

MSci 603 Fall 20 Term Project

University of Waterloo

September 19, 2020

Overview:

The MSci603 term project is designed as a substantial assignment for students to explore interesting application areas of operations research. You can propose a problem related to the subjects that you are interested in, at the initial stage. You are also welcome to reach us for suggestions and guidance at all stages.

General guidelines:

1. The project contribute to 60% of the final grade in the course.
2. The project is to be done in teams of three students. You can either choose your own team members or I will allocated you randomly to a teams.
3. Use the corresponding Dropbox on Learn to submit project deliverable.

Project stages:

1. **Team formation - Sep 22:** Form your team, by letting me know who you want to work with or the instructor will assign you to a team. If I don't hear anything from you, I assume you want to be assigned to a team by the instructor. You don't need to deliver anything at this stage.
2. **Problem definition - Oct. 11th:** Detailed problem definition, justification for its importance and previous work - max 1-2 pages. In order to fulfill this requirement you need to define the exact problem that you want to solve and propose your initial ideas on the decision variables, objective function and constraints. You should provide the context of the problem and the sources of your data, and also the framework you are planning to use for your problem formulation and solution - Excel, GAMS, AIMMS, MATLAB, R, Python, etc. There should be a discussion on why you think your problem is important, previous work done in this area and if you have any plans to improve the

previous work. One great resource to get ideas from is the Informs Journal on Applied Analytics <https://pubsonline.informs.org/journal/inte> . You can explore the papers in this journal and reproduce the models given in the chosen paper. If you plan to reproduce results from a paper, which you don't have data for, you can generate your own data, considering its validity for the context you are proposing. We plan meetings with your team to discuss your project plan and the feasibility of your problem as a course project, in the week of Oct 5th.

3. **Progress report - Nov. 1st:** Report your project progress - max 1-2. As part of this stage of your project, you should have a clean and refined data set. You should also provide a detail mathematical model of your problem, with justifications of why you are using such model. In addition, the model should be implemented in a program and provide optimal solutions. If you decide to choose a pre-existing model from a journal like Informs Journal on Applied Analytics, the major emphasis of your grade would be on its implementation in a program of your choice, and providing sensitivity analysis and improvements on the suggested model.
4. **Final report and presentation at Nov 23 December 6:** submit your final report - max 5 pages and present your work - 15 min. Your final report is due on Nov. 23rd and your presentation is scheduled in the last week of classes. During this stage of your work you should provide justifications for your project, literature review, your mathematical model, results from its implementation with realistic datasets and sensitivity analysis and further justifications on your output - adding uncertainties, improving previous models, etc. The required format of your report will be communicated later.