

**Commerce 4QC3  
Modeling and Analytics using Excel  
Winter 2020 Course Outline**

**Operations Management Area  
DeGroot School of Business  
McMaster University**

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***COURSE OBJECTIVE***

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To gain familiarity with the fundamental concepts, assumptions, and limitations behind the most common prescriptive analytics techniques, and see how each works. Spreadsheets have become one of the most widely used analytical tools in the hands of managers, and hence this course will provide an application-oriented introduction to building computer models for solving business problems. To that end, a variety of real-world managerial problems would be logically modeled, solved and analyzed using *Analytic Solver Platform*, an Excel add-in.

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***INSTRUCTOR AND CONTACT INFORMATION***

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**Tuesdays 14:30 to 17:20**

**DSB AB102**

**Dr. Manish Verma**

**Instructor**

[mverma@mcmaster.ca](mailto:mverma@mcmaster.ca)

Office: DSB415

Office Hours: By appointment

Tel: (905) 525-9140 x27438

**Teaching Assistant**

**Ms. Alyaa Abdelhalim**

[abdela21@mcmaster.ca](mailto:abdela21@mcmaster.ca)

**Course website:** <https://ug.degroot.mcmaster.ca/descriptions/4qc3/>

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***COURSE ELEMENTS***

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Credit Value: 3	Leadership: No	IT skills: Yes	Global view: Yes
A2L: Yes	Ethics: Yes	Numeracy: Yes	Written skills: Yes
Participation: No	Innovation: Yes	Group work: Yes	Oral skills: Yes
Evidence-based: No	Experiential: Yes	Final Exam: Yes	Guest speaker(s): No

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## ***COURSE DESCRIPTION***

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*Management Science*, a scientific approach to aid managerial decision-making, is regularly used by major corporations such as Air Canada, IBM, Canadian Pacific, etc., to help solve complex problems. This course will discuss the most popular prescriptive analytics techniques, and then use them to logically model real-world applications from a variety of business areas such as operations, marketing, finance, etc., The logical model will be converted into a computer model, which will then be solved and analyzed via *Analytic Solver Platform* (within a spreadsheet environment).

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## ***LEARNING OUTCOMES***

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Upon successful completion of this course, students will be able to complete the following key tasks:

- Use management science techniques to solve managerial problems.
  - Logically model, solve, and analyze a problem in Analytics Solver Platform (& Excel).
  - Simulate (components of) a decision problem.
  - Apply modeling and analytical techniques to larger problem settings (i.e., real-world applications).
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## ***REQUIRED COURSE MATERIALS AND READINGS***

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Custom textbook developed with Wiley entitled, “*4QC3: Modeling and Analytics using Excel*”. ISBN for custom book is: 9781119683162, and that for custom e-text is: 9781119683179. The textbook will contain your access to Analytic Solver Platform, and the relevant details will be provided in class.

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## ***EVALUATION***

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### **Term Test (35%)**

There will be one in-class closed book and closed notes term test on 25<sup>th</sup> February 2020. Note that appropriate formula sheets and tables will be provided with the printed copy of the test. You would be allowed to bring the university specified calculator. More details will be provided in the class. Refer to the course schedule for the exam dates. Please note that each student has to write the term test. If you are unable to write the exam on the scheduled date, and have advanced knowledge and permission, the instructor will provide you with an opportunity to write an alternate version of the test at an alternate time. *Note that this is not automatic and that a written request for alternate exam has to be made, along with the supporting documents, well ahead of the scheduled date.*

**Case Study (30%)**

The instructor will assign one of the listed case studies (with relevant questions) that would require you to logically model and solve the posed problem. It is important to consider all the three pertinent stages of problem solving, i.e., studying the posed situation; model development; and, solution/ analysis and recommendation.

- You will work on this assignment in a team of 3-4 students. The group must be finalized by the end of the class on 28<sup>th</sup> January, 2020.
- Each group will be expected to prepare a short presentation highlighting the managerial problem, (mathematical and) computer model, assumptions, solutions and recommendations. (30% weight).
- A written report containing the complete details of the case study is due before their in-class presentation. It is important that the report be professionally typewritten using 12 point Times New Roman font, and double spaced. Please proof-read the report before submission. (70% weight equally divided between analysis and presentation & exposition).

**List of Case Studies: Ivey Publishing**

1. *Container Transportation*. Product Number 9B08E005.
2. *Denka Chemicals*. Product Number 9B14E007.
3. *My School Bus*. Product Number 9B13E016.
4. *Production Planning at Viktor Lenac Shipyard*. Product Number 9B04D019.
5. *Professional Media Inc.* Product Number 9B13E004.
6. *Radiation Treatment Machine Capacity Planning at Cancer Care Ontario*. Product Number 9B15E014.
7. *Red Brand Cannery and Its Supply Chain*. Product Number 9B12E007.
8. *Selecting Stocks for a Hedge Fund*. Product Number 9B05E022.
9. *Tallink: Connecting Estonia to Finland, Sweden and Russia*. Product Number 9B05E016.
10. *Trionym Systems: Investment Decision-Making Using Prescriptive Analytics*. Product Number 9B12E009.

