Transportation Engineering Graduate Student Handbook

Zachry Department of Civil Engineering

2017-2018
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Overview
Program Overview

Transportation Engineers are involved with the safe and efficient movement of both people and goods. They plan, design and maintain all types of transportation facilities, including:

- Highways and streets
- Mass transit systems
- Railroads
- Airfields
- Ports and harbors

Transportation Engineers apply technological knowledge as well as an understanding of the economic, political, and social factors in their projects. They must work directly with urban planners because the quality of a community is directly related to the quality of the transportation system.

Research areas of our faculty include:

- Transportation Planning
- Traffic Management
- Traffic Control
- Highway Capacity
- Traffic Flow Theory
- Intelligent Transportation Systems
- Geometric Design
- Safety
- Transportation Economics
- Automated and Connected Vehicles
- Transportation Systems Modeling and Design
- Transportation Network Optimization
- Performance/Risk/Decision Analysis
- Scheduling Algorithms
- Innovative Transit
- Demand Responsive Services
- Freight transportation and logistics
WHY PURSUE A GRADUATE DEGREE?

- acquire advanced knowledge in your specific area of interest
- challenging courses that help you gain problem solving and engineering skills
- prepares you for a more challenging, more interesting, and higher paying job
- practice in solving a complex problems using many skill sets
- additional post-graduation job opportunities and career advancement opportunities
Faculty Members

Administration

Department Head: Robin Autenrieth
Division Head: Nasir Gharaibeh

Transportation Engineering Faculty

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Degree Programs
Degree of Master of Engineering

A minimum of 30 credit hours of approved courses is required for the Master of Engineering degree (M.E.). The university places limitations on these credit hours in addition to the requirements of the Transportation Engineering program that are listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading “The Degree of Master of Engineering.”

A. Advising Committee

An advisor (chair) will be determined during the first semester. The Master of Engineering program in transportation does not require an advising committee.

B. Degree Plan

The degree plan of M.E. students should be prepared in consultation with the advisor (chair) and submitted before the end of the student’s second semester otherwise students will be blocked from registration for courses.

C. Courses

Required Courses in Transportation Engineering – M.E. students are required to take all of the following courses for a total of 13 Credit Hours:

- CVEN 617: Traffic Engineering: Characteristics
- CVEN 618: Traffic Engineering: Operations
- CVEN 635: Street and Highway Design (CVEN 766 may be taken in place of CVEN 635. Students that took CVEN 456 as an undergraduate are required to take CVEN 635)
- CVEN 672: Engineering and Urban Transportation Systems
- CVEN 681: Transportation Seminar (can use only 1 Credit Hour on degree plan)

Optional Courses in Transportation Engineering – M.E. students are required to take two of the following courses for a total of 6 Credit Hours.

- CVEN 454: Urban Planning for Engineers
- CVEN 625: Traffic Engineering: Design
- CVEN 626: Highway Safety
- CVEN 632: Transportation Engineering: Economics
• CVEN 635: Street and Highway Design (If CVEN 635 is taken as a required course, it cannot be taken as an optional course)
• CVEN 696: Urban Traffic Facilities (Stacked with CVEN 457, students that took CVEN 457 as an undergraduate cannot take CVEN 696 for credit)
• CVEN 689: Traffic Flow Theory for Connected and Automated Vehicles
• CVEN 765: Advanced Civil Engineering Systems
• CVEN 766: Highway Design (Stacked with CVEN 456, students that took CVEN 456 as an undergraduate cannot take CVEN 766 for credit. If CVEN 766 is taken as a required course in place of CVEN 635, it cannot be also considered as an optional course)

Courses Outside of Transportation Engineering – M.E. students may take any combination of other courses approved by their committee to satisfy the remaining 11 Credit Hours on their degree plan. Students may consider Optional Courses in Transportation Engineering listed above (and not yet included in their degree plan), other commonly taken courses listed below (Attachment A) and other courses as well.

The degree plan will be developed by the student and their advisor and will include core courses and other courses that are appropriate for that student’s specific interest/area of study within Transportation Engineering.

