Department of Marketing and Consumer Studies
MCS*6060
MULTIVARIATE RESEARCH METHODS
Winter 2015

Instructor(s): Dr. Towhidul Islam, Professor  
Room: MINS 206, Ext 53835  
Email: islam@uoguelph.ca  
Office Hours: Mondays 12:30 - 2:30 pm, or by appointment

Class Times and Location: 
Lecture: Mondays 8.50 -10:30 am, Room MINS B33  
Lab: Mondays: 10:50 - 12:00, Room MACS 311

Course Description and Objectives:
A review of selected multivariate analysis techniques as applied to marketing and consumer research. Topics include regression, mediation and moderation analysis, analysis of variance, best-worst scaling and discrete choice analysis, explanatory and confirmatory factor analysis, structural equation modeling. 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?  
4. Replicate results of refereed journal articles.

Course Materials and Resources:
This course uses a variety of materials and resources. One of your primary resources will be the course website (http://courselink.uoguelph.ca). All announcements, required and recommended readings, assignments and updates will be posted here. You will also be able to access any handouts you may have missed through this site. Check this site often.

Suggested Texts for Reading Selected Chapters (We will not follow any particular text)

Multiple Topics
  Free Access: http://www.socialresearchmethods.net/kb/  
- Lattin, J., Carroll, J. D., Green, P. E. (2003), Analyzing Multivariate Data, Thomson

Multilevel Model

Moderation and Mediation
Experimental Designs


Discrete Choice Analysis

Train, K. (2003), Discrete Choice Methods with Simulation, Cambridge

Structural Equation Modeling


Evaluation Procedure:

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Modules</th>
<th>Weight (M.Sc.)</th>
<th>Weight (Ph.D.)</th>
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<tbody>
<tr>
<td>1</td>
<td>Regression Analysis</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>2</td>
<td>Moderation and Mediation Analysis: Replication Study</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>3</td>
<td>Experimental Designs</td>
<td>13%</td>
<td>10%</td>
</tr>
<tr>
<td>4</td>
<td>Analysis of Variance</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>5</td>
<td>Discrete Choice Analysis</td>
<td>13%</td>
<td>11%</td>
</tr>
<tr>
<td>6</td>
<td>CFA &amp; SEM</td>
<td>13%</td>
<td>11%</td>
</tr>
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</table>

For each assignment, you will get at least 7 days time for submission from the assignment handover date. Unless you have discussed an extension well ahead of the due date, late penalties of 3% earned grade/day (including weekends) will be assigned. Extensions will only be granted on the basis of extenuating circumstances.

Final Exam (Concepts and Applications) 25%

Class and Lab Participation: 10%

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

Course Philosophy and Approach:

I believe that the role of the teacher is to facilitate learning and thinking by fostering an environment that stimulates passion for learning and motivates students to embrace and take an active role in the lifelong learning process. I also believe in empowering students with self-confidence in solving marketing and societal problems. My academic goals are in accordance with the University of Guelph’s mission statement that the university “... is a research-intensive, learner-centered university.”

“Learner-centered” to me means being engaged as a teacher, while engaging students and putting learning at the centre of the education process. Engagement in the students leads to intrinsic inquiry, where students take ownership for the product that is their education. When students take an active role in their education, the outcome not only benefits their academic curiosity but also has societal benefits. To me it is of the upmost importance that students walk away from my course having learnt something tangible, not simply memorized definitions. In my students, I want to see the development of intellectual growth, critical thinking, and other important skills such as analysis, synthesis, abstraction, and generalization. As a result, I do my best to ensure that assignments and the end products are relevant to future work and assist in developing the skills mentioned.

When taking the learner-centered approach in the classroom, it is important to acknowledge that students have different learning styles and needs. As such, I try to incorporate many different learning styles to interest a wide range of students, i.e., theoretical explanations, cases, applied examples, etc. In most cases, students come with different knowledge bases, so I try to tailor the learning experience to each class and also make myself available through
extended office hours. I keep an open-door policy to personally aid any student who needs help or wants to be challenged. Ultimately I seek to create conditions that foster learning both in class and outside the class for each student.

