1.	Record Nr.	UNINA9910919815603321
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	Titolo	Lectures on Optimal Transport / / by Luigi Ambrosio, Elia Brué, Daniele Semola
	Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2024
	ISBN	9783031768347 3031768345
	Edizione	[2nd ed. 2024.]
	Descrizione fisica	1 online resource (XI, 260 p. 2 illus., 1 illus. in color.)
	Collana	La Matematica per il 3+2, , 2038-5757 ; ; 169
	Disciplina	515
	Soggetti	Mathematical analysis Mathematical optimization Calculus of variations Measure theory Mathematics Analysis Calculus of Variations and Optimization Measure and Integration
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di contenuto	- 1. Lecture I. Preliminary notions and the Monge problem -- 2. Lecture II. The Kantorovich problem -- 3. Lecture III. The Kantorovich - Rubinstein duality -- 4. Lecture IV. Necessary and sufficient optimality conditions -- 5. Lecture V. Existence of optimal maps and applications -- 6. Lecture VI. A proof of the isoperimetric inequality and stability in Optimal Transport -- 7. Lecture VII. The Monge-Ampére equation and Optimal Transport on Riemannian manifolds -- 8. Lecture VIII. The metric side of Optimal Transport -- 9. Lecture IX. Analysis on metric spaces and the dynamic formulation of Optimal Transport -- 10. Lecture X.Wasserstein geodesics, nonbranching and curvature -- 11. Lecture XI. Gradient flows: an introduction -- 12. Lecture XII. Gradient flows: the Brézis-Komura theorem -- 13. Lecture XIII. Examples of gradient flows in PDEs -- 14. Lecture XIV. Gradient flows: the EDE and EDI formulations -- 15. Lecture XV. Semicontinuity and convexity of energies in the Wasserstein space -- 16. Lecture XVI. The Continuity

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Sommario/riassunto

This textbook is addressed to PhD or senior undergraduate students in mathematics, with interests in analysis, calculus of variations, probability and optimal transport. It originated from the teaching experience of the first author in the Scuola Normale Superiore, where a course on optimal transport and its applications has been given many times during the last 20 years. The topics and the tools were chosen at a sufficiently general and advanced level so that the student or scholar interested in a more specific theme would gain from the book the necessary background to explore it. After a large and detailed introduction to classical theory, more specific attention is devoted to applications to geometric and functional inequalities and to partial differential equations. This is the second edition of the book, first published in 2018. It includes refinement of proofs, an updated bibliography and a more detailed discussion of minmax principles, with the aim of giving two fully self-contained proofs of Kantorovich duality.