

Winter 2025 Course Outline

**Com 4QA3: Operations Modelling
and Analysis
DeGroot School of Business
McMaster University**

SCHEDULE AND CONTACT INFORMATION

Section	Time	Location
C01	Fr 11:30AM - 2:20PM	see Mosaic

Instructor:

Amin Shahmardan

shahmara@mcmaster.ca

Office Hours:

By appointment

If you have any questions about the course, you could send me an email. If needed, we can arrange office hours to discuss your concerns.

Teaching Assistant:

Alireza Motallebi Nasrabadi

motallea@mcmaster.ca

Office Hours:

TBA

COURSE ELEMENTS

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

COURSE DESCRIPTION

Operations management (OM) is the science and art of planning the creation and delivery of goods and services to customers. Fundamental topics in operations management include forecasting, financial analysis, supply chain management and analysis, quality control, service operations management, inventory control and management. These days this field of study is subjected to changes and challenges, with an emphasis of making informed managerial decisions based on optimization and statistical models. This course will discuss the aforementioned topics in optimization- and data-driven approaches

LEARNING OUTCOMES

- Upon completing this course, the students will be able to
- Develop a solid understanding of the role of operations management in manufacturing and service organizations,
 - Understand the strategic importance of operations,
 - Identify the connections between operations management and the other parts of the organization,
 - Apply optimization and statistical models to solve real-world business problems. See the section *Course Schedule* below for the topics to be covered.
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COURSE OBJECTIVE

The course aims at:

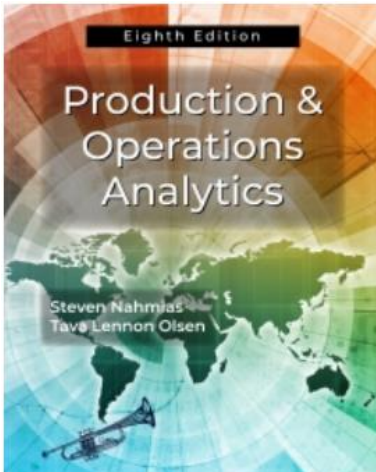
- *developing an in-depth understanding of the set of operations management activities that creates value in the form of goods and services by transforming inputs into outputs.*
- *developing modelling and problem-solving skills useful for reducing operational inefficiency.*
- *gaining familiarity with common analytical tools necessary for solving operational problems.*

The course combines theory, real-life examples/cases, modelling exercises, etc. to prepare students for applying operations management theory and methods to help organizations improve operational efficiency.

COURSE MATERIALS, TOOLS AND READINGS

Textbook

- Avenue registration for course related materials
- Main textbook (**Optional**): *Production and Operations Analytics, 8th Edition* by Steven Nahmias and Tava Lennon Olsen, Waveland Press, Long Grove, Ill. 2021



- *This book is also available as an eBook from VitalSource.*

Notes:

1. The textbooks serve as references and provide details for the materials covered in the lectures. The lectures, lecture slides and other materials delivered by the instructor (such as practice problems) prioritize over the textbook for the purpose of preparing for the exams. Topics not covered during the lectures will not be tested in the exams or assignments. The lectures may cover some materials not included in the textbook.
2. Reading the course notes, slides, and practicing with the provided questions will be sufficient to excel in this course. The recommended textbook is an additional resource for enthusiastic students who wish to explore the topics in greater depth.

Software

Throughout this course, we will use **Microsoft Excel** and **Python** programming language. We will use Python for additional support and demonstration purposes. Please note that your Python programming skills **will not be assessed** as part of this course.

EVALUATION

Overview of course activities:

ACTIVITY	Delivery	Description	Tools
Lectures	In-person ¹	In -person classes	
Tutorials	No Tutorial for this course		
Assessments	See details in “Course Deliverables”	Details in “Course deliverables”	In-person/A2L

¹ Lectures will not be recorded. So, it is students’ responsibility to attend the class.

COURSE DELIVERABLES

Your grade of the course will be the higher one between the two grades calculated from Schemes 1& 2 below.

