

# ISE 530 Optimization Methods for Analytics

Last edit: January 10, 2023

## Course topics

- Modeling and the optimization paradigm. Convexity.
- Linear programming. The simplex algorithm. Sensitivity analysis. Duality.
- Optimality conditions. Nonlinear optimization.
- Network flows. Max-flow / min-cut.
- Integer programming formulations. Branch-and-bound. Cutting planes.
- Dynamic programming.
- Special topics in optimization, if time permits.

## Timetable

Classes for the course are on Tuesday and Thursday, 12:30PM-1:50PM.

## Textbook

The textbook is *Optimization methods in finance*, by Cornuejols and Tütüncü. It is available online here: [http://web.math.ku.dk/~rolf/CT\\_FinOpt.pdf](http://web.math.ku.dk/~rolf/CT_FinOpt.pdf).

## Assessment methods and schedule

**Wk 3:** Problem Set 1 due, covering Wk 1–2.

**Wk 5:** Problem Set 2 due, covering Wk 3–4.

**Wk 7:** Problem Set 3 due, covering Wk 5–6.

**Wk 9:** Midterm Exam on Thursday March 9 during class, covering Wk 1–6.

**Wk 10:** Spring break, no class or homework.

**Wk 11:** Problem Set 4 due, covering Wk 7–9.

**Wk 13:** Problem Set 5 due, covering Wk 11–12.

**Wk 15:** Problem Set 6 due, covering Wk 13–14.

**Wk 17:** Final Exam (exam week).

The final course grade is computed as follows:

- 25%: Homework (6 problem sets, *lowest one is dropped*, each of the remaining 5 is worth 5% each).
- 30%: Midterm exam.
- 35%: Final exam.
- 10%: Class participation.

## Homework policy

- All homework assignments are due by 11:59:00pm on the date indicated on the problem set.
- Homework assignments must be submitted via Blackboard. Only one pdf file should be submitted for each homework assignment. Students can submit PDFs generated with your favorite method: Latex-generated PDFs, converted from Word/Libreoffice, or even scanned images converted to PDF.
- Late homework submissions are not accepted under any circumstances.
- There will be biweekly homework assignments. The lowest scored homework assignment will not be considered in your final grade
- Working with other students on homework assignments is allowed, including discussing the answers and working together to find a solution strategy. However, each student must write and submit their own personal work.