University of Guelph

Department of Marketing and Consumer Studies

Multivariate Research Methods: MCS*6060, Winter 2013

Instructor: Dr. Towhidul Islam, Professor
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Lecture: Mondays 9.00 -11:00, Room MACS 129
Lab: Mondays: 11:00 - 12:30, Room MACS 311
Consultation: Mondays 1:30 – 2:30 pm, Tuesdays 5:30-6:30 pm & Thursdays 5:30 – 6:30 pm
        or by appointment

Course Description: A review of selected multivariate analysis techniques as applied to marketing and consumer research. Topics include regression, anova, principle components, factor and discriminant analysis, non-metric scaling and trade-off analysis. The course uses a 'hands-on' approach with small sample databases available for required computer program analysis.

Course Objectives: Make you intelligent users of multivariate techniques and good critics of multivariate analysis performed by others. We shall work together to achieve the following:
1.   How the technique works?
2.   How to apply the technique?
3.   How to interpret the results of the analysis?

Suggested Texts for Reading Selected Chapters (We will not follow any particular text for lecture and lab materials)

Multiple Topics
☐   Trochim, W. (2005) Research Methods: The Concise Knowledge Base, CENGAGE Learning
        Free Access: http://www.socialresearchmethods.net/kb/
☐   Tabachnick, B. and Fidel, L. (2001), Using Multivariate Statistics, 4th Edition, Allyn & Bacon

☐   Lattin, J., Carroll, J. D., Green, P. E. (2003), Analyzing Multivariate Data, Thomson

☐   Sharma, Subash (1995), Applied Multivariate Techniques, Wiley.
Multilevel Model
☐   Singer, J. D. and Willet, J. B. (2003), Applied Longitudinal Data Analysis: Modeling change and Event Occurrence,   Oxford University Press.
Experimental Designs
☐   Montgomery, D. (1997), Design and Analysis of Experiments, Fourth Edition, Wiley
☐   Kuehl, R. (2000), Design of Experiments: Statistical Principles of Research Design and Analysis, Second Edition, Duxbury.
Discrete Choice Analysis
☐   Ryan, M., Gerard, K. and Amaya, M. (2007). Using Discrete Choice Experiments to Value Health and Health Care, Springer
☐   Train, K. (2003), Discrete Choice Methods with Simulation, Cambridge
☐   Ben-Akiva, M. and Lerman. S. (1985), Discrete Choice Analysis: Theory and Application to Travel Demand, The MIT Press, Cambridge
Structural Equation Modeling
☐   Raykov, T. and Marcoulides, G. (2006), A First Course in Structural Equation Modeling, 2nd Edition, NJ: Lawrence Erlbaum

Evaluation Procedure:
Assignments: **60%**

    1. Regression Analysis   12%
    2. Analysis of Variance   12%
    3. Moderation and Mediation Analysis   12%
    4. Discrete Choice Analysis   12%
    5. Confirmatory Factor Analysis
        & Structural Equation Modeling   12%

For each assignment, you will get about 10 days time for submission from the handover date. There will be 10% deduction of mark for each day of late submission.

Final Exam   **30%**

Class Discussion & Participation   **10%**

Main Software**:** SPSS (Regression, Analysis of Variance, Discrete Choice. Moderation & Mediation)
Specialized Software: SAS (Exp. Design), Mplus (CFA and SEM)

Academic Integrity
University of Guelph places emphasis on academic integrity. Plagiarism and other forms of academic dishonesty will be dealt with the official policies of the university. I will be holding you, as graduate student, to a high standard of integrity and professional conduct.

