Commerce 4QA3
Operations Modelling and Analysis
Winter 2026 Course Outline

DeGroote School of Business
McMaster University

SCHEDULE, INSTRUCTOR, AND CONTACT INFORMATION

Section	Time	Room
C01	Th 11:30 AM – 2:20 PM	See Mosaic

Instructor:

Ahmed Foda
fodaa@mcmaster.ca

Office Hours:
By appointment
If you have any questions about the course, please feel free to email me. If needed, we can also arrange office hours to discuss your concerns in more detail.

Teaching Assistant:

Robab Eynloo
eynloor@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

A course that looks at productions and operations management as practiced in engineering and manufacturing industries and the services sector.
Lectures (three hours)
Prerequisite(s): One of STATS 2MA3, 3J04, 3N03, 3Y03, MATLS 3J03, ENGPHYS 3W04 A/B, or equivalent, and registration in any Engineering and Management, or Mechanical Engineering program; or registration in Level IV or V of any Engineering Physics program
Antirequisite(s): COMMERCE 2OC3, IBH 2BC3, 3BE3

Operations and Production Management (OPM) focuses on the planning, design, and control of systems that create and deliver goods and services to customers. Fundamental topics of OPM include designing products, designing and locating facilities, quality control, project planning, supply chain management, forecasting customer demands, and production and inventory management. Emphasis is placed on informed managerial decision-making through the use of optimization and statistical models to address OPM challenges in both manufacturing and service organizations. This course covers the aforementioned OPM topics using optimization and data-driven approaches.

IMPORTANT LINKS

- Mosaic
- Avenue to Learn
- Student Accessibility Services - Accommodations
- McMaster University Library
- Academic Calendar

COURSE LEARNING OUTCOMES

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

- Develop a solid understanding of how operations and production management support effective decision-making in manufacturing and service organizations,
- Understand the strategic importance of operations,
- Apply advanced mathematical techniques based on calculus, probability, optimization, and statistical models to solve operations problems. See the section “Course Schedule” below for the topics to be covered.

COURSE LEARNING GOALS

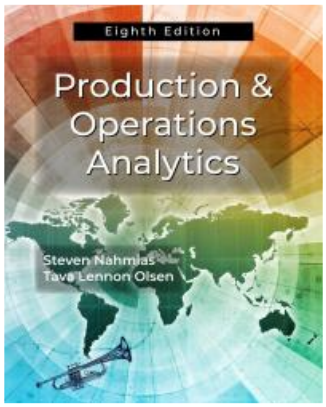
The course aims at:

- Attain a deep understanding of how operations management activities create value through the transformation of inputs into outputs,
- Design modelling and problem-solving skills for identifying and reducing operational inefficiencies,
- Build familiarity with standard analytical tools, including optimization and statistical models, for solving operational problems.

REQUIRED MATERIALS, TOOLS, AND TEXTS

Textbook:

- Main course-related materials will be available in Avenue to Learn.
- Main textbook (**Optional**): Production and Operations Analytics, 8th Edition by Steven Nahmias and Tava Lennon Olsen, Waveland Press, Long Grove, Ill. 2021. ($131.95 US in Dec. 2025)
  - This textbook is also available as an eBook from VitalSource. As of 2026-12-14, a 90-day licence is $63.63 CAD.
  - Please visit the A2L module "Textbook information" for purchase options.
  - The textbook is a supplementary reference. Lecture content, slides, and instructor-provided materials (e.g., practice problems) take precedence for exams and assignments. Only topics covered in lectures will be assessed, and some lecture material may not appear in the textbook.
  - Studying the lecture notes, slides, and practice problems is sufficient to excel in this course. The textbook is an additional resource and intended for students seeking a deeper exploration of the topics.



Software:

- In this course, we will use **Microsoft Excel** (freely available to McMaster students via the Office 365 Hub) and the **Python** programming language (open-source).
- Python could be used in lectures for illustrative and demonstration purposes.
- Notably, students will not be asked to use Python for any course assessments.
- Please refer to the A2L module "Software information" for details.

COURSE EVALUATION

Overview of course activities:

Activity	Delivery	Description	Tools
Lectures	In-person*	In-person classes	
Tutorials	No tutorials provided in this course		
Assessments	Details are provided in "Course Deliverables."	See "Course Deliverables" Section	In-person/A2L

** Lectures will not be recorded; students are responsible for attending all classes.*

COURSE DELIVERABLES

The components of the course grade will be weighted as follows:

Grade Component	Weight	Details
Assignments 1 - 4	20%	4 x 5% each
Midterm	35%	
Final Exam	45%	
Total	**100%**	

Class participation:
Class attendance is not mandatory, and no marks are allocated for it. However, regular attendance is strongly recommended, as students are responsible for keeping up with all material covered in class.

