

Master of Science in Transportation Degree Requirements 1

Students must have satisfactorily completed a program of study of at least 66 units of graduate level subjects, plus a research-based master's thesis. Coursework includes two required core subjects, at least three additional transportation or related subjects comprising an individually designed program, one policy or technology subject, and a computer programming subject.

In the following document you will find specific information pertaining to:

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2/ Research and Degree Requirements

3/ Thesis Submission

Appendix A/ Contact Information

Appendix B/ Policy and Technology Subjects

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Appendix E/ Responsible Conduct of Research

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Thesis Supervision

A student's thesis supervisor can be a 1/MIT Interdepartmental Program in Transportation Faculty member(s) or 2/ Interdepartmental Program in Transportation Senior Research Scientist/Engineer. A thesis supervisor is responsible for certifying and signing the thesis.

Research and Degree Requirements

Subject Requirements

The requirements for the MST degree consist of the following:

- a core of two 12-unit subjects; 1.200 and 1.201
- an individually designed program area comprised of 3 subjects, totaling at least 30 units
- at least one Policy or Technology subject;
- a computer programming requirement;
- a thesis and research requirement.

Students are required to fill out and submit the program form, found in Appendix B, by December 15 of their first term.

The Core

The MST core consists of two 12-unit subjects, which are taught in the Fall semester:

1.200 Transportation Systems Analysis: Performance and Optimization (C. Osorio)

Problem-motivated introduction to methods, models and tools for the analysis and design of transportation networks including their planning, operations and control. Capacity of critical elements of transportation networks. Traffic flows and deterministic and probabilistic delay models. Formulation of optimization models for planning and scheduling of freight, transit and airline systems, and their solution using software packages. User- and system-optimal traffic assignment. Control of traffic flows on highways, urban grids, and airspace.

1.201 Transportation Systems Analysis: Demand and Economics (M. Ben-Akiva)

Introduces transportation systems analysis, stressing demand and economic aspects. Covers the key principles governing transportation planning, investment, operations and maintenance. Introduces the microeconomic concepts central to transportation systems. Economic theories of the firm, the consumer and the market, disaggregate and aggregate demand models, discrete choice analysis, cost models and production functions for passenger and freight demand, pricing theory and application to transportation systems including the theory and practice of congestion pricing, technological change, resource allocation, market structure and regulation in the transportation industry, and project evaluation for transportation systems. Applications include passenger and freight, urban public transportation, aviation and intelligent transportation systems .

The core reflects the interdisciplinary, systems-oriented nature of our educational approach.

The Program

The program requires each student to select three or more subjects which further their educational objectives in the field of transportation. For some students this will mean building their depth of understanding in a selected area of interest. For other students the program may emphasize breadth rather than depth in a single area. At least two of the designated subjects should be clearly focused on transportation, while the other(s) can be in a field which supports transportation- for example, a subject covering methods that are used in transportation, drawn from fields such as economics, operations research, political science, management, project evaluation and others.

Depth is provided in the following areas:

- Air Transportation
- Analysis and Planning Methods Data Sciences for Transportation
- Intelligent Transportation Systems, Safety and Security
- Logistics and Supply Chain Management
- Transportation Policy, Planning and Sustainability
- Urban Transportation

Three subjects selected from any subset of the above areas will achieve breadth. At least one of the subjects should be either a Policy or a Technology course.

The Computer Programming Requirement

The Computer Programming requirement can be satisfied by taking a subject from the following list:

- 1.001 Engineering Computation and Data Science (G credit, 12 units)
- 1.000 Computer Programming for Scientific and Engineering Applications (U credit, 12 units)
- 6.0001 Introduction to Computer Science Programming in Python (U credit, 6 units)

Only 1.001 provides graduate credit. The other subjects may qualify for graduate credit if the student obtains permission from the Academic Programs Office and the Office for Graduate Education. To seek graduate credit, students must coordinate with their Academic Advisor and the subject instructor to determine what extra work is required. Then, students must complete and submit the OGE Graduate Student Petition Form within the first two weeks of the term, for which they are registered for the subject.

