Commerce 4DA3
Modelling and Prescriptive Analytics
Fall 2024 Course Outline

Operations Management Area
DeGroote School of Business
McMaster University

COURSE OBJECTIVE

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.

INSTRUCTOR AND CONTACT INFORMATION

Day and Time	Tuesday 2:30 pm to 5:20 pm
Venue	
Teaching Assistant	TBD
	TBD
	Office hour: TBD
Instructor	Zeinab Vosooghi
	vosooghz@mcmaster.ca

COURSE ELEMENTS

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

COURSE DESCRIPTION

Analytics is the use of data, information technology, statistical analysis, quantitative methods, and mathematical or computer-based models to gain improved insights and to make better fact-based decisions. 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).

LEARNING OUTCOMES

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

- ✓ Use prescriptive analytics 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)

REQUIRED COURSE MATERIALS AND READINGS:

- Custom textbook developed with Wiley entitled, "4DA3: Modeling and Analytics using Excel".
- Analytic Solver Platform (www.solver.com). The requisite license will be purchased by the school, and the relevant installation details will be shared in class.

EVALUATION

Midterm (30%)

There will be one midterm test to be completed in-class on October 22, 2024 from 2:30 pm to 5:20 pm. You will write this exam on your computer. Please note that each student has to write the midterm 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.***

Assignments (3: each worth 10%)

You will work on the assignments in a team of 5 students. The due dates are as follows
• *Assignment # 1: 5:00pm on October 15, 2024.*
• *Assignment # 2: 5:00pm on November 12, 2024.*
• *Assignment # 3: 5:00pm on December 5, 2024.*

Final Exam (40%)

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. *If you are unable to write the exam at the designated date, then you will have to write the deferred exam in February 2025.*

Components And Weights[1]

Assignment	(group)	30%
Midterm Exam	(individual)	30%
Final Exam	(individual)	40%
Total		100%

Grade Conversion

At the end of the course your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme.

Letter Grade	Percent	Points
A+	90 – 100	12
A	85 – 89	11
A-	80 – 84	10
B+	77 – 79	9
B	73 – 76	8
B-	70 – 72	7
C+	67 – 69	6
C	63 – 66	5
C-	60 – 62	4
D+	57 – 59	3
D	53 – 56	2
D-	50 – 52	1
F	0 – 49	0

COMMUNICATION AND FEEDBACK

Students who wish to correspond with instructor or TA 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 Administrative Assistant.

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[1] Any requests for a re-read of the assignments or examinations should be made within two weeks of the date of distribution of the marks.

Instructors are encouraged to conduct an informal course review with students by Week #4 to allow time for modifications in curriculum delivery. Instructors should provide evaluation feedback for at least 10% of the final grade to students prior to Week #8 in the term.

ACADEMIC DISHONESTY

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

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

AUTHENTICITY / PLAGIARISM DETECTION

This course will use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software.

All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

ON-LINE ELEMENT

This course will use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, usernames for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course.

The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

ON-LINE PROCTORING

This course may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

REQUESTING RELIEF FOR MISSED ACADEMIC WORK

Students may request relief from a regularly scheduled midterm, test, assignment or other course components. Please refer to the policy and procedure on the DeGroote website at the link below: http://ug.degroote.mcmaster.ca/forms-and-resources/missed-course-work-policy

STUDENT ACCESSIBILITY SERVICES

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. For further information, consult McMaster University's Policy for Academic Accommodation of Students with Disabilities: http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicAccommodationStudentsWithDisabilities.pdf.

RELIGIOUS, INDIGENOUS, OR SPIRITUAL OBSERVATIONS (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation 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.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

POTENTIAL MODIFICATIONS TO THE COURSE

The instructor and university reserve the right to modify elements of the course during the term. The university may change 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.

ACKNOWLEDGEMENT OF COURSE POLICIES

Your registration and continuous participation (e.g. on A2L, in the classroom, etc.) to the various learning activities of 4DA3 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.

COURSE SCHEDULE

COMMERCE 4DA3
MODELLING AND PRESCRIPTIVE ANALYTICS
FALL 2022 COURSE SCHEDULE

WEEK	DATE	TOPICS/ DELIVERABLES
1, 2	Sep. 3, Sep. 10	• Introduction to Business Analytics • Analytics using Spreadsheets Data • Data Exploration and Preparation
3, 4	Sep. 17, Sep. 24	• Linear Optimization
5	Oct. 1	• Optimization of Network Flows
6	Oct. 8	• Integer Optimization
7	Oct. 15	**Mid-Term Recess** <u>Due</u>: Assignment #1 (5:00 pm EST; Oct. 15)
8	**Oct. 22**	**Mid-Term Exam**
9	Oct. 29	• Nonlinear Optimization
10	Nov. 5	• Optimization of nonsmooth Models
11	Nov. 12	• Monte Carlo Simulation • <u>**Due**</u>: Assignment #2 (5:00 pm EST; Nov. 12)
12	Nov. 19	• Optimization in Simulation
13	Nov. 26	• Classification and Prediction methods
14	Dec. 3	• Practice Problems • <u>**Due**</u>: Assignment #3 (5:00 pm EST; Dec. 5)