

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	■	■	■	■	■	■
Intermediate	■	■	■	■	✓	■
Advanced	■	■	■	■	■	■

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 will demonstrate an advanced ability in a range of contexts to effectively communicate, interact and work with others both individually and in groups.</p> <p>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 will demonstrate a mastery in professional skills and behaviours in leading others.</p> <p>Students will be required to display skills in:</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.</p> <p>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 • Demonstrating 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.</p> <p>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"> • Demonstrating 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 • Demonstrating 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 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](#)