The Computer Programming Requirement may also be fulfilled by the MITx online course 6.00x found here: <https://www.edx.org/course/introduction-to-computer-science-and-programming-using-python> - this course will not be counted towards your total credits but it will fulfill the Programming Requirement.

Note on Petitions: Petitions are an Institute level request, through the Office of Graduate Education, and are used for academic requests including, but not limited to, requesting graduate level credit for an undergraduate level subject, late add or drop, filing for dual degree status, etc. If you would like to request grad level credit for a subject you must take action at the start of the term AND the instructor must agree to assign additional work. Note that while the petition can cover multiple requests, there is a \$50 filing fee. The Academic Administrator in the Interdepartmental Program in Transportation, in the CEE Academic Programs Office, can sign for the program and then you will submit the form to the OGE in 3-138.

Note on Waivers: Requesting a waiver is done at the program level and is usually requested if a student would like to waive a degree requirement, eg the Computer Programming requirement. To request a waiver, please email the Academic Administrator in the Interdepartmental Program in Transportation, in the CEE Academic Programs Office (APO), at cee-apo@mit.edu with the rationale for your request and include any relevant supporting documents like syllabus from previous coursework, that support and document your justification for requesting the waiver. Once the APO receives the waiver request we will work through the approval process and the student will be notified whether or not the waiver has been approved. Waivers should be requested at the time of submitting your program form, by December 15 of your first term at MIT.

Research Requirement and Thesis Registration

Research plays an integral role in the MST degree, and this research effort is tracked academically through enrollment in your department of registration's thesis subject designation.

In the Interdepartmental Program in Transportation, we **require each graduate student to register for either 1.THG or 11.THG (i.e., X.THG) every semester that they are in the program.** The X.THG units should fill in the semester load to equal 48 units (a full subject load), but with a minimum of 12 units X.THG in a given semester. The number of credit hours is determined in consultation with your advisor. Through enrollment in X.THG, students are formally graded on research performance each semester, in accordance with MIT Faculty Rules and Regulations 2.62.3.

<http://web.mit.edu/faculty/governance/rules/2.60.html>

Checklist for Submission of Master of Science in Transportation Thesis

MIT has three degree-granting cycles per year: February, June and September. Approaching the time when you will submit your thesis, you should register to be on the appropriate degree list. To register for the degree list go to student.mit.edu, select "online degree application" and follow the instructions. Once registered for the degree list you will receive a detailed email from the Graduate Administrator outlining the steps needed to complete your degree.

Submitting your Thesis to the Academic Programs Office

You are required to submit two signed copies of your thesis printed on acid-neutral or archival bond paper, by 5 pm on the day of the Department's deadline. Check with the Academic Administrator in the Interdepartmental Program in Transportation, in the CEE Academic Programs Office (cee-apo@mit.edu) to find out the date for your degree list. Reminder, the Academic Administrator will be responsible for retrieving the signature of the Chair of the Graduate Program Committee, please do not contact him/her directly. The copies must be unbound but secured between heavy cardboard covers with a binder clip. The front cardboard cover of each thesis copy should feature a photocopy of the top half of your thesis signature page (from the copyright up). You may simply tape or glue it on.

Congratulations! You have finished!

Appendix A

Contact Information

Kiley Clapper
Interdepartmental Program in Transportation Academic Administrator
Email: kclapper@mit.edu
Office: 1-290

Max Martelli
Academic Assistant
Email: maxmm@mit.edu
Office: 1-290

Professor Hamsa Balakrishnan
Director and Graduate Officer, Interdepartmental Program in Transportation
Email: hamsa@mit.edu
Office: 33-207

Transportation Student Group (TSG)
Student group that organizes social events for interdepartmental students to connect.
Email: tsg-exec-2018@mit.edu

Appendix B Policy and Technology Subjects

This list is not exhaustive and you are free to take alternate subjects to fulfill this requirement per the discretion of your advisor.