D. Writing Requirement and Waiver of Final Exam

The University has a writing requirement for all graduate degrees. The M.E. degree requires the preparation and defense of a report, which might be from one of the classes on the degree plan or be the result of CVEN 685: Directed Studies.

At the same time you submit your report, you will schedule the Final Exam, which might also be waived, if your chair agrees.

You must provide a minimum of 2 weeks for the review of the report. It is your responsibility to ensure enough time is provided in order to meet the deadlines by the university’s Office of Graduate Studies (http://ogs.tamu.edu/).
Degree of Master of Science

A minimum of 32 credit hours of approved courses is required for the Master of Science degree (MS). At least 25 semester credit hours must be coursework. The university places limitations on these credit hours in addition to the requirements of the Transportation Engineering program that are listed below. A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading “The Degree of Master of Sciences”. For example, university requirements include a final examination and submission of a thesis to the university.

A. Advising committee

An advisor (chair) will be determined during the first semester. An advisory committee will have to be formed at the beginning of the second semester.

B. Degree Plan

The student’s advisory committee, in consultation with the student, will develop the proposed degree plan. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ and submitted electronically to your graduate advisor and advisory committee for their electronic endorsement. The office of graduate studies blocks students from further registration if a degree plan is not filed before the end of their second semester of study. If you are blocked, you are not considered a full time student and become ineligible to receive any assistantship.

C. Course

Required Courses in Transportation Engineering – MS students are required to take all of the following courses for a total of 13 credit hours:

- CVEN 617: Traffic Engineering: Characteristics
- CVEN 618: Traffic Engineering: Operations
- CVEN 635: Street and Highway Design (CVEN 766 may be taken in place of CVEN 635. Students that took CVEN 456 as an undergraduate are required to take CVEN 635)
- CVEN 672: Engineering and Urban Transportation Systems
- CVEN 681: Transportation Seminar (can use only 1 credit hour on degree plan)
- CVEN 691: Research (4 to 8 credit hours on the degree plan)
Optional Courses in Transportation Engineering – MS students are required to take one of the following courses for a total of 3 credit hours.

- CVEN 454: Urban Planning for Engineers
- CVEN 625: Traffic Engineering: Design
- CVEN 626: Highway Safety
- CVEN 632: Transportation Engineering: Economics
- CVEN 635: Street and Highway Design (If CVEN 635 is taken as a required course, it cannot be taken as an optional course)
- CVEN 689: Traffic Flow Theory for Connected and Automated Vehicles
- CVEN 696: Urban Traffic Facilities (Stacked with CVEN 457, students that took CVEN 457 as an undergraduate cannot take CVEN 696 for credit)
- CVEN 765: Advanced Civil Engineering Systems
- CVEN 766: Highway Design (Stacked with CVEN 456, students that took CVEN 456 as an undergraduate cannot take CVEN 766 for credit. If CVEN 766 is taken as a required course in place of CVEN 635, it cannot be also considered as an optional course)

Courses Outside of Transportation Engineering – M.S. students may take any combination of other courses approved by their committee to satisfy the remaining credit hours on their degree plan. Students may consider Optional Courses in Transportation Engineering listed above (and not yet included in their degree plan), other commonly taken courses listed below (Attachment A) and other courses as well.

D. Thesis Proposal

As soon as the research project can be outlined in reasonable detail, but no later than the end of the 3rd semester of study, the thesis research proposal should be completed. The Research Proposal shall describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student’s area of study. Upon approval of the Research Proposal by the advisory committee chair, the Research Proposal must be submitted to other members of the advisory committee at least 2 weeks (10 working days) prior to the Oral defense of the proposal. An oral defense of the proposal can be waived upon approval of the chair and all members of the advising committee.
E. Final Exam

The M.S. degree requires the preparation and oral defense of a thesis. The completed thesis needs to be submitted to all committee members for review at least two weeks before the scheduled oral defense date.
ATTACHMENT A:

Masters Courses Outside of Transportation Engineering

The following courses are commonly taken by Masters students to complete their degree requirements:

