



Mathematics 661.01 Convex Optimization

Calendar Description: an introduction to modern convex optimization, including basics of convex analysis and duality, linear conic programming, robust optimization, and applications.

Prerequisites: Mathematics 311 and Mathematics 367

Notes: Mathematics 603 or Mathematics 545 is recommended as preparation.

Textbook: A. Ben-Tal, A. Nemirovski, Lectures on Modern Convex Optimization: Analysis, Algorithms, and Engineering Applications

(see Course Descriptions under the year applicable: <http://www.ucalgary.ca/pubs/calendar/>)

Syllabus

<u>Topics:</u>	<u>Number of Hours</u>
Basics of linear, convex and conic programming, convexity, basic duality; LP, SOCP and SDP classes of problems; review of LP duality.	6
Conic programming duality theory with applications to infeasibility detection and optimization.	12
Elements of robust optimization, polyhedral and ellipsoidal uncertainty sets in symmetric conic programming; SDP approximations to MIP, MAXCUT.	12
Other applications: non-negative polynomials, option pricing, epigraphs of some convex functions.	6
TOTAL:	36

Time permitting, some of the following topics may be covered to the discretion of the instructor: basics of interior-point methods, first-order methods, other applications.

Last modified on 2016-03-24

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