POLICY SUBJECTS

Subjects that satisfy the program policy requirement include:

I. Transportation policy subjects:

11.478 (Spring) - Behavior and Policy: Connections in Transportation

SUP-651 (Fall) - Transportation Policy and Planning (at Harvard's Kennedy School)

II. Transportation subjects with substantial policy content (nominally half):

11.526J/1.251J (Spring) - Comparative Land-Use and Transportation Planning

16.71 (Fall) - The Airline Industry

III. Policy subjects with modest or no transportation content:

IDS.521 (Spring) - Energy Systems and Climate Change Mitigation

IDS.411 (Fall) - Concepts and Research in Technology and Policy

IDS.412J/17.310J/STS.482J (Spring) - Science, Technology, and Public Policy (IDS.401)

12.848J/15.023J (Spring) - Global Climate Change: Economics, Science and Policy

IDS.435 (Spring) - Law, Technology and Public Policy

6.805JJ/STS.085J (Fall) - Foundations of Information Policy

11.255 (Spring) - Negotiations and Dispute Resolution In the Public Sector

11.481J/1.284J (Spring) - Analyzing and Accounting for Regional Economic Change

TECHNOLOGY SUBJECTS

Subjects that satisfy the program technology requirement include:

IDS.521 (Spring) - Energy Systems and Climate Change Mitigation

2.65J/1.818J/10.391J/ (Fall) - Sustainable Energy

11.371J/22.811J (Fall)

6.268 (Spring) - Network Science and Models

16.422 (Fall, not offered this AY) - Human Supervisory Control of Automated Systems

16.453J/HST.518J (Fall) - Human Factors Engineering

16.72 (Fall, not offered this AY) - Air Traffic Control

MAS.552J/4.557J (Fall, not offered this AY) - City Science

MAS.836 (Spring) - Sensor Technologies for Interactive Environments

Master of Science in Transportation (MST) Program Approval Form

Name: _____

A. Core Requirement

	Term/Year	Grade	Units
1.200 Transportation Systems Analysis: Performance and Optimization	_____	_____	<u>12</u>
1.201 Transportation Systems Analysis: Demand and Economics	_____	_____	<u>12</u>

B. Program Area

List the subjects you plan to take to satisfy the program area requirement, and check the box next to the subject that meets the one Policy or Technology subject requirement. The program area should include at least three subjects and 30 units of credit. At least two of the designated subjects should be clearly focused on transportation, while the other(s) can be in a field which supports transportation.

	<u>Number</u>	<u>Subject Title</u>	<u>Term/Year</u>	<u>Policy or Technology</u>	<u>Units</u>
1)				<input type="checkbox"/>	_____
2)				<input type="checkbox"/>	_____
3)				<input type="checkbox"/>	_____

C. Computer Programming Requirement

- | | | |
|--|---|--|
| <input type="checkbox"/> 1.001 (12 units, G) | <input type="checkbox"/> 6.149 (6 units, U*) | <input type="checkbox"/> Waiver Request Submitted (no units) |
| <input type="checkbox"/> 1.000 (12 units, U*) | <input type="checkbox"/> 6.0001 (6 units, U*) | <input type="checkbox"/> Waiver Request Approved |
| <input type="checkbox"/> Petition for Graduate Credit Approved Prior to Registering for UG subject | | |

* Indicates student must petition for graduate credit

TOTAL UNITS _____

The MST degree requires a total of 66 graduate units. A thesis is also required.

Faculty Advisor **Date**

This form must be completed and electronically to cee-apo@mit.edu by December 15 of your first term at MIT



Internal Doctoral Application Form Interdepartmental Program in Transportation

Process: Fill out the form below, write a one page statement of purpose detailing your current education, research and career objectives together with an updated CV.

Please request 2 letters of reference from current faculty at MIT with at least one recommendation coming from a faculty member who can evaluate the student's research ability and potential.

Additionally, please request a copy of your original application to MIT and your MIT grade report from your current graduate administrator to be sent to the APO. All documents and letters of reference should be sent from the source to the Academic Programs Office (APO) in CEE at: cee-apo@mit.edu

Deadline: Please submit to cee-apo@mit.edu by September 15 of your second academic year.

