

**GRADUATE CURRICULUM GUIDE**  
University of Connecticut  
Civil Engineering Field of Study  
Transportation and Urban Engineering Area of Concentration  
Revised September 2014

In pursuing a graduate degree in Transportation and Urban Engineering (TUE), you must satisfy the requirements of the Graduate School, the Civil Engineering Department, and the TUE program. General Graduate School degree requirements can be found in:

- The Graduate Catalog: <http://catalog.grad.uconn.edu/>

Civil Engineering Graduate Degree Requirements at the University are found at:

- The CEE Department Website: <http://www.engr.uconn.edu/cee/page.php?id=pgs&pid=ms>

**This document summarizes the most critical elements of the information at these two locations for your convenience.** Please review the above websites and this document and discuss any questions you have with your advisor as early in your program as possible to avoid inconvenient delays later on.

Relevant background, core courses, transportation specialization courses and recommended courses outside transportation and CE are listed in Table 1 at the end of this document. Note that this table is not exhaustive, consult your advisor if you would like to propose a course in your plan of study not included in this list.

## MS DEGREE REQUIREMENTS

### Plan A versus Plan B

- Plan A is the **thesis** option. All students being supported as Graduate Research Assistants are expected to choose this track. If you are planning to go on for a Ph.D. you should choose this track.
- Plan B is the **non-thesis** option.

### Course Requirements

- For either degree plan:
  - Background preparation courses (unless satisfied by a previous degree)
  - CE 5710 – Case Studies in Transportation Engineering (3 credits)
  - Students must register for and attend CE 5030 every semester in which they are either enrolled for 9 or more credits or supported by a graduate assistantship.
- For Plan A:
  - Two courses from Transportation Core (6 credits)
  - One or more course of CE/Transportation Specialization (Minimum 3 credits)
  - Two or more courses outside CE/Transportation (Minimum 6 credits)
  - 9 credits of GRAD 5950 (Master's Thesis Research)
    - Note: Registering for GRAD 5950 requires a special application process
  - **Minimum 30 total credits**
- For Plan B:
  - Three courses from Transportation Core (9 credits)
  - Two or more courses of CE/Transportation Specialization (Minimum 6 credits)

- Two or more courses outside CE/Transportation (Minimum 6 credits)
- A final Master's project, usually done as an independent study (3 credits)
- **Total of 30 credits**

### **Plan A Thesis and Defense**

- See the section below titled "The Thesis and Dissertation."

### **Plan B Project and Final Exam**

- The **final examination** (oral exam) consists of an oral presentation of the final Master's project to a faculty examination committee, followed by questions from the committee.
- The project report must be delivered to the examination committee two weeks before the date of the final examination.

### **The MS Plan of Study**

- The Plan of Study (POS) lists the courses to be used to complete the requirements for the degree.
  - The chosen courses must conform to the above requirements and be approved by the major advisor and two associate advisors (selected jointly by the student and the major advisor).
  - The POS must be approved by the Graduate School **before the student may appear for his/her final examination or defense**. Note that several months are usually required for processing at the Graduate School.
- MS POS preparation steps:
  - 1) Begin the process no later than the beginning of the semester in which you expect to finish.
  - 2) Download and complete one (1) copy of the POS from the Graduate School website: <http://www.grad.uconn.edu/forms.html>
  - 3) Sign and present the POS to advisory committee for signature.
  - 4) Submit POS to the Graduate School.

## **PhD DEGREE REQUIREMENTS**

### **Course Requirements**

- With a prior MS, a minimum fifteen (15) credits of courses; without a prior MS, 45 credits of courses
- In either case, coursework must include the following:
  - CE 5710 – Case Studies in Transportation Engineering (3 credits)
  - Background preparation and 3 courses from Transportation Core (if not satisfied by a previous degree)
  - Two courses outside of CE/Transportation as a topical sequence approved by your advisor (6 credits)
  - Additional courses, as necessary, for a total of 15 credits or 45 past the B.S. degree.
- Fifteen (15) credits of GRAD 6950 (Dissertation Research)
- Students must register for and attend CE 5030 every semester in which they are either enrolled for 9 or more credits or supported by a graduate assistantship.

### **The PhD Plan of Study**

- The Plan of Study (POS) lists the courses to be used to complete the requirements for the degree.

- The courses listed must conform to the above requirements and be approved by his/her major advisor and two associate advisors (selected jointly by the student and the major advisor).
- Be sure to list the 6 credits used for your Related Area of Study on page 3.
- You also must indicate two semesters in which you were registered full-time to meet the “Residency Requirement”.
- For the PhD degree, the Plan of Study must be approved by the Graduate School before the student may appear for his/her General Examination. Note that several months are usually required for processing at the Graduate School.
- Ph.D. Plan of Study Checklist:
  - Start the process no later than six months before you expect to take your general exam.
  - Download and complete 3 copies of the POS from the Graduate School website: <http://www.grad.uconn.edu/forms.html>
  - Sign and present the POS to advisory committee for signature (original signatures on each copy)
  - Submit three copies of the POS to the Graduate School.

