Syllabus: Course Name and Course Code

Contact Information

Instructor: Mehrdad Pirnia, mpirnia@uwaterloo.ca

TA: Zeynep Bulbul, zbulbul@uwaterloo.ca

Course Organization

I follow the following timeline for posting the materials and setting the deadlines:

- Mondays: Weekly materials will be posted on Mondays - I try to post slides, videos and other course contents by Mondays at 2:30 pm. Since I am creating the contents as we move along I might be late here and there, but I try my best to follow the deadlines.
- Tuesdays: There will be live sessions to review course contents and answer questions through Learn-Virtual classroom on Tuesdays at 2:30 pm.
- Thursdays: There will be live sessions to practice questions and answer questions by TA through Learn-Virtual classroom on Thursdays at 2:30 pm.
- Fridays: Quizzes/assignments are posted on Fridays.
- Sundays: The due dates for deliverables are Sundays at 11:59 pm.

Announcements

I use the **Announcements** widget on the Course Home page during the term to communicate new or changing information about the course as needed. You are expected to read the announcements on a regular basis.

To ensure you are viewing the complete list of announcements, you may need to click Show All Announcements.

Discussions

There would be weekly discussions in each week's module. Under each weekly discussion forum, there would be different threads for posting your questions,

special announcements and other interesting and thought-provoking prompts. I expect the class to participate meaningfully in discussion forums by addressing other students' questions and bringing thoughtful conversations into the discussions, so we can learn from each other.

Contact Us

The green italicized text indicates where you should enter/overwrite information.

Who and Why	Contact Details
Instructor and TA • Course-related questions (e.g., course content, deadlines, assignments, etc.) • Questions of a personal nature	**Post your course-related questions** to the **weekly** discussion topics*. This allows other students to benefit from your question as well. I encourage the other classmates to respond to the questions and the TA and myself guide the discussions as needed. **Questions of a personal nature** can be directed to your instructor, and TA. Your instructor and TAs check email and the discussion forums* frequently and will make every effort to reply to your questions within 48 hours, Monday to Friday. When emailing the instructor, please indicate the course code in the subject line. *Discussion topics can be accessed by clicking **Connect** and then **Discussions** on the course navigation bar above.

Who and Why	Contact Details
Technical Support • Technical problems with Waterloo LEARN	learnhelp@uwaterloo.ca Include your full name, WatIAM user ID, student number, and course name and number. Technical support is available during regular business hours, Monday to Friday, 8:30 AM to 4:30 PM (Eastern Time). LEARN Help Student Documentation
Student Resources	Student Resources • Academic advice • Student success • WatCards • Library services and more

Course Description and Learning Outcomes

Course Description

This is an introductory course to the principles of operations research, where core optimization concepts, such as linear programming, integer programming and application of optimization in variety of areas is discussed. The course mainly highlights formulation of such problems and provides popular algorithms to solve them. Furthermore, topics such as uncertainty and what-if analysis are covered to provide students with a robust foundation of optimization techniques. Throughout assignments students may implement computer programs, involving the formulation and solution of a mathematical model and output analysis.

Learning Outcomes

By the end of this course, students should be able to:

- Formulate linear and integer programming problems.
- Use popular algorithms to solve optimization problems.
- Implement optimization problems in Excel or other optimization programs, such as GAMS, AIMMS, Lindo, etc and interpret results obtained from such models.
- Perform sensitivity analysis to provide solution to uncertain problems.
- Develop awareness of the usefulness and limitations of OR models in different applications, such as transportation, scheduling, communications, etc.

Grade Breakdown

The following table represents the grade breakdown of this course.

Activities and Assignments	Weight (%)
Introduce Yourself	1% (bonus)
Quizzes	10%
assignments	15%
Discussions	15%
Project	60%

Assessments:

Quizzes: There will be quizzes from the materials covered each week. The quizzes will be a few multiple-choice questions, due on Sunday of most of the weeks. You will have a limited time to submit your quiz from the time you start it.

