

# Data Sciences and Operations

USC Marshall School of Business

## DSO 570

### The Analytics Edge: Data, Models, and Effective Decisions

Fall 2019 (3.0 units)

Time: MW 12:30pm – 1:50pm (Section 16285)

MW 5:00pm – 6:20pm (Section 16287)

Professor Paat Rusmevichientong

### Who should take the course?

**Students who wish to go beyond the standard business analytics course.** You will learn about “getting an edge” -- how to make effective decisions using data and models through optimization. The skills and tools learned in this course will give you a unique analytics and competitive edge, and they can be applied to a broad range of careers, including finance, consulting, marketing, operations, and technology.

### Course objectives

The course will teach students how to convert data into models, and most importantly, *how to use the models to make effective decisions through optimization*. Students will learn about optimization concepts and tools, and see how it can be applied to a broad range of applications. The class will provide students with extensive hand-on optimization practices.

### Key Concepts

- Decision trees
- Bayes' Rule
- Probability distributions
- Linear programming (LP)
- Shadow prices
- Linear optimization under uncertainty
- LP in finance and operations
- Nonlinear programming and applications to portfolio optimization
- Integer programming
- Dynamic optimization over time
- Applications in aviation, supply chain, manufacturing, and retail

### Course description

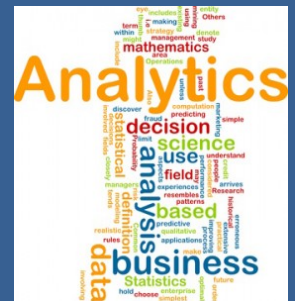
You will learn how to build models from data, and how to translate these models into effective decisions through optimization, providing you with a unique analytics and competitive edge. We will study four modules:

- Framework for effective decision-making
- Dealing with uncertainty: Fundamentals of probability
- From data to models: Building blocks of optimization
- Putting everything together: Effective decisions through optimization

Comparison to other DSO courses: This course (DSO 570) provides a much more in-depth study of optimization models and methods in decision-making. We will also cover more business cases involving optimization. There is minimal overlap with DSO 547.

570

DSO



Optimization