Graduate studies in transportation engineering program at the University of Illinois offer the student a large and diversified academic program and close personal interaction with faculty members.

The graduate program in transportation facilities engineering deals directly with the design, construction, and rehabilitation of the transportation infrastructure. This program includes advanced study and research opportunities in pavement and geometric design, materials, maintenance, and management. Emphasis is also given to computer modeling, full-scale testing, economic comparisons, rehabilitation, structural analysis, foundations, climatic effects, subdrainage, and characterization of materials for use in pavements for highways, airports, and railroad track systems.

The graduate program in transportation systems engineering emphasizes advanced study and research in the application of quantitative methods for analysis, planning, design, and operation of all modes of transportation systems including transportation network analysis and evaluation, logistics systems, public transportation, travel demand forecasting, traffic operations and control, transportation safety, traffic flow modeling and simulation, highway capacity analysis, and applications of advanced technologies in transportation.

Strong program support is provided by the broad range of courses within the Civil and Environmental Engineering Department and by other campus departments in such subjects as statistics, operations, systems analysis, artificial intelligence, mechanics, mathematics, computer simulation, GIS, material science, and data management.

Admission

Master of Science (M.S.) Program

Admission to the Graduate College with full status in the transportation program within the Department of Civil and Environmental Engineering is granted to graduates of accredited institutions whose requirements for the bachelor's degree are substantially equivalent to those of the University of Illinois. The applicant's past scholastic achievement in his or her chosen major field must be at least an average grade point of 3.0 (based on 4.0 for the grade A). This average is computed on the basis of the last 60 semester hours. Applicants with grade point averages of less than 3.0, and applicants from schools with different grading systems, may be considered if evidence is provided indicating that their ability is not appropriately measured by the grades submitted. Students who do not have sufficient background in the transportation area may be required to take undergraduate transportation courses to become better prepared for graduate studies in transportation.

A thesis option is often selected by M.S. degree candidates, but is not a requirement. A total of 36 hours are required for all candidates who do not prepare a thesis, while 32 hours are required for those who choose the thesis option. Research assistants normally write a thesis on a phase of the work conducted as part of the project to which they are assigned. M.S. candidates, who expect to continue their graduate work for a Ph.D., are encouraged to complete a thesis to demonstrate their ability to perform independent research. All M.S. candidates typically complete a special problem in their research or coursework which consist of a critical evaluation of the literature on an appropriate topic, and by solving an analytical, numerical, or experimental problem.
Each student's program of study is designed in consultation with a faculty advisor in relation to the student's background and career objectives. Each student takes several courses offered by the department plus appropriate courses in other departments which are outlined in the CEE Graduate Handbook.

**Doctoral Program**

The formal requirements for the doctoral degree consist of a minimum of 32 hours of graded course work beyond the M.S. degree, plus 32 hours of thesis credit. The doctoral program is comprised of five stages. The first stage ends when the candidate receives a M.S. degree, or earns the equivalent credit hours. The second stage is passing the Ph.D. qualifying exam administered by the transportation group. The third stage comprises completion of at least 32 hours of course work and fulfillment of CEE department requirements. The fourth stage is passing a preliminary Ph.D. examination. The fifth and final stage involves research (minimum of 32 hours), preparation of the doctoral dissertation, and the final Ph.D. examination. The residence period must include two successive semesters in the third or fifth stage.

The major area of specialization often involves a selection of courses which are closely related to, but not necessarily within, the Transportation Engineering program of the Department of Civil and Environmental Engineering. Each student is encouraged to arrange a program of study with the aid of a faculty advisor in such a way as to encompass a reasonable number of courses which augment the major program of study. There is no foreign language requirement for the Ph.D. in Transportation Engineering, unless the candidate's research area requires knowledge of a foreign language, and/or the faculty advisor or student's graduate committee recommends it. All doctoral students must identify a Ph.D. advisor prior to joining the program.

**Financial Aid**

**Research and Teaching Assistantships**

Research and teaching assistants are immediately available to incoming graduate students who are selected. These assistantships provide at least the standard monthly stipend for half- or quarter-time employment, plus exemption from tuition and service fees. The stipend for M.S. degree students is set by the CEE Department and is based on the percentage time appointment. For doctoral candidates who have passed the preliminary examination, the stipend will be higher.

Research and teaching assistants normally take 2 to 3 courses per semester. Research and teaching assistants normally take 1.5 to 2.0 years to complete the requirements for the Master's degree, while full-time students without an assistantship can complete the requirements in 12 months. Ph.D. candidates with an assistantship can complete the course requirements in approximately three to four semesters while working on their dissertation research. In many instances, research assistants receive appointments in the summer at the same rate of pay.

**Research Fellowships**

Outstanding graduate students may be considered for a fellowship in addition to a normal research assistantship stipend. The amount of the fellowship depends upon each student's academic status and ranges from $500 to $5000, plus tuition and fees. These fellowships are intended to encourage outstanding students to pursue the Ph.D.

**Facilities**

**Laboratories**

The Transportation Engineering Group is located at Newmark Civil Engineering Laboratory (NCEL) and at the Advanced Transportation Research and Engineering Laboratory (ATREL). Research capabilities exist for evaluating construction materials and studying the behavior of pavements under static and repeated load with the facilities to simulate various climatic conditions.

One of the top transportation facilities in the nation, the ATREL facility is a unique and comprehensive transportation research, educational and testing laboratory. ATREL is located on 47 acres at the former Chanute Air Force Base in Rantoul, Illinois. The facility is 60,000 square feet of laboratories, continuing education classrooms, office space, a technical library, and a computer facility for the use of researchers, faculty, and students alike. All areas of ATREL have advanced computer networks, which allow for internal networking as well as outside communications to the campus and world wide.

The ATREL complex includes three major buildings for testing pavement materials and transportation operations. The main building laboratories are utilized for transportation research relating to subgrade soils, aggregates and railroad ballast materials, hot-mix asphalt and concrete materials, geosynthetics, and a multitude of other transportation systems. Facilities are available for handling and processing the large quantities of material needed including a mixer for batching concrete, stabilized and unstabilized materials, and a comprehensive collection of SUPERPAVE binder and mixture test
equipment as well as servo-hydraulic and specially designed equipment.

A second large building is dedicated to transportation operations, safety, system simulation, and Intelligent Transportation Systems (ITS). The Traffic Operations Laboratory houses sophisticated research equipment for both railroad and highway operations and safety studies. A third facility is utilized for large-scale indoor testing and construction material processing.

ATREL also houses nondestructive testing equipment including a van equipped with state-of-the-art ground penetration radar (GPR) with a wide range of antennae for accurate measurements of pavement’s layer thicknesses and flaw detection. Testing conducted at ATREL includes the use of electromagnetic waves as well as stress waves (ultrasonic and impact echo).

The large land area included in the ATREL complex is being utilized for the construction of a full-scale pavement test facility. Through funding from the Illinois Department of Transportation and the State of Illinois, ATREL acquired a $2 million Accelerated Transportation Loading Assembly (ATLAS) to evaluate multiple transportation support systems, such as highway and airport pavements and railroad tracks. The facility has readily available data acquisition systems for collecting both static and dynamic data from instrumented pavement sections.

Computers

Excellent computing facilities exist at the University of Illinois. The CEE Department and ATREL computers are networked to the campus-wide network, supercomputers, and the Internet for access to computers elsewhere in the nation and the world.

For additional information contact:

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Faculty in Transportation Engineering

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