MAT 180 Modeling and Analytics for Operations Research

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Course Description:

This course introduces some of the key mathematical tools used in Industrial Engineering and Operations Research. In this course, we will learn about modeling operational decisions and analyzing the merits and limitation of different models. The course will also discuss the role of uncertainty in decision making.

Covered Topics:

Optimization Material

- Linear Programming, Mixed-Integer Programming
- Queueing theory
- Dynamic Programming
- Conic Optimization
- Robust Optimization / Distributional Robust Optimization
- Column Generation / Benders Decomposition

Applications

- Inventory management
- Production plan
- Facility location
- Scheduling
- Design of service systems
- Electrical power systems
- Two stages decision making

Prerequisites:

All of the following: MAT 22A, MAT 108, MAT 135A, or any equivalent courses
Any of the following: MAT 167, MAT 168, MAT 170
Recommended: MAT 168, MAT 170
Programming language experience required

Assessment:

Several small homework projects and one final project implementing and developing models from some papers