

DOCTOR OF PHILOSOPHY IN TRANSPORTATION

Graduate Programs in Transportation (<https://catalog.mit.edu/interdisciplinary/graduate-programs/transportation>)

Program Requirements

MIT graduate-level subjects taken to fulfill the requirements of the Master of Science in Transportation degree (<https://catalog.mit.edu/degree-charts/master-transportation>) may be counted toward the doctoral program requirements.

Core Subjects

1.200[J]	Transportation: Foundations and Methods	12
11.251	Frontier of Transportation Research ¹	6

Select one of the following: 12

1.144[J]	Applied Category Theory for Engineering Design	
1.202	Demand Modeling	
1.208	Resilient Networks	
1.260[J]	Logistics Systems	
11.478	Behavioral Science, AI, and Urban Mobility	

Computation/Analytics 12

Select one of the following:

1.C51 & 6.C51	Machine Learning for Sustainable Systems and Modeling with Machine Learning: from Algorithms to Applications	
6.3732[J]	Statistics, Computation and Applications	
6.7900	Machine Learning	
6.7910[J]	Statistical Learning Theory and Applications	
15.071	The Analytics Edge	
15.072	Advanced Analytics Edge	

Core Research Area 24

Select two subjects from one of the five approved areas:

Performance and Optimization

1.208	Resilient Networks	
6.7220[J]	Nonlinear Optimization	
6.7260	Network Science and Models	
6.7700[J]	Fundamentals of Probability	
6.7720[J]	Discrete Probability and Stochastic Processes	

15.081[J]	Introduction to Mathematical Programming	
15.081[J]	Introduction to Mathematical Programming	
15.094[J]	Robust Modeling, Optimization, and Computation	

Machine Learning and Statistics

1.127[J]	Reinforcement Learning: Foundations and Methods	
1.C51 & 6.C51	Machine Learning for Sustainable Systems and Modeling with Machine Learning: from Algorithms to Applications	
6.7250	Optimization for Machine Learning	
6.7730	Modern Mathematical Statistics	
6.7800	Inference and Information	
6.7810	Algorithms for Inference	
6.7900	Machine Learning	
6.7910[J]	Statistical Learning Theory and Applications	
6.7960	Deep Learning	
6.8300	Advances in Computer Vision	
9.521[J]	Mathematical Statistics: a Non-Asymptotic Approach	
9.522	Statistical Reinforcement Learning	
15.095	Machine Learning Under a Modern Optimization Lens	

Planning and Policy ²

11.478	Behavioral Science, AI, and Urban Mobility	
11.526[J]	Comparative Land Use and Transportation Planning	
11.540	Urban Transportation Planning and Policy	

Logistics ³

1.260[J]	Logistics Systems	
15.764[J]	The Theory of Operations Management	
15.762[J] & 15.763[J]	Supply Chain Analytics and Supply Chain: Capacity Analytics	

Demand ⁴

1.202	Demand Modeling	
1.205	Advanced Demand Modeling	
14.380 & 14.381	Statistical Method in Economics and Estimation and Inference for Linear Causal and Structural Models ⁵	
14.382	Econometrics ⁵	

Unrestricted Electives ⁶		54
Thesis		
1.THG	Graduate Thesis ⁷	540
Total Units		660

Note: Students in this program can choose to receive the Doctor of Philosophy or the Doctor of Science in Transportation. Students receiving veterans benefits must select the degree they wish to receive prior to program certification with the Veterans Administration.

¹ Taken twice for a total of 6 units.

² The Policy and Planning area also requires a written exam.

³ Students who DO NOT take 1.260 to fulfill the Core requirement, must take either 15.764, or 15.762 and 15.763. Students who DO take 1.260 to fulfill the Core requirement must

⁴ Students who do NOT take 1.202 to fulfill the Core requirement must take 1.202, and either 1.205 or 14.382. Students who DO take 1.202 to fulfill the Core requirement must take either 1.205 and 14.382, or 1.205, 14.380, and 14.381.

⁵ For either 14.380 and 14.381, or for 14.382, students can instead choose one of the following, more advanced subjects: 14.384 Time Series Analysis, 14.385 Nonlinear Econometric Analysis, or 14.386 New Econometric Methods.

⁶ Students choose subjects in consultation with their advisor.

⁷ Thesis units are based on the average duration of the doctoral program (five years) but will vary based on how long the student remains in the program.