact hours (72) are distributed as follows:

24 hours of lectures, 24 hours of tutorials, 12 hours of laboratory practicals and 12 hours of computer practicals.

Part 3: Assessment

The Assessment Strategy has been designed to support and enhance the development of both subject-based and generic key skills, whilst ensuring that the modules Learning Outcomes are attained.

The coursework comprises two elements.

The first is a problem solving exercise which will provide an opportunity for students to demonstrate their ability to apply basic problem solving skills to unseen problems and evidence their skills in approaching it appropriately.

The second element is a portfolio. Students will be given instruction on the content of this portfolio which will contain examples of both study skills and laboratory skills such as: laboratory workbook; evidence of referencing; examples of poster presentation; a skills evaluation; reflection and action plan.

Component A is made up of two online exams, each with a 24 hour window for completion. The exams will allow students to undertake a suitable range of activities such as data analysis, ability to undertake calculations; process and manipulate data; draw and display data in graphs and other forms. This will test a range of the learning outcomes.

Formative feedback is available to students throughout the module through group discussions particularly in tutor group sessions. Students are provided with formative feed-forward for their exam through a revision and exam preparation session prior to the exam and through support materials supplied through Blackboard.

First Sit Components	Final Assessment	Element weighting	Description
Portfolio - Component B		24 %	Portfolio of laboratory work sheets
Portfolio - Component B		36 %	Portfolio of statistical analyses and study skills
Examination (Online) - Component A		13 %	Online examination 1 (24 hours)
Examination (Online) - Component A	✓	27 %	Online examination 2 (24 hours)
Resit Components	Final Assessment	Element weighting	Description
Examination (Online) - Component A	✓	40 %	Online Examination (24 hours)
Written Assignment - Component B		60 %	Integrated assignment (including portfolio)

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Part 4: Teaching and Learning Methods	
Learning Outcomes	On successful completion of this module students will achieve the following learning outcomes:

Module Learning Outcomes	Reference
Address scientific problems using appropriate mathematical and statistical skills; assess their individual capabilities in analysis and presenting experimental data and recognise the degree of experimental uncertainty in experimental measures	MO1
Analyse forensic and other data by formulating hypotheses and making decisions based on appropriate statistical tests	MO2
Statistical tests; for simple scenarios and evidence types evaluate the strength of evidence using probabilities and Bayesian statistics	MO3
Perform some simple statistical modelling by applying basic statistical distributions to real life problems	MO4
Use electronic resources that will also support their problem solving skills throughout their undergraduate course	MO5
Describe the functions of the components of basic analytical instruments and operate analytical instruments at a basic level	MO6
Recognise and describe a range of routine analytical techniques available for the chemical analysis of substances of relevance in forensic science	MO7
Prepare and analyse simple biological and chemical samples using the above techniques appropriately	MO8
Record experimental data in an appropriate manner, use it for the calculation of concentrations and other parameters of simple biological or chemical test samples and in the calibration of instruments	MO9
Understand the need for developing key graduate skills in addition to subject based proficiency	MO10
Use resources that will support their research, problem solving and study skills throughout their undergraduate course	MO11

Contact Hours	**Independent Study Hours:**	
	Independent study/self-guided study	234
	Total Independent Study Hours:	234
	Scheduled Learning and Teaching Hours:	
	Face-to-face learning	66
	Total Scheduled Learning and Teaching Hours:	66
	Hours to be allocated	300
	Allocated Hours	300

Reading List	*The reading list for this module can be accessed via the following link:* https://uwe.rl.talis.com/modules/ussjrw-30-1.html

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Part 5: Contributes Towards
This module contributes towards the following programmes of study: