

The University of Pennsylvania
The Wharton School

**OIDD 001: Prescriptive Analytics: Making Business Decisions using
Optimization and Simulation**

Summer 1 2021 Course Syllabus

Professor: Sergei Savin

Instructor: Tan (Suparerk) Lekwijit, slek@wharton.upenn.edu

Course Description

In this course, we will explore the subject of quantitative business decision making. Specifically, we will study optimization and simulation tools and provide you with a set of key skills in the area of prescriptive analytics. We will illustrate the use of these tools in a variety of business applications, including manufacturing, logistics, inventory management, capital budgeting, insurance, and revenue management.

The course assumes no specific mathematical background beyond basic algebra and probability concepts. Familiarity with the basic functioning of Excel is helpful, but not required as we will introduce and review the Excel skills as needed. No prior experience with programming or statistics is expected.

Course Format

Each week, the course will have two class sessions.

The first session is an online, pre-recorded video lecture where the professor will cover the modeling concepts and examples of their use. The recording of each lecture will be posted at 9am EST on the days indicated in the course schedule below.

The second session, a “recitation,” will reinforce the concepts introduced in the week’s lecture. Recitations will be held at 5pm EST on the days indicated in the course schedule below and will last 110 minutes. Each recitation will be divided into two parts: during the first part the instructor will work through an additional example of the concept introduced in lecture, and during the second part you will complete a “recitation exercise” that will be graded.

Office Hours

The instructor will hold online, live office hours on Tuesdays, 12-1:30pm EST (link to be posted on Canvas).

Course Materials

Online:

The course Canvas site will be the source for all class materials and assignments. In particular, lecture recordings and accompanying slides and Excel files, as well as recitation materials, will be posted on Canvas.

Software:

In this course we will use Excel, and, in particular, two “add-ins” that are built into Excel: “Solver” and “Data Analysis.”

Deliverables and Grades

Your final score will be determined by your performance on graded assignments, recitation exercises, and the final exam, with the following weights:

| | |
|--------------------------|-----|
| Three graded assignments | 20% |
| Recitation Exercises | 20% |
| Final Exam | 60% |

Your final score will be normalized to 100 points, and your course grade will be calculated as follows:

| Normalized Score Interval (out of 100) | Course Grade |
|--|--------------|
| [95, 100) | A+ |
| [85, 95) | A |
| [80, 85) | A- |
| [75, 80) | B+ |
| [70, 75) | B |
| [65, 70) | B- |
| [60, 65) | C+ |
| [0, 60) | C or lower |

We will not round final scores to determine your grade.

Assignments:

There will be three graded assignments during this course. The questions on these assignments are similar in nature to the questions you can expect to see on the final exam. While completing these assignments, you are allowed to collaborate with other students registered this semester in our course. However, each student must submit their own assignment.

All assignments are due by 11:30 pm EST of the assigned due date (see the course schedule below). Late assignments are not accepted, even for partial credit. You must submit your assignments electronically via Canvas.

Final Exam:

Your final exam will be delivered in the form of a 2-hour Canvas quiz on Wednesday July 7, 2021, 5-7 pm EST.

During your final exam, you may not communicate with anyone and you may only use class materials posted on Canvas. You may use a calculator (which includes graphing or programmable calculators) during the exam. However, you may not use any electronic device that can run Excel or communicate with another electronic device.

Course Schedule

| Week | Topic | Lecture | Recitation | Assignment |
|-------------|---|----------------|-------------------|--|
| 1 | Introduction to Optimization | May 24 | May 26 | A1: distributed May 24 |
| 2 | Linear Network Models with Applications to Logistics and Inventory Management | May 31 | June 2 | |
| 3 | Answering “What If” Questions in Linear Optimization | June 7 | June 9 | A1: due June 7 A2: distributed June 7 |
| 4 | Linear Models with Integer Variables | June 14 | June 16 | |
| 5 | Introduction to Simulation | June 21 | June 23 | A2: due June 21 A3: distributed June 21 |
| 6 | Comparing Alternative Decisions Using Simulation | June 28 | June 30 | A3: due June 30 |