TOMS 5301
Modeling Business Decisions
WINTER 2019

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A. COURSE OVERVIEW

This course deals with some of the important quantitative methods for strategic, tactical, and operational business decision making. The course will help you develop problem solving and decision making skills. The decision modeling techniques studied here have been applied successfully in the problems of business, government, health care, education and many other areas. The emphasis will be (1) on the understanding of the basic underlying ideas of the techniques, (2) on the applications of those ideas to management/business problems from various functions (3) on model formulation and (3) on solving and analyzing the models using Excel. The unified approach of this course (minimal theory and more emphasis on applications) is intended to help you to understand the way in which quantitative methods can be applied to practical problems so that you will be able to:

- Identify situations where Management Science techniques can be applied;
- Solve basic problems yourselves as managers;
- Communicate with specialists during the identification and solution stages of business problems.

The course introduces some of the important management science approaches in modeling systems for problem solving and decision-making. The emphasis will be on optimization models, decision analysis and multi-criteria analysis.

Calendar Description: Quantitative methods for strategic, tactical, and operational business decision making. Optimization, simulation, project management, decision analysis, and multi-

criteria analysis. Underlying ideas, model formulation, computer implementation, and analysis of model results, with applications from various business functions.

B. LEARNING OBJECTIVES and LEARNING OUTCOMES

Upon completion of this course, students should:

(a) have an understanding of the strategic role of modeling in managerial decision making and problem solving and develop an appreciation of the entire modeling process from problem identification and formulation to solution development, implementation, and evaluation.

(b) recognize which cases are amenable to different types of analysis, what is required to find a good solution or even a best solution.

(c) develop an understanding on how to extract insights from management science models and how to use them to communicate, persuade, and motivate change.

(d) learn how to become an End-User modeller capable of structuring problems to effectively communicate with specialists/consultants or apply by themselves as decision makers the management science thinking tools this course focuses upon to solve management/business problems;

(e) learn about the resources available to managers in the use of modeling approaches and how to leverage this knowledge to solve real-life business problems.

C. COURSE ORGANIZATION

The format of the course consists of a mixture of lectures, exposing the relevant material, case discussions on specific applications of management science approaches, and in-class problem solving. Students are required to read the assigned reading materials prior to the respective class. Learning will be enhanced through a set of review problems that will be assigned to practice some of the management science approaches discussed in class. The answers to these problems are not to be handed in, but should assist you in preparing for exams as well as in-class problem solving and discussion.

D. COURSE PREREQUISITE

No prerequisites.

E. COURSE MATERIAL

REFERENCE BOOKS

You have three alternatives:

Alternative 1

1. Frederick S. Hillier and Mark S. Hillier: Introduction to Management Science: A Modelling and Case Studies Approach with Spreadsheets, fifth edition, McGraw Hill Ryerson.
   Note: Only Chapters 2, 5, 7, 9, and 12 or its parts from the reference book (Hillier and Hillier) are required. These chapters are available for purchase and download at https://create.mheducation.com/shop/#/catalog/details/?isbn=9781307143126 in the form of a course pack. They are provided to supplement some of the technical concepts that will be briefly discussed in class.

Alternative 2

2. Quantitative Analysis for Management,
   By Barry Render, and Ralph M. Stair Jr. *et al.* (10^{th}, 11^{th}, 12^{th}, or 13^{th} Edition), Pearson

Alternative 3

3. Introduction to Management Science
   By Bernard W. Taylor III (10th, 11th, or 12th Edition), Pearson

Above two reference books (Alternatives 2 and 3) are available to purchase (used or new) from web sites (such as Amazon). Although latest edition is always preferred but, if interested, you may purchase previous editions of any of the above two books.

Also, you may be able to borrow a Management Science book from the Library.

Cases to Purchase

E-Book (Alternative 1) includes the Cases. For Alternatives 2 and 3, how to access Cases is discussed below:

CASE STUDIES

We will use the following 5 case studies in the course:

1. Merck &Company: Evaluating a Drug Licensing Opportunity. Case No. 9-201-023, Harvard Business School (6 pages).
2. Appshop Inc. Bodily, Samuel, E. and Tyler, Hohn. Case No. UV0367, 2003. Darden Business publishing (2 pages).
3. Merton Truck Company. Dhebar, A. Case No. 9-189-163, Harvard Business School (4 pages).
4. Red Brand Canners
5. The Pert Studebaker

Cases 1, 2, and 3 are included in the e-Book (Hillier and Hillier). If Alternative 2 or 3 is selected for the reference Book, then Cases 1, 2, and 3 need to be purchased. They can be purchased from Harvard Business Review site.
Cases 4 and 5 will be provided in class.

SOFTWARE

1. Excel solver – Add-in for Excel to implement some techniques presented in the course.

2. Microsoft Project - can be downloaded from:
   https://imagine.carleton.ca

Two other softwares - TreePlan and RiskAMP will be discussed in class.