Scheme 1:

Grade Component	Weight	Description
Quizzes 1-4	20%	4 x 5% each; Timed quiz on A2L
Midterm	35%	Computational/written-response questions
Final Exam	45%	Computational/written-response questions
Total	100%	

Scheme 2:

Grade Component	Weight	Description
Quizzes 1-4	20%	4 x 5% each; Timed quiz on A2L
Midterm	40%	Computational/written-response questions
Final Exam	40%	Computational/written-response questions
Total	100%	

Class participation

Class attendance is not mandatory, and no marks are allocated for attendance. However, it is highly recommended that students attend all classes. It is the students' responsibility to attend and keep up with the course material covered during class.

Exams:

Final and midterm are mandatory. All concerns related to grades must be reported within 2 weeks of the posting of grades. Only the use of a McMaster standard calculator is allowed during midterms and final in this course. See McMaster calculator policy at the following URL:

<http://www.mcmaster.ca/policy/Students-AcademicStudies/examinationindex.html>

Midterm Exam:

The midterm exam will be comprised of some **computational/written-response questions**.

Tentative schedule:

	Date	Time	Rooms
Midterm	March 7	11:30 AM – 2:30 PM	TBA

Final Exam

The final exam will include **computational/written-response questions**.

The final exam will be held during the final exam period in April. The exact date and format will be determined by the Registrar's Office. The final exam may cover selected topics from the materials before midterm and will include all the materials after midterm. The selected topics from the first half of the course to be covered in the final exam will be announced on Avenue to Learn.

Quizzes

Regular quizzes.

There will be 4 regular quizzes throughout the semester. Quizzes will be accessible through Avenue to Learn. Each quiz is a timed MC, arithmetic, short-answer quiz on Avenue to Learn. Students need to start the quiz between the start and end dates shown above; once a quiz starts, it needs to be submitted within 2 hours.

Tentative Assignment schedule:

Assignment #	Start Date	End Date
A1	3-Feb (Monday 9:00 AM)	4-Feb (Tuesday 9:00 AM)
A2	24-Feb (Monday 9:00 AM)	25-Feb (Tuesday 9:00 AM)
A3	17-Mar (Monday 9:00 AM)	18-Mar (Tuesday 9:00 AM)
A4	31-Apr (Monday 9:00 AM)	01-Apr (Tuesday 9:00 AM)

On missed/late assignments

Missed assignments and exams will receive a grade of zero unless the student has submitted and been approved for a Notification of Absence or MSAF. Late assignments will **not** be accepted.

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	Letter Grade	Percent
A+	90 – 100	C+	67 – 69
A	85 – 89	C	63 – 66
A-	80 – 84	C-	60 – 62
B+	77 – 79	D+	57 – 59
B	73 – 76	D	53 – 56
B-	70 – 72	D-	50 – 52
		F	00 – 49

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. All students must receive feedback regarding their progress prior to the final date by which a student may cancel the course without failure by default.

- *For Level 1 and Level 2 courses, this feedback must equal a minimum of 20% of the final grade.*
- *For Level 3 courses and above, this feedback must equal a minimum of 10% of the final grade.*

Instructors may solicit feedback via an informal course review with students by Week #4 to allow time for modifications in curriculum delivery.

REQUESTING RELIEF FOR MISSED ACADEMIC WORK

In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “[Requests for Relief for Missed Academic Term Work](#)” and the link below;

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

ACADEMIC INTEGRITY

Students 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. It is your responsibility to understand what constitutes academic dishonesty. 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. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](#), located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>

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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Generative AI

Students may freely use generative AI in this course so long as the use of generative AI is referenced and cited following citation instructions given in the syllabus. Use of generative AI outside assessment guidelines or without citation will constitute academic dishonesty. It is the student’s responsibility to be clear on the expectations for citation and reference and to do so appropriately.

AUTHENTICITY/PLAGIARISM DETECTION

Some courses may 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

<http://www.mcmaster.ca/academicintegrity>

COURSES WITH AN ON-LINE ELEMENT

The course will use on-line elements (e.g. email, Avenue to Learn (A2L), web pages, 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, user names 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 online 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.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the [Code of Student Rights & Responsibilities](#) (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact [Student Accessibility Services](#) (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's [Academic Accommodation of Students with Disabilities policy](#).