**Final Exam (35%)**

Final Exam will be held during the exam week, and more details will be provided in the class. It will not be cumulative, but can include some topics that serve as the building blocks for the post-term test material.

Missed tests/exams will receive a grade of zero unless the student has submitted and been approved for a Notification of Absence or MSAF. Your final grade will be calculated as follows:

**Components and Weights**

Case Study	(group)	30%
Term Test	(individual)	35%
Final Exam	(individual)	35%
Total		100%

NOTE: The use of a McMaster standard calculator is allowed during examinations in this course. See McMaster calculator policy.

## **Communication and Feedback**

Students who wish to correspond with instructors or TAs directly via email must send messages that originate from their official McMaster University email account. This protects the confidentiality and sensitivity of information as well as confirms the identity of the student. Emails regarding course issues should NOT be sent to the Area Administrative Assistants. Instructors are required to provide evaluation feedback for at least 10% of the final grade to students prior to Week #9 in the term. Instructors may solicit feedback via an informal course review with students by Week #4 to allow time for modifications in curriculum delivery.

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## ***ACADEMIC INTEGRITY***

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You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the *Academic Integrity Policy*, located at:

[www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity)

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations

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## ***AUTHENTICITY/PLAGIARISM DETECTION***

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In this course we will be using a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. Students will be expected to submit their work electronically either directly to Turnitin.com or via Avenue to Learn (A2L) plagiarism detection (a service supported by Turnitin.com) so can be checked for academic dishonesty. Students who do not wish to submit their work through A2L and/or Turnitin.com must still submit an electronic and/or hardcopy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com or A2L. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). To see the Turnitin.com Policy, please go to:

[www.mcmaster.ca/academicintegrity](http://www.mcmaster.ca/academicintegrity).

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### ***REQUESTING RELIEF FOR MISSED ACADEMIC WORK***

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Students may request relief from a regularly scheduled midterm, test, assignment or other course components. Please refer to the policy and procedure on the DeGroot website at the link below:

<http://ug.degroote.mcmaster.ca/forms-and-resources/misled-course-work-policy/>

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### ***STUDENT ACCESSIBILITY SERVICES***

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Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail [sas@mcmaster.ca](mailto:sas@mcmaster.ca).

For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities:

<http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodation-StudentsWithDisabilities.pdf>

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### ***ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)***

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Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request, including the dates/times needing to be accommodated and the courses which will be impacted, to their Faculty Office normally within 10 days of the beginning of term or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

<https://multifaith.mcmaster.ca/riso>

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### ***POTENTIAL MODIFICATION TO THE COURSE***

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The instructor reserves the right to modify elements of the course during the term. There may be changes to the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

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***ACKNOWLEDGEMENT OF COURSE POLICIES***

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Your enrolment in Commerce 4QC3 will be considered to be an implicit acknowledgement of the course policies outlined above, or of any other that may be announced during lecture and/or on A2L. **It is your responsibility to read this course outline, to familiarize yourself with the course policies and to act accordingly.**

Lack of awareness of the course policies **cannot be invoked** at any point during this course for failure to meet them. It is your responsibility to ask for clarification on any policies that you do not understand.

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**COURSE SCHEDULE**


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WEEK	DATE	ASSIGNMENT
1	Jan. 07	<ul style="list-style-type: none"> <li>• Introduction to Business Analytics</li> <li>• Analytics using Spreadsheets</li> <li>• Data Exploration and Preparation</li> </ul>
2	Jan. 14	<ul style="list-style-type: none"> <li>• Linear Optimization</li> </ul>
3	Jan. 21	
4	Jan. 28	<ul style="list-style-type: none"> <li>• Optimization of Network Flows</li> </ul> <p><b><u>Due:</u></b> Jan. 28<sup>th</sup>: Group List</p>
5	Feb. 04	<ul style="list-style-type: none"> <li>• Integer Optimization</li> </ul>
6	Feb. 11	<ul style="list-style-type: none"> <li>• Nonlinear Optimization</li> </ul>
	Feb. 18	READING WEEK
7	Feb. 25	<b>TERM TEST</b>
8	Mar. 03	<ul style="list-style-type: none"> <li>• Optimization of Nonsmooth Models</li> </ul>
9	Mar. 10	<ul style="list-style-type: none"> <li>• Monte Carlo Simulation</li> </ul>
10	Mar. 17	<ul style="list-style-type: none"> <li>• Optimization in Simulation</li> </ul>
11	Mar. 24	<ul style="list-style-type: none"> <li>• Classification and Prediction Methods</li> </ul>
12	Mar. 31	
13	Apr. 07	<p>Case Study Presentations</p> <p><b><u>Due:</u></b></p> <ul style="list-style-type: none"> <li>• 6<sup>th</sup> April 2020, 5 pm EST: Presentation slides</li> <li>• 10<sup>th</sup> April 2020, 5 pm EST: Case report.</li> </ul>