### **PhD General Examination**

- To be admitted to candidacy, each PhD student must pass the General Examination.
- The General Examination for TUE is given in three parts:
  - The written portion of the exam consists of four questions, one each from the three selected Transportation Core courses, and one from the area of emphasis outside of CE/Transportation. The exam is generally 3 to 4 hours long and each part may be open or closed book according to the examiner’s decision.
  - The research proposal is usually a draft of the student’s dissertation prospectus (see below).
  - In the oral portion, the student makes a 20 minute presentation of the research proposal and answers questions about this proposal and the answers to the written questions.
- The timing of the three parts is as follows:
  - One week before the written portion is administered; the examiners announce whether each part will be open or closed book.
  - The research proposal is submitted on or before the date of the written portion.
  - The oral portion is scheduled about one week after the date of the written portion.

### **PhD Dissertation and Prospectus**

- The Ph.D. degree requires the student to prepare and defend a dissertation describing some ground-breaking research contributions in the field of Transportation and Urban Engineering (see the section below titled “Thesis and Dissertation”).
- Before completing the dissertation, a Dissertation Prospectus must be prepared according to guidelines prescribed by the Graduate School.
  - The prospectus must clearly state the expected contributions of the proposed research, backing them up with sufficient citations of previous work.
  - It also must clearly describe the resources and methodology that will be used to complete the research, and convince the examination committee that all of these are sufficient to make the declared contributions.
- The Transportation and Urban Engineering faculty expect each Ph.D. candidate to have his/her prospectus approved within six months of passing the General Examination.

## GRADUATE SCHOOL RULES APPLYING TO ALL PROGRAMS

### Course Rules

- Up to 6 credits of 3000 & 4000-level courses (that are not open to sophomores) may be applied towards any graduate degree.
- Up to 6 credits of courses taken as a non-degree student may be applied towards any graduate degree.

### Provisional Status

- If a student is admitted with an undergraduate GPA under 3.0, he/she is admitted under Provisional Status.
- If a matriculated graduate student's GPA drops below 3.0, he/she goes into Provisional Status.
- While registered under Provisional Status, a student is **not eligible to receive funding as a Graduate Assistant, and cannot graduate.**
- To go off Provisional Status, a student must complete 12 credits of graduate level courses with at least a 3.0 GPA.

### Continuous Registration

- You must maintain uninterrupted registration with the Graduate School every semester until you complete your degree requirements. Your options are:
  - Registration in courses or GRAD 5950/6950, subject to tuition charge (unless supported as a GA).
  - 0 credit "continuous registration" in GRAD 5998/5999/6998/6999, subject only to registration fees.
- If you fail to matriculate under one of these options, your registration status will lapse and your advisor will have to petition to reinstate your registration in order to complete your degree, and you will incur additional penalty fees, as well as paying all fees for semesters in which you should have been registered.

## THE THESIS AND DISSERTATION

### Content & Format

- The format of the thesis or dissertation must conform **exactly to Graduate School regulations.** Your thesis or dissertation will not be accepted if any of these rules are violated. The graduate school website provides these rules for the master's thesis at <http://www.grad.uconn.edu/masters.html> and for the Ph.D. dissertation at <http://www.grad.uconn.edu/dissert.html>. We recommend that you ask another student or your advisor for a sample of a thesis or dissertation that was accepted as an example if you are unsure how to interpret the rules.
- The thesis or dissertation must constitute original work by the student resulting in ground-breaking, seminal findings in the field of study, which are presented in an oral final examination according to Graduate School regulations.
- The literature review must be exhaustive and clearly show how the thesis or dissertation builds significantly on previous research. Simply itemizing the content of each background paper is not adequate; all papers discussed in a literature review must be tied together and explicitly related to the research topic.
- It is necessary to demonstrate the contributions of the research in the conclusions.
- The Civil Engineering field of study offers the option of preparing the dissertation as a series of peer-reviewed journal papers. The TUE faculty recommends that students follow this format.

## **Timing**

- The time to write an MS thesis is usually about 2 to 3 semesters; for a PhD dissertation, usually about 5 to 8 semesters.
- Revisions to an individual thesis or dissertation chapter will take at least six (6) weeks from the first time a complete draft is provided to the major advisor. Students are encouraged to provide drafts one section or chapter at a time when possible, as soon as the work documented is completed.
- Once the major advisor is satisfied the thesis or dissertation is ready, a copy is provided to each member of the final exam committee, which consists of the major advisor and two associate advisors, and two additional faculty (five total) for a PhD dissertation. A final examination date and time is set at least two weeks from the time the copies are provided to the examination committee.
- Note that the Graduate School requires several additional requirements, including a form that must be signed by the Advisory Committee one week before the date of the defense.

