Faculty of Science
School of Psychology

PSYC3371
Multivariate Data Analysis for Psychology
Course Outline

Semester 2, 2015

Course convenor: Dr Melanie Gleitzman

1. Information about the Course

FACULTY	Science
SCHOOL	School of Psychology
COURSE CODE & NAME	PSYC3371 Multivariate Data Analysis for Psychology
SEMESTER	Semester 2	**YEAR**	2015
UNITS OF CREDIT	6	**LEVEL OF COURSE**	Level 3

ASSUMED KNOWLEDGE, PREREQUISITES OR CO REQUISITES	This course is designed for students intending to undertake an honours year in psychology. Students are required to have completed PSYC3001 and are assumed to have an advanced understanding of ANOVA based inferential statistical procedures and be able to competently carry out simple procedures ANOVA

3. Course Timetable					
Component	Class Number	Day	Time	Location	
Lectures		Monday	12:00 13:00	Central Lecture Block 6	
		Wednesday	14:00 15:00	Central Lecture Block 8	
		Thursday	11:00 12:00	Mathews Theatre B	
Statistics Tutorials				Location	Tutor
		Monday	14:00 15:00	Mat 420	
		Monday	15:00 16:00	Mat 307	
		Tuesday	10:00 11:00	Mat 420	
		Tuesday	15:00 16:00	Mat 420	
		Wednesday	09:00 10:00	Mat 420	
		Wednesday	13:00 14:00	Mat 420	
Computing Tutorials		Tuesday	12:00 13:00	Mat 209	
		Wednesday	15:00 16:00	Mat 209	
		Thursday	09:00 10:00	Mat 209	
		Thursday	13:00 14:00	Mat 209	
		Friday	09:00 10:00	Mat 209	
		Friday	11:00 12:00	Mat 209	
Practice	Students have 24/7 access to computing labs Mat 209A, 209, 422. You are free to use the lab during this time provided that it is not being used for a scheduled activity				

4. Aims of the Course

The aims of the course are to

1. provide you with a level of understanding of multiple regression procedures which will allow you to choose analysis strategies appropriate for a range of contexts (prediction, analysing complex experiments.185780TD0Tc0l1Tc037T31Tf36.792TT21Tf(pR00035599813.44refBT10.980010.9870.865

3. Statistical control by partialling. Relationship between squared correlations (zero order, partial, semi partial, multiple). Readings: Course Notes; Pedhazur (Ch. 5; Ch. 7: pp. 160 170, 174 188).

4. MRA for the purposes of prediction. Subset regression methods – stepwise, forwards and backwards selection. Bias and cross validation. Readings: Course Notes; Pedhazur (Ch 8: pp. 195 203 225).

5. One way ANOVA via MRA. Coding schemes for categorical independent variables. Example of effect coding and contrast coding for J = 3. Tests of significance. Unequal n's. MRA as General Linear Model. Readings: Course Notes. Pedhazur (Ch. 11 pp.342 367, 378 383)

6. ANCOVA via MRA. Tests of significance. Role of covariate in randomised vs non randomised designs. Readings: Course Notes; Pedhazur (Ch. 15 pp. 628 653).

7. Non orthogonal factorial ANOVA via MRA. Simultaneous vs hierarchical MRA. Effect coding and contrast coding. Tests of significance. Readings: Course Notes. Pedhazur (Ch. 12 pp. 414 430, 447 455, 481 491).

8. Factorial designs via MRA where one or more factors are continuous variables. Meaning of product variable. Hierarchical MRA. Readings: Pedhazur (Ch. 14 pp. 560–592).

9. Structural Equation Modelling via MRA. Causal hierarchy of independent variables. Path diagrams. Regression coefficients as direct effects. Mediating variables and indirect effects. Effects (direct and indirect) vs spurious contributions to correlations. Simplifying structural models. Assumptions. Readings: Course Notes. Pedhazur (Ch. 18: pp. 769 783, 788 799.)