**Class Schedule**

<table>
<thead>
<tr>
<th>Week and Module (and Labs)</th>
<th>Lecture Topics &amp; Readings</th>
</tr>
</thead>
</table>
| **Week 1 - 2 (Jan 5 & Jan 12): Regression Analysis** | o  Introduction to Multivariate Data Analysis and Techniques  
Lab Week 1: Introduction to SPSS, Binary & Effect coding, Linear regression analysis  
Lab Week 2: Regression with Categorical Explanatory Variables & Logistic Regression | o  Multiple Regression Analysis  
  o  Regression with categorical explanatory variables  
  o  Logistic Regression  
  o  Multilevel model for change/Hierarchical Regression  
**Readings:**  
0 Tabachnick and Fidel (2001), Chapter 5: Multiple Regression, Chapter 12: Logistic Regression  
0 Sharma (1995) Chapter 10: Logistic Regression  
| **Week 3-4 (Jan 19 & Jan 26): Moderation and Mediation Analysis** | o  Moderation & Mediation  
Lab Week 3: Introduction to PROCESS and Moderation Analysis  
Lab Week 4: Mediation Analysis & Moderated Mediation, Mediated Moderation | o  Moderated Mediation & Mediated Moderation  
  o  Bootstrapping and Monte Carlo Simulations  
**Readings:**  
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.  
| **Week 5-6 (Feb 2 & Feb 9): Experimental Designs for ANOVA, Best-Worst Scaling & Choice Experiments** | o  Designs for Analysis of Variance (ANOVA)  
Lab Week 5-6: Experimental designs: ANOVA designs, Latin Squares, BIBD, Factorial and design for choice experiments | o  Blocking  
  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  
  o  Choice experiments using BIBD  
  o  Alternative Specific Choice Experiments  
**Readings: Experimental Designs**  
0 Trochim (2005) Chapter 7: Design, Chapter 8: Experimental Design  
0 Montgomery (1997): Chapter 5: Randomized Blocks, Latin Squares, and Related Designs, Chapter 6: Introduction to Factorial Designs  
0 Kuehl (2000): Chapter 9: Incomplete Block Designs: An Introduction  
### Week 7 (starting Feb 16)

**Week 8 - 9 (Feb 23 & March 2): Analysis of Variance**
- Lab Week 8: Analysis of Variance (ANOVA)
- Lab Week 9: Multivariate Analysis of Variance; Repeated Measures ANOVA

### Winter Break

- Introduction to ANOVA
- Between and Within Subject Designs
- Main and Interaction Effects
- Sources of Interaction Effects using SPSS Syntax
- Contrasts and Multiple Comparisons
- Randomized Block Analysis
- Analysis of Covariance (ANCOVA)
- Introduction to Multivariate ANOVA
- Repeated Measures ANOVA

**Readings: Analysis of Variance**
- Trochim (2005) Chapter 12-3: Experimental Analysis
- Tabachnick and Fidel (2001), Chapter 8: Analysis of Covariance, Chapter 9: Multivariate Analysis of Variance and Covariance

### Week 10-11 (March 9 & 16): Discrete Choice Analysis

- Lab Week 10: Discrete Choice Analysis (DCA); Aggregate models
- Lab Week 11: Managerial Insights from DCA

**Readings:**

### Week 12 - 13 (March 23 & 30): Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM)

- Lab Week 12: EFA and CFA
- Lab Week 13: SEM

**Confirmatory Factor Analysis (CFA) and Measurement Model**
- Exploratory Factor Analysis (EFA)
- Measurement Errors and Theory Testing in CB and B2B
- Identification Issues: Scaling
- Measurement of Reliabilities
- Testing Convergent and Discriminant Validity

**Readings:**
- Sharma (1995), Chapter 6: Confirmatory Factor Analysis
- Latin, Carroll and Green (2003), Chapter 6: Confirmatory Factor Analysis

**Structural Equation Modeling (SEM)**
- Model Identification and Assessing Model Fit
- Model Testing and Evaluation
- Revisit Testing Moderation and Mediation using SEM framework (introduced in Moderation and Mediation Module)

**Readings:**
- Raykov and Marcoulides (2006), Chapter 4: Confirmatory Factor Analysis, Chapter 5: Structural Regression Models
Note: The schedule of learning activities may require modification from time to time. Any changes will be announced in class and/or on the Courselink site.