**Table 1: COURSE PROGRAM**

<p><b>Background Preparation</b><sup>1</sup>  CE 2210 Decision Analysis in CEE  CE 2710 Transportation Engineering  MATH 2110Q Multivariable calculus</p> <p><b>Transportation Core</b>  CE 5710 Case Studies in Transportation Engineering<sup>2</sup>  CE 5720 Highway Engineering - Design  CE 5730 Transportation Planning  CE 5740 Traffic Engineering Characteristics  CE 5750 Pavement Design</p>	<p><b>CE/Transportation Specialization</b>  CE 4210 Operations Research in CEE  CE 5570 Bituminous Materials  CE 5715 Sustainable Transportation  CE 6730 Travel Demand Forecasting  CE 6735 Transportation Network Analysis  CE 6740 Traffic Engineering Operations  CE 5090 Transportation Safety  CE 5090 Public Transportation Systems</p>
<p><b>Suggested Courses outside CE/Transportation</b></p>	
<p><u>Chemical Engineering (CHEG)</u>  5336 Optimization  5367 Polymer Rheology  5368 Polymer Rheology and Processing Laboratory  5358 Composite materials  5352 Polymer Properties</p> <p><u>Civil Engineering (CE)</u>  5164 Finite Element Methods in Applied Mechanics I  5166 Finite Element Methods in Applied Mechanics II  5130 Numerical methods in Civil Engineering  5541 Advanced Soil Mechanics  5544 Geosynthetics in Geotechnical Design</p> <p><u>Economics (ECON)</u>  5201 Microeconomics I  5202 Macroeconomics I  5301 Mathematical Economics  5311 Econometrics I  5439 Urban and Regional Economics  5495 Special Topics: Operations Research</p> <p><u>Electrical and Computer Engineering (ECE):</u>  6104 Information, Control and Games  6108 Linear Programming and Network Flows  6111 Applied Probabilistic and Stochastic Processes  6125 Digital Image Processing  6141 Neural Networks for Classification and Optimization  6142 Fuzzy and Neural Approaches to Engineering  6143 Pattern Recognition and Neural Networks  6437 Computational Methods for Optimization</p> <p><u>Environmental Engineering (ENVE)</u>  CE 5220 Transportation and Air Quality  CE/ENVE 5320 Environmental Quantitative Methods  CE 5330 Probabilistic Methods in Engineering Systems</p>	<p><u>Geography (GEOG)</u>  5100 Location Analysis  5290 Advanced Urban Geography  5500 Fundamentals of GIS  5510 Application Issues in GIS</p> <p><u>Geology (GEOL)</u>  6510 Fundamentals of Seismology  6520 Advanced Seismology  6530 Geophysical Inverse Theory</p> <p><u>Mathematics (MATH)</u>  5530 Mathematical Modeling  5580 Optimization  5635 Intro to Operations Research</p> <p><u>Mechanical Engineering (ME)</u>  5410 Theory of Elasticity  5433 Theory of Plasticity  5511 Principles of Optimum Design  6511 Advanced Optimum Design</p> <p><u>Metallurgy and Materials Engineering (MMAT)</u>  5322 Materials Characterization  5364 Advanced Composites</p> <p><u>Operations and Information Management (OPIM)</u>  5110 Operations Management  5641 Operations Research in Management  5671 Decision Support Systems</p> <p><u>Statistics (STAT)</u><sup>3</sup>  5315 Analysis of Experiments  5415 Advanced Statistical Methods  5505-5605 Applied Statistics I-II  5515 Design of Experiments  5525 Sampling Theory  5585-5685 Mathematical Statistics I-II  5825 Applied Time Series  6315 Statistical Inference I</p>

<sup>1</sup>Equivalent courses taken prior to entering the program may be substituted. For 2210, any courses in basic engineering economics and statistical analysis are acceptable. For 2710, any engineering design course is acceptable.

<sup>2</sup>No substitutions (other than CE 4710) are permitted for meeting this requirement.

<sup>3</sup>Special note on Statistics courses: STAT 5315 (and any prerequisites) is generally sufficient preparation for the analysis needed for an MS thesis. STAT 5505-5605 is preferred for the advanced statistical analysis required for a Ph.D. dissertation, or a MS thesis requiring specialized statistical analysis. If a MS student is considering PhD study, STAT 5505-5605 is recommended.