



## UNSW Course Outline

# ZPEM8311 Data Analysis and Applications - 2024

Published on the 03 Jul 2024

## General Course Information

Course Code : ZPEM8311

Year : 2024

Term : Semester 2

Teaching Period : Z2

Is a multi-term course? : No

Faculty : UNSW Canberra

Academic Unit : UC Science

Delivery Mode : Online

Delivery Format : Standard

Delivery Location : UNSW Canberra at ADFA

Campus : UNSW Canberra

Study Level : Postgraduate

Units of Credit : 6

[Useful Links](#)

[Handbook Class Timetable](#)

## Course Details & Outcomes

### Course Description

This course provides a foundation in statistics for students undertaking further studies in many applied fields, including workforce planning. It teaches the fundamentals of data analysis with emphasis on the analysis of data arising from real-life situations across various disciplines. It

focuses on the understanding of the concepts of statistics without overemphasizing the mathematical detail.

The course teaches the principles of good experimental design, as well as the interpretation and critical evaluation of statistical information presented in the media and in published reports. It introduces a computer software package which is used for data exploration, presentation and analysis.

Main topics covered include: gathering, organising and summarising data; using graphical techniques to present statistical information; measures of location and spread; probability; probability distributions such as the normal distribution; introduction to Markov modelling; confidence intervals and hypothesis tests; correlation and simple linear regression.

## Course Aims

The aim of the course is to enable students to use data to answer questions and make informed, objective decisions, by teaching them to evaluate information, to reason logically, to critically evaluate the reasoning of others, to understand the methods of data analysis and to be able to apply appropriate techniques to analyse data arising from real-life situations.

## Relationship to Other Courses

This course does not assume any prior knowledge. However, this does provide fundamental methods and techniques which will then be used in subsequent courses in the degree program.

## Course Learning Outcomes

Course Learning Outcomes
CLO1 : At the successful completion of this course, students should be able to summarize and present data clearly in numerical and graphical forms.
CLO2 : At the successful completion of this course, students should be able to solve life-related problems using probability distributions.
CLO3 : At the successful completion of this course, students should be able to estimate the true value of parameters with confidence.
CLO4 : At the successful completion of this course, students should be able to use sample data to assess claims about unknown population parameters.
CLO5 : At the successful completion of this course, students should be able to model relationships between variables by using linear regression techniques.
CLO6 : At the successful completion of this course, students should be able to interpret results of statistical analyses and present conclusions in clear non-technical language.

Course Learning Outcomes	Assessment Item
CLO1 : At the successful completion of this course, students should be able to summarize and present data clearly in numerical and graphical forms.	
CLO2 : At the successful completion of this course, students should be able to solve life-related problems using probability distributions.	
CLO3 : At the successful completion of this course, students should be able to estimate the true value of parameters with confidence.	
CLO4 : At the successful completion of this course, students should be able to use sample data to assess claims about unknown population parameters.	
CLO5 : At the successful completion of this course, students should be able to model relationships between variables by using linear regression techniques.	
CLO6 : At the successful completion of this course, students should be able to interpret results of statistical analyses and present conclusions in clear non-technical language.	

## Learning and Teaching Technologies

Moodle - Learning Management System | Echo 360

### Learning and Teaching in this course

Enrolment in this course or participation in any activity that is recorded constitutes consent to be recorded during tutorial and other teaching sessions. Recordings will only be used for the purposes of teaching this course. If you do not consent to be recorded, you must notify your course convenor immediately so other arrangements can be made.

This course will give you an understanding of why you would want to use a particular statistical technique, and why the method is sensible. Mathematical details are kept in the background.

You will learn the concepts and techniques through the practical examples in the lecture notes. Labs allow you to practise using these tools by completing problems from the Lab sheets. You will use a computer software package, Excel, as a useful tool throughout this course. You will learn the relevant Excel commands by working through the detailed instructions provided in the Lab sheets. The Lab sheets are not compulsory, but will be beneficial to completing the Assignment.

# Assessments

## Assessment Structure

Assessment Item	Weight	Relevant Dates
-----------------	--------	----------------

## Assessment Details

### General Assessment Information

All marks obtained for assessment items during the session are provisional. The final mark as published by the university following the assessment review group meeting is the only official mark.

