



TOMS 5301
Modeling Business Decisions
FALL 2015

Professor: Saroj Koul
Email: Saroj.Koul@carleton.ca
Office: 1717 DT
Phone: (613)-520-2600 ext. 1502
Office Hours: Friday, 1:00 pm - 4:00 pm or by appointment

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
- (4) 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.

[Precludes additional credit for BUSI 5600 (no longer offered)]

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, in-class problem solving, and case discussions on specific applications of management science approaches. 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

BUSI 5801; The School of Business enforces prerequisites.

E. COURSE MATERIAL

REFERENCE TEXTBOOKS

Frederick S. Hillier and Mark S. Hillier: *Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets*, 5/e, McGraw Hill Ryerson, 2014.

William J. Stevenson, Ceyhun Ozgur, and Aaron. L. Nsakanda: *An Introduction to Management Science with Spreadsheets*, 1/e, McGraw Hill Ryerson, 2009.

Note: Only specific chapters or its parts from the reference books are required. These chapters are available for purchase and can be downloaded in the form of a course pack. The link is

<https://create.mheducation.com/shop/#/catalog/details/?isbn=9781308683096>

They are provided to supplement some of the technical concepts that will be briefly discussed in class. One copy each of the main text book is on reserve in the Library.

CLASS NOTES

Any supplementary lecture notes and readings will be available on CuLearn.

CASE STUDIES

We will use four (4) case studies in the course. The cases are as follows:

1. *Cutting Cafeteria Costs*: from Chapter 2 Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets, Fifth Edition by Hillier & Hillier, 2014.
2. *Assigning Students to Schools*: from Chapter 3 Introduction to Management Science: A Modeling and Case Studies Approach with Spreadsheets, Fifth Edition by Hillier, Hillier, 2014.
3. *Merton Truck Company*. Dhebar, A. Case No. 9-189-163, Harvard Business School.
4. *Appshop Inc.* Bodily, Samuel, E. and Tyler, Hohn. Case No. UV0367, 2003. Darden Business publishing.

SOFTWARE

Excel solver will be used to implement some techniques presented in the course.

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>

Source Two:

From OR/MS Today Journal:

<http://www.lionhrtpub.com/orms/ORMS-search.shtml>

F. COURSE EVALUATION

Course Design

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

Class Participation	12%
Two Individual surprise Quizzes	24%
Two Individual Case Write-ups/Managerial Reports	24%
Final Exam – Take home (Group work)	40%
Total	100%

Class Participation – Contribution to Class Discussions (12%)

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 4. That is, the minimum possible mark for participation in each class discussions is 0, the maximum is 4. Therefore, the total highest mark for participation in class discussions throughout the course is 12, the lowest is 0 (first session will not be counted).

Instructor 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? 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.

Individual Quiz (24%)

There will be two (2) examinations in the form of surprise quiz-exercises to be attempted individually in this course after the first two sessions are over. Each surprise quiz is worth 12% of final grade. The surprise quiz-exercise [45 minutes] is essentially numeric-based problem solving from the course material covered prior to last class.

To assist you the preparation, the lecture material and the practice problems will be helpful to complete this assignment. All questions of the surprise quiz-exercise are compulsory.

Managerial Reports (24%)

There will be four (4) cases discussed in this course. Individually, each one of you will be required to hand in write-ups for two (2) of these cases. Each case write-up is worth 12% 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 three (3) pages double spaced.

Please note that the managerial reports will not be returned back after being marked. However, they will be available for consultation at the instructor's office. Be sure to keep a copy for yourself.

Final Exam (40%)

The Final Exam shall be a Take Home Exam. Group work and details to be announced in class [Session 4]. Groups with three members each will be randomized and decided by the faculty.

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.

G. 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 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."

Borrowing someone else's answers, unauthorized possession of tests or answers to tests, or possession of material designed to help answering exam questions, are also subject to university policy regarding instructional offences. For more information on Carleton University's Academic Integrity Policy, consult: http://www.carleton.ca/studentaffairs/academic_integrity

The photocopying of substantial portions of a textbook (e.g. more than 1 chapter or 15% of the total page count) without the publisher's permission is another misuse of intellectual property, and is also a violation of Canadian copyright law. Access Canada's website provides guidelines on legitimate copying.

You may also find useful information at: <http://library.wlu.ca/access/guidelines.htm>

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.co/students/mba/dates-deadlines/>

J. IMPORTANT ADDITIONAL INFORMATION

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

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.

