Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	Statistics and R
Unit ID:	STATS5000
Credit Points:	15.00
Prerequisite(s):	Nil
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	010103

Description of the Unit:

Data scientists use statistics to collect, check, analyse, and obtain meaningful conclusions from raw and unstructured data. They create models to test predictions or identify trends. This unit introduces you to statistical analysis methods using R, an open-source programming language and environment used for statistical analysis, data visualization, and data science. You will encounter problem sets from various disciplines as you learn to analyse and visualise data and communicate your findings to various audiences.

Grade Scheme: Graded (HD, D, C, P, MF, F, XF)

Work Experience:

No work experience

Placement Component: No

Supplementary Assessment: Yes

Where supplementary assessment is available a student must have failed overall in the Unit but gained a final mark of 45 per cent or above, has completed all major assessment tasks (including all sub-components where a task has multiple parts) as specified in the Unit Description and is not eligible for any other form of supplementary assessment.

Course Level:

Level of Unit in Course	AQF Level of Course					
	5	6	7	8	9	10
Introductory				✔		
Intermediate						
Advanced						

Learning Outcomes:

Knowledge:

K1. Describe a set of data using appropriate statistical measures.
K2. Distinguish between hypothesis testing procedures in statistics.
K3. Analyse the relationship between two variables using linear regression.

Skills:

S1. Complete routine data management tasks and statistical analyses using R software.
S2. Perform formal statistical analysis of data from a variety of disciplines.
S3. Summarise data using graphs and tables.
S4. Select and perform appropriate hypothesis tests using R software.
S5. Formulate a simple linear regression model and determine the model functionality.
S6. Perform and interpret one- and two-way analyses of variance (ANOVA).
S7. Communicate results from statistical analyses using appropriate statistical conventions.

Application of knowledge and skills:

A1. Select, perform and justify appropriate statistical analysis for given data sets and problem situations.
A2. Produce clear, orderly and informative statistical summaries and technical reports.

Unit Content:

Topics may include:

- Introduction to the R environment.
- Data presentation and basic descriptive statistics.
- Discrete and continuous probability distributions.
- Estimation and hypothesis testing (t-tests for single sample, paired and independent).
- Non-parametric alternatives.
- ANOVA
- Chi-square tests.
- Simple linear regression.

FEDTASKS

Federation University Federation recognises that students require key transferable employability skills to prepare them for their future workplace and society. FEDTASKS (**T**ransferable **A**ttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are be embedded within curriculum, developed gradually towards successful measures and interlinked with cross-discipline and Co-operative Learning opportunities. *One or more FEDTASK, transferable Attributes, Skills or Knowledge must be evident in the specified learning outcomes and assessment for each FedUni Unit, and all must be directly*

assessed in each Course.

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	**Assessment task (AT#)**
FEDTASK 1 Interpersonal	Students will demonstrate high-level skills to effectively communicate, interact and work with others both individually and in groups Students will be required to display (in person and/or online) high-level skills in-person and/or online in: • Effective verbal and non-verbal communication via a range of synchronous and asynchronous methods • Active listening for meaning and influencing • High-level empathy for others • Negotiating and demonstrating extended conflict resolution skills • Working respectfully in cross-cultural and diverse teams	Not applicable	Not applicable
FEDTASK 2 Leadership	Students will demonstrate the ability to apply leadership skills and behaviours Students will be required to display skills in: • Creating, contributing to, and enabling collegial environments • Showing self-awareness and the ability to self-reflect for personal growth • Inspiring and enabling others • Making informed and evidence-based decisions through consultation with others • Displaying initiative and ability to solve problems	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	Students will demonstrate an ability to work in complex and ambiguous environments, using their imagination to create new ideas Students will be required to display skills in: • Reflecting critically on complex problems • Synthesising, evaluating ideas, concepts and information • Proposing alternative perspectives to refine ideas • Challenging conventional thinking to clarify concepts through deep inquiry • Proposing creative solutions in problem solving	Not applicable	Not applicable
FEDTASK 4 Digital Literacy	Students will demonstrate the ability to work proficiently across a range of tools, platforms and applications to achieve a range of tasks Students will be required to display high-level skills in: • Finding, accessing, collating, evaluating, managing, curating, organising and appropriately and securely sharing complex digital information at a high-level • Receiving and responding to messages in a range of digital media • Using digital tools appropriately to conduct research • Contributing proficiently to digital teams and working groups • Participating in and utilising digital learning opportunities	Not applicable	Not applicable

FEDTASK attribute and descriptor		Development and acquisition of FEDTASKS in the Unit	
		Learning Outcomes (KSA)	Assessment task (AT#)
FEDTASK 5 Sustainable and Ethical Mindset	Students will demonstrate the ability to think ethically and sustainably. Students will be required to display skills in: • The responsible conduct of research • Making informed judgments that consider the impact of devising solutions in multiple global economic environmental and societal contexts • Demonstrating commitment to social responsibility as a professional and a citizen • Generating research solutions which are sustainable,ethical, socially responsible and/or sustainable • Extending lifelong, life-wide and life-deep learning to be open to diverse others • Demonstrate extended actions to foster sustainability in their professional and personal life.	Not applicable	Not applicable

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1, K2, K3, S1, S2, S3, S4, S5, S6, S7, A1	Weekly lab activities	Online quizzes	10-20%
K1, K2, K3, S1, S2, S3, S7, A1, A2	Statistical analysis, data visualisation and interpretation.	Analysis Report	20% - 30%
K1, K2, K3, S4, A1	Practical tasks to assess the application of hypothesis testing in the context of different real world problems; model development; use and analysis of simple linear regressions vs ANOVA.	Test(s)	40% - 60%

Adopted Reference Style:

APA ()

Refer to the library website for more information

Fed Cite - referencing tool