

AE 8803 Special Topics - Syllabus

Optimal Transport Theory and Applications. 3 Credit Hours.

General Information

Description

In this course, we will systematically go over optimal transport theory. We will cover classical topics in optimal transport such as Kantorovich duality, Wasserstein distance, gradient flow, displacement interpolation etc. We will also study more recent developments such as entropic regularization, connections to stochastic control, Wasserstein generative adversarial networks and statistical optimal transport. Algorithms and applications of optimal transport will be discussed in details.

Pre- &/or Co-Requisites

Advanced Calculus, Real Analysis, Convex optimization, Riemannian Geometry

Course Goals and Learning Outcomes

This is a math-oriented course. The students are expected to build a solid background in optimal transport by the end of the semester. The course is project based. The students will have the opportunities to conduct research in this timely topic.

Course Requirements & Grading

Note: Graded components of a course may vary with each offering. The example below is typical but subject to change.

Description of Graded Components

Homework	30%
Lecture scribing	5%
Course project	65%

Grading Scale

Your final grade will be assigned as a letter grade according to the following scale:

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	0-59%

Topics Covered

Last modified: October 10, 2024

Note: The exact topics covered in a course may vary with each offering. The example below is typical but subject to change.

1. Introduction and math background
2. Optimal transport theory
3. Optimal transport algorithms
4. Optimal transport applications
5. Other topics on optimal transport

Course Materials

Note: Course materials may vary with each offering. The example below is typical but subject to change.

Textbook

Topics in Optimal Transportations, Cedric Villani

Course notes

All relevant information on the class will be disseminated electronically at Canvas.