COURSE INFORMATION

Course title:	Managerial Decision Modeling and Analytics		
Course code:	BAMS 523	Credits:	1.5
Session, term, period:	2019W1, Period 6	Class location:	Henry Angus 435
Section(s):	001	Class times:	M/W 2pm – 4 pm
Course duration:	Sept 3 – Oct 12, 2019	Pre-requisites:	n/a
Division:	Operations and Logistics	Co-requisites:	n/a
Program:	MBA		

Course website: https://canvas.ubc.ca

Makeup class: There is no class on Monday, Sept 2. Instead, there will be a make-up class on Friday, Sept 6, 2pm-4pm, HA 435

INSTRUCTOR INFORMATION

Instructor:	Steven Shechter		
Phone:	604-822-8340	Office location:	Henry Angus 477
Email:	steven.shechter@sauder.ubc.ca	Office hours:	By appointment

Teaching assistant:	Hossein Piri and Forough Pourhossein
Office hours:	TBD
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COURSE DESCRIPTION

The success of many organizations, across a variety of industries, hinges on the ability to combine available data with advanced analytical techniques to improve decision-making. The term "analytics" is rather broad in its scope and spans three main categories: descriptive, predictive, and prescriptive analytics. This course primarily focuses on the last item: prescriptive analytics, which involves learning how to formulate and solve challenging decision problems, using specialized software.

COURSE FORMAT

The course will consist of lectures and in-class exercises completed using students' own laptops.

LEARNING OBJECTIVES

- To introduce students to the concepts of decision modeling
- To understand when and how to incorporate uncertainty into decision making
- To learn how to formulate and solve a variety of problems using Excel-based optimization software
- To learn how to formulate and solve a variety of problems using Excel-based Monte Carlo simulation software
- To develop skills in reporting the results of decision models to managerial audiences

By the end of the course, students will be able to:

- Learn good decision modeling and spreadsheet modeling practices
- Recognize different problems types and be able to formulate an appropriate decision model
- Implement models in Excel and use its various functionalities to perform analyses
- Gain insight into solutions obtained from decision models
- Understand how changes in different inputs might affect models' outputs ("sensitivity analysis")
- Learn several examples of companies and organizations successfully applying these techniques

ASSESSMENTS

Summary

Component	Weight
Three Assignments (20% each)	60%
Final exam	30%
Class participation/Professionalism	10%
Total	100%

Details of Assessments

Assignments:

There will be 3 homework sets assigned during this course. Homework will be performed by teams consisting of three students each (it's possible there will be one or two teams of 4 each, depending on class size). You will be *randomly assigned to groups* for each homework set. You should not work with other students (besides your team partner) or obtain outside help on each assignment.

I realize that random matchings of students for assignments may create some discomfort for some people. However, I truly believe there is important real-world value with this approach. Most of us do not end up with professional colleagues of our choosing, and so this is meant to simulate the need to successfully complete various jobs with random co-workers.

When writing up your assignments, be sure to provide managerial insights, not just numerical solutions. You may use tables or other visualizations if you think that would improve the presentation and discussion of your results.

Final Exam:

There will be a three-hour exam in the examination week. This will be a computer-based exam, run on your own laptops. More information will be provided after the course begins.

Participation/Professionalism:

This is based on both constructive class participation, as well as common courtesy (e.g., being on time to class, not using cell phone, etc.; see RHL Polices below). Students should bring their laptops to each class

for in-class activities. Note, however, that the default policy for class will still be "lids down," and laptops should only be opened up when we are working on in-class activities.

LEARNING MATERIALS

Requirements:

- The lectures will be self-contained and no textbook is required for this course. Copies of the slides used in class will be available on the course website. You should supplement them with your own notes taken during the lectures.

Suggested Reading Materials:

There are several good textbooks on decision modeling. Two of these will be placed on course reserve for your reference (available for 24-hour checkout at the David Lam Library):

- *Managerial Decision Modeling with Spreadsheets*, second Canadian edition, by Render, Stair, Balakrishnan, Smith
- *Management Science: The Art of Modeling with Spreadsheets*, by Powell and Baker.

If you plan to purchase one, I think the Render et al. book is particularly illustrative of real-world applications of various analytical models and obviously has greater breadth and depth of coverage than we can cover in 5 weeks. That being said, I think you can do well in the course without purchasing a book, and you will be introduced to numerous applications throughout.

