

Unit Outline (Higher Education)

Institute / School:	Institute of Innovation, Science & Sustainability
Unit Title:	REGRESSION AND MULTIVARIATE DATA ANALYSIS
Unit ID:	STATS7101
Credit Points:	15.00
Prerequisite(s):	(STATS5000)
Co-requisite(s):	Nil
Exclusion(s):	Nil
ASCED:	010103

Description of the Unit:

This unit introduces you to two widely used concepts in statistical data analysis: regression analysis and multivariate methods. It is designed as an applied unit for individuals to solve real-world statistical problems in multiple disciplines, with emphasis on developing an understanding of the concepts and methodologies such as statistical forecasting, factor analysis and clustering of multi-dimensional data. We have chosen to feature the R programming environment for all analyses and visualisations in this unit.

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

Work Experience:

No work experience: Student is not undertaking work experience in industry.

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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intermediate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Advanced	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Learning Outcomes:

Knowledge:

- K1.** Solve problems using appropriate statistical data analysis techniques.
- K2.** Identify statistical limitations of regression and forecasting techniques and determine appropriate mitigation strategies.
- K3.** Differentiate the role of statistical decomposition strategies and clustering methods for multivariate data analyses.

Skills:

- S1.** Analyse statistical data using R software.
- S2.** Perform appropriate data assessment procedures to determine the most appropriate data analysis methods for a given problem.
- S3.** Communicate results from data analyses using statistical summaries and technical reports.

Application of knowledge and skills:

- A1.** Construct regression models for real life applications and apply those models to predict future events and conditions.
- A2.** Analyse and visualise patterns in data using statistical multivariate techniques.

Unit Content:

Topics include:

- Review of basic statistical concepts
- The R environment for regression.
- Multiple linear and logistic regressions
- Time series forecasting
- MANOVA
- Linear discriminant analysis
- Principal component analysis
- Clustering

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**tttributes **S**kills and **K**nowledge) provide a targeted focus on five key transferable Attributes, Skills, and Knowledge that are 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	<p>Students at this level will demonstrate an advanced ability in a range of contexts to effectively communicate, interact and work with others both individually and in groups. Students will be required to display high level skills in-person and/or online in:</p> <ul style="list-style-type: none"> Using and demonstrating a high level of verbal and non-verbal communication Demonstrating a mastery of listening for meaning and influencing via active listening Demonstrating and showing empathy for others High order skills in negotiating and conflict resolution skills Demonstrating mastery of working respectfully in cross-cultural and diverse teams. 	K1-K3, S3, A1, A2	AT1, AT2, AT3, AT4
FEDTASK 2 Leadership	<p>Students at this level will demonstrate a mastery in professional skills and behaviours in leading others.</p> <ul style="list-style-type: none"> Creating and sustaining a collegial environment Demonstrating a high level of self-awareness and the ability to self-reflect and justify decisions Inspiring and initiating opportunities to lead others Making informed professional decisions Demonstrating initiative in new professional situations. 	Not applicable	Not applicable
FEDTASK 3 Critical Thinking and Creativity	<p>Students at this level will demonstrate high level skills in working in complexity and ambiguity using the imagination to create new ideas. Students will be required to display skills in:</p> <ul style="list-style-type: none"> Reflecting critically to generate and consider complex ideas and concepts at an abstract level Analysing complex and abstract ideas, concepts and information Communicate alternative perspectives to justify complex ideas Demonstrate a mastery of challenging conventional thinking to clarify complex concepts Forming creative solutions in problem solving to new situations for further learning. 	K1-K3, S1-S3, A1, A2	AT1, AT2, AT3
FEDTASK 4 Digital Literacy	<p>Students at this level will demonstrate the ability to work competently across a wide range of tools, platforms and applications to achieve a range of tasks. Students will be required to display skills in:</p> <ul style="list-style-type: none"> Mastering, exploring, evaluating, managing, curating, organising and sharing digital information professionally Collating, managing complex data, accessing and using digital data securely Receiving and responding professionally to messages in a range of professional digital media Contributing competently and professionally to digital teams and working groups Participating at a high level in digital learning opportunities. 	K1-K3, S1, S2, A1, A2	AT2, AT3

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 at this level will demonstrate a mastery of considering and assessing the consequences and impact of ideas and actions in enacting professional ethical and sustainable decisions. Students will be required to display skills in: <ul style="list-style-type: none"> • Demonstrate informed judgment making that considers the impact of devising complex solutions in ambiguous global economic environmental and societal contexts • Professionally committing to the promulgation of social responsibility • Demonstrate the ability to evaluate ethical, socially responsible and/or sustainable challenges and generating and articulating responses • Communicating lifelong, life-wide and life-deep learning to be open to the diverse professional others • Generating, leading and implementing required 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, S1, A1	Assignment 1 comprises the first three weeks of lecture materials on the topics 'Review of Basic Statistics Concept' and 'Simple Linear Regression'.	Report	10-20%
K1, K2, S1-S3, A1	Assignment 2 may comprise materials on multiple regressions and model building, as well as on time series forecasting, covered in Lectures 4-7.	Report	10-20%
K1, K3, S1-S3, A2	Assignment 3 will be based on materials covered in Lectures 8-11 and may comprise topics on Linear Discriminant Analysis, Principal Component Analysis and Clustering.	Report	10-20%
K1-K3, S1-S3 and A1-A2	Summative tasks covering fundamentals of different regression and multivariate analysis methods and their applications.	Test/Exam	40% - 60%

Adopted Reference Style:

APA

 Refer to the [library website](#) for more information

 Fed Cite - [referencing tool](#)