### Northwestern University Masters of Science Program in Transportation Systems Analysis and Planning (2016-2017)

The MS in TRN requires 12 course units in addition to a writing requirement and the Seminar in Transportation Engineering.

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<tr>
<th>Track</th>
<th>1st Quarter/Fall</th>
<th>2nd Quarter/Winter</th>
<th>3rd Quarter/Spring</th>
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<tbody>
<tr>
<td>4 Courses/Quarter plus Transportation Engineering Seminar</td>
<td>Transportation Systems Planning and Management (479)</td>
<td>Infrastructure Systems Analysis (483)</td>
<td>Evaluation and Decision Making for Infrastructure Systems (482)</td>
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<td>Choose 3 courses from tracks below</td>
<td>Travel Demand Analysis &amp; Forecasting I (480-1)</td>
<td>Choose 3 courses from tracks below</td>
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<td></td>
<td>Seminar in Transportation Engineering (517) – no tuition zero credit seminar</td>
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#### Tracks Recommendation

- **Transportation Science and Systems**
  - **Introduction to Transportation Engineering** (376, *)
  - Transportation Systems Analysis I (471-1, *)
  - Advanced Theories of Traffic Flow (484, +, #)
  - Transportation Systems Operations and Control I: Urban Network (472-1, +, #)
  - Transportation Systems Analysis II (471-2, *)

- **Operations research and Logistics**
  - **Deterministic Models and Optimization** (IEMS 313, $, &)
  - Mathematical Programming (450-2)
  - Supply chain modeling and analysis (IEMS 381),
  - Supply Chain Management (IEMS 480)
  - Civil and Environmental Engineering Systems Analysis (304)

- **Travel demand analysis**
  - **Intermediate statistics** (IEMS 401, $)
  - Introduction to Applied Econometrics (ECON 281-0, $)
  - Uncertainty analysis (306)
  - Stochastic models and simulation (IEMS 315), Microeconomics (Econ 310)
  - Survey methods, data and analysis (473-0, $)
  - Advances in Travel Demand Analysis and Forecast (482-2, +, #)

- **Urban planning and policy**
  - **Transportation Economics and Public Policy** (Econ 355, $)
  - Elements of Public Finance (Econ 309)
  - Public Policy and Management Strategy: Energy and Environment (KGMS 466)

#### Writing requirement

**No tuition zero credit (518).** Please see Appendix B for detailed requirement.

Please see Appendix A for explanations.
Appendix A: Important notes on MS Program Table

1. Recommended courses/projects are in bold face in the table.
2. Recommended courses without any marks are required; Recommended courses marked with $ are electives.
3. For the three recommended courses marked with *, at least two must be taken to fulfill the MS degree requirement.
4. For the four recommended courses marked with +, at least one must be taken to fulfill the MS degree requirement.
5. Recommended courses marked with # are offered in alternating years.
6. The students are recommended to take one of the two courses marked with &. While both courses cover optimization, IEMS 313 is more suitable for those who do not have a strong background in this area.
7. ECON 281-0 is recommended only for PhD students who need a solid introductory course to applied econometrics. MS students cannot use this course to fulfill the 12-unit degree requirement.
8. CivEnv 517: Seminar in Transportation engineering. All students are expected to register and attend the seminar series through the year.
9. Seminar in Responsible Conduct for Research. Researchers and MS/PhD students are required to attend. MS students with PhD aspirations are encouraged to attend. Please contact CEE DGS, Dave Corr (d-corr@northwestern.edu), for additional details.
10. Electives are not limited to the courses listed in the table. Other 300 level courses or above may be taken as electives, subject to the faculty supervisor’s approval. Students may also take up to 3 research/independent-study units, which also requires the faculty supervisor’s approval.
Appendix B Transportation System Program Writing Requirement for the M.S. Degree

In addition to satisfactory completion of required coursework, M.S. students must conduct an independent research effort and prepare a research report. This could focus on a subject covered in the coursework of our program, or it may go beyond into an area of special interest to the student. The work and the product must have these characteristics:

- The work may be basic or applied research, an innovative analysis and solution to a practical problem, evaluation or development of a transportation policy, etc.
- It must be an original effort which, though limited in scope, demonstrates an interesting contribution to transportation and significant growth in the student’s knowledge.
- By “original” we mean that the work must feature a contribution from the student him/herself, rather than being merely a survey of what others have done.
- The topic must be mutually agreed upon by student and his/her faculty advisor, which is to say that the advisor has a role in selection of topic from the outset.
- Students should consult with their advisors in the design of the effort, selection of tools and data, and interpretation of results.
- Any transportation faculty member may serve as principal advisor. Another Northwestern faculty member, or (if the substance of the topic so warrants) even an outside senior professional in the field, may serve as principal advisor with the consent of student, the candidate advisor, and the Transportation Program area coordinator, Prof. Nie.
- The effort should reflect approximately one month or 180 hours of full-time work. Of course the effort itself may be spread over a much longer time period.
- The final product must be a well-written report which is:
  - Suitable for use as a professional report or a paper for submission to a journal.
  - In clear and correct English
  - Structured with a title page, executive summary, table of contents, lists of figures and tables, main text including a review of the literature and/or work of others, structured with thoughtful headings, graphics integrated in the text, and references presented in proper and consistent format.
- Draft reports should be presented for review by the principal advisor and second faculty member prior to completion. Advisors must be given a minimum of two weeks for report review. Students must address all significant comments from the advisor.
- When the report is found to be satisfactory, advisor and secondary reader will clear the student for graduation.
### MS in Transportation Systems Analysis and Planning – 2016-17 Sample Course Plan

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<tr>
<th>Course</th>
<th>Instructor</th>
<th>Time Schedule</th>
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<th>Time Schedule</th>
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<tr>
<td>CIVENV 376, Intro. to Transportation Engineering</td>
<td>Nie</td>
<td>MW 8-9:50</td>
<td>CIVENV 471-1, Transportation Systems Analysis-1</td>
<td>Nie</td>
<td>TBA</td>
<td>CIVENV 471-2, Transportation Systems Analysis-2</td>
<td>Nie</td>
<td>TBA</td>
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<td>CIVENV 517-1, Seminar in Transportation Engineering</td>
<td>Stathopoulos</td>
<td>Th 3:30-5</td>
<td>CIVENV 480-1, Travel Demand Modeling I</td>
<td>Stathopoulos</td>
<td>TBA</td>
<td>CIVENV 473-0, Survey methods, data and analysis</td>
<td>Stathopoulos</td>
<td>TBA</td>
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<td>IEMS 450-1, Mathematical Programming</td>
<td>Nohadani</td>
<td>MW 12:30-1:50</td>
<td>CIVENV 517-2, Seminar in Transportation Engineering</td>
<td>Stathopoulos</td>
<td>Th 3:30-5</td>
<td>CIVENV 517-3, Seminar in Transportation Engineering</td>
<td>Stathopoulos</td>
<td>Th 3:30-5</td>
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<td>Elective: The City (Sociology 301), Development of the Modern American City 1870-Present (History 322-2), Introduction to Stochastic Simulation (IEMS 435), others in EECS/Stats/IEMS/Applied Math/Economics</td>
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<td>Econ 355, Transportation Economics and Public Policy (7 spots; email <a href="mailto:ipsavage@northwestern.edu">ipsavage@northwestern.edu</a> by end of day)</td>
<td>Savage</td>
<td>MWF 11-12:20</td>
<td>Econ 331, Economics of Risk and Uncertainty</td>
<td>Siniscalchi</td>
<td>TTh 2-3:20</td>
<td>Econ 480-1, Introduction to Econometrics</td>
<td>Manksi</td>
<td>TTh 1:00-2:50, F 9-10:50</td>
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<td>CIVENV 306, Uncertainty Analysis (Email <a href="mailto:mark-clark@northwestern.edu">mark-clark@northwestern.edu</a> to arrange, if class closes.)</td>
<td>Clark</td>
<td>MWF 12-12:50, T 9-9:50</td>
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<td>IEMS 313, Deterministic Models &amp; Optimization (5 spots)</td>
<td>Wilson</td>
<td>MWF 11-11:50, M 4-4:50</td>
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<td>Other electives: In EECS, Statistics, IEMS, Applied Math, Math, Economics. For example, Econ 309, 310, 326. IEMS 415, 464.</td>
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