Assignments
There will be 4 regular assignments throughout the semester. Assignments will be accessible through Avenue to Learn. Students need to start the assignment between the start and end dates shown below; once an assignment starts, it must be **submitted within 2 hours**.

Tentative Assignment Schedule: "To be confirmed on A2L."

Assignment	Start Date	End Date	Topics
A1	26 - January (Monday 9:00 AM)	27 - January (Tuesday 9:00 AM)	To be confirmed on A2L
A2	23 - February (Monday 9:00 AM)	24 - February (Tuesday 9:00 AM)	To be confirmed on A2L
A3	16 - March (Monday 9:00 AM)	17 - March (Tuesday 9:00 AM)	To be confirmed on A2L
A4	30 - March (Monday 9:00 AM)	31 - March (Tuesday 9:00 AM)	To be confirmed on A2L

Midterm Exam:
The midterm exam will be comprised of some computational and written-response questions.

Tentative Midterm Schedule: "To be confirmed on A2L."

	Date	Time	Rooms
Midterm	26 - February	11:30 AM – 2:20 PM	TBA

Final Exam
The final exam will include computational and written-response questions. It will be held during the official exam period in April, with the exact date and format set by the Registrar's Office. The exam will cover **all material taught after the midterm and selected topics from before the midterm**. The specific pre-midterm topics included will be announced on Avenue to Learn.

Exams:
The midterm and final exams are mandatory. Any grade-related concerns must be reported within two weeks of the grades being posted. Only McMaster-approved standard calculators are permitted during exams. Refer to the McMaster calculator policy at the following URL:
http://www.mcmaster.ca/policy/Students-AcademicStudies/examinationindex.html

On missed/late assignments:
- Late submissions that are not subject to accommodation will not be considered.
- Missed assignments or exams will receive a grade of zero unless the student has submitted and received approval 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, and you will receive one of the letter grades listed in the table below. I use the McMaster grade scale as follows. https://registrar.mcmaster.ca/exams-grades/grades/#tab-10

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/

COURSE MODIFICATION

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.

From time to time, there may be a need to remove/add topics or to change the schedule or the delivery format. If these are necessary, you will be given as much advance notice as possible.

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.

ACADEMIC INTEGRITY

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. **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.

The following illustrates only three forms of academic dishonesty:

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

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. Avenue to Learn, 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.

COURSES WITH AN 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, 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 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.

ONLINE PROCTORING

Some courses 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.

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, Avenue to Learn and/or McMaster email.

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 2026 Course Schedule

The sequence of chapters we will cover does not follow the book's sequence. This arrangement is designed to better align with a firm's decision-making framework, focusing on long-, medium-, 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 Sales 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 and 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 to 2.9 (pp. 61-98)

- **Chapter 7: Supply Chain Analytics - Capacity Growth Planning** [Long-term Decisions]
  - Section covered: 7.1 (pp. 379-388)

- **Chapter 7: Supply Chain Analytics - Facilities 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 CRAFT): Sections covered: Appendix 1-A and Appendix 1-B (pp. 47-59)

- **Chapter 3: Sales and Operations Planning (a.k.a. Aggregate Planning)** [Medium-term Decisions]
  - Sections covered: 3.4 to 3.6 (pp. 149-171)

"Midterm Exam (Includes material from the topics listed above. This is a tentative plan, and the exact coverage of the midterm exam will be announced in the class and A2L)."

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

- **Chapter 4: Inventory Control Subject to Known Demand** [Short-term Decisions]
  - Sections covered: 4.1 to 4.10 (pp. 219-264)

- **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 Queueing techniques (pp. 489-509)

- **Chapter 12: Project Scheduling** [Short-term Decisions] (Optional - Time permitting)
  - Sections covered: 12.1 to 12.6 (pp. 709-752)

Notes:

- ✓ Depending on the pace of the lectures, this schedule may change slightly.
- ✓ If, for any reason, any section or part of the material covered in the previous topics is to be removed from the covered material, it will be announced during lectures and on the course webpage on Avenue to Learn.
- ✓ Additional material may be provided and used by the instructor in the form of handouts.
- ✓ The chapters/quantitative modules mentioned above refer to the corresponding parts in the main textbook.
- ✓ The weekly schedule and topic are subject to change at the instructor's discretion, contingent on course progress.