MCMASTER University   **DeGroote SCHOOL OF BUSINESS**

B793
Applied Multivariate Statistics
Winter 2020 Course Outline

Human Resources and Management Area
DeGroote School of Business
McMaster University

COURSE OBJECTIVES

As applied researchers, the research we do typically uses imperfect designs that result in "messy" data. The purpose of this course is to expose students to a variety of statistical techniques for dealing with the challenges presented by these data. The focus is on the application of statistical techniques and the interpretation of results using these techniques. As a result, we will spend more time on conceptual understanding and use of these techniques and very little time on their mathematical foundation. A graduate level course in introductory statistics (e.g., MBA Q600) or equivalent is a prerequisite for this course. Our goal is to provide you with the background necessary to learn the techniques that you will use to conduct and evaluate quantitative research in human resources and management.

INSTRUCTORS AND CONTACT INFORMATION

Class Location: TSH 605 Tuesdays 9:00 AM - 12:00 PM	Class Location: TSH 605 Tuesdays 9:00 AM - 12:00 PM	
Dr. Catherine Connelly	**Dr. Aaron Schat**	**Laura Johnson**
CRC & Professor	Chair & Associate Professor	Graduate Program Administrator
connell@mcmaster.ca	schata@mcmaster.ca	busphd@mcmaster.ca
Office: DSB #412	Office: DSB #417	Office: DSB #104
Office Hours: by appointment	Office Hours: by appointment	
Tel: (905) 525-9140 x23954	Tel: (905) 525-9140 x23946	Tel: (905) 525-9140 x23373

RECOMMENDED COURSE MATERIALS AND READINGS

Meyers, L.S., Gamst, G., & Guarino, A.J. (2017). *Applied Multivariate Research: Design and Interpretation*. 3rd Edition.Thousand Oaks, CA: Sage Publications. (1st or 2nd Editions are ok too).

S. Rogelberg (Ed.), *Handbook of research methods in industrial and organizational psychology*. 2004. Oxford, UK: Blackwell.

We will make a copy available for photocopying individual chapters if necessary.

EVALUATION

Components and Weights

Assignments (4 @ 15%)	60%
Presentation	20%
Final Exam	20%

Grade Conversion

At the end of the course your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme.

LETTER GRADE	PERCENT
A+	90 - 100
A	85 - 89
A-	80 - 84
B+	75 - 79
B	70 - 74
B-	65 – 69
F	00 - 64

Assignments

Students will be required to complete four assignments. For each assignment, students will require an appropriate dataset. This may come from your own research (e.g., your thesis), your supervisor, one of the instructors, or from elsewhere. To ensure that the dataset is appropriate

for the course assignments, students should have their proposed datasets approved by one of the instructors.

For each assignment, students will be required to briefly articulate a research question they are examining, pre-screen the data, analyze the data using the assigned technique(s) to answer the research question, write a detailed results section in APA format, and provide a narrative interpretation and discussion of the results.

Assignments should be submitted electronically, in a single .doc, docx, or .pdf file. A maximum of one additional file may also be submitted (e.g., SPSS output).

All assignments are due by midnight on the Monday of the week indicated in the course schedule. Late assignments will be penalized at a rate of ten percent (10%) per calendar day.

Presentation

Students will be required to research and make a presentation on an advanced statistical technique or topic that is not covered in the course outline. The presentations should include the following:

- o an overview of the technique;
- o the type of data or research questions for which it is used;
- o its key assumptions and limitations;
- o an overview of how it compares to other related techniques;
- o an illustration of the technique, as it appears in the relevant scholarly literature (e.g., *MIS Quarterly, Journal of Applied Psychology*).

Early in the semester, before proceeding with preparation for the presentation, students should obtain instructor approval of their topics. Duplicate presentations will not be permitted. Other faculty and graduate students from the business school may be invited to attend these presentations. The presentations should be about 20 minutes long, and they will be evaluated on how well the abovementioned criteria are met, the clarity and effectiveness of the explanations provided, and the quality of the responses to questions.

Possible topics include (but are not limited to): logistic regression, cluster analysis, multidimensional scaling, relative weight analysis / dominance analysis, testing curvilinear effects, analysing dependent variables with limited ranges, policy capturing or conjoint analysis, indicators of reliability, comparisons of effect sizes, and many more. We encourage you to choose a topic that is of interest to you and that will be helpful to your program of research.

Final Exam

The final take-home exam will consist of several integrative questions related to the course content. More details regarding the exam format and due date will be provided later in the semester.