Assignments: Some weeks the quizzes might be replaced by assignments, which include more computational questions to be submitted over crowdmark.

Discussions: There would be weekly discussions in each week's module. Under each weekly discussion forum, there would be different threads for posting your questions, special announcements and other interesting and thought-provoking prompts. I expect the class to participate meaningfully in discussion forums by addressing other students' questions and bringing thoughtful conversations into the discussions, so we can learn from each other.

Exam: There will be a final exam similar to quizzes and assignments during the last week of the class.

Your Instructor

If you want to know more about me refer to My Personal Website

I am very interested in applications of optimization and AI in energy field. I am using these models in predicting and prescribing policy mechanisms for the future energy systems, such as the integration of renewable sources, electric vehicles and storage capacities in our electric system.

If I am not working, you may find me playing soccer or riding my bike or maybe taking my camping gear to a remote area. I wish I could play soccer with your class this summer as it's been the tradition in the past years.

Materials and Resources

Textbook(s)

Required

Operations Research: Applications and Algorithms, 4th Edition, By: Wayne L. Winston, ISBN-10: 0534380581 | ISBN-13: 9780534380588

Recommended

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

Hillier, F.S. and Lieberman, G.J. (2015). *Introduction to Operations Research, 10th edition*, McGraw-Hill

Resources

Library COVID-19: Updates on library services and operations.

Course and Department Policies

Course Policies

Late Assignments, Missed Exam: Assignments turned in after the deadline, and missed exams will receive zero, unless valid reasons, e.g., illness, or severe family emergency have been discussed with the instructor in advance.

University Policies

Academic integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check the Office of Academic Integrity for more information.]

Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4. When in doubt, please be certain to contact the department's administrative assistant who will provide further assistance.

Discipline: A student is expected to know what constitutes academic integrity to avoid committing an academic offence, and to take responsibility for his/her actions. [Check the Office of Academic Integrity for more information.] A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate associate dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline. For typical penalties, check Guidelines for the Assessment of Penalties.

Appeals: A decision made or penalty imposed under Policy 70, Student Petitions and Grievances (other than a petition) or Policy 71, Student Discipline may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72, Student Appeals.

Note for students with disabilities: AccessAbility Services, located in Needles Hall, Room 1401, collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with AccessAbility Services at the beginning of each academic term.

Turnitin.com: Text matching software (Turnitin®) may be used to screen assignments in this course. Turnitin® is used to verify that all materials and sources in assignments are documented. Students' submissions are stored on a U.S. server, therefore students must be given an alternative (e.g., scaffolded assignment or annotated bibliography), if they are concerned about their privacy and/or security. Students will be given due notice, in the first week of the term and/or at the time assignment details are provided, about arrangements and alternatives for the use of Turnitin in this course.

It is the responsibility of the student to notify the instructor if they, in the first week of term or at the time assignment details are provided, wish to submit alternate assignment.

June 15, 2009 (updated March 2018)

Coronavirus Information

Coronavirus Information for Students

This resource provides updated information on COVID-19 and guidance for accommodations due to COVID-19.

Mental Health Support (optional)

All of us need a support system. We encourage you to seek out mental health supports when they are needed. Please reach out to Campus Wellness and Counselling Services.

We understand that these circumstances can be troubling, and you may need to speak with someone for emotional support. Good2Talk is a post-secondary student helpline based in Ontario, Canada that is available to all students.

Territorial Acknowledgement

“We acknowledge that we live and work on the traditional territory of the Attawandaron (Neutral), Anishinaabeg, and Haudenosaunee peoples. The University of Waterloo is situated on the Haldimand Tract, the land promised to the Six Nations that includes ten kilometres on each side of the Grand River.”

Credits and Copyright

Credits

I am relying on contributions from many communities and individuals for developing this course. I will cite them through the lecture notes as we move forward.

Copyright

Some of the figures, data and contents in the course notes are coming from the textbook.