

MCDA 5520 Statistical Business Analytics

Instructor

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Bio: Dr. Michael Zhang is an Associate Professor at Sobey School of Business. He has PhD in Management Science from Richard Ivey School of Business, the Western University. He also has a master degree in Financial Economics and a bachelor degree in Electrical Engineering. He teaches courses of Applied Data Analysis, Statistics, Operations Management and Quantitative Methods for Master of Finance, Master of Applied Science, MBA and Undergraduate students. His research centers on Healthcare and Supply Chain Analytics and Optimization and. His research has been awarded by multiple funding agencies such as CIHR, NSERC, Mitacs, CIRS and Innova Corp. He has extensive experiences in business modeling, logistics, revenue management, and large network simulation.

Course Overview

Analytics is quickly becoming the most important and foundational competency needed to support and transform any business function. However, this is a dynamic field with new challenges emerging every day. In order to live up to expectations, I believe effective Analytics must quickly go beyond conventional dashboard and reporting capabilities and deliver fundamental insights needed to deliver lasting and meaningful outcomes improvement.

This is never easy. I recommend the following Learning Objectives for you young Analytics Professionals:

- Integrate information technologies with data analytical methods to extract value from data sets.
- Think critically about the business implications, meaningfulness and applicability of observed data patterns and analytical inferences.
- Identify opportunities, needs and constraints for data analytics within organizational contexts.
- Select appropriate analytic tools for specific managerial issues.
- Compose data-analytic tools and concepts to create innovative data-analytic solutions.
- Demonstrate proficiency with several data-analytic tools.
- Communicate clearly and persuasively to audiences with various backgrounds.
- Provide leadership in analytics teams and projects.

MCDA5520 will contribute the above in a significant way. In particular, I intend to share some practices on how to use Analytics to improve business outcomes in this course. Following the descriptive-predictive-prescriptive framework that is commonly imposed on topics in Analytics, it emphasizes the analysis and solution of complex business decision problems using data-driven models. We will discuss numerous cases covering a variety of outcomes improvement examples.

But equally important, we will lay down a solid theoretical foundations before taking on more challenging issues in Analytics. We will start from basics, with the hope to provide an in-depth understanding of the most useful applied statistical techniques for Analytics. Emphasis will be on designing, conducting, analyzing, and interpreting the results of analytical research designs.

Pedagogy: The course will be taught largely through a mix of case discussions (competitions, precisely), theory-based lectures, and critical thinking exercises (individual and team work). The focus is on developing skills in Analytics and understanding the application of them. It is important to note that students are expected to be thoroughly prepared before coming to class.

Textbook: *Business Analytics: Methods, Models, and Decisions*, James R. Evans, 2nd Edition, Pearson

Cases: Several Harvard and Ivey cases will be used to illustrate the application process of Analytical skills and models examined in the call.

Coursework Evaluation and Grading

Grading Scheme

Graded coursework	Percentage
Team competitions	40%
Class quizzes	20%
Peer assessment	10%
Team Project	30%

Team Competitions (40 marks)

There will be about 8-10 competitions. Each time all the teams will present the answer/solution to assignment questions of cases. Usually I give the assignment questions one week ahead. The best team will be awarded 5 points for all the team members; while the worse team will get between 4 and 1, depending on the performance. I may drop the lowest marks for each team.

Class quizzes (20 marks)

Almost every class I will give a quiz. Each quiz takes about 15 -20 minutes. Each student will submit an individual answer. After that students can discuss within the group, and submit a group solution. Individual answer and group solution will count 50% each for the quiz marks. I may drop the lowest marks.

Peer assessment (10 marks)

At the very last class each team member will assess all the team members by giving a score from 0 to 10. I will take the average as your peer assessment marks.

Team Project (30 marks)

A team project will be on an empirical data set using R, SAS, Stata or other software at students convenience. Details will be available later.

Numerical-Alpha Grade Conversion

90-100	A+	77-79.9	B+	67-69.9	C+	Below 60	F
85-89.9	A	73-76.9	B	63-66.9	C		
80-84.9	A-	70-72.9	B-	60-62.9	C-		

Tentative Course Content

Review of Probability and Basic Statistical Concepts (1.5 Weeks)

Descriptive Analytics (3 Weeks)

- Chapter 5: Probability Distributions and Data Modeling
- Chapter 6: Sampling and Estimation
- Chapter 7: Statistical Inference

Predictive Analytics (4 Weeks)

- Chapter 8: Predictive Modeling and Analysis
- Chapter 9: Regression Analysis
- Chapter 10: Forecasting Techniques
- Chapter 11: Simulation and Risk Analysis

Prescriptive Analytics and Decision Analysis (3 Weeks)

- Chapter 13: Linear Optimization
- Chapter 14: Applications of Linear Optimization
- Chapter 15: Integer Optimization
- Chapter 17: Optimization Models with Uncertainty
- Chapter 18: Decision Analysis

Academic Honesty

The University is strongly committed to upholding the University policy on academic dishonesty. You are responsible for knowing and abiding by this policy. Details of the policy can be found at

<http://www.smu.ca/registrar/documents/SaintMarys0708nopictures.pdf> (Page 22).