Course Outline

MSCI 719 - Operations Analytics
Winter 2021
Course Meets: Mondays 9:00-11:00 am
Tutorials: Wednesdays 12:00-1:30 pm

Instructor:	Hossein Abouee Mehrizi (haboueem@uwaterloo.ca)
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Course Scope and Mission

Analytics is not a new invention, but rather a coming together of several technologies and fields of science including data warehousing and management, data mining, statistical modeling, forecasting, optimization, and most importantly management decision making under uncertainty.

In this course we first discuss predictive analytics that provides techniques to model the relationships between inputs and outcomes, and construct predictions about future outcomes. Then, we cover the prescriptive analytics that provides tools to optimize actions against a complex set of objectives to find best practices and design best policies under all circumstances. We also look at practical problems, solution techniques, and algorithms. Specifically, we look at examples in supply chains, service industries, healthcare systems, revenue management, inventory management, and sports. Finally, we apply our knowledge to investigate several case studies concerning real world problems and learn from a couple of guest speakers who discusses interesting challenges and opportunities that data analytics has presented.

Readings

- Course Package, including all cases.
- Further course material (made available before/after the relevant sessions)
  - Slides
  - Link to supplementary materials and reading. If you come across interesting articles or blog posts with regards to scheduling, please bring them to my attention to share it with the class

Evaluation and Grades

Each student shall be judged on the basis of how well he or she commands the course materials. The grade is based on assignments and the final exam.

Grade Component	Percentage	Individual/Group	Due Dates
Assignment 1	6%	Individual	January 25
Assignment 2	6%	Individual	February 1
Assignment 3	6%	Individual	February 8
Assignment 4	6%	Individual	February 22
Assignment 5	6%	Individual	March 1
Assignment 6	6%	Individual	March 8
Assignment 7	6%	Individual	March 22
Assignment 8	6%	Individual	March 29
Exam	52%	Individual	April 17
Total	100%		

Please Note:

- Case analyses are collected at the beginning of the session on the due date.
- Students should submit all the assignments to pass the course.

Weekly Schedule: Overview

Jan. 11	Lecture 1	Analytics Source of Business Innovation Case 1: Night-Lights and Nearsightedness
Jan. 18	Lecture 2	Case 2: Supply Chain Analytics to Manage Blood Bank
Jan. 25	Lecture 3	Case 3: Happy Cow Ice Cream: Data-driven Sales Forecasting
Feb. 1	Lecture 4	Case 2: Supply Chain Analytics to Manage Blood Bank (continue …)
Feb. 8	Lecture 5	Case 4: Vanderbilt University Medical Center
Feb 15		Reading week
Feb. 22	Lecture 6	Case 5: Customer Analytics at Bigbasket
March 1	Lecture 7	Case 6: End-to-End analytics at Rue La La
March 8	Lecture 8	Case 6: End-to-End analytics at Rue La La (continue …)
March 15		Reading week
March 22	Lecture 9	Case 7: Blood Supply Chain
March 29	Lecture 10	Case 8: Ontario MRI Services
April 5	Lecture 11	Review of Cases 1-8
April 12		Discussion