10. Principal Components Analysis and Factor Analysis. Accounting for variance in a set of standardised measures by PCA. Interpretation of loadings as row wise and column wise regression coefficients, and as variable component correlations. Orthogonal rotation to simple structure. Oblique vs orthogonal rotation. Reproducing variable scores from component scores. The distinction between common factors and components. The factor analysis model, with and without unique factors. Factors as latent variables. Rotation in FA. The problem of estimating factor scores. FA vs PCA. Readings: Course Notes.

11. Multivariate analysis of variance (MANOVA). Detecting the effect of a grouping variable (with any number of levels) on an optimal linear combination of dependent variables (a discriminant function). Choice of a test statistic in MANOVA. Multiple

7. Teaching

11. Understand the difference between appropriate and inappropriate analysis strategies and methods for the analysis of multivariate data, including data from within subjects experiments.

9. Graduate Attributes

School of Psychology Graduate Attributes*	Level of Focus 0 = No focus 1 = Minimal 2 = Minor 3 = Major	Activities/Assessment
1. Core knowledge and understanding	3	Participation in lectures & tutorials and class work – this requires students to form advanced understanding of data analysis concepts and practice. Assessed in exam and assignment.
2. Research methods in psychology	3	Participation in lectures & tutorials and class work will equip students to understand, apply and evaluate basic research methods in psychology; this includes applying different data analysis methods across a range of research designs, drawing appropriate inferences from the data, and the appropriate use of statistical packages.
3. Critical thinking skills	3	Development of data analysis assignment showing use of critical and creative thinking, ability to apply appropriate data analysis methods to specific research question

10. Assessment

Assessment Task	Weight	Learning Outcomes and Graduate Attributes Assessed	Date of Submission	Feedback
Assignment 1	10%	Each assessment task covers all learning outcomes and graduate attributes.	Submit to Turnitin link by 11 pm, Monday 31st August, 2015 (Week 6).	Available from Moodle within 4 weeks of due date.
Class Test	20%		Thursday 11am 12pm, 24th September 2015 (Week 9)	Test papers returned in class Week 12 or earlier.
Assignment 2	20%		Submit to Turnitin link by 11 pm, Monday 19th October, 2015 (Week 12)	Available from Moodle within 4 weeks of due date.

11. Course Schedule – check Moodle for updates

Week	Lecture	Lecture Date	Lecture Topic	Statistics Tutorial	Computing Tutorial
1	1	Monday 27 July	Introduction, Topic 1	No tutorials	No tutorials
	2	Wednesday 29 July	Topic 1		
	3	Thursday 30 July	Topic 1, 2		
2	4	Monday 3 Aug	Topic 2	Topic 1,2	Topic 1, 2
	5	Wednesday 5 Aug	Topic 3		
	6	Thursday 8 Aug	Topic 3, 4		
3	7	Monday 10 Aug	Topic 4	Topic 2	Topic 3
	8	Wednesday 12 Aug	Topic 4		
	9	Thursday 13 Aug	Topic 4, 5		
4	10	Monday 17 Aug	Topic 5	Topic 4	Topic 4
	11	Wednesday 19 Aug	Topic 5		
	12	Thursday 20 Aug	Topic 5, 6		
5	13	Monday 24 Aug	Topic 6	Topic 5	Topic 5
	14	Wednesday 26 Aug	Topic 6		
	15	Thursday 27 Aug	Topic 7		
6	16	Monday 31 Aug	Topic 7		
		Monday 31 Aug	Assignment 1 (worth 10%) Topics 1 4		
	17	Wednesday 2 Sept	Topic 8	Topic 6	Topic 6
	18	Thursday 3 Sept	Topic 8, 9	16	Thurc

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12. Expected Resources for Students	
TEXTBOOK (RECOMMENDED)	Pedhazur, E.J. (1997). Multiple regression in behavioral research: Explanation and prediction. (3rd Ed.). Fort Worth: Harcourt Brace.
	Bird, K.D. (2004). Analysis of Variance via Confidence Intervals. London: Sage Publications. NOTE: available **online** via UNSW Library
COURSE MATERIALS	The **PSYC3371 Moodle** site (access via MyUnsw) provides course

The **School of Psychology Student Guide,** available on http://www.psy.unsw.edu.au/current students/student guide, contains