ACADEMIC DISHONESTY

It is the student's responsibility to understand what constitutes academic dishonesty. Please refer to the University Senate Academic Integrity Policy at the following URL:

http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf

This policy describes the responsibilities, procedures, and guidelines for students and faculty should a case of academic dishonesty arise. Academic dishonesty is defined as to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. Please refer to the policy for a list of examples. The policy also provides faculty with procedures to follow in cases of academic dishonesty as well as general guidelines for penalties. For further information related to the policy, please refer to the Office of Academic Integrity at:

http://www.mcmaster.ca/academicintegrity

STUDENT ACCESSIBILITY SERVICES

Student Accessibility Services (SAS) offers various support services for students with disabilities. Students are required to inform SAS of accommodation needs for course work at the outset of term. Students must forward a copy of such SAS accommodation to the instructor normally, within the first three (3) weeks of classes by setting up an appointment with the instructor. If a student with a disability chooses NOT to take advantage of an SAS accommodation and chooses to sit for a regular exam, a petition for relief may not be filed after the examination is complete. The SAS website is:

http://sas.mcmaster.ca

POTENTIAL MODIFICATIONS TO THE COURSE

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

MISSED WORK

Late assignments will be penalized as described earlier. No extensions are available except under extraordinary circumstances. Please discuss any extenuating situation with your instructor at the earliest possible opportunity.

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http://www.copyright.mcmaster.ca/Access_Copyright_Agreement

COURSE SCHEDULE

WEEK	TOPIC	READINGS AND ASSIGNMENT SCHEDULE
1. Tuesday, Jan 7, 9:00 am	Introduction to Multivariate Statistics and Dealing with Data	Meyers, Gamst, & Guarino (2017): Chapters 1-4 (A & B)
2. Tuesday, Jan 14, 9:00 am	Multiple Regression – Part 1 • Introductory topics	Meyers et al. (2017): Chapter 5 (A & B)
3. Tuesday, Jan 21, 9:00 am	Multiple Regression – Part 2 • Special topics (e.g., mediation, moderation, etc.)	Meyers et al. (2017): Chapter 6 (A & B) Stewart, G.L. & Barrick, M.R. (2000). Team structure and performance: Assessing the mediating role of intrateam process and the moderating role of task type. *Academy of Management Journal. 43*, 135-148.
4. Tuesday, Jan 28, 9:00 am	Hierarchical Linear Modeling	Hofmann, D.A. (2004). Issues in Multilevel Research: Theory Development, Measurement, and Analysis. In S. Rogelberg (Ed.), *Handbook of research methods in industrial and organizational psychology* (ch. 12). Oxford, UK: Blackwell. Meyers et al. (2017) Chapter 8 (A)
5. Tuesday, Feb 4, 9:00 am	Meta-Analysis	Huffcutt, A.I. (2004). Research perspectives on Meta-Analysis. In S. Rogelberg (Ed.), *Handbook of research methods in industrial and organizational psychology* (ch. 18). Oxford, UK: Blackwell. **Assignment 1 (Multiple Regression) due Monday, February 3**
6. Tuesday Feb 11, 9:00 am	Exploratory Factor / Components Analysis	Meyers et al. (2017): Chapter 10 (A & B)
7. Feb 17-21	Reading Week	Reading Week (no classes)

WEEK	TOPIC	READINGS AND ASSIGNMENT SCHEDULE
8. Tuesday Feb 25, 9:00 am	Structural Equation Modeling – Part 1 • Introduction to SEM	Meyers et al. (2017): Chapter 14A **Assignment 2 (Exploratory factor analysis) due Monday, February 24**
9. Tuesday March 3, 9:00	Structural Equation Modeling – Part 2 • Confirmatory factor analysis (CFA)	Meyers et al. (2017): Chapter 11A Williams, L. J., Ford, L. R., & Nguyen, N. (2004). Basic and advanced measurement models for confirmatory factor analysis. In S. Rogelberg (Ed.), *Handbook of research methods in industrial and organizational psychology* (Ch. 18). Oxford, UK: Blackwell. **Presentation topic should be approved by now**
10. Tuesday March 10, 9:00	Structural Equation Modeling – Part 3 • Path Analysis with Observed and Latent Variables	Meyers et al. (2017): Chapter 13A
11. Tuesday March 17, 9:00	MANOVA	Meyers et al. (2017): Chapter 18 **Assignment 3 (SEM) due Monday, March 16**
12. Week of March 23 – date TBD	Presentations – Advanced Techniques	
13. Tuesday March 31, 9:00	Presentations – Advanced Techniques	**Assignment 4 (Meta-Analysis) due Monday, March 30**
	Exam	**Details TBA**