- ACCT 640: Accounting Concepts and Procedures I
- CVEN 612: Tools for Highway Materials and Pavement Design (stacked with CVEN 418)
- CVEN 624: Infrastructure Engineering and Management
- CVEN 644: Project Risk Management
- CVEN 658: Civil Engineering Applications of GIS (stacked with CVEN 423)
- CVEN 685: Directed Studies (see catalog restrictions for limits)
- CVEN 699: Engineering Risk Analysis
- CVEN 710: Civil Engineering Project Finance
- ECON 629: Microeconomic Theory I
- FINC 635: Financial Management for Non-Business
- ISEN 430: Human Factors and Ergonomics
- ISEN 613: Engineering Data Analysis
- ISEN 630: Human Operator in Complex Systems
- ISEN 635: Human Information Processing
- MATH (any graduate level math course)
- MGMT 655: Survey of Management
- PLAN 612: Transportation in City Planning
- PLAN 616: Analyzing Risk/Hazard and Public Policy
- PLAN 670: Urban Public Transportation Planning
- PLAN 673: Design for Sustainable Analysis
- PLAN 674: Transportation Systems Analysis
- PLAN 676: Transportation Investment Decisions
- PLAN 678: Applied Transportation Studio: Site Planning and Traffic Impact
- PSAA 611: Public Policy Formation
- STAT 601: Statistical Analysis (4 hour credit)
- STAT 658: Transportation Statistics
Doctor of Philosophy

The Doctor of Philosophy (Ph.D.) degree is a research-oriented degree requiring a minimum of 64 semester credit hours of approved courses and research beyond the Master of Science (M.S.) degree [96 credit hours beyond the Bachelor of Science (B.S.) degree]. The university places limitations on these credit hours in addition to the requirements of the Department of Civil Engineering listed below.

A complete discussion of all university requirements is found in the current Texas A&M University Graduate Catalog (available on the Internet at http://www.tamu.edu/admissions/catalogs/) under the heading “The Degree of Doctor of Philosophy.” For example, university requirements include a preliminary examination, a final examination, and submission of a dissertation to the university.

NOTE: All documents requiring departmental signatures must be submitted to the Civil Engineering Graduate Office at least one day prior to the Office of Graduate Studies deadline.

A. Departmental Requirements

In addition to fulfilling the University requirements for the Doctor of Philosophy (Ph.D.) degree, a student enrolled in the Civil Engineering graduate program in the area of Transportation Engineering must satisfy the following department requirements.

- A minimum of 32 credit hours of graduate level coursework taken through Texas A&M University [a minimum of 24 credit hours if the student already has taken at least another 24 credit hours of graduate coursework for the Master of Science (M.S.) or Master of Engineering (M.E.) degree].
- Remaining coursework requirement can be met by 32 hours of CVEN 691

B. Transportation Area Requirements

The student must also satisfy the following area requirements and/or recommendations described below:

- Qualifying Exam: A Qualifying Examination will be scheduled with members of the Transportation Engineering faculty. The exam will include both written and oral components. The exam should be taken after the first semester (Fall or Spring) of study. The qualifying exam covers three major areas of Transportation Engineering: operations, planning, and design. English writing will be a separate part. The oral exam is generally scheduled within two weeks of the written exam. The students need to pass both the oral
and written parts. If a student fails the qualifying exam, he or she has to take it again at the end of the following semester. If the student fails again, he or she will have to leave the program.

- **Degree Plan**: An advisory committee must be formed and a Degree Plan must be submitted and approved by the advisory committee after passing the Qualifying Exam. The proposed degree plan must be typed on the official form as it appears on the Internet at http://ogs.tamu.edu/ with endorsements by the student’s advisory committee.

- **Written Preliminary Exam**: After completion of the coursework listed on the Degree Plan (with the exception of CVEN 691 Research), but no later than the end of the fifth semester (Fall or Spring) of study, a Written Preliminary Examination will be scheduled with members of the advisory committee. This exam consists of written questions from the advisory committee. The exam in total should be given over a period of one week. The individual committee member decides whether a written exam will be given and whether it will be take-home or in-class, open-book or close-book if an exam is given.

