PSYC 3010 – Advanced Statistics

Unit of Study Code: PSYC3201

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Format of Unit: 2 x 1 hour lectures/week x 13 weeks
1 x 2 hour tutorial/week x 12 weeks

Credit Point Value: 6 Credit Points

Qualifying: PSYC (2012 or 2112) plus one other Intermediate Psychology Unit from PSYC (2011 or 2111), PSYC (2013 or 2113), PSYC (2014 or 2114).

Assessment: Classwork:

SECTION 1
Tutorial test, 10% of the total mark of the unit
Week 5, August 20 to August 24

1,000 words Assignment, 15% of the total mark of the unit
Due Date: Week 8, Monday 10th September

SECTION 2
Tutorial Prac, 25% of the total mark of the unit
Week 11, 8 October to 12 October

Examination:
50% of the total mark of the unit
part multiple choice, part short answer questions

Evaluation of teaching and learning:
Date: week 13 of semester
Type: questionnaire
Unit of study general description:
The first section of this course deals with the design and analysis of experiments in psychology for which some form of analysis of variance is appropriate. The second section of the course deals with multiple regression and path analyses. Tutorials for both parts will involve the use of statistical packages on a computer as well as hand calculators. Students should bring a calculator to all tutorials.

Teaching outcomes:
(1) Ability to calculate and interpret a one way analysis of variance, including tests of contrasts.
(2) Demonstrate an understanding of the problem of multiple comparisons and control of the Type I error rate.
(3) Ability to calculate, analyze and interpret data from factorial designs including ANOVA and contrasts.
(4) Understanding of issues involved in the treatment of data involving repeated measurements.
(5) Ability to carry out computer-based analyses for ANOVA and contrast testing, and to interpret the results appropriately.
(6) Ability to calculate and interpret multiple regression (MR) and related methods.
(7) Understanding a conceptual link between ANOVA and MR analyses.
(8) Knowledge of different types of MR and ability to choose the analysis appropriately for a research question.
(9) Ability to carry out computer-based analyses for MR and to interpret the results appropriately.
(10) Understanding of how matters of the reliability of psychological test items affect research and data analyses.

Evidence of learning:
The quality of students’ performance in tutorial tests and practical exercises, in a written assignment, and in examinations will be taken as evidence of learning.

SYLLABUS

Section 1. Anova and Contrasts.
The one way fixed effects ANOVA model: partitioning variation and degrees of freedom. Expected mean squares and the formation of F ratios.

Asking focused questions: testing contrasts. Planned orthogonal contrasts. Trend analysis.

Controlling the Type I error rate with multiple comparisons: the Scheffe procedure and the Bonferroni procedure.

Factorial designs: The two way ANOVA model with fixed effects. Partitioning between-group variation into main effects and interaction effects. Main effect and interaction contrasts for a two way ANOVA design.

Decision-wise vs family-wise control of Type I errors.

Repeated measures or within-subject variables. Differing approaches to the analysis of repeated measures data. Planned contrasts for designs involving repeated measures data.
Section 2. Multiple Regression and Beyond.

Multiple Regression: Revision of Simple Linear Regression model and Introduction to Multiple Linear Regression.

Multiple Regression: Multiple independent variables, the assumptions, the estimates, the SPSS output. Prediction and Explanation. Different types of Multiple Regression.

Categorical Variables in Multiple Regression: Dummy Variables.


Beyond Multiple Regression: Path analysis. Introduction to AMOS.

Test reliability, its estimation, effects of unreliability

TIMETABLE

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TEXT

There is no set text for the Anova & Contrasts section, but if students wish to purchase a book, the following would be useful:


For the Multiple Regression and Beyond part (weeks 7-13) the text is:

OTHER REFERENCES

Section 1. Anova & Contrasts.


Section 2. Multiple Regression and Beyond.
