IE 310 Operations Research Spring 2021

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Objective:

The objective of this course is to introduce the basic tools of Operations Research to be used in handling various engineering problems. During the course, the students will

- Acquire the ability to model real-life problems using Linear Programming and Integer Programming.
- Learn several algorithmic methods to solve the related models.
- Learn the fundamental concepts of modeling, optimality, and duality.
- Learn basic network problems and non-linear optimization.

References:

- Operations Research Applications and Algorithms (Winston W., 4th Edition, Thomson, 2004)
- Operations Research, (Hamdy A. Taha, 8th Edition, Prentice Hall, 2007)
- Introduction to Operations Research, (F.S. Hillier, G.J. Lieberman, 9th Edition, McGraw-Hill, 2010)

Outline:

Week 1:	Intro to O.R. and LP Modeling
Week 2:	LP: Graphical Solution Procedure, LP: Model Formulation
Week 3:	LP: Simplex Method
Week 4:	LP: Simplex Method - Starting Methods
Week 5:	LP: Matrix Form of Simplex, Revised Simplex, LP: Duality
Week 6:	LP: Dual Simplex
Week 7:	Sensitivity Analysis
Week 8:	Integer Programming (IP): Modeling, IP: Cutting Plane Method
Week 9:	IP: The Branch and Bound Method
Week 10:	Network Problems
Week 11:	Introduction to Non-Linear Programming
Week 12:	Convex functions – Unconstrained Non-Linear Optimization
Week 13:	Unconstrained Non-Linear Optimization

Grading:

Homework	30%
Quiz	30%
Final	40%