University Grading Scheme
This course follows the University grading scheme outlined in the University Calendar[*]:

A+	90-100%	**Excellent:** An outstanding performance in which the student demonstrates a superior grasp of the subject matter, and an ability to go beyond the given material in a critical and constructive manner. The student demonstrates a high degree of creative and/or logical thinking, a superior ability to organize, to analyze, and to integrate ideas, and a thorough familiarity with the appropriate literature and techniques.
A	85-89	
A-	80-84	
B+	77-79	**Good:** A more than adequate performance in which the student demonstrates a thorough grasp of the subject matter, and an ability to organize and examine the material in a critical and constructive manner. The student demonstrates a good understanding of the relevant issues and a familiarity with the appropriate literature and techniques.
B	73-76	
B-	70-72	
C+	67-69	**Acceptable:** An adequate performance in which the student demonstrates a generally adequate grasp of the subject matter and a moderate ability to examine the material in a critical and constructive manner. The student displays an adequate understanding of the relevant issues, and a general familiarity with the appropriate literature and techniques.
C	65-66	
F	0-64	**Fail:** An inadequate performance.

Class Schedule

Week and Module	Lecture Topics (and Labs) & Readings
Week 1: Review Lab Week 1: Introduction to SPSS; Data Entry & Data Coding; Review of univariate and bivariate analysis	o Introduction to Multivariate Data Analysis and Techniques o Measurement Scales o Descriptives: univariate o Bivariate Relationship: correlation, partial correlations, cross-tabs, reliability o Inferential Statistics, Language of Hypotheses Testing, Testing mean differences, Testing differences in variances o Conclusion Validity, Power, Effect Size **Readings:** o Trochim (2005) Research Methods: The Concise Knowledge Base, CENGAGE Learning **Free Access: http://www.socialresearchmethods.net/kb/**
Week 2, 3 : Regression Analysis Lab Week 2: Regression Analysis and diagnostics and Regression with categorical variables Lab Week 3: Longitudinal Data Analysis - multilevel model and Logistic Regression	o Multiple Regression Analysis o Regression with categorical explanatory variables o Longitudinal Data Analysis - Multilevel Model o Logistic Regression **Readings:** o Trochim (2005) Chapter 3: The Theory of Measurement, Chapter 11: Analysis, Chapter 12 (12-2): The General Linear Model o Tabachnick and Fidel (2001), Chapter 5: Multiple Regression, Chapter 12: Logistic Regression o Sharma (1995) Chapter 10: Logistic Regression o Singer and Willet (2003): Chapter 2: Exploring Longitudinal Data on change, Chapter 3: Introducing the Multilevel Model for Change
Week 4: Experimental Design Lab Week 4: Experimental design: Latin Squares, BIBD, Factorial and design for DCE	o Introduction to Experimental Design o Blocking o Latin Squares o Balanced Incomplete Block Design (BIBD) and Applications o Consideration of Cognitive and Statistical Efficiency in Designs o Best-Worst Experiments o Orthogonal /Factorial Designs for Discrete Choice Experiments (DCE) o Choice experiments using BIBD o Alternative Specific Choice Experiments **Readings: Experimental Designs** o Trochim. (2005) Chapter 7: Design, Chapter 8: Experimental Design o Montgomery (1997): Chapter 5: Randomized Blocks, Latin Squares, and Related Designs, Chapter 6: Introduction to Factorial Designs o Kuehl (2000): Chapter 9: Incomplete Block Designs: An Introduction o Green (1974): On the Design of Choice Experiments Involving Multifactor Alternatives, Journal of Consumer Research, 1, 61-68. o Louviere, J.J., Hensher, D.A. and J.D. Swait (2000). Stated Choice Methods: Analysis and Application, Cambridge, UK: Cambridge.

