

## MIE1623: Introduction to Healthcare Engineering

- Instructor:** Prof. Dionne Aleman, MC321, [aleman@mie.utoronto.ca](mailto:aleman@mie.utoronto.ca)  
 Prof. Mike Carter, RS311, [carter@mie.utoronto.ca](mailto:carter@mie.utoronto.ca)
- Teaching Assistant:** Parnian Azimzadeh
- Office hours:** By appointment (e-mail)
- Textbook:** none
- Prerequisites:** APS1005 or basic OR background recommended.  
 Students who do not have a background will be required to do some extra reading on some topics available on the website.
- Lectures:** Wednesday 17:10 - 20:00
- First class:** January 8, 2024
- Room:** WB 219; (Most classes will be virtual on zoom.)

### Course description

This course illustrates the use of industrial engineering techniques in the field of healthcare. Common strategic, tactical, and operational decision-making problems arising in healthcare will be approached from an operations research perspective. Unique aspects of healthcare compared to other industries will be discussed. Real-world datasets will be provided to illustrate the complexity of applying standard operations research methods to healthcare.

### Course goals

- Learn to recognize healthcare problems that can be solved with OR
- Learn important metrics that must be considered in healthcare
- Learn to balance competing objectives and stakeholders
- Learn how to assess efficiency in healthcare systems

### Grading

Assessment	Weight	Date
Homework (5 assignments, 10% each)	50%	See schedule of topics
Final Quiz (45 minutes)	10%	Wednesday, March 26
Project presentation	5%	Wednesday, April 2
Project	35%	Wednesday, April 2

**Schedule of topics:** The schedule of topics below is subject to change without notice.

Week	Date	Lecture	Due
1	Jan 8	Intro to course; Facility location and layout	
2	Jan 15	Waitlist management, staffing, forecasting	
3	Jan 22	Health and human resources; System Dynamics	Assignment 1
4	Jan 29	Excel-based DSS	
5	Feb 5	Public Health Policy; Decision Analysis	Assignment 2
6	Feb 12	Surgical, shift and appointment scheduling	
7	Feb 19	READING WEEK	
8	Feb 26	Staffing assignments, queuing theory	Assignment 3
9	Mar 5	Patient flow, supply chain, simulation, related software D/M	
10	Mar 12	Benchmarking	Assignment 4
11	Mar 19	Case mix planning; Goal Programming	
12	Mar 26	Resource management, capacity planning; Final Quiz	Assignment 5
13	Apr 2	Project presentations	Project