



## **Module Specification**

### **Research Methods**

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## Part 1: Information

**Module title:** Research Methods

**Module code:** UFMFGV-15-M

**Level:** Level 7

**For implementation from:** 2021-22

**UWE credit rating:** 15

**ECTS credit rating:** 7.5

**Faculty:** Faculty of Environment & Technology

**Department:** FET Dept of Engineering Design & Mathematics

**Partner institutions:** None

**Delivery locations:** Frenchay Campus

**Field:** Engineering, Design and Mathematics

**Module type:** Standard

**Pre-requisites:** None

**Excluded combinations:** None

**Co-requisites:** None

**Continuing professional development:** Yes

**Professional, statutory or regulatory body requirements:** None

## Part 2: Description

**Overview:** This module is concerned with the careful use of scientific method, qualitative research and the application of statistical techniques in empirical research. Research Governance including ethics, health and safety, use of human tissue, animal welfare and genetic medication will be delivered. It covers the principles of data quality and method validation.

**Features:** Not applicable

**Educational aims:** The aim of this module is to develop research skills required to deliver evidence-based analysis that underpins each core module, where research governance plays a central role.

**Outline syllabus:** • Advanced modelling techniques

- Binary, ordinal and nominal logistic regression models: application, theoretical underpinning, model diagnostics.
- Discriminant Analysis: applications and interpretation, theoretical underpinning, model diagnostics.
- Multivariate Analysis of Variance
- Survival Analysis

Biomedical research techniques:

- Principles of experimental designs relating to medical studies.
- Determination of sample size for a given study
- Measures of reliability including Intra Class Correlations, Bland-Altman plots, Cohen's kappa
- Analysis of survival data including the proportional hazards survival model, estimation of survival probabilities, Kaplan-Meier survival curves, log rank tests

Industrial Studies:

- Two-level full and fractional factorial designs, central composite and rotatable designs and process optimisation
- Taguchi methods and their role in product design and quality improvement

Missing data

Meta-analysis

Introduction to meta-analysis. Systematic reviews, publication bias, effect sizes, random and fixed effects models; examples taken from the empirical literature.

Research Governance

Students will gain an overview of research governance including bioethics and ethical standard frameworks and committees.

### Part 3: Teaching and learning methods

**Teaching and learning methods:** Lectures: This module will be delivered in discrete sections, following the subject areas outlined in the syllabus. Each topic area will be introduced with underpinning lectures followed by a series of tutorials where extensive use of case studies will be made.

Tutorials: Tutorials will use indicative lists of questions to guide student learning. It is expected that the tutorial work will be completed before the tutorial. Therefore, the tutorial will engage active discussion on individual and group findings.

#### Module Learning outcomes:

**MO1** Apply advanced statistical techniques in empirical research using modern day software [components A and B]

**MO2** Evaluate model diagnostics to inform empirical model building [Components A and B]

**MO3** Interpret and explain a wide variety of empirical statistical models in different context (own analyses or research papers) [Components A and B]

**MO4** Evaluate the role played by statistical design in medicine and industry [Component B]

**MO5** Apply appropriate research governance that is particular to any research project [Component A).

**Hours to be allocated:** 150

#### Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

**Reading list:** The reading list for this module can be accessed at [readinglists.uwe.ac.uk](http://readinglists.uwe.ac.uk) via the following link

## Part 4: Assessment

**Assessment strategy:** There are two pieces of assessment an examination (Component A) and a written assignment (Component B).

COMPONENT A: The second piece of assessment will be an examination (2 hours). This paper will have a partly seen component which assesses article critique.

COMPONENT B: The coursework is designed to develop their understanding of how qualitative and quantitative data is currently used in the Healthcare Technology field and will test statistical modelling of data and second design concepts. This piece of coursework will involve the analysis of data from relevant data sets such as those important to systemic reviews and research data. This component will assess the student's application statistical modelling.

### Assessment components:

#### **Examination (Online) - Component A (First Sit)**

Description: Online Data analysis paper (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO5

#### **Written Assignment - Component B (First Sit)**

Description: Statistical modelling of data and design concepts (1500 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

#### **Examination (Online) - Component A (Resit)**

Description: Online Data analysis paper (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4, MO5

**Written Assignment - Component B (Resit)**

Description: Statistical modelling of data and design concepts (1500 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3, MO4

**Part 5: Contributes towards**

This module contributes towards the following programmes of study:

Health Technology [Sep][FT][Frenchay][1yr] MSc 2021-22

Health Technology [Sep][PT][Frenchay][2yrs] MSc 2021-22