Week 5 & 6 : **Analysis of Variance** Lab Week 5: Analysis of Variance Lab Week 6: Multivariate Analysis of Variance; Repeated Measures ANOVA	o Introduction to **ANOVA** o Between and Within Subject Designs o Main and Interaction Effects o Sources of Interaction Effects using SPSS Syntax o Contrasts and Multiple Comparisons o Randomized Block Analysis o Analysis of Covariance (ANCOVA) o Introduction to **Multivariate ANOVA** o Repeated Measures **ANOVA** **Readings: Analysis of Variance** o Trochim (2005) Chapter 12-3: Experimental Analysis o Latin, Carroll and Green (2003). Chapter 11: Analysis of Variance o Tabachnick and Fidel (2001), Chapter 8: Analysis of Covariance, Chapter 9: Multivariate Analysis of Variance and Covariance
Week 7	Winter Break
Week 8: **Moderation and Mediation Analysis** Lab Week 8: Moderation and Mediation Analysis	o Moderation, Mediation, Moderated Mediation and Mediated Moderation 0 Baron, R. and Kenny, D. (1986), The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations, Journal of Personality and Social Psychology, 51 (6), 1173-1182 0 Muller, D., Judd, C. M. and Yzerbyt, V. (2005), When Moderation is Mediated and Mediation is Moderated, Journal of Personality and Social Psychology, 89 (6), 852-863. 0 Zhao, X., Lynch, J. and Chen, Q. (2010), Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis, Journal of Consumer Research, 37, 197-206. 0 Preacher, K.J., Rucker, D.D., & Hayes, A.F. (2007). Adressing Moderated Mediation Hypotheses:Theory, Methods and Prescriptions. *Multivariate Behavioral Research*, 42(1), 185-227
Week 9, 10: Discrete Choice Analysis (DCA) Lab Week 9: Discrete Choice Analysis (DCA); Design and Survey; Aggregate models Lab Week 10: Managerial Insights from DCA	o Stated preference (SP) and Revealed preference (RP) data o Decision Making: Individual/Group/ Joint Decision Making o Preference. Preference Stability Consistency, Heterogeneity o Preference Elicitation using different methods o Conjoint and Discrete Choice o Conceptual Framework : Random Utility Model o DCE Surveys, Data Collection and Analysis o Aggregate Model: Multinomial Logit Models (MNL), Latent Class Models o Individual Level Model: Data expansion using Best-Worst Experiments and Weighted Least Squares approach o Research Applications

	Readings: o Ryan, Gerard and Amaya (2007): Chapter 1: Discrete Choice Experiments in a Nutshell, Chapter 3: Practical Issues in Conducting a Discrete Choice Experiment o Train (2003): Chapter 2: Properties of Discrete Choice Models o Ben-Akiva and Lerman (1985) Chapter 3: Theories of Individual Choice Behavior, Chapter 4: Binary Choice Models o Louviere, J.J., Hensher, D.A. and J.D. Swait (2000). Stated Choice Methods: Analysis and Application, Cambridge, UK: Cambridge University Press.

Week 11, 12 & 13: **Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM)**
 	
Lab Week 11: EFA and CFA
 	
Lab Week 12: SEM; Testing mediation and moderation
	Confirmatory Factor Analysis (CFA) and Measurement Model
	   o Exploratory Factor Analysis (EFA)
	   o Measurement Errors and Theory Testing in CB and B2B
	   o Identification Issues: Scaling
	   o Measurement of Reliabilities
	   o Testing Convergent and Discriminant Validity
	
	Readings:
	o Trochim. (2005) Chapter 5: Scales and Indexes
	o Sharma (1995), Chapter 6: Confirmatory Factor Analysis
	o Latin, Carroll and Green (2003), Chapter 6: Confirmatory Factor Analysis
	
	Structural Equation Modeling (SEM)
	
	   o Model Identification and Assessing Model Fit
	   o Model Testing and Evaluation
	   o Revisit Longitudinal Data Analysis using Latent Growth Model (introduced in Regression Module)
	   o Revisit Testing Moderation and Mediation using SEM framework (introduced in Moderation and Mediation Module)
	
	Readings:
	o Raykov and Marcoulides (2006), Chapter 4: Confirmatory Factor Analysis, Chapter 5: Structural Regression Models
	o Sharma (1995), Chapter 14: Covariance Structure Models
	o Latin, Carroll and Green (2003), Chapter 10: Structural Equation Models with Latent Variables
	o Tabachnick and Fidel (2001), Chapter 14: Structural Equation Modeling