



Unit Outline (Higher Education)

Institute / School: Institute of Innovation, Science & Sustainability

Unit Title: EXPERIMENTAL DESIGN AND ANALYSIS

Unit ID: STATS2100

Credit Points: 15.00

Prerequisite(s): (MS501 or STATS1000)

Co-requisite(s): Nil

Exclusion(s): (MS601)

ASCED: 010103

Description of the Unit:

This unit introduces the key concepts underlying the design and analysis of statistical experiments. A range of experimental designs is considered. Data from various disciplinary contexts is utilised, and there is a strong emphasis on computing skills, interpretation of computer output and communication of statistical results and conclusions.

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 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.** describe the concepts of experimental design, determine the design used in a particular practical situation, and identify the factors relevant to the situation;
- K2.** choose appropriate experimental design techniques in context of the problem;
- K3.** identify, analyse and report on a selection of advanced experimental designs;
- K4.** describe the concept of power in relation to experimental design, and perform power calculations for simple designs;
- K5.** interpret the results and computer output from all of the above designs and present clear, orderly and informative statistical summaries and technical reports.

Skills:

- S1.** use technology to perform analysis of variance, including estimation of contrasts, planned and post hoc comparisons;
- S2.** perform formal statistical analysis of data from a variety of disciplines;
- S3.** use technology to generate and then interpret computer output and communicate statistical results and conclusions.

Application of knowledge and skills:

- A1.** build and apply experimental designs for the real-world problems.

Unit Content:

Topics may include:

- one-way ANOVA with multiple comparisons and planned and post hoc comparisons;
- factorial designs and interactions;
- power analysis;
- fixed and random effects models;
- balanced incomplete block designs;
- latin squares and split plot designs;
- hierarchical (nested) designs;
- repeated measures designs.

Learning Task and Assessment:

Learning Outcomes Assessed	Assessment Tasks	Assessment Type	Weighting
K1-K5; S1-S3; A1	Practical use of appropriate statistical packages, and interpretation of output.	Weekly laboratory exercises	0 - 10%
K1-K5; S1-S3; A1	Read, research and apply various aspects of experimental designs.	Assignments	40 - 50%
K1-K5; S1-S3; A1	Attend lectures, read and summarise theoretical aspects of the unit	Examination(s)	50 - 60%

Adopted Reference Style:

APA

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

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