

B793
Applied Multivariate Statistics
Winter 2015 Course Outline

Human Resources and Management Area
DeGroot School of Business
McMaster University

COURSE OBJECTIVES

As applied researchers, the research we do typically uses imperfect designs that result in “dirty” 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.

INSTRUCTORS AND CONTACT INFORMATION

Class Location: DSB 421

Mondays 9:00 – 12:00

Dr. Catherine Connelly
CRC & Associate Professor
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Dr. Aaron Schat
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Deb Randall Baldry
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Office Hours: 8-4
Tel: (905) 525-9140 x26189

RECOMMENDED COURSE MATERIALS AND READINGS

Meyers, L.S., Gamst, G., & Guarino, A.J. (2013) *Applied Multivariate Research: Design and Interpretation*. 2nd Edition. Thousand Oaks, CA: Sage Publications. (1st Edition is ok too).

Cost: \$Too much

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

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

Supplemental Resources (Not Required but really interesting and fun)

Grimm, L.G. & Yarnold, P.R. (1995). *Reading and understanding multivariate statistics*. Washington, DC: APA Books.

Grimm, L.G. & Yarnold, P.R. (2000). *Reading and understanding more multivariate statistics*. Washington, DC: APA Books.

Pedhazur, E. J. (1997). *Multiple regression in behavioral research* (3rd ed.). New York: Harcourt Brace.

Kline, R. B. (2005). *Principles and practice of structural equation modeling*, 2nd edition. New York: Guilford.

Tabachnik, B.G., & Fidell, L.S. (2006). *Using multivariate statistics, 5th Edition*. Boston: Allyn & Bacon.

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, 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 date 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 particular topic that is not covered in the course outline. The objective of the presentations is to provide an overview of the technique, the type of data or research questions for which it is used, and its key assumptions and limitations as well as an overview of how it compares to other related techniques. It may be useful to provide 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 will be evaluated on how well the abovementioned criteria are met, the clarity and effectiveness of the exposition, 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, indicators of reliability, conjoint analysis, and many more...

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. Jan 5	Introduction to Multivariate Statistics and Dealing with Data	Meyers, Gamst, & Guarino (2013): Chapter 3 (A & B)
2. Jan 12	Multiple Regression – Part 1 • Introductory topics	Meyers et al. (2013): Chapter 7 (A & B) (Chapter 4 in 1 st Edition)
3. Jan 19	Multiple Regression – Part 2 • Special topics (e.g., mediation, moderation, etc.)	Meyers et al. (2013): Chapter 8 (A & B) (Chapter 5 in 1 st Edition) 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. <i>Academy of Management Journal</i> . 43, 135-148.
4. Jan 26	Exploratory Factor / Components Analysis	Meyers et al. (2013): Chapter 12 (A & B)
5. Feb 2	Structural Equation Modeling – Part 1 • Introduction to SEM	Meyers et al. (2013): Chapter 16A (Chapter 13 in 1 st Edition) Assignment 1 (Multiple regression) due
6. Feb 9	Structural Equation Modeling – Part 2 • Confirmatory factor analysis (CFA)	Meyers et al. (2013): Chapter 18A (Chapter 14 in 1 st Edition) Williams, L. J., Ford, L. R., & Nguyen, N. (2004). Basic and advanced measurement models for confirmatory factor analysis. In S. Rogelberg (Ed.), <i>Handbook of research methods in industrial and organizational psychology</i> (Ch. 18). Oxford, UK: Blackwell.

7. Feb 23	Structural Equation Modeling – Part 3 • Path Analysis with Observed and Latent Variables	Meyers et al. (2013): Chapter 19A Assignment 2 (Exploratory factor analysis) due Presentation topic should be approved by now
8. Mar 2	MANOVA	Meyers et al. (2013): Chapter 5 (A & B) (Chapters 9A, 10A, 11A in 1 st Edition).
9. Mar 9	Meta-Analysis	Huffcutt, A.I. (2004). Research perspectives on Meta-Analysis. In S. Rogelberg (Ed.), <i>Handbook of research methods in industrial and organizational psychology</i> (ch. 18). Oxford, UK: Blackwell. Assignment 3 (SEM) due
10. Mar 16	Latent Profile Analysis	TBA
11. Mar 23	Hierarchical Linear Modeling	Hofmann, D.A. (2004). Issues in Multilevel Research: Theory Development, Measurement, and Analysis. In S. Rogelberg (Ed.), <i>Handbook of research methods in industrial and organizational psychology</i> (ch. 12). Oxford, UK: Blackwell.
12. March 30	Presentations – Advanced Techniques	Assignment 4 (Meta-Analysis) due
	Exam	Details TBA