



Hankuk University of Foreign Studies

2023 Summer Session

MATH 480 Linear Optimization

Course Outline

Course Code: MATH 480

Instructor: Vadim Olshevsky

Home Institution: University of Connecticut

Office Hours: TBA

Email: olshevsky@gmail.com

Credit: 4

Class Hours:

This course will have 52 class hours, including 32 lecture hours, professor 8 office hours, 8-hour TA discussion sessions, 4-hour review sessions.

Course Description:

List of topics: Math 480 is an introductory course in linear optimization with a focus on linear programming, simplex method, quadratic optimization, and least-squares, duality theory, sensitivity analysis, interior point methods and integer programming

Homework will be assigned twice a week. Due online on Wednesday and Friday at 23:00. **NO LATE HOMEWORK WILL BE ACCEPTED.** One homework assignment can be dropped.

Exams: two exams, a midterm and a final.

Required Course Materials:

Dimitris Bertsimas, John N. Tsitsiklis. Introduction to Linear Optimization. Athena Scientific, 4th edition, ISBN 978-1-886529-19-9.



Grading & Evaluation: (HW+Midterm+Final)/3

Grading System (1 ~ 100)

The final score will be scaled and the scaled score will be used to assign a Course grade.

A+ : 96 - 100	A : 91 - 95
B+ : 86 - 90	B : 81 - 85
C+ : 76 - 80	C : 71 - 75
D+ : 66 - 70	D : 60 - 65
F : 0 - 59	
Pa : Pass	Fa : Fail

Course Schedule

Week 1.

Monday: Review of Linear Algebra

Tuesday: Matrix Analysis.

Wednesday: Variants, Examples, Piecewise linear convex objective functions, Graphical solution, Polyhedra and convex sets

Thursday: Extreme points, vertices, and basic feasible solutions

Week 2.

Monday: Vertices, Standard form, Degeneracy

Tuesday: Existence and optimality of extreme points, Bounded polyhedral, Fourier-Motzkin elimination

Wednesday: Simplex method, Anticycling, Phase One.

Thursday: Column Geometry Mathematical Software for Optimization

Week 3.



Monday: Motivation for Duality, Dual problem, Duality theorem, Marginal cost,
Dual simplex method

Tuesday: Farkas Lemma, Separating hyperplanes, Cones, Representation of polyhedra,

Wednesday: Global dependence on right-hand side, Set of dual optimal solutions

Thursday: Global dependence on cost, Parametric programming

Week 4.

Monday: The affine scaling algorithm, Convergence of affine scaling, The potential reduction

Tuesday: The primal path following algorithm, The primal-dual path following algorithm

Wednesday: Branch and bound, Dynamic programming

Thursday: Integer programming duality

