
University of Guelph

Department of Marketing and Consumer Studies
Multivariate Research Methods: MCS*6060, Winter 2012

Instructor: Towhidul Islam
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Lecture: Mondays 08.30 -11:20, Room MACS 129
Lab: Fridays: 13.00 - 14:30, Room MACS 311A
Consultation: Mondays 11:30 –13:30 pm & Thursdays 17:30 –18:30 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 15%
2. Experimental design and Analysis of Variance 15%
3. Discrete Choice Analysis 15%
4. Factor Analysis & Structural Equation Modeling 15%

For each assignment, you will get 10-14 days time for submission from handover date.

Final Exam 30%

Class Discussion & Participation 10%

Main Software: SPSS (Regression, Analysis of Variance, Factor Analysis, Discrete Choice)

Specialized Software: SAS (Exp. Design), Mplus (CFA and SEM), Latent Gold (Discrete Choice)

Class Schedule

Week and Module	Lecture Topics (and Labs) & Readings
<p>Week 1, 2 & 3</p> <p>Introduction, Review and Regression Analysis</p> <p>Lab Week 1: Introduction to SPSS; Data Entry & Data Coding; Review of univariate and bivariate Analysis.</p> <p>Lab Week 2: Regression Analysis and diagnostics, Regression with categorical variables</p> <p>Lab Week 3: Multilevel Model and Logistic Regression</p>	<ul style="list-style-type: none">● Introduction to Multivariate Data Analysis and Techniques● How Multivariate Data Analysis fits into your overall research● Review: Univariate Stat., Measurement Scales● Review: Bivariate Relationship: correlation, partial correlations, cross-tabs, Reliability● Review: Inferential Statistics, Conclusion Validity, Power, Effect Size● Regression Analysis● Regression with categorical explanatory variables● Multilevel model for change/Hierarchical Regression● Logistic Regression● Research Applications <p>Readings:</p> <ul style="list-style-type: none">o Trochim (2005) Chapter 3: The Theory of Measurement, Chapter 11: Analysis, Chapter 12 (12-2): The General Linear Modelo Tabachnick and Fidel (2001), Chapter 5: Multiple Regression, Chapter 12: Logistic Regressiono Singer and Willet (2003): Chapter 2: Exploring Longitudinal Data on change, Chapter 3: Introducing the Multilevel Model for Changeo Sharma (1995) Chapter 10: Logistic Regression

<p>Week 4, 5 & 6</p> <p>Experimental Designs and Analysis of Variance</p> <p>Lab Week 4: Experimental design: Latin Squares, BIBD, Factorial and design for DCE</p> <p>Lab Week 5: Analysis of Variance</p> <p>Lab Week 6: Multivariate Analysis of Variance; Repeated Measures ANOVA</p>	<ul style="list-style-type: none"> ● Introduction to Design- Review ● Blocking ● Latin Squares ● Balanced Incomplete Block Design (BIBD) and Applications ● Best-Worst Experiments ● Orthogonal /Factorial Designs for Discrete Choice Experiments (DCE) ● Consideration of Cognitive and Statistical Efficiency in Designs ● Research Applications <p>Readings:</p> <ul style="list-style-type: none"> 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. <ul style="list-style-type: none"> ● Introduction to ANOVA ● Between and Within Subject Designs ● Main and Interaction Effects ● Contrasts and Multiple Comparisons ● Randomized Block Analysis ● Analysis of Covariance (ANCOVA) ● Research Applications <ul style="list-style-type: none"> ● Introduction to MANOVA ● Theoretical and Practical Issues/ Assumptions ● Research Applications <ul style="list-style-type: none"> ● Repeated Measures ANOVA ● Non-parametric version of Repeated Measures ANOVA - Friedman Test <p>Readings:</p> <ul style="list-style-type: none"> 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
<p>Week 7</p>	<p>Winter Break</p>

<p>Week 8, 9 & 10</p> <p>Discrete Choice Analysis (DCA)</p> <p>Lab Week 8: Discrete Choice Analysis (DCA); Design and Survey; Aggregate models</p> <p>Lab Week 9: Managerial Insights from DCA</p> <p>Lab Week 10: Individual Level Choice Models using Weighted Least Squares</p>	<ul style="list-style-type: none"> ● Stated preference (SP) and Revealed preference (RP) data ● Decision Making: Individual/Group/ Joint Decision Making ● Preference. Preference Stability Consistency, Heterogeneity ● Preference Elicitation using different methods ● Conjoint and Discrete Choice ● Conceptual Framework : Random Utility Model ● DCE Surveys, Data Collection and Analysis ● Aggregate Model: Multinomial Logit Models (MNL), Latent Class Models, Generalized MNL ● Individual Level Model: Data expansion using Best-Worst Experiments and Weighted Least Squares approach ● Research Applications <p>Readings:</p> <ul style="list-style-type: none"> 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
<p>Week 11, 12 & 13)</p> <p>Exploratory (EFA) and Confirmatory Factor Analysis (CFA)</p> <p>Structural Equation Modeling (SEM)</p> <p>Lab Week 11: EFA and CFA</p> <p>Lab Week 12: SEM</p> <p>Lab Week 13: SEM (continue)</p>	<p>Exploratory Factor Analysis (EFA)</p> <ul style="list-style-type: none"> ● Introduction and Steps ● Potential Applications <p>Readings:</p> <ul style="list-style-type: none"> o Latin, Carroll and Green (2003), Chapter 5: Exploratory Factor Analysis o Tabachnick and Fidel (2001), Chapter 13: Principal Components and Factor Analysis o Sharma (1995): Chapter 5: Factor Analysis <p>Confirmatory Factor Analysis (CFA) and Measurement Model</p> <ul style="list-style-type: none"> ● Measurement Errors and Theory Testing in CB and B2B ● Identification Issues: Scaling ● Measurement of Reliabilities ● Testing Convergent and Discriminant Validity ● <p>Readings:</p> <ul style="list-style-type: none"> 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

	<p>Structural Equation Modeling (SEM)</p> <ul style="list-style-type: none"> ❶ General Purpose, Description and Research Questions ❷ Model Identification and Assessing Model Fit ❸ Model Testing and Evaluation ❹ Testing Moderation and Mediation ❺ Research Applications <p>Readings:</p> <ul style="list-style-type: none"> 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
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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	63-66	
C-	60-62	
F	0-59	Fail: An inadequate performance.