MATH 1502 Background Books and Further Reading:

Optimal Transportation:

* McCann and Guillen 'Five lectures on optimal transport' In Analysis and Geometry of Metric Measure Spaces. G. Dafni et al, eds. Providence: Amer. Math. Soc. (2013) 145-180.

* Santambrogio. *Optimal Transport for Applied Mathematicians*. Springer, 2015. Available as an electronic resource through the University Library.

* Villani. Topics in Optimal Transportation. AMS, 2003.

* Villani. Optimal Transport: Old and New. Springer, 2009.

Measure Theory and Integration:

Royden. *Real Analysis. 3rd ed.* McMillan Publishing Co., 1988, 1963. Rudin. *Real and Complex Analysis. 3rd ed.* McGraw- Hill 1987, 1966. Lieb and Loss. *Analysis.* American Mathematical Society 1997.

Functional Analysis:

Brezis. Functional analysis, Sobolev Spaces and Partial Differential Equations. Springer, 2011.

Reed and Simon. *Functional Analysis* (volume 1 of Methods of Modern Mathematical Physics; Revised and Enlarged Edition). Academic Press 1980.

Rudin. *Functional Analysis*. McGraw-Hill 1973. Adams. *Sobolev Spaces*. Academic Press 1975. (for Legendre transforms!)

Linear Programming:

* Anderson and Nash. *Linear Programming in Infinite-Dimensional Spaces. Theory and applications.* Wiley 1987. (especially chapter on transportation)

Brickman. Mathematical Introduction to Linear Programming and Game Theory. Springer-Verlag 1989. (elementary introduction)

Convex Analysis:

van Tiel. Convex analysis. An Introductory Text. Wiley 1984 Ekeland and Teman. Convex analysis and variational problems. SIAM 1999. Rockafellar. Convex Analysis. Princeton University Press 1972.

Schneider. Convex bodies: the Brunn-Minkowski Theory Cambridge University Press 1993.

Riemannian and Metric Geometry:

* Ambrosio, Gigli and Savare. Gradient Flows in Metric Spaces and in the Space of Probability Measures. Birkhauser 2005.

* Burago, Burago and Ivanov. A Course in Metric Geometry AMS, 2001. Gallot, Hulin and Lafontaine. Riemannian Geometry. Springer-Verlag 1993. Krantz. Complex analysis : the geometric viewpoint. Washington, 1990.

Milnor. Morse Theory. Princeton University Press 1963, 1969.

* Wald. General Relativity. University of Chicago Press, 1984.

Geometric Analysis:

* Evans and Gariepy. *Measure Theory and Fine Properties of Functions*. CRC Press 1992.

Federer. Geometric Measure Theory. Springer, 1969.

Giusti. Minimal Surfaces and Functions of Bounded Variation. Birkhäuser 1984.

Maggi. Sets of Finite Perimeter and Geometric Variational Problems: an Introduction to Geometric Measure Theory, Cambridge 2012.

Morgan. Geometric Measure Theory. A Beginner's Guide. Academic Press 1995.

Simon. Lectures on Geometric Measure Theory, CMA-ANU, 1983.

Partial Differential Equations:

Caffarelli and Cabré. Fully nonlinear elliptic equations. AMS, 1995. * Evans. *Partial Differential Equations*. American Math Society 1998.

Figalli. The Monge-Ampère Equation and Its Applications. EMS, 2017

Gilbarg and Trudinger. Elliptic Partial Differential Equations of Second Order. Springer, 2001.)

Gutiérrez. The Monge-Ampère Equation. Birkhauser, 2001.

Fluid Mechanics:

Bertozzi and Majda. Vorticity and Incompressible Flow. Cambridge, 2002. Cullen. A Mathematical Theory of Large Scale Atmospheric and Oceanic

Flow. Imperial College, 2006.

Salmon. Lectures on Geophysical Fluid Mechanics. Oxford, 1998. Vazquez. The Porous Medium Equation. Oxford, 2007.

Economics:

Basov. Multidimensional Screening. Springer, 2005.

Beckmann and Puu. Spatial Economics: Density, Potential, and Flow, North-Holland / Elsevier 1985.

Chiappori. Matching with Transfers: The Economics of Love and Marriage. Princeton, 2017.

Galichon. Optimal Transport Methods in Economics. Princeton, 2016.

Henry-Labordère. Model-free Hedging: A Martingale Optimal Transport Viewpoint. CRC Press 2017.

Mas-Colell, Whinston and Green. *Microeconomic Theory*. Oxford, 1995.

Sotomayor and Roth. Two-Sided Matching: a Study in Game-Theoretic Modeling and Analysis. Cambridge Press, 1992.

Vohra. Mechansm design: A Linear Programming Approach. CUP, 2011.

Computer Science, Algorithms and Complexity:

Knuth. Stable marriage and its relation to other combinatorial problems. An introduction to the mathematical analysis of algorithms. AMS, 1997

Papadimitriou and Steiglitz. Combinatorial Optimization. Dover 1982. Roughgarden. Selfish Routing and the Price of Anarchy. MIT, 2005.