Module Specification

Scientific Skills

Version: 2024-25, v3.0, 29 May 2024

Contents

Part 1: Information

Module title: Scientific Skills

Module code: USSJRW-30-1

Level: Level 4

For implementation from: 2024-25

UWE credit rating: 30

ECTS credit rating: 15

College: College of Health, Science & Society

School: CHSS School of Applied Sciences

Partner institutions: None

Field: Applied Sciences

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: In this module students will learn basic analytical skills in chemistry, mathematics and statistics that will enable them to analyse forensic data.

Features: Not applicable

Educational aims: This module aims to give students an understanding of the chemical, mathematical and statistics underpinning forensic science and the skills to apply these.

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

Part 3: Teaching and learning methods

Teaching and learning methods: The module will be delivered using a mixture of lectures, tutorial group sessions, and laboratory and computer practical classes.

Support for student learning will be given through the 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. Students will develop IT and data analysis skills through computer-based workshops.

Through laboratory practical classes students will get valuable hands on experience of laboratory techniques, data collection and analysis.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

> **MO1** Perform simple mathematical calculations and use appropriate statistical methods in solving forensic problems.

> **MO2** Use appropriate software (for example Excel) to process, display, interpret and communicate scientific and forensic data.

> **MO3** Demonstrate the practical laboratory skills which underpin analyses in forensic chemistry.

MO4 Apply common spectroscopic and chromatographic techniques and knowledge of the basic interpretation of results in a forensic context.

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

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

Part 4: Assessment

Assessment strategy: Assessment 1: Report (1500 words)
Assessment 1 is a laboratory report, based on a series of laboratory practical classes, which develop basic scientific and analytical skills. The report itself also develops scientific writing skills. Students will be supported to succeed in this assessment through laboratory sessions and feedback in coursework support tutorials.

Assessment 2: Portfolio
Assessment 2 is a portfolio of 12 short tests (approximately five minutes), to be completed in fortnightly computer practical classes and four longer problems of 30 minutes each to be completed out of class. The best 10 of 12 short tests will be taken along with the marks from the longer problems. The portfolio will assess learning on mathematics and statistics and covers topics such as calibration curves, statistical analysis, problem solving exercises and basic computer skills, such as the use of Excel. Random number generation software will be used both to help mitigate against collusion, but also to allow students to practice, supporting their success.

Both assessments are designed to maintain student engagement with the module but also have in-built mitigation for short term absence.

Assessment tasks:

Report (First Sit)

Description: Laboratory Report (1500 words).

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested: MO3, MO4

Portfolio (First Sit)

Description: Mathematics and Statistics Portfolio

Weighting: 60 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

Report (Resit)

Description: Laboratory Report (1500 words).

Weighting: 40 %

Final assessment: No

Group work: No

Learning outcomes tested: MO3, MO4

Portfolio (Resit)

Description: Mathematics and Statistics Portfolio

Weighting: 60 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Forensic Science {Foundation} [Frenchay] BSc (Hons) 2023-24

Forensic Science {Foundation} [Frenchay] MSci 2023-24

Forensic Science [Frenchay] - Withdrawn MSci 2024-25

Forensic Science [Frenchay] BSc (Hons) 2024-25