

# LF103-6 Quantitative Skills for Biology (GSD)

**20/21**

**Department**

Life Sciences

**Level**

Undergraduate Level 1

**Module leader**

Daniel Franklin

**Credit value**

6

**Module duration**

14 weeks

**Assessment**

100% coursework

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

LF103-6 Quantitative Skills for Biology (GSD)

[Module web page](#)

### Module aims

The purpose of this module is to introduce students to a range of data analysis skills that they will need to apply throughout their undergraduate studies. By studying the module, students will gain an appreciation of the benefits of the application of statistical approaches to support the understanding and interpretation of biological data, an awareness of how simple mathematical models can be used to explore biological systems, and the computational skills to enable them to test and interpret biological data.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Summarising biological data - types of data, graphical summaries, summary statistics.

Probabilities and common statistical distributions for biological data - simple ideas of probability; normal, Poisson and binomial distributions.

Estimates and Confidence Intervals - summarising real data using sample statistics and distributional assumptions.

Testing for differences - principles of hypothesis testing, t-tests and non-parametric alternatives for comparing population means.

Tests for count data - chi-squared tests for association and goodness of fit with applications to distributions, genetics, medical studies.

Familiarisation with statistical software.

Normality in biological data and testing for normality. Non-parametric alternatives for testing for differences between two samples.

Analysing Designed Experiments - analysis of variance and interpretation of results, with applications in plant, animal and medical science

Simple Linear Relationships - simple ideas of linear regression models, plots, fitted lines and summary statistics

Biological Data Analysis - applications of statistical summary approaches, hypothesis testing and regression modelling in a range of biological sciences, including epidemiology, medical science, ecology, and environmental science.

Descriptive and predictive modelling of basic biological systems using medicine, disease and population dynamics applications.

## **Learning outcomes**

By the end of the module, students should be able to:

- will have a clear appreciation of the value of statistical approaches to the analysis and interpretation of biological data
- They should also understand the basic principles of modelling biological populations
- be aware of how to summarise and analyse the different types of data they will generate
- have an understanding of how and when to apply a number of standard statistical tests
- understand how to use spreadsheets and dedicated statistical software to manipulate data and explore biological relationships

## **Indicative reading list**

DYTHAM, C. 2011. Choosing and using statistics: a biologist's guide, John Wiley & Sons.

## **Subject specific skills**

No subject specific skills defined for this module.

## **Transferable skills**

No transferable skills defined for this module.

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## Study

### Study time

Type	Required
Practical classes	28 sessions of 1 hour (47%)
Private study	32 hours (53%)
Total	60 hours

### Private study description

32 Hours of Private Study

### Other activity description

Directed study/data analysis 92 hours

## Costs

No further costs have been identified for this module.

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## Assessment

You do not need to pass all assessment components to pass the module.

### Assessment group A1

	Weighting	Study time	Eligible for self-certification
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Assessment component			
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Exercise based open book assignments.	50%		Yes (extension)
exercise based open book assignments.			

Reassessment component is the same

Assessment component			
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Exercise based open book assignments.	50%		Yes (extension)
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exercise based open book assignments.

Reassessment component is the same

## **Feedback on assessment**

Cohort level feedback provided on summative assessment along with individual marks

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## **Availability**

### **Courses**

This module is Core for:

- UBSA-C700 Undergraduate Biochemistry
  - Year 1 of C700 Biochemistry
  - Year 1 of C700 Biochemistry
- ULFA-C1A2 Undergraduate Biochemistry (MBio)
  - Year 1 of C1A2 Biochemistry
  - Year 1 of C700 Biochemistry
- UBSA-3 Undergraduate Biological Sciences
  - Year 1 of C100 Biological Sciences
  - Year 1 of C100 Biological Sciences
- Year 1 of ULFA-C1A1 Undergraduate Biological Sciences (MBio)
- UBSA-C1B9 Undergraduate Biomedical Science
  - Year 1 of C1B9 Biomedical Science
  - Year 1 of C1B9 Biomedical Science
  - Year 1 of C1B9 Biomedical Science
- ULFA-C1A3 Undergraduate Biomedical Science (MBio)
  - Year 1 of C1A3 Biomedical Science
  - Year 1 of C1B9 Biomedical Science