- **Research Proposal**: As soon as the research project can be outlined in reasonable detail, but no later than the end of the fifth semester (Fall or Spring) of study, the dissertation research proposal should be completed. The Research Proposal shall describe the proposed research, including relevant background information, and clearly demonstrate how this research will make a unique contribution of new knowledge to the student’s area of study. Upon approval of the Research Proposal by the advisory committee chair, the Research Proposal must be submitted to other members of the advisory committee at least 2 weeks (10 working days) prior to the Oral Preliminary Exam.

- **Oral Preliminary Exam**: After passing the Written Preliminary Exam, but no later than the end of the fifth semester (Fall or Spring) of study, an Oral Preliminary Examination will be scheduled with members of the advisory committee. At this examination, the student will give a presentation of the Research Proposal. The questions in this exam will cover the Written Preliminary Exam, the Oral Preliminary Exam presentation, and any relevant coursework.

- **Completion of Dissertation**: Upon approval of the Dissertation by the advisory committee chair, the Dissertation will be submitted to the other members of the advisory committee at least 2 weeks (10 working days) prior to the Final Defense.

- **Final Defense**: A Final Defense consisting of an oral examination will be scheduled with all of the advisory committee members. At this examination, the student will give a presentation of the research work completed for the degree and documented in the Dissertation. The student is encouraged to invite other interested individuals to the research presentation.
C. Recommended Coursework:

We do not have a fixed list of recommended courses for Ph.D. students as they have all completed core courses for the MS degree and work on specific areas of transportation that require different knowledge. Ph.D. students are encouraged to take the elective courses within the Transportation area and also take courses from other departments that will help them develop and complete dissertation research. The student should work closely with the committee chair for course selection.
Funding Opportunities
The Transportation Engineering Program offers competitive financial packages to graduate students working on research projects through Texas A&M University or the Texas Transportation Institute. The exact level of funding depends on several factors:

1. **Doctor of Philosophy (Ph.D.)** students earn the most, followed by **Master of Science (M.S.)** students, with **Master of Engineering (M.E. - non-thesis)** earning the least. Ph.D. students usually have earned a Master’s degree prior to entering the Ph.D. program.

We also award a number of fellowships every year. A fellowship can qualify a student for paying in-state tuition. It can also be added on to a teaching assistant, research assistant, or a TSP offer.

**Tuition and Fees**
The amount of the student’s monthly stipend is determined by how the tuition is paid. If the research sponsor allows direct payment of tuition, the student receives the base stipend. If the research sponsor does not allow direct payment of tuition, the student’s stipend will be increased to compensate for the difference. Fees are not normally paid for funded graduate students.

**Salary Rates**
Projects beginning Fall 2017 (or later) will include salary rates for students who are Graduate Assistants in Research (GARs) equal to $2K/month + tuition (no paid fees). The GAR position requires that you are enrolled as a full time student making satisfactory progress towards your degree and work 20 hours per week on one of Texas A&M’s/TTI’s sponsored research projects.

**Health Insurance:**
- available for a very small cost to students.
Research Assistantships

Research Assistantship (RA) positions are offered through individual faculty members and TTI researchers. There is no centralized list of available positions. New students should send their resume to the Transportation Graduate Advisor so that he can work with any TTI researchers looking to hire graduate students.

Teaching Assistantships

New students are automatically considered for the small number of available positions based on their graduate application package. All other students who are qualified should contact the Departmental Graduate Advisor to be considered for TA positions in future semesters.

If you are an international student, you must have satisfactorily passed the ELPE exam and/or TOEFL Oral score (refer to Grad office for specific rules) before being considered for a TA position.

Fellowships

Many of our fellowships are awarded to incoming students and there is no formal application process for this. All incoming students are considered for these fellowships based on your application package. There are several transportation fellowships awarded to current students. Announcements for applications for these fellowships will be sent to students.

Tuition Waivers & In-state Tuition

Tuition waivers do not exist by themselves – Research and Teaching Assistantship positions always include coverage of the out-of-state portion of your tuition. Some Research and Teaching Assistantships cover both the in-state and out-of-state portion of your tuition. Additionally, you can qualify for in-state tuition if you were awarded a Fellowship of $1000 or more.