Assessment for the course will comprise:

1. an Assignment (with 7 parts) - 10% each;
2. regular (10) Moodle Quizzes - 1% each;
3. a Final Test - 20%.

For the Assignment, each student will be working with a unique data set to analyse throughout the semester, using techniques covered in the course material. Each part of the Assignment will be worth 10% of the final mark.

Throughout the semester, there will be 10 Moodle Quizzes, each worth 1% of the final mark.

These will cover various aspects of the course content and encourage you to keep up-to-date.

There will be a Final Test which will assess all of the techniques and ideas taught in the course. This will be worth 20% of the final mark.

### Use of Generative Artificial Intelligence (AI) – such as ChatGPT – in UNSW Assessments

It is prohibited to use any software or service to search for or generate information or answers. If its use is detected, it will be regarded as serious academic misconduct and subject to the standard penalties, which may include 00FL, suspension and exclusion.

## Grading Basis

Standard

## Requirements to pass course

The assessment for the course has been designed so that an overall mark of 50% or greater indicates that the student has unambiguously demonstrated satisfactory completion of each learning outcome.

# Course Schedule

Teaching Week/Module	Activity Type	Content
Week 1 : 15 July - 19 July	Lecture	<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Thinking statistically</li> <li>• Introduction to Excel</li> </ul>
Week 2 : 22 July - 26 July	Lecture	<ul style="list-style-type: none"> <li>• Gathering data</li> <li>• Graphical representation of data</li> </ul>
	Assessment	Assignment 1 - gathering a data set
Week 3 : 29 July - 2 August	Lecture	<ul style="list-style-type: none"> <li>• Summarising data</li> </ul>
Week 4 : 5 August - 9 August	Lecture	<ul style="list-style-type: none"> <li>• Probability essentials</li> <li>• The Normal distribution</li> </ul>
	Assessment	Assignment 2 - summarising data numerically and graphically
Week 5 : 12 August - 16 August	Lecture	<ul style="list-style-type: none"> <li>• Assessing Normality</li> </ul>
Week 6 : 19 August - 23 August	Lecture	<ul style="list-style-type: none"> <li>• Confidence intervals</li> </ul>
	Assessment	Assignment 3 - probability
Week 7 : 9 September - 13 September	Lecture	<ul style="list-style-type: none"> <li>• Hypothesis testing</li> </ul>
	Assessment	Assignment 4 – confidence intervals and hypothesis testing
Week 8 : 16 September - 20 September	Lecture	<ul style="list-style-type: none"> <li>• Correlation</li> </ul>
Week 9 : 23 September - 27 September	Lecture	<ul style="list-style-type: none"> <li>• Regression</li> </ul>
	Assessment	Assignment 5 - correlation and regression
Week 10 : 30 September - 4 October	Lecture	<ul style="list-style-type: none"> <li>• Difference between two samples</li> </ul>
Week 11 : 7 October - 11 October	Lecture	<ul style="list-style-type: none"> <li>• ANOVA</li> </ul>
	Assessment	Assignment 6 - comparing two or more groups
Week 12 : 14 October - 18 October	Lecture	<ul style="list-style-type: none"> <li>• Introduction to Markov processes</li> </ul>
Week 13 : 21 October - 25 October	Lecture	<ul style="list-style-type: none"> <li>• Analysing Markov processes</li> </ul>
	Assessment	Assignment 7 - summarising the analysis

## Attendance Requirements

Students are strongly encouraged to attend all classes and review lecture recordings.

# Course Resources

## Prescribed Resources

You will need to obtain the following compulsory text e-book (see 10% discount voucher on Moodle):

MacGillivray, H., Utts, J.M., Heckard, R.F., 2014, Mind on statistics: Australian and New Zealand, 2nd edition, Cengage, ISBN 9780170237901

## Recommended Resources

It may be useful to purchase a scientific calculator (Casio FX82 or similar). However, the calculator function or software on your computer will suffice.

## Course Evaluation and Development

One of the key priorities in the 2025 Strategy for UNSW is a drive for academic excellence in education. One of the ways of determining how well UNSW is progressing towards this goal is by listening to our own students. Students will be asked to complete the myExperience survey towards the end of this course.

## Staff Details

Position	Name	Email	Location	Phone	Availability	Equitable Learning Services Contact	Primary Contact
Lecturer	Simon Watt		Building 22 Room 311			No	Yes