Course Outline

Title: EXPERIMENTAL DESIGN & ANALYSIS

Code: STATS2100

Formerly: MS601

Faculty / Portfolio: Faculty of Science

Program Level:

	AQF Level of Program					
	5	6	7	8	9	10
Level						
Introductory						
Intermediate			✔			
Advanced						

Pre-requisites: (MS501 or STATS1000)

Co-requisites: Nil

Exclusions: (MS601)

Progress Units: 15

ASCED Code: 010103

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.

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Values and Graduate Attributes:

Values:

V1. appreciate the need for appropriate design of experiments for use in a practical situation;
V2. be aware of the role of power analysis in relationship to experimental design;
V3. appreciate the need to produce clear, orderly and informative statistical summaries and technical reports.

Graduate Attributes:

Attribute	Brief Description	Focus
Continuous Learning	Students will be able to develop an understanding of concepts and methodologies of experimental design, and apply these concepts and understandings to real-world problems in their disciplines.	Medium
Self Reliance	Self reliance will be demonstrated through utilisation of extra resources in the course such as reading reference notes, completion of laboratory and tutorials, and timely completion of assessment tasks.	Medium
Engaged Citizenship		
Social Responsibility	Students will be able to appreciate the role and appropriate use of experimental design to solve the real-world problems.	Low

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.

Assessment:

Learning Outcomes Assessed	Assessment Task	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

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Presentation of Academic Work:

https://federation.edu.au/students/assistance-support-and-services/academic-support/general-guide-for-the-presentation-of-academic-work