Department of Mathematics & Statistics
Concordia University

MAST 324
Introduction to Optimization
Winter 2026

Instructor*: _____

Email: _____

Office Hours: _____

*Students should get the above information from their instructor during class time. The instructor is the person to contact should there be any questions about the course.

Office Hours: The instructor will announce in class the hours when help will be available to discuss and clarify the material of the course. Note that, if a student misses a lecture, the instructor will not use office hours to make up for the student's missed class. Office hours are to clarify and better assimilate the material of the course that the student tried first to understand from the lecture or textbook in an individual study.

Textbook: *Operations Research: Applications and Algorithms*, by Wayne L. Winston, Brooks/Cole, 4th Edition.

Recommended Text: *Operations Research: An Introduction*, by Hamdy A. Taha, Pearson, 10th Edition.

Assignments: Homework will be assigned almost every week, via Moodle. Late submissions will not be accepted. Students are expected to submit assignments weekly as a **single PDF file** to Moodle. Solutions must be written up carefully, showing all work for full credit.

Quizzes: There will be two short quizzes (approximately 20 – 30 minutes each) held during the semester, in class. The first quiz will be held in Week 6 and will cover (approximately) the first 4 weeks of the course, and the second quiz will be held in in week 12 and will cover (approximately) the material from weeks 6 – 10.

PLEASE NOTE: If you miss Quiz 1, the weight of that quiz will be moved to Quiz 2. If you miss Quiz 2, the weight of that quiz will be moved to the final exam. If you miss both Quiz 1 and Quiz 2, the weight of both Quizzes will be moved to the final exam.

Midterm Test: There will be one midterm during lecture time in week 8. This test will cover the material from weeks 1 – 6.

PLEASE NOTE: Tests missed for any reason, including illness, cannot be made up. If you miss the midterm, the weight will be moved to the final exam.

Final Exam: At the end of the course, there will be a final examination during the period assigned by Concordia's Exam Office. It will cover material from the entire course.

PLEASE NOTE: Students are responsible for finding out the date and time of the final exam once the schedule is posted by the Examination Office. Any conflicts or problems with the scheduling of the final exam must be reported directly to the Examination Office, **not** to your instructor. It is the Department's policy and the Examination Office's policy **that students are to be available until the end of the final exam period. Conflicts due to travel plans will not be accommodated.**

Final Grade: The final grade will be the higher of (a), (b), or (c):

(a) 15% Assignments, 10% Quizzes (5% per quiz), 25% Midterm test, 50% Final Exam.
(b) 15% Assignments, 10% Quizzes (5% per quiz), 75% Final Exam.
(c) 15% Assignments, 85% Final Exam.

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

Calculators: Only calculators approved by the Department (with a sticker attached as proof of approval) are permitted for the class test and final examination. For a list of Approved and Not-approved calculators see www.concordia.ca/artsci/math-stats/services.html

Plagiarism: Cases of plagiarism (including the assignments, quizzes, mid-term test, and final exam) will be treated according to the University policy.

Topics to be covered (time permitting):

Section	Topics
3.1	What Is a Linear Programming Problem?
3.4	A Diet problem
3.5	A Work Scheduling Problem
3.8	Blending Problem
4.1	How to Convert an LP to Standard Form
4.2	Preview of the Simplex Algorithm
4.3	Direction of Unboundedness
4.4	Why Does an LP have an Optimal bfs?

4.5	Simplex Algorithm
4.6	Using Simplex Algorithm to Solve Minimization Problems
4.7	Alternative Optimal Solutions
4.8	Unbounded LPs
4.11	Degeneracy and Convergence of the Simplex Algorithm
4.12	The Big M Method
4.13	The Two-Phase Simplex Method
4.14	Unrestricted in Sign Variables
6.1	A Graphical Introduction to Sensitivity Analysis
6.2	Some Important Formulas
6.3	Sensitivity Analysis
6.5	Finding the Dual of an LP
6.6	Economic Interpretation of the Dual problem
6.7	The Dual Theorem and its Consequences
6.8	Shadow Prices
6.9	Duality and Sensitivity Analysis
6.11	The Dual Simplex Method
7.1	Formulating Transportation Problems
7.2	Finding Basic Feasible Solutions for Transportation problems
7.3	The Transportation Simplex Method
7.4	Sensitivity Analysis for Transportation Problem

Student Services
You may wish to access the many services available to you as a Concordia student. An overview of these resources can be found here: https://www.concordia.ca/students/services.html

Academic Integrity and the Academic Code of Conduct
This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: https://www.concordia.ca/conduct/academic-integrity.html" *[Undergraduate Calendar, Sec 17.10.2]*

Behaviour
All individuals participating in courses are expected to be professional and constructive throughout the course, including in their communications.

Concordia students are subject to the Code of Rights and Responsibilities which applies both when students are physically and virtually engaged in any University activity, including classes, seminars, meetings, etc. Students engaged in University activities must respect this Code when engaging with any members of the Concordia community, including faculty, staff, and students, whether such interactions are verbal or in writing, face to face or online/virtual. Failing to comply with the Code may result in charges and sanctions, as outlined in the Code.

Intellectual Property
Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities. As specified in the Policy on Intellectual Property, the University does not claim any ownership of or interest in any student IP. All university members retain copyright over their work.

Extraordinary circumstances

In the event of extraordinary circumstances and pursuant to the Academic Regulations the University may modify the delivery, content, structure, forum, location and/or evaluation scheme. In the event of such extraordinary circumstances, students will be informed of the change.