

# ES1B6-15 Data Analysis II

**24/25**

**Department**

School of Engineering

**Level**

Undergraduate Level 1

**Module leader**

Iyabo Adamu

**Credit value**

15

**Module duration**

35 weeks

**Assessment**

100% coursework

**Study locations**

University of Warwick main campus, Coventry Primary

Distance or Online Delivery

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## Description

### Introductory description

This module consolidates the first-year data analysis module in order to solve a wide variety of data-driven real-life problems. Students will develop a solid understanding of statistical methods and inferencing that will allow them to effectively analyse data and conduct hypothesis testing for decision making. Students will learn about random variables, probability distributions, one- and two-sample tests, statistical inferencing, hypothesis testing, linear regression, correlation, and analysis of variance (ANOVA). Students will further enhance their knowledge of statistical principles by using an appropriate statistical programming language to implement and analyse data.

### Module aims

To equip students with sufficient knowledge and problem-solving skills needed to understand probability distributions, perform statistical inferencing using hypothesis testing, and carry out analysis of variance using the R statistical programming language.

### 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.

- Basic Probability Concepts (probability; complements; experiments; outcomes; sample space; independent events; mutually exclusive events; laws of probability – multiplication and addition rule).
- Discrete & Continuous Random Variables.
- Discrete & Continuous Probability Distributions (Binomial & Normal distributions).
- One- and Two- Sample tests.
- Statistical Inferencing and Hypothesis Testing.
- Regression and Correlation.
- Analysis of variance (ANOVA).
- Using the R statistical programming software for data analysis.

## **Learning outcomes**

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

- Demonstrate a good understanding of statistical probability distributions to critically evaluate data and draw appropriate conclusions.
- Conduct hypothesis testing and understand how statistical tests can be used to quantify the amount of evidence in favour of a scientific hypothesis.
- Identify relationships between data variables using correlation and make predictions using regression analysis.
- Use the R statistical programming software to analyse quantitative/qualitative data.

## **Indicative reading list**

- S. L. Weinberg, D. Harel, S. K. Abramowitz, Statistics using R : an integrative approach, Cambridge University Press (2021), ISBN: 9781108719148.
- E. G. M. Hui, Learn R for Applied Statistics, Apress (2019), ISBN: 9781484241998.
- R. J. Barlow, Statistics, A Guide to the Use of Statistical Methods in the Physical Sciences, Wiley (1989), ISBN: 9781118723234

[View reading list on Talis Aspire](#)

## **Subject specific skills**

Able to manage data effectively and undertake data analysis;

Communicating mathematically;

Quantitative reasoning;

Logical thinking;

Manipulation of precise and intricate ideas.

## **Transferable skills**

Analytical skills;

Problem-solving;

Flexibility;  
Persistence;  
A thorough approach to work.

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## Study

### Study time

Type	Required
Lectures	10 sessions of 1 hour (7%)
Seminars	15 sessions of 1 hour (10%)
Tutorials	5 sessions of 1 hour (3%)
Work-based learning	73 sessions of 1 hour (49%)
Online learning (independent)	10 sessions of 1 hour (7%)
Other activity	2 hours (1%)
Private study	10 hours (7%)
Assessment	25 hours (17%)
Total	150 hours

### Private study description

Inclusive of:

- Online tutor-recorded videos.
- Online Quiz for revision.
- Online forum for discussing queries with course peers and tutor.  
Recapping of prior learning is expected where necessary. Reading around the topics covered will provide the depth of understanding required to complete the course to a good standard. This may be both prior to and/or after the teaching and learning sessions. Support from teaching staff is available but students will be expected to increasingly develop their independent learning skills.

### Other activity description

- Support Session (Online).

### Costs

No further costs have been identified for this module.

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## Assessment

You must pass all assessment components to pass the module.

## Assessment group A

	<b>Weighting</b>	<b>Study time</b>
Class Test	40%	10 hours
This assessment will be based on the topics covered in Block 1.		
Data Analysis Assignment	60%	15 hours
This assessment will be based on the topics covered in Block 1 and Block 2.		

## Feedback on assessment

Feedback will be given as appropriate to the assessment type:

- Written cohort-level summative feedback on class test.
- Individual feedback provided for the data analysis assignment task.

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## Availability

There is currently no information about the courses for which this module is core or optional.