OTHER SOURCES

Source One:
There is a full list of success stories of using OR/MS on INFORMS website:
https://www.informs.org/About-INFORMS
http://www.scienceofbetter.org/can_do/success_alpha.php
https://www.informs.org/Practitioners
You can link to the full text of articles

Source Two:
From OR/MS Today Journal:
http://www.lionhrtpub.com/orms/ORMS-search.shtml

F. COURSE EVALUATION

Course Design
The course will consist of seminars, class discussions, case assignments for class presentation and write up, and a final exam. The grading scheme is as follows:

Class Participation		15%
Case Write-up/Managerial Report	(Group)	20%
Case Presentation (Group)		15%
Final Exam.		50%
Total		100%

Class Participation – Contribution to Class Discussions (15%)
The general guidelines are: Read all the required readings/cases and participate in class discussions as actively and constructively as possible. I will grade each student's participation in class discussions. The continuum of the instructors' evaluation ranges from 0 to 3. That is, the minimum possible mark for participation in each class discussions is 0, the maximum is 3. Therefore, the total highest mark for participation in class discussions throughout the course is 15, the lowest is 0 (first session will not be counted).

Iinstructor will evaluate your participation in class discussion by applying the following criteria:

1. Did the student participate in today's class discussion?

2. Was there evidence that the student's participation in the discussion was based on his or her knowledge of the required readings? Did the student really read ALL readings assigned for a given class or was the student's discussion based only on his or her past experience and/or common sense? (For classes in which readings/cases are required)

3. Was the student's discussion appropriate and to the point?

4. Did the student contribute to class learning? (e.g., by asking thoughtful questions, helping to understand complicated ideas or concepts, offering constructive criticism of another's ideas, suggesting reasonable alternatives, being willing to try out new ideas, pursuing the logic advanced by others, etc.)?

Class discussions provide an opportunity to manifest your creative abilities.

Managerial Report (20%)
There will be 5 cases discussed in this course. Your group will be required to hand in write-up for one of these cases. This case will be other than the one your group is allocated for presentation in the class. Case write-up is worth 20% of final grade. To assist you in completing this assignment a set of questions for each case that I expect to see answered in your write up will be provided in the preceding class. A managerial report of quality suitable for consulting practice is required. It must include (a) cover letter, (b) an executive summary consisting of the more important results, conclusions, and recommendations; (c) the main body consisting of the detailed analysis, answers to the assigned questions, assumptions and analyses that led to these answers. The managerial reports are to be handed in at the start of the class in which this case is to be presented. These questions will also form the basis of our discussion in class. When handing in the managerial report DO NOT just repeat case facts. Rather, you need to analyze the material given in the case when answering the case questions. Managerial write-ups should be precise and to the point not exceeding typed 6 pages double spaced.
Please note that the managerial reports will not be returned after being marked. However, they will be available for consultation at the instructor's office. Be sure to keep a copy for yourself.

Note: The Sprott School of Business encourages group assignments in the School for several reasons. They provide you with opportunities to develop and enhance interpersonal, communication, leadership, follower-ship and other group skills. Group assignments are also good for learning integrative skills for putting together a complex task. In this context, you may find the resources at **http://sprott.carleton.ca/academic_programs/groupwork** useful.

Case Presentation (15%)
You need to submit only the presentation slides (electronically)

Final Exam (50%)
Details to be announced in class.

F. CONDUCT

Professional conduct is built upon the idea of mutual respect. Such conduct entails (but is not necessarily limited to):

- *Attending the class*.
  Each class benefits from the attendance and participation of all participants. Class attendance is mandatory. The participation grade will be affected by absences. If any circumstances prevent attendance to the class, the participant is responsible for all materials discussed, handouts distributed, assignments covered, and announcements made.

- *Arriving on time.*
  Late arrivals are disruptive and show disrespect to those who are on time. Late arrivals are not allowed.

- *Minimizing disruptions.*
  You should not leave and re-enter the class. All cell phones and electronic communication devices must be be turned off during class. You should avoid engaging in side conversations after class has begun.

- *Focusing on the class.*
  While you may take notes on laptops, do not use laptop computers or hand-held devices for other tasks while in class. Activities such as net surfing, and answering email are very impolite and disruptive both to neighbors and the class.

- *Being prepared for class.*
  Participants must be ready to discuss any assigned readings and to answer any assigned questions.

- *Respect.*
  Participants should act respectfully toward all class participants.

Class participation grading reflects student adherence to these principles; participants gain participation credit when they contribute with valuable insights and lose credit if they fail to adhere to any of the above guidelines.

