

**Com 4QA3: OPERATIONS MODELLING &
ANALYSIS**

Fall 2023 Course Outline

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Operations Management Area

DeGroote School of Business

McMaster University

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Abstract

Enjoy the course! We'll have fun.



Section	First Class	Last Class	Room
C01	September 7, 2023 (Thursday)	November 30, 2023 (Thursday)	See below
C02	September 8, 2023 (Friday)	December 1, 2023 (Friday)	See below

- Cancelled classes: Mid-term recess: **October 9, 2023 (Monday) to October 15, 2023 (Sunday)**
- <https://registrar.mcmaster.ca/dates-and-deadlines/>
- Last day for withdrawing from courses without failure by default: Friday, November 10

©

- **Day 1 data collection: Mathematics and Statistics courses taken by students.**
- Emails sent from non-McMaster accounts sometimes end up in my spam folder. So, please use only your Mac account when communicating with me and the TA. We do not accept responsibility for non-Mac emails ending up in our spam folder which happens often. :-)
- In this course Excel (Solver) and the computer algebra system Maple will be used for the purpose of experiential learning.

1 IMPORTANT LINKS

- Mosaic: <https://epprd.mcmaster.ca/psp/preprd/?cmd=login&languageCd=ENG&>
- A2L: <https://avenue.mcmaster.ca/>
- SAS: <https://sas.mcmaster.ca/accommodations/policies-and-procedures/>
- Library: <https://library.mcmaster.ca/>

CLASSROOM CONDUCT

No Virtual Class

- This course will NOT be taught virtually in Fall 2023!
- Bu there will be online components on Avenue which should be studied asynchronously.

Submission of Assignments and Exams

- All assignments will be done online via Avenue in “quiz” format.
- Exams will be written in a classroom environment (as in the olden days)

Other Matters

Please respect the following line of conduct in class in order to preserve a favorable learning environment:

- Show up to class on time!
- **Phones turned off in class; no leaving class for calls!**
- **No laptop use in class!**
 - **Exception to this Rule: When I am demonstrating a software application, you can use your laptop, but once it’s over, the laptop gets turned off!**
- No talking while the instructor is talking.

- Questions to be directed to the instructor.
- No reading materials unrelated to class.



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2 COURSE OBJECTIVE

- To develop an understanding of production & operations management principles.
- To gain familiarity with common analytical tools necessary for solving production & operations problems

3 PREREQUISITES

- One of STATS 2MA3, 3J04, 3N03, 3Y03, MATLS 3J03, ENGPYS 3W04 A/B, COMMERCE 2QA3, IBH 2AD3 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

4 SECTIONS

Sections	C01	C02
Time	Thursdays: 14:30–17:30	Fridays: 11:30–14:30
Class location	ABB 165	ABB 163

5 INSTRUCTOR/CONTACT INFORMATION

5.1 Instructor

Dr. Mahmut Parlar

parlar@mcmaster.ca

Office: DSB-425

Office hours: TBA

1 (905) 525-9140, Ext. 22858

★ <https://parlar.azurewebsites.net/index.html>

5.2 Teaching Assistants

Name	Email	Phone
TBA	TBA	TBA

6 COURSE WEBSITE (reachable from...)

★ <http://avenue.mcmaster.ca/>

- Please upload a recent photo to Avenue to Learn (A2L).

7 COURSE ELEMENTS

Credit Value:	3	Team Skills:	No	IT Skills:	Yes	Global:	Yes
ELM:	No	Verbal Skills:	No	Numeracy:	Yes	Political:	No
Participation:	Yes	Written Skills:	Yes	Innovation:	Yes	Social:	No

8 COURSE DESCRIPTION

Production and operations management (POM) is the profession that designs, plans and operates production systems to achieve the goals of the organization. Goals are to provide

certain products (i.e., goods and services) to certain customers in certain geographical areas. Production systems take labour, material, and equipment and, through a conversion process, produce these products (i.e., goods and services). Topics to be covered include designing products, designing and locating facilities, quality control, project planning, supply chain management, forecasting customer demands, and production and inventory management.

9 LEARNING OUTCOMES

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

- Understand the strategic importance of operations;
- Use advanced mathematical techniques based on calculus, probability, statistics and optimization to model and solve operations problems. See the section COURSE SCHEDULE below for the topics to be covered.