Person with Disabilities: Students with disabilities requiring academic accommodations in this course are encouraged to contact a coordinator at the Paul Menton Centre for Students with Disabilities to complete the necessary letters of accommodation. After registering with the PMC, make an appointment to meet and discuss your needs with me at least two weeks prior to the exam. This is necessary in order to ensure sufficient time to make the necessary arrangements. Please refer to <http://www.carleton.ca/pmc/> for all PMC information.

Religious Observance: Students requesting academic accommodation on the basis of religious observance should make a formal, written request to their instructors for alternate dates and/or means of satisfying academic requirements. Such requests should be made during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist, but no later than two weeks before the compulsory academic event. Accommodation is to be worked out directly and on an individual basis between the student and the instructor(s) involved. Instructors will make accommodations in a way that avoids academic disadvantage to the student.

Students or instructors who have questions or want to confirm accommodation eligibility of a religious event or practice may refer to the Equity Services website for a list of holy days and Carleton's Academic Accommodation policies, or may contact an Equity Services Advisor in the Equity Services Department for assistance.

Pregnancy: Pregnant students requiring academic accommodations are encouraged to contact an Equity Advisor in Equity Services to complete a *letter of accommodation*. The student must then make an appointment to discuss her needs with the instructor at least two weeks prior to the first academic event in which it is anticipated the accommodation will be required.

K. 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).

L. 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 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://www2.carleton.ca/sasc/advisingcentre/academic-integrity/>.

Tentative Schedule

<i>Session</i>	<i>Topics</i>	<i>Readings</i>
Session 1 (2-Nov) – Sec-A (3-Nov) – Sec-D	Self-study (no class attendance) 1. Why study modeling; benefits of business models and nature of Management Science. 2. Role of spread-sheet; some background knowledge for spreadsheet modeling, lessons from expert and novice modelers.	<ul style="list-style-type: none">○ Handout available
Session 2 (9-Nov) – Sec-A (10-Nov) – Sec-D	In-class attendance 3. Introduction to Business Modeling with Management Science approaches - using Linear Programming (LP). 4. Study of Basic Concepts, Formulating LP problems; Graphical Method; Extreme Points	<ul style="list-style-type: none">○ Chapter 2 Hillier (Sections 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8)○ Handout available○ Practice Problems○ Case study Cutting Cafeteria Costs
Session 3 (16-Nov) – Sec-A (17-Nov) – Sec-D	In-class attendance 5. Solving LP using EXCEL Linear Programming (LP) Applications 6. LP: Sensitivity Analysis and Interpretation of Solution 7. Group work discussion	<ul style="list-style-type: none">○ Chapter 3 Hillier (Sections 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8)○ Case study Assigning Students to Schools○ Chapter 3 Aeron (sections 3.1, 3.2, 3.3, 3.5) Sensitivity and computer output○ Practice Problems, Special Cases○ Handout available○ Case study Merton Truck Company

Session 4 * (20-Nov) – Sec-A (20-Nov) – Sec-D	In-class attendance 8. Integer Linear Programming (ILP)	<ul style="list-style-type: none"> ○ Chapter 6 Aeron (sections 6.1-6.6, 6.8) ○ Handout available ○ Practice Problems
Sessions 5 (23-Nov) – Sec-A (24-Nov) – Sec-D	In-class attendance 9. Decision Analysis	<ul style="list-style-type: none"> ○ Chapter 10 Aeron (sections 10.5 - 10.7) ○ Handout available ○ Practice Problems ○ <i>Case study</i> Appshop Inc - Monte Carlo simulation modeling
Session-6 (30-Nov) – Sec-A (1-Dec) – Sec-D	In-class attendance 10. Multi Criteria Decision Making	<ul style="list-style-type: none"> ○ Chapter 9 Aeron (sections 9.1, 9.3, 9.4) ○ Handout available ○ Practice Problems
Session-7 (7-Dec) – Sec-A (8-Dec) – Sec-D	In-class attendance 11. Introduction to Simulation	<ul style="list-style-type: none"> ○ Chapter 13 Aeron (sections 13.1-13.4) ○ Handout available ○ Practice Problems
*	NOTE: The Classroom booked for Session 4 on November 20th: <ul style="list-style-type: none"> ○ TOMS5301A (11:30 am – 2:30 pm) in SA501 ○ TOMS5301D (6:00 pm – 9:00 pm) is CB2104 	