Fall 2019

MATH 707-001: Optimal Transport

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NJIT New Jersey's Science & Technology University

THE COLLEGE OF SCIENCE AND LIBERAL ARTS

THE DEPARTMENT OF MATHEMATICAL SCIENCES

MATH 707: Optimal Transport
Fall 2019 Graduate Course Syllabus

NJIT Academic Integrity Code: All Students should be aware that the Department of Mathematical Sciences takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

Course Description: An introduction to Optimal Transport. Topics may include the dual formulation, polar factorization, the Monge-Ampère equation, the Wasserstein metric, applications to geometric optics and geophysics, and numerical methods.

Number of Credits: 3

Prerequisites: Departmental approval. A current research topic of interest to departmental faculty. Typical topics include: computational fluid dynamics, theoretical fluid dynamics, acoustics, wave propagation, dynamical systems, theoretical and numerical aspects of combustion, mathematical biology, and various topics in statistics.

Course-Section and Instructors

Course-Section	Instructor
Math 707 - ST	Professor B. Hamfeldt

Office Hours for All Math Instructors: Fall 2019 Office Hours and Emails

Recommended Textbooks:

Title	*Topics in Optimal Transportation*
Author	C. Villani
Edition	2003
Publisher	American Mathematical Society
ISBN #	9780821833124

University-wide Withdrawal Date:The last day to withdraw with a **W** is **Monday, November 12, 2019**. It will be strictly enforced.

POLICIES

DMS Course Policies: All DMS students must familiarize themselves with, and adhere to, the Department of Mathematical Sciences Course Policies, in addition to official university-wide policies. DMS takes these policies very seriously and enforces them strictly.

Grading Policy: The final grade in this course will be determined as follows:

Homework	50%
Project	50%

Your final letter grade will be based on the following tentative curve.

A	90 - 100	**C+**	76 - 79
B+	86 - 89	**C**	70-75
B	80 - 85	**F**	0-69

Attendance Policy: Attendance at all classes will be recorded and is **mandatory**. Please make sure you read and fully understand the Math Department's Attendance Policy. This policy will be strictly enforced.

Homework: Homework assignments will be posted on the course webpage. Each assignment must be handed in at the beginning of class on the due date. Late assignments are NOT accepted. Solutions will be graded for correctness, completeness, and clarity.

Project: Each student will select a topic related to optimal transportation to research for a final class project, which must include a written report and a 10-15 minute oral presentation. A brief (maximum 1 page) project proposal will be due no later than Monday November 4. Students are strongly encouraged to meet with the instructor prior to this to discuss and obtain approval for their proposed topic. A written report will be due Wednesday December 4. Oral presentations will be scheduled for the end of the semester.

Makeup Exam Policy: To properly report your absence from a midterm or final exam, please review and follow the required steps under the DMS Examination Policy found here:

- http://math.njit.edu/students/policies_exam.php

Cellular Phones: All cellular phones and other electronic devices must be switched off during all class times.

ADDITIONAL RESOURCES

Accommodation of Disabilities: Disability Support Services (DSS) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director of Disability Support Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall, Room 260. A Letter of Accommodation Eligibility from the Disability Support Services office authorizing your accommodations will be required.

For further information regarding self identification, the submission of medical documentation and additional support services provided please visit the Disability Support Services (DSS) website at:

- https://www.njit.edu/studentsuccess/accessibility/

Important Dates (See: Fall 2019 Academic Calendar, Registrar)

Date	Day	Event
September 4, 2019	T	First Day of Classes

September 10, 2019	M	Last Day to Add/Drop Classes
November 12, 2019	M	Last Day to Withdraw
November 20, 2019	T	Thursday Classes Meet
November 21, 2019	W	Friday Classes Meet
November 22 - 25, 2019	R - Su	Thanksgiving Recess
December 12, 2019	W	Last Day of Classes
December 13 & 14, 2019	R & F	Reading Days
December 15 - 21, 2019	Sa - F	Final Exam Period

Course Outline

Week	Topic
1	Introduction to Optimal Transport
2-6	Optimal Transport Theory
7-10	Applications of Optimal Transport
11-14	Numerical Methods for Optimal Transport
15	Presentations

Updated by Professor B. Hamfeldt-7/16/2019
Department of Mathematical Sciences Course Syllabus, Fall 2019