

**OIDD 9100 – Linear Optimization**  
**DRAFT Syllabus 8/4/24**

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**Course Schedule and Location**

The course will meet in Q2, starting October 22<sup>nd</sup>, on Tuesdays, 3:30-6:30pm, in JMHH 540/1.

**Course Overview**

This course covers the basics of linear optimization. You will learn what linear programs (LPs) are, what they are used for, and how they are solved. During the course, you will also find connections between LPs and some of the basics of microeconomic theory.

The mathematical prerequisites for the course are few. You should understand the basics of linear algebra, and we will review matrix operations, linear independence, and matrix inversion. While not strictly necessary, an understanding of partial derivatives will also help you to appreciate certain topics.

At the same time, the course will emphasize careful mathematical thinking. The study of LPs provides you with a fantastic opportunity to develop a strong foundation in thinking about mathematical problems both geometrically and algebraically, as well as to make connections between the two ways of thinking.

The course will also provide you with the opportunity to prove mathematical properties of LPs. This type of theorem proving is an essential skill required in a broad array of research in OM.

**Book**

*Linear Optimization* by Dimitris Bertsimas and John Tsitsiklis, Athena Scientific, 1997.

**Grading Scheme**

Three problem sets will count for 60% and a final exam will count for 40% of the course grade.

**Course Schedule and Topics**

I tentatively plan to cover the following topics in 7 weeks of 3-hour sessions.

<b>Week</b>	<b>Description</b>	<b>Read Before</b>	<b>HW Due</b>
1	Introduction to LPs		
2	Linear Algebra for LP's	Chapter 1	
3	Polyhedral Geometry of LP's	Chapter 2	HW1
4	The Simplex method	Chapter 3	
5	Duality	Chapter 4	HW2
6	Sensitivity Analysis	Chapter 5	
7	Tour of Applications, Conclusion		HW3
Final Exam: Date and Time TBD			