First Name:

Last Name:

MIT ID:

Email:

Gender:

Date of Birth:

Citizen of:

Initial Degree Objective:

Final Degree Objective:

Name of Letter Writer:

Name of Letter Writer:

Appendix E

Responsible Conduct of Research

Each SM student is required to complete MIT’s online course on the Responsible Conduct of Research within the first year, i.e. by the end of Spring term AY1. If you are paid on an NSF grant, you are required to complete the course within 60 days of being assigned to the grant. You can access the course from this web site and following the instructions below. You will need an MIT certificate.

<http://osp.mit.edu/compliance/responsible-conduct-of-research-rcr/register-for-rcr-training>

1. On the bottom of the page, click on “accessing the site for the first time”

Quickcards

Quickcards in PDF format for RCR training can be downloaded here.

- Accessing the CITI site for the first time 
- Accessing CITI for additional training
- Affiliating CITI training with MIT

2. From there CITI will ask you to create a password.

3. After you have created your new password, click on “Add a course or Update Learner Group”

My Learner Tools for Massachusetts Institute of Technology

 You are not enrolled in any courses for this institution. [Click here to complete your enrollment.](#)

-  [Add a Course or Update Learner Groups](#)
- [View Previously Completed Coursework](#)
- [Update Institution Profile](#)
- [View Instructions page](#)
- [Remove Affiliation](#)

4. Go to question 4 and select, RCR for Engineers

5. You should then see that the course has been added

Massachusetts Institute of Technology Courses		
Course	Status	Completion Report
Responsible Conduct of Research for Engineers	Not Started	Not Earned

6. Complete The Integrity Assurance Statement before beginning the course

7. Once you have completed the course (12 modules with 80% or better on the individual quizzes) send a screen shot of your completion report to the graduate academic administrator, Kiley Clapper (cee-apo@mit.edu).

Office of Graduate Education
Graduate Student Petition – General

1. Student Information

Last Name _____ First Name _____

Course# or Program _____ MIT ID _____

Dorm Name, Room or Unit # _____

Email Address _____

2. Student Statement of Petition Request

(Please include request, term, subject number if applicable, brief reason for requested academic change)

3. Department Statement of Approval

A. Write departmental comments below
(please clarify request if necessary)

B. If approved, Print and sign:

Graduate Administrator or Officer: _____

Student's Signature: _____

Instructor's Signature: _____

(Instructor's Signature required for any action pertaining to a subject you have attended)

4. Institutional Approval

Authorized Signature, Office of Graduate Education (OGE) Room 3-138

Important Information

The Vice Chancellor and Senior Associate Dean in the Office of the Dean for Graduate Education (OGE) act with power on behalf of the Committee on Graduate Programs (CGP) with regard to all requests.

A processing fee of \$50.00 will be charged to your student account for each petition approved. The exception is a \$100.00 fee charged for an approved petition to register after the 5th week of term.

Once signed at OGE (Room 3-138), a scanned copy of the approved petition will be emailed to you, your departmental Graduate Administrator, and to the Registrar's office where it will be implemented.

Instructions for Submitting a Petition

This petition may be used for (but is not limited to) the following actions:

- Establish or Amend a dual master's degree (*attach list of subjects and credit units for each degree*)
- Choose a thesis field not currently on the list of departmental fields
- Add or drop a subject after the stated deadlines
- Request a joint master's degree thesis (*attach a statement specifying division of labor*)
- Request to register after add date due to the clearance of a registration hold
- Establish special tuition rates
- Changing a grade of "O" (missing final exam or final project) to OX (excused)
- Request approval for retroactive actions in unusual circumstances
- Appoint an ad-hoc interdisciplinary PhD dissertation committee

Specific forms are available for the following petition actions:

- Request early termination of a housing contract due to unforeseeable circumstances
- Non-resident Doctoral thesis status
- Thesis in absentia
- Exchange Scholar Status
- Childbirth Accommodation (maternity leave from academic and research activities)

Note: To request medical or other types of leave, please see <http://odge.mit.edu/gpp/registration/changes/medical-leave-policy/>