University of Gdańsk

Subject card

Subject name and code	Optimal Transportation, PG_00210329		
Field of study	Mathematics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2026/2027
Education level	Master's studies	Subject group	Obligatory subject group in the field of study Optional subject group
Mode of study	full-time studies	Mode of delivery	at the university
Year of study	1	Language of instruction	Polish
Semester of study	1	ECTS credits	5.0
Learning profile	academic	Assessment form	credit
Conducting unit	Institute of Mathematics -> Faculty of Mathematics, Physics and Informatics -> Rector		
Name and surname of lecturer (lecturers)	Subject supervisor	dr Szymon Myga	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	30.0	0.0	0.0	0.0	60

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	60	3.0	62.0	125

Subject objectives

The aim of the course is to introduce the topic of optimal transportation and discuss its applications in machine learning.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[MATMU2_U05] is able to apply new or adapt existing methods and tools from a selected field of mathematics and information and communication technologies in related fields	The student knows the basics of the theory of metric properties of the spaces of probabilistic measures.	[SU4] test/exam - oral or written
[MATMU2_W01] knows and understands in depth the theory of selected areas of mathematics or related fields, the complex relationships between them and their development trends	The student understands the problem of optimal transport and its numerous reformulations.	[SW4] test/exam - oral or written

Subject contents

1. Monge problem. Kantorovitch problem.
2. Dual problem.
3. Sinkhorm algorithm.
4. Wasserstein metric.
5. Applications.
6. Presenting the English nomenclature for the course.

Prerequisites and co-requisites

Mathematical analysis, probability.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Assesment of student's attitude	51.0%	0.0%
Wirtten or oral exam and/or project and/or tests	51.0%	100.0%

Recommended reading	Basic literature	1. Cédric Villani, *Topics in optimal transportation*, Grad. Stud. Math., 58, American Mathematical Society, Providence, RI, 2003, 2. Filippo Santambrogio, *Optimal transport for applied mathematicians* . Calculus of variations, PDEs, and modeling Progr. Nonlinear Differential Equations Appl., 87 Birkhäuser/Springer, Cham, 2015. link 3. Gabriel Peyré, *Optimal Transport for Machine Learners, Course notes*. link
	Supplementary literature	Gabriel Peyre, Marco Cuturi, et al. *Computational optimal transport.* Foundations and Trends® in Machine Learning, 11(5-6):355607, 2019.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.