10 REQUIRED COURSE MATERIALS and ONLINE LEARNING TOOLS

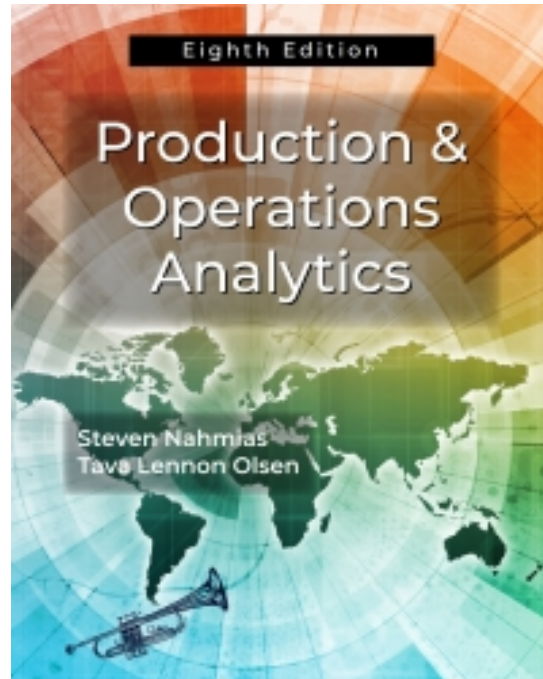
10.1 Required Text @ Mac Bookstore

- Production and Operations Analytics, 8th Edition by Steven Nahmias and Tava Lennon Olsen, Waveland Press, Long Grove, Ill. 2021
- ★ Please visit the A2L module “Textbook information” for purchase options. This book is also available as an eBook from VitalSource.

10.2 Software

Please refer to the A2L module “Software information” for details. But, here is what we will use in this course

- Excel Solver
- Maple 2022



11 EVALUATION

- See below.
- The “assignments” will be on A2L in “Quiz” format.
- The components of the course grade will be weighted as follows.
- Four quizzes @5%, MT 35%, Final 45%
- Quizzes will have 10-15 questions for 60 mins
- **NOTE: After the quiz is over, Avenue will,**
 - Show questions answered incorrectly,
 - Show question answers,
 - Show question score and out of score,
 - Show attempt score and overall attempt score.
- **Tentative** dates for quizzes are as follows:
 - Q1: September 25–26, 2023 (Monday 9:00 a.m. to Tuesday 9:00 p.m.)

- Q2: October 16–17, 2023 (Monday 9:00 a.m. to Tuesday 9:00 p.m.)
- Q3: November 13–14, 2023 (Monday 9:00 a.m. to Tuesday 9:00 p.m.)
- Q4: December 4–5, 2023 (Monday 9:00 a.m. to Tuesday 9:00 p.m.)

Component	Weight	✂ <u>Tentative</u> ✂ Date and Times	✂ <u>Tentative</u> ✂ Duration/Due date
Four Quizzes	20%	TBA (but see above)	M 9:00 am – T 9:00 pm
Midterm exam	35%	October 27, 2023, Friday @7:00 pm	2.5 hours
Final exam	45%	TBA	2.5 hours
TOTAL	100%		

11.1 Grade Conversion

Missed tests/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 be penalized 50% for each day they are late. Your final grade will be calculated as follows:

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	Range
A+	90–100
A	85–89
A–	80–84
B+	77–79
B	73–76
B–	70–72
C+	67–69
C	63–66
C–	60–62
D+	57–59
D	53–56
D–	50–52
F	0–49

12 COURSE SCHEDULE

The sequence of chapters we will cover does not follow the book’s sequence. I believe that our approach is more in line with the long term / medium term / short term decisions of a firm.

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

- **Chapter 1: Strategy and Competition** [INTRODUCTION]
 - Introduction to the course: 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: 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 (Class notes on Simple Median Model):
 - * Sections covered: 7.2 to 7.4 (pp. 388–402)
 - Facilities Layout (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)
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- **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. There will be only one (1) question in Quiz 3 on this topic.] and 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] (Time permitting)

- Sections covered: 12.1 to 12.6 (pp. 709–752)

13 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/AcademicAccommodation-StudentsWithDisabilities.pdf>

14 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.

15 PLACES YOU GET HELP WITH YOUR WORK

Teaching assistant(s) will be available to help students in regularly scheduled office hours (TBA). In addition to this, the instructor will be available to answer questions **during office hours** (TBA).

16 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.

17 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/>

18 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, located at <https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/>

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.

19 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 www.mcmaster.ca/academicintegrity.

20 COURSES WITH AN ON-LINE ELEMENT

Some courses may 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.

21 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.

22 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 environ-

ment 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.

23 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.

24 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.

25 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.

26 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.

27 RESEARCH USING HUMAN SUBJECTS

All researchers conducting research that involves human participants, their records or their biological material are required to receive approval from one of McMaster's Research Ethics Boards before (a) they can recruit participants and (b) collect or access their data. Failure to comply with relevant policies is a research misconduct matter. Contact these boards for further information about your requirements and the application process.

McMaster Research Ethics Board (General board): <https://reo.mcmaster.ca/>

Hamilton Integrated Research Ethics Board (Medical board): <http://www.hireb.ca/>

28 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.

29 GENERATIVE AI: USE PROHIBITED

Students are not permitted to use generative AI in this course. In alignment with McMaster academic integrity policy¹, it “**shall be an offence knowingly to . . . submit academic work for assessment that was purchased or acquired from another source**”. **This includes work created by generative AI tools.** Also state in the policy is the following, “Contract Cheating is the act of “outsourcing of student work to third parties” (Lancaster & Clarke, 2016, p. 639) with or without payment.” Using Generative AI tools is a form of contract cheating. Charges of academic dishonesty will be brought forward to the Office of Academic Integrity.

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¹<https://secretariat.mcmaster.ca/app/uploads/Academic-Integrity-Policy-1-1.pdf>