Technology Requirements:

- Please bring a laptop that you can run Windows on to each class. If you own an Apple laptop, you are responsible for configuring Windows on your Mac. A free copy of Microsoft Windows 10 Education is available for all eligible active UBC Students here: https://it.ubc.ca/services/desktop-print-services/software-licensing/windows-10-education
- Excel Solver, the optimization tool embedded in Excel spreadsheets. For students using a Mac computer, Excel Solver will run better when accessing Excel through the Windows environment. The Mac version has been buggy in the past (and might still be).
- @Risk software installed to be installed on your laptops. We will use the academic version of @Risk for Monte Carlo simulation. There is a required course fee of approximately $40 USD, which is the bulk discounted price they offer UBC. Details on how to pay the Sauder fee online will be made available during class.

COURSE-SPECIFIC POLICIES AND RESOURCES

Prerequisites

This is a quantitative course. Students should have a basic familiarity with statistics and probability. One does not need to be an Excel expert, but should be familiar with basics such as entering formulas, using Excel built-in functions (such as average, standard deviation, max, min, sumproduct), basic plotting, and the use of relative and absolute cell references (e.g., A1 vs. A1). I will assume you have already done a basic review of these concepts before the class begins.

Missed or late assignments, and regrading of assessments

Late submissions will not be accepted and will receive a grade of zero.

Academic Concessions

If extenuating circumstances arise, please contact the RHL Graduate School program office as early as reasonably possible, and submit an Academic Concession Request & Declaration Form https://webforms.sauder.ubc.ca/academic-concession-rhlee. If an academic concession is granted during the course, the student will be provided options by RHL, or by the instructor in consultation with RHL, per UBC's policy on Academic Concession.

POLICIES APPLICABLE TO COURSES IN THE ROBERT H. LEE GRADUATE SCHOOL

Attendance

Excepting extenuating circumstances, students are expected to attend 100% of their scheduled class hours. Absent students limit their own academic potential, and that of their classmates, and cause unnecessary disruption to the learning environment. Students missing more than 20% of the total scheduled class hours for a course (including classes held during the add/drop period) without having received an academic concession will be withdrawn from that course. Withdrawals, depending on timing, could result in a "W" or an "F" standing on the transcript.

Punctuality

Students are expected to arrive for classes and activities on time and fully prepared to engage. Late arrivals may be refused entry at the discretion of the instructor or activity lead. Students arriving later than halfway through a scheduled class will be treated as absent for that class.

Electronic Devices

Devices such as laptops, tablets, and cell phones are not permitted to be used in class unless directed by the instructor for in-class activities. Students who do not follow the School's policy in this regard may be required to leave the room for the remainder of the class, so that they do not distract others. Research shows that students' use of laptops in class has negative implications for the learning environment, including reducing their own grades and the grades of those sitting around them.

Citation Style

Please use the American Psychological Association (APA) reference style to cite your sources.

Details of the above policies and other RHL Policies are available at:
http://www.calendar.ubc.ca/vancouver/index.cfm?tree=12,199,506,1625

UNIVERSITY POLICIES AND RESOURCES

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available on the UBC Senate website at https://senate.ubc.ca/policies-resources-support-student-success.

Academic Integrity

The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply if the matter is referred to the President's Advisory Committee on Student Discipline. Careful records are kept in order to monitor and prevent recurrences.

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All materials of this course (course handouts, lecture slides, assessments, course readings, etc.) are the intellectual property of the instructor or licensed to be used in this course by the copyright owner. Redistribution of these materials by any means without permission of the copyright holder(s) constitutes a breach of copyright and may lead to academic discipline. Audio or video recording of classes are not permitted without the prior approval of the Instructor.]

ACKNOWLEDGEMENT

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the xwməθkwəy̓əm (Musqueam) people, who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.

COURSE SCHEDULE

Class#	CLASS TOPICS	ASSIGNMENTS / DELIVERABLES
Week 1 (Sept 4,6)	• Introduction to decision modeling • Linear programing (LP)	HW 1 assigned on Sept 6 (Due: Sept 15)
Week 2 (Sept 9, 11)	• LP Sensitivity Analysis • Network Models	
Week 3 (Sept 16, 18)	• Integer programming • Monte Carlo simulation	HW 2 assigned on Sept 16 (Due: Sept 25)
Week 4 (Sept 23, 25)	• Monte Carlo simulation	HW 3 assigned on Sept 26 (Due: Oct 4)
Week 5 (Sept 30, Oct 2)	• Simulation optimization • Introduction to Discrete-event simulation	
Week 6 (Oct 7-12)	• Exam week	To be scheduled by the RHL Office