

Transportation Science, M.S.

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The graduate program in Transportation Science includes faculty from four academic units: the Department of Civil and Environmental Engineering in The Henry Samueli School of Engineering, the Department of Economics in the School of Social Sciences, the Department of Planning, Policy, and Design in the School of Social Ecology, and the Department of Computer Science in the Bren School of Information and Computer Sciences. The program is designed to educate students in a broad set of competencies and perspectives that mirror the actual practice of current transportation research. The M.S. and Ph.D. degrees in Transportation Science are offered.

Admission is limited to a small number of exceptionally talented, independent, and self-disciplined students. The deadline for application for admission is March 1 for fall quarter. A second window for application for admission for winter or spring quarters is open from April 15 through June 1 but funding options for this second window may be very limited. All applicants must take the Graduate Record Exam (GRE) prior to the application deadline. Applicants whose first language is not English must also submit Test of English as a Foreign Language (TOEFL) scores.

The M.S. program is a 44-unit program with two options: (1) thesis; and (2) comprehensive examination. Students will choose one of these two options. For both options, no more than 12 credit hours of non-transportation courses can count toward the required number of course-work units. Exceptions must be approved by the student's advisor and the Director of the Transportation Science program. Opportunities are available for part-time study toward the M.S. degree. The normative time for completion of the M.S. is four quarters, with some students finishing in a single academic year, and others staying into a second year. Many students will choose to stay for five or six quarters, and the maximum time permitted is four years.

Requirements

Core courses must be chosen from lists in each of the four program areas: *Area 1 (Transportation Systems Engineering)*, *Area 2 (Urban and Transportation Economics)* and *Area 3 (Transportation Planning)*, and *Area 4 (Computer Science)*.

Substitutions and exceptions must be requested ahead of time and must be approved by the Director of the Transportation Science program.

Each student must choose at least two graduate courses from Area 1, at least one graduate course from Areas 2 and 3, and at least four additional graduate courses from any of the four areas. At least five of the eight core courses must be transportation courses, which are indicated by an asterisk.

Specific courses in each of these areas are shown below:

Area 1 (Transportation Systems Engineering)

ENGRCEE 220A	Travel Demand Analysis I *
ENGRCEE 220B	Travel Demand Analysis II
ENGRCEE 221A	Transportation Systems Analysis I *
ENGRCEE 222	Transit Systems Planning
ENGRCEE 223	Transportation Systems III: Planning and Forecasting
ENGRCEE 224A	Transportation Data Analysis I *
ENGRCEE 226A	Traffic Flow Theory I *
ENGRCEE 228A	Urban Transportation Networks I *
ENGRCEE 229A	Traffic Systems Operations and Control I

Area 2 (Urban and Transportation Economics) ¹

ECON 210A- 210B	Microeconomic Theory I and Microeconomic Theory II
ECON 281A- 281B	Urban Economics I and Urban Economics II *
ECON 281B	Urban Economics II
ECON 282A- 282B	Transportation Economics I and Transportation Economics II *
ECON 282B	Transportation Economics II
Economics 289 A–Z*	

Area 3 (Transportation Planning)

UPPP 202	History of Urban Planning
UPPP 207	Land-Use Law

UPPP 212	Transportation Planning and Policy
UPPP 231	Transportation and Environmental Health
UPPP 235	Geographic Information Systems (GIS) Problem Solving in Planning
UPPP 237	Introduction to Geographic Information Systems
Pre-approved upper-division undergraduate courses, independent study units, or seminars:	
Area 4 (Computer Science)	
COMPSCI 206	Principles of Scientific Computing
COMPSCI 248A	Introduction to Ubiquitous Computing
COMPSCI 260	Fundamentals of the Design and Analysis of Algorithms
COMPSCI 268	Introduction to Optimization
COMPSCI 271	Introduction to Artificial Intelligence
COMPSCI 274A	Probabilistic Learning: Theory and Algorithms
A. Pre-approved upper-division undergraduate courses:	
ECON 105A- 105B	Intermediate Quantitative Economics I and Intermediate Quantitative Economics II
ECON 123A- 123B	Econometrics I and Econometrics II
ECON 123B	Econometrics II
ECON 149	Special Topics in Economics of Public and Private Organizations
ENGRCEE 121	Transportation Systems I: Analysis and Design
ENGRCEE 122	Transportation Systems II: Operations and Control
ENGRCEE 123	Transportation Systems III: Planning and Forecasting
ENGRCEE 124	Transportation Systems IV: Freeway Operations and Control
I&C SCI 45C	Programming in C/C++ as a Second Language
I&C SCI 46	Data Structure Implementation and Analysis
COMPSCI 115	Computer Simulation
COMPSCI 121	Information Retrieval
COMPSCI 122A	Introduction to Data Management
B. Independent study units:	
ECON 299	Independent Study
ENGRCEE 296	Master of Science Thesis Research
ENGRCEE 298	Special Topics in Civil Engineering
ENGRCEE 299	Individual Research
UPPP 298	Directed Studies in Urban Planning
UPPP 299	Independent Study in Urban Planning
COMPSCI 298	Thesis Supervision
COMPSCI 299	Individual Study
C. Students who choose the thesis option may also select up to eight units of the following:	
ENGRCEE 296	Master of Science Thesis Research (4 to 12 units)
UPPP 298	Directed Studies in Urban Planning
COMPSCI 298	Thesis Supervision

¹ NOTE: ECON 281A-ECON 281B and ECON 282A-ECON 282B require ECON 210A or consent of the instructor. Students can only count one ECON 289 course toward the required number of units.

After approval from their advisor, students may petition the Director of the Transportation Science Program with requests for substitution of the required courses.

Plan I: Thesis Option

Students who select the thesis option must complete at least 44 units of study, up to eight of which can be taken in conjunction with the thesis research topic (thesis units should be taken in the home department of the faculty advisor); they must also complete at least 36 units of course work with no more than four units of pre-approved upper-division undergraduate courses, independent study units, or seminars. The thesis should reflect an original research investigation and it must be approved by a thesis committee of at least three full-time faculty members, a majority of which must be Transportation Science faculty.

Plan II: Comprehensive Examination Option

Students who select the comprehensive examination option must successfully complete 44 units of course work and pass a comprehensive examination. These units may include no more than 12 units of pre-approved upper-division undergraduate courses, independent study units, or seminars. The comprehensive examination requirements may be met with a publication-quality paper dealing with a transportation topic; this paper must be approved by the student's advisor and the Director of the Transportation Science program.

UCI is a major research university and has an excellent library collection, as well as special interlibrary loan arrangements with other University of California libraries including the Transportation Library at Berkeley. Research is coordinated with the Irvine branch of the Institute of Transportation Studies (ITS). Approximately 30 to 40 graduate students are employed as research assistants each year in ITS. Research covers a broad spectrum of transportation issues. Current funded research projects focus upon intelligent transportation systems (ITS), particularly advanced transportation management systems; planning and analysis of transportation systems; transportation systems operation and control; transportation engineering; transportation safety; road and congestion pricing; environmental and energy issues and demand for alternative fuel vehicles; public transit operations, transportation-land use interactions, demand for autos, and travel demand.

ITS is part of the University of California Transportation Center, one of ten federally designated centers of excellence for transportation research. The transportation research program at UCI is also supported by the Advanced Transportation Management Systems (ATMS) Laboratories. The Institute maintains a regular publications series documenting research conducted within its programs and is the editorial headquarters of the *Journal of Regional Science*.