G. PLAGIARISM

The University's Senate defines plagiarism in the regulations on instructional offences as: "to use and pass off as one's own idea or product work of another without expressly giving credit to another."
Violations of academic integrity are a serious academic offence. Violations of academic integrity – presenting another's ideas, arguments, words or images as your own, using unauthorized material, misrepresentation, fabricating or misrepresenting research data, unauthorized co-operation or collaboration or completing work for another student – weaken the quality of the degree and will not be tolerated. Penalties may include expulsion; suspension from all studies at Carleton; suspension from full-time studies; a refusal of permission to continue or to register in a specific degree program; academic probation; and a grade of Failure in the course, amongst

others. Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy which is available, along with resources for compliance at: http://carleton.ca/studentaffairs/academic-integrity/.

H. CHANGES TO THE SYLLABUS

Every effort has been made to make the course outline as complete as possible, but there may be occasions when changes are required. The instructor will announce any deviations from the course outline in class and the change will be posted on the course web page.

I. *MBA Academic year*

Important Dates and Deadlines can be found at: http://sprott.carleton.ca/students/mba/dates-deadlines

Tentative Schedule

Session	Topics	Readings
January 7	Introduction to Business Modeling with Management Science approaches- using Linear Programming Models Basics, Formulations.	○ Class notes on Problem formulation
January 14	Solving LP using EXCEL Linear Programming (LP)Applications LP: Sensitivity Analysis and Interpretation of Solution Integer Linear Program (ILP)	○ Handout on solving LP with Excel solver ○ Handout on LP Applications ○ Class Notes on Special Cases Sensitivity and computer output
January 21 January 28 February 4 February 11	Decision Analysis Multi Criteria Decision Making Scheduling Projects Microsoft Project Introduction to Simulation	○ **Case**- Merton Truck Company **(G1)** ○ **Case** – Red Brand Canners **(G2)** ○ **Case** – Merck & Company **(G3)** ○ **Case** – The Pert Studebaker **(G4)** ○ **Case** – Appshop Inc. **(G5)** ○ Class Notes on Decision Analysis, Project Management, and Simulation

IMPORTANT ADDITIONAL INFORMATION

Required Calculator in BUSI Course Examinations
Starting fall 2006, only Texas Instruments BA II Plus calculators will be permitted in all 1000-level Business course examinations.

Starting fall 2007, only Texas Instruments BA II Plus calculators will be permitted in *all* Business course examinations.

This calculator is available in the campus bookstore and at various other off-campus retail stores.

Drop Course Policy
The deadline for academic withdrawal is the last day of classes (each term).

Course Sharing Websites
Student or professor materials created for this course (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the author(s). They are intended for personal use and may not be reproduced or redistributed without prior written consent of the author(s).

Policy on Mobile Devices
The use of mobile devices IS NOT PERMITTED in this class. It is disruptive to the instructor and class members. If you carry such a device to class, please make sure it is turned off. If an emergency situation requires you to keep it turned on, please discuss this with your instructor prior to class.

Group Work
The Sprott School of Business encourages group assignments in the school for several reasons. They provide you with opportunities to develop and enhance interpersonal, communication, leadership, followership and other group skills. Group assignments are also good for learning integrative skills for putting together a complex task. Your instructor may assign one or more group tasks/assignments/projects in this course.
Before embarking on a specific problem as a group, it is your responsibility to ensure that the problem is meant to be a group assignment and not an individual one.

Deferred Final Examination:
Students unable to write a final examination because of illness or other circumstances beyond their control must contact the instructor in writing to request a deferred exam. Permission may be granted when the absence is supported by a medical certificate and or appropriate document/s to support the reason for the deferral. Deferred exams are not granted for students who have made travel arrangements that conflict with examination schedule.

The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and

impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at 613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). Requests made within two weeks will be reviewed on a case-by-case basis. After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website (www.carleton.ca/pmc) for the deadline to request accommodations for the formally-scheduled exam (if applicable).

Requests for Academic Accommodation
You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: **carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf**

Religious obligation
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: **carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf**

Academic Accommodations for Students with Disabilities
If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made.
carleton.ca/pmc

Survivors of Sexual Violence
As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: **carleton.ca/sexual-violence-support**

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the

national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. **https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf**

For more information on academic accommodation, please contact the departmental administrator or visit: **students.carleton.ca/course-outline**

Academic Integrity

Violations of academic integrity are a serious academic offence. Violations of academic integrity – presenting another's ideas, arguments, words or images as your own, using unauthorized material, misrepresentation, fabricating or misrepresenting research data, unauthorized co-operation or collaboration or completing work for another student – weaken the quality of the degree and will not be tolerated. Penalties may include; a grade of Failure on the submitted work and/or course; academic probation; a refusal of permission to continue or to register in a specific degree program; suspension from full-time studies; suspension from all studies at Carleton; expulsion from Carleton, amongst others. Students are expected to familiarize themselves with and follow the Carleton University Student Academic Integrity Policy which is available, along with resources for compliance at: https://carleton.ca/registrar/academic-integrity/.

Important dates and deadlines

https://sprott.carleton.ca/students/mba/dates-deadlines-policies/