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (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.

EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

POTENTIAL MODIFICATION TO THE COURSE

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.

ACKNOWLEDGEMENT OF COURSE POLICIES

Your enrolment in Commerce 4QA3 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 4QA3 Operations Modelling and Analysis Winter 2025 Course Schedule (Tentative)

Note: Depending on the pace of the lectures the schedule below may change slightly.

Note: If, for any reason, any section or part from the material stated in the table below is to be removed from the covered material, it will be announced on the course webpage on Avenue.

Note: Additional material may be provided and used by the instructor in the form of handouts.

Note: The order in which we will cover the chapters differs from the sequence in the book. This arrangement is designed to better align with the decision-making framework of a firm, focusing on long-term, medium-term, and short-term decisions.

The numbers in the X.X format refer to the section numbers.

- **Chapter 1: Strategy and Competition** [Introduction]
 - ✓ Introduction to the course: Slides and class notes
 - ✓ Sections covered (self-reading): 1.1 to 1.3 (pp. 1-15)
- **Chapter 3: Optimization Supplement** in Sale and Operations Planning [Analytics]
 - ✓ Chapter 3, Supplement 1: Sales and Operations Planning
 - ✓ S1.1 to S1.9: Linear Programming (pp. 185—213)
 - ✓ Integer and Nonlinear Programming: Slides Class notes
- **Chapter 7: Financial Analysis, Appendix 7-A** [Analytics]
 - ✓ Present Worth Calculations / Financial Analysis (p. 429)
- **Chapter 2: Forecasting** [Input to Long-Term Decisions]
 - ✓ Sections covered 2.1 – 2.9 (pp. 61-98)
- **Chapter 7: Supply Chain Analytics – Capacity Growth Planning** [Long-Term Decisions]
 - ✓ Sections covered 7.1 (pp. 379-388)
- **Chapter 7: Supply Chain Analytics – Facility Location and Layout** [Long-Term Decisions]
 - ✓ Facilities Location (Slides and Class notes on Simple Median Model): Sections covered: 7.2 to 7.4 (pp. 388-402)
 - ✓ Facilities Layout (Slides and Class notes on CARFT): Sections covered: Appendix 1-A and Appendix 1-B (pp. 47-59)

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- **Chapter 7: Supply Chain Analytics** [Medium-Term Decisions]
 - ✓ Transportation Problem [Brief discussion: This is a simple linear optimization model. I suggest you read the relevant material on the topic on your own]
 - ✓ Vehicle Routing: Section covered: 7.6 to 7.9 (pp. 410-428)

Midterm Exam (This is a **tentative** plan, and the exact coverage of the midterm exam will be **announced in the class and A2L**)

- **Chapter 4: Inventory Control Subject to Known Demand** [Short-Term Decisions]
 - ✓ Sections covered: 4.1 to 4.10 (pp. 2019-264)
- **Chapter 5: Inventory Control Subject to Uncertain Demand** [Short-Term Decisions]
 - ✓ Sections covered: 5.1 to 5.8 (pp. 275-322)
- **Chapter 8: Service Operations Management** [Short-Term Decisions]
 - ✓ Sections covered: 8.2 to 8.5 (pp. 445-472)
 - ✓ Appendix 8S.2 Queuing techniques (pp. 489-509)
- **Chapter 8: Quality and Assurance** [Short-Term Decisions] (Time permitting)
 - ✓ Sections covered: 10.2 to 10.6 (pp. 581-603)
- **Chapter 2: Project Scheduling** [Short-Term Decisions] (Time permitting)
 - ✓ Sections covered: 12.1 to 12.6 (pp. 709-752)

Notes:

1. The chapters/quantitative modules mentioned above refer to the corresponding parts in the main textbook.
2. Contingent on the course progress, the weekly schedule and the topic are subject to changes at the discretion of the instructor.