Other job opportunities

The faculty and graduate advisors do not coordinate nor know of any student worker positions in the department. If you are interested or need to pursue job opportunities beyond the TA/RA positions, you may want to look at: http://jobforaggies.com
IMPORTANT WEBSITES:

1) The Zachry Department of Civil Engineering; http://engineering.tamu.edu/civil
2) The Transportation Group's Website with course and degree information; http://engineering.tamu.edu/civil/academics/degrees/specialty/transportation-engineering

3) Texas Transportation Institute: information on current research; http://tti.tamu.edu/

4) Texas A&M University Institute of Transportation Engineers student chapter: information on student activities; https://maroonlink.tamu.edu/organization/ite
Additional Information
Full-Time Enrollment

Required credit hours to be certified as a full-time are:

- Fall and Spring semesters: 9 hours
- 10-week summer semester: 6 hours

Graduate students may be certified as full time with fewer than the required hours under special circumstances, including:

- During their final semester before graduation;
- Presence of a documented disability that mandates a reduced course load

These exceptions may or may not apply to a student’s eligibility for certain types of financial aid. Students who have questions about how exceptions to the full time enrollment requirements will affect their scholarships, loans, grants, etc., should confer with their financial aid counselor.

In most cases, international students are eligible for the same exceptions to full time requirements; however, all international students requesting an exception to full time requirements must have their request approved by International Student Services. Students who are not U.S. citizens, but who are permanent U.S. residents (VISA TYPE = IM) are not required to clear with ISS on enrollment exceptions.

A student who is enrolled in less than a full-time course of study at Texas A&M may be in jeopardy of:

- being out of compliance with the Bureau of Citizenship and Immigration Services (formerly INS) if enrolled at Texas A&M on a student visa;
- losing their Research or Teaching Assistantship position
- losing insurance coverage under his or her parent/guardian’s insurance policy;
- being placed on a loan repayment schedule by a lender or guarantor if the student is the recipient of Federal financial aid; and/or
- losing a scholarship if the guidelines for receiving the scholarship require full-time enrollment, etc.
Student Offices

Offices for students who are Teaching Assistants are made through the main CE Graduate Advising Office for Transportation Engineering students. You are responsible for contacting Mr. Chris Grunkemeyer, Ms. Laura Byrd and/or Dr. Yunlong Zhang for a desk assignment.

For students who become involved in research on a TTI or CE project, desk assignment will be made. We currently do not have guaranteed space for unfunded students.

Academic Probation

Graduate students must maintain 3.0 GPR. This requirement includes courses in degree plan as well as all graduate courses taken. If a course is repeated, the last grade received will be the one utilized in GPR calculation. If a student’s GPR falls below 3.0, the student will need to meet with their graduate advisor to set out a plan to raise GPR to above 3.0 within one semester. Under extenuating circumstances, a second semester may be allowed for the student to raise their GPR.

Once a plan has been devised, it will be forwarded to the main CE Graduate Office. If the student fails to raise their GPR, they will be removed from the Transportation Engineering graduate program.
Frequently Asked Questions
Degree Plans

1. **What is the difference between the MS and ME degree?**
   - ME (Master of Engineering) - non-thesis option requiring 30 hours of graduate credit
   - MS (Master of Science) - thesis option requiring 32 hours of graduate credit

   Accordingly, the MS degree is more research oriented and ME is more course oriented and geared towards professional practice.

2. **I have taken a graduate level course in which I got a C. This course is already present on my degree plan. Can I keep the course on the degree plan?**

   Yes. The requirement for graduate students is to maintain a GPA of 3.0 on the degree plan. The intent of the degree plan is to identify the appropriate course of study for your chosen degree as determined by your advisor. Once the courses have been chosen and placed on an approved degree plan, it is the student’s responsibility to maintain a 3.0.

   It is NOT the intent of the degree plan to allow students to take courses and then, after taking the courses and receiving a grade, to choose whether or not the courses are to be included in the degree plan. A student is NOT to choose only those courses for inclusion in the degree plan for which he/she may receive grades of A or B!

