

## Syllabus

Last updated: August 9, 2024

**Course coordinator.** Prof. Nelson Uhan ✉ uhan@usna.edu

**Course description.** Students in this course will work on several applied operations research projects throughout the semester, based on realistic case studies. Emphasis will be on integrating multiple operations research techniques and technical communication.

**Course objectives.** In this course, students will

- (1) develop a deeper understanding of what an applied operations research project entails, by solving realistic problems that require integrating data wrangling, data visualization, modeling and computational techniques;
- (2) improve their technical writing and presentation skills;
- (3) enhance their understanding of the modeling and computational techniques from their previous courses in optimization, stochastic processes, simulation, and statistics.

**Textbook.** Case studies from *INFORMS Transactions on Education*, Simio LLC, and IISE/Rockwell Automation.

**Project 1.** Murat Köksalan, Selin Özpeynirci, Haldun Süral (2010) Case–Forecasting Beer Demand at Anadolu Efes. *INFORMS Transactions on Education* 10(3):142-145.

**Project 2.** Timothy C. Y. Chan, Craig Fernandes, Albert Loa, Nathan Sandholtz (2023) Case–Moneyball for Murderball: Using Analytics to Construct Lineups in Wheelchair Rugby. *INFORMS Transactions on Education* 24(2):119-199.

**Project 3.** IIE/RA Contest Problems – Eighth Annual Contest: SM Travel. In W. David Kelton, Randall P. Sadowski, David T. Sturrock (2007) *Simulation with Arena* (4th ed.). McGraw-Hill.

**Final Project.** Student choice among several options, TBA.

**Schedule.** Here is a tentative schedule.

---

Week	Activities
<b>Project 1</b>	
1	Course overview Overview of case study Basic analysis and visualization of case study data Writing about operations research – overview of report structure Writing about operations research – the data section
2	Basic data wrangling of case study data Modeling for the case study Writing about operations research – the model and results section for statistical models
3	Generating and analyzing results for the case study Work on Project 1
4	Work on Project 1 <b>Project 1 due</b>
<b>Project 2</b>	
5	Overview of case study Basic analysis and visualization of case study data
6	Modeling for the case study Writing about operations research – the model and results section for optimization models
7	Work on Project 2
8	Work on Project 2 <b>Project 2 due</b>
<b>Project 3</b>	
9	Overview of case study Work on Project 3
10	Work on Project 3 Writing about operations research – the model and results section for simulation models
11	Work on Project 3
12	Work on Project 3 <b>Project 3 due</b>
<b>Final Project</b>	
12	Work on Final Project
13	Work on Final Project
14	Work on Final Project
15	Work on Final Project Presenting about operations research – quad charts and 5-minute elevator pitches
16	Work on Final Project <b>Student presentations: 5-minute elevator pitches</b>
17	<b>Project 4 due</b>

---