B793
Applied Multivariate Statistics
Winter 2022 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: TBD Class time: TBD		
Dr. Catherine Connelly	**Dr. Aaron Schat**	**Bani Rafeh**
CRC & Professor	Associate Professor	Graduate Program Administrator
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www.degroote.mcmaster.ca

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 provide digital copies of the required chapters

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.

Grade	Points	Equivalent Percentages
A+	12	90 – 100
A	11	85 – 89
A-	10	80 – 84
B+	9	77 – 79
B	8	73 – 76
B-	7	70 – 72
F	0	69 and under

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 if necessary (e.g., SPSS output).

All assignments are due by 5 PM on the Friday 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 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. More information on the length and timing of the presentation will be provided.

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

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at:

www.mcmaster.ca/academicintegrity

The following illustrates only three forms of academic dishonesty:
1. Plagiarism, e.g., the submission of work that is not one's own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations

MISSED ACADEMIC WORK

Late assignments will not be accepted. No extensions are available except under extraordinary circumstances. Please discuss any extenuating situation with your instructor at the earliest possible opportunity.

STUDENT ACCESSIBILITY SERVICES

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca.

For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities:

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

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request, including the dates/times needing to be accommodated and the courses which will be impacted, to their Program Office normally within 10 days of the beginning of term. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

POTENTIAL MODIFICATIONS TO THE COURSE

The instructor reserves the right to modify elements of the course during the term. There may be changes to 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.

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

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

Course Schedule

WEEK	TOPIC	READINGS AND ASSIGNMENT SCHEDULE
1. Week of January 17th, 2022	Introduction to Multivariate Statistics and Dealing with Data	Meyers, Gamst, & Guarino (2017): Chapters 1-4 (A & B)
2. Week of January 24th, 2022	Multiple Regression – Part 1 • Introductory topics	Meyers et al. (2017): Chapter 5 (A & B)
3. Week of January 31st, 2022	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. Week of February 7th, 2022	Hierarchical Linear Modeling	(Recommended but not required reading) 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) **Assignment 1 (Multiple Regression) due**
5. Week of February 14th, 2022	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. 10). Oxford, UK: Blackwell.
6. Week of February 21st, 2022	Reading Week	Reading Week (no classes)

WEEK	TOPIC	READINGS AND ASSIGNMENT SCHEDULE
7. Week of February 28th, 2022	Exploratory Factor / Components Analysis	Meyers et al. (2017): Chapter 10 (A & B)
8. Week of March 7th, 2022	Structural Equation Modeling – Part 1: Introduction to SEM	Meyers et al. (2017): Chapter 14A **Assignment 2 (Exploratory factor analysis) due**
9. Week of March 14th, 2022	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. Week of March 21st, 2022	Structural Equation Modeling – Part 3: Path Analysis with Observed and Latent Variables	Meyers et al. (2017): Chapter 13A
11. Week of March 28th, 2022	MANOVA	Meyers et al. (2017): Chapter 18 **Assignment 3 (SEM) due**
12. Week of April 4th, 2022	Presentations – Advanced Techniques	**Details TBA** **Assignment 4 (Meta-ananlysis) due**
	Exam	**Details TBA**