3. **Can I change the courses on my degree plan once it is filed?**

   Yes, the student can change the courses by filing a Petition. The Petition must be signed by **ALL** committee members AND the department head. The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

4. **Can I change my degree status once I’ve been admitted?**

   Yes, once admitted to graduate school, a student may file a Petition to change a degree status. The Petition must be signed by the department head and then filed with the Office of Graduate Studies (OGS) and approved. International students must check with the International Student Services Office to maintain legal status.

5. **Can I change my degree status once a degree plan is filed?**

   Yes, the student must file a Petition that is available electronically through the Office of Graduate Studies (OGS) website. The Petition will include any changes needed to the degree plan. The Petition must be signed by ALL committee members AND the department head.
The Petition must subsequently be filed with the Office of Graduate Studies (OGS) and approved.

6. **Are leveling courses to be included in the degree plan even though they cannot be counted towards the required number of credits?**

Leveling courses should be listed at the bottom of the degree plan as prerequisites.

## Assistantships

1. **There are two different types of courses for the summer, 5-week courses and 10-week courses? How can I register to satisfy the full-time status for my RA/TA?**

To be considered a full-time student for the Summer, a student must register for a minimum of 6 credit hours in one of the two following ways:

- 6 credit hours during the 10-week summer term OR
- 3 credit hours during each 5-week summer term

To hold an assistantship for the Spring and Fall semesters, the student needs to register for a minimum of 9 hours in order to be considered full-time.

No other combinations are allowed.

2. **How do I apply for a Teaching Assistant (GAT) position?**

New students are automatically considered for the small number of available positions based on their graduate application package. All other students who are qualified should contact Dr. Yunlong Zhang to be considered for TA positions in future semesters.

If you are an international student, you must have satisfactorily passed the ELPE exam before being considered for a TA position.

3. **How do I apply for a Research Assistant (RA) position?**

Research Assistantship (RA) positions are offered through individual faculty members and TTI researchers. There is no centralized list of available positions. New students should send their resume to the Transportation Graduate Advisor so that he can work with any TTI researchers looking to hire graduate students.

4. **I am a foreign student and English is my second language. Can I apply for a TA? What is the requirement?**
International students whose native language is not English and who wish to apply for a TA position must fulfill an English proficiency requirement. The English Proficiency Certification is **required before** a graduate student is eligible to apply to serve as a TA or in any other position considered to be a teaching position.

It is best to meet this proficiency requirement early in a student's program. Contact the International Admissions Office to arrange a test.

**Probation**

1. **What is the criteria on probation?**

   Graduate students are expected to maintain a Grade Point Ratio (GPR) equal to or better than 3.0 **throughout** the duration of their graduate study. This requirement applies to each of cumulative, degree plan, and semester GPR. It is also a prerequisite for receiving a graduate degree in Civil Engineering.

2. **What happens after one semester on probation if my GPR is not back up to 3.0?**

   When a student's GPR (either cumulative, degree plan or semester) falls below 3.0, the student is placed on probation by the department. Notifications are made by letter to the student, the advisor, and other pertinent offices within the university. The student must then meet with their graduate advisor and determine a plan to bring their GPR up to a 3.0 within one semester.

3. **What if the GPR requirement is satisfied after one semester, but falls again below 3.0 in another semester?**

   If after one semester on probation a student's cumulative or degree plan GPR is not back up to 3.0, the Office of Graduate Studies will be asked to remove the student from the graduate studies program. If extenuating circumstances exist, probation time may be extended for one more semester, allowing the student a final chance to meet the minimum GPR requirement.

4. **I took a course in which I got an I for incomplete. After one semester, it becomes an F. Now I am on probation. What can I do to change the F back to a better grade?**

   The student must complete the course work for which an I was received by submitting it to the professor. The professor will then submit a grade change form. This change may or may not change the student's GPR, depending on the final grade received. The student will remain on probation until the registrar has changed the grade in the system.
5. Does I (incomplete) in 691 (research) 684 (professional internship), or 692 (Professional study) become an F after one semester?

No, these courses are excluded from that rule.

6. Does an I (incomplete) of 685 (problems) become an F after one semester?

Yes, if you receive an F in 685, it will turn to an F after one semester. The course 685 is a letter grade course and therefore is not excluded from the rule.