If you are registered with the Centre for Students with Disabilities and will require some form of accommodation in the completion of the required learning activities for this course, please meet with me during the first week of classes.

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. The Academic Misconduct Policy is detailed in the Graduate Calendar: http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1687.shtml

E-mail Communication

All students are required to check their University of Guelph e-mail account regularly. E-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course in writing, with your name, id#, and e-mail contact. See the graduate calendar for information on regulations and procedures for Academic Consideration: http://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/sec_d0e1415.shtml

Drop Date

The last date to drop one-semester courses, without academic penalty, is Friday, March 7. Two-semester courses must be dropped by the last day of the add period in the second semester. Refer to the Graduate Calendar for the Schedule of Dates.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded in any electronic media without the permission of the presenter, whether the instructor, a classmate or guest lecturer.

Resources

The Graduate Calendar is the source of information about the University of Guelph’s procedures, policies and regulations that apply to graduate programs: http://www.uoguelph.ca/registrar/calendars/graduate/current/

Religious Holidays:

Should a student need to miss scheduled tests, mid-term examinations, final examinations, or requirements to attend classes and participate in laboratories for religious reasons, please advise the instructor within two weeks of the distribution of this course outline so that alternate arrangements can be made. For further information see http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml
University Grading Scheme
This course follows the University grading scheme outlined in the University Calendar:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>90-100%</td>
<td><strong>Excellent:</strong> 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.</td>
</tr>
<tr>
<td>A</td>
<td>85-89</td>
<td></td>
</tr>
<tr>
<td>A-</td>
<td>80-84</td>
<td></td>
</tr>
<tr>
<td>B+</td>
<td>77-79</td>
<td><strong>Good:</strong> 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.</td>
</tr>
<tr>
<td>B</td>
<td>73-76</td>
<td></td>
</tr>
<tr>
<td>B-</td>
<td>70-72</td>
<td></td>
</tr>
<tr>
<td>C+</td>
<td>67-69</td>
<td><strong>Acceptable:</strong> 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.</td>
</tr>
<tr>
<td>C</td>
<td>65-66</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>0-64</td>
<td><strong>Fail:</strong> An inadequate performance.</td>
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</table>

Code of Conduct – The Top Ten
As a student in the Department of Marketing and Consumer Studies, College of Management and Economics at the University of Guelph, you are a member of a scholarly community committed to improving the effectiveness of people and organizations, and the societies in which they reside, through groundbreaking and engaging scholarship and pedagogy. We seek to promote a comprehensive, critical and strategic understanding of organizations, including the complex interrelationship between leadership, systems (financial and human) and the broader social and political context. And, we prepare graduates for leadership roles in which organizational objectives, self-awareness, social responsibility and sustainability are primary considerations.

In keeping with this commitment, we expect all of our students (indeed – all members of our community) to act in a professional and respectful manner to fellow students, staff and faculty, as well as to members of the broader university and local community. This expectation is very much in keeping with your preparation for a professional career.

The following conduct is expected of all of our students:

- Come to class prepared to learn and actively participate (having completed assigned readings, learning activities etc.).
- Approach your academic work with integrity (avoid all forms of academic misconduct).
- Arrive on time and stay for the entire class. If you happen to be late, enter the classroom as quietly as possible. At the end of class, apologize to the faculty member for the interruption. If you have to leave class early, alert the faculty member in advance.
- If you know in advance that you are going to miss a class, send an email to the faculty member letting him/her know that you will be absent, with a brief explanation.
- While in class, refrain from using any written material (e.g., newspaper) or technology (e.g., the Internet, computer games, cell phone) that is not relevant to the learning activities of that class. Turn off your cell phone at the start of each class.
- Listen attentively and respectfully to the points of view of your peers and the faculty member. Don’t talk while others have the floor.
- Raise your hand when you wish to contribute and wait to be called upon. Challenge others appropriately, drawing on reason and research rather than unsubstantiated opinion, anecdote and/or emotion. Keep an open mind and be prepared to have your point of view challenged.
- Provide thoughtful feedback at the completion of all courses (we are committed to continuous improvement but need your input to help us decide what to focus on).