M.S. in Transportation

Degree Requirements

Students who lack an appropriate background may be admitted and required to make up deficiencies by taking a program of bridge courses designed in consultation with graduate advisors. These courses are taken in addition to the degree requirements. See the undergraduate catalog for descriptions of 100 to 400-level courses. Students may be required to take or demonstrate that they already have taken courses equivalent to the bridge courses.

Students must select one area of specialization and take a minimum of 30 credits. TRAN 792 Pre-Doctoral Research is required for all students who receive departmental or research-based awards. A maximum of 6 credits may be taken from the 500-level courses for the master of science.

Three general areas of specialization are available. While they share a common methodological core, each is designed to suit various interests:

- **Transportation Engineering** focuses on traffic engineering, physical design and operational aspects of transportation systems. This area is best suited for students with an undergraduate engineering degree.
- **Transportation Planning** emphasizes the analysis and planning aspects, in particular the integration of transportation systems with urban and regional considerations such as economics, land use, and the environment.
- **Advanced Transportation Systems and Technologies** emphasizes the use of emerging technologies such as intelligent transportation systems in planning, design and operations of multi- and inter-modal transportation systems.

Additional elective courses for all areas of specialization may be taken with approval of the graduate advisor.

Students are able to substitute Master's thesis in their program. With permission of their research advisor, students intending to do an MS thesis should first register in the TRAN 700B (Masters Project). Students must receive a satisfactory (S) grade in 700B before registering for TRAN 701B (Masters Thesis). Students taking TRAN 701B must register in the immediate following semester with the same advisor. The MS thesis topic should be continuation of the work done in TRAN 700B.

Transportation Engineering

Code	Title	Credits
Bridge Courses		
CE 350	Transportation Engineering [1]	3
CS 101	Computer Programming and Problem Solving	3
ECON 265	Microeconomics	3
MATH 105	Elementary Probability and Statistics	3
MATH 309	Mathematical Analysis for Technology	4
Total Credits		**16**

[1] Students who have demonstrated professional transportation work experience may have this course waived.

Code	Title	Credits
Core Courses		
TRAN 603	Introduction to Urban Transportation Planning	3
TRAN 610	Transportation Economics	3
TRAN 650	Urban Systems Engineering	3
or EM 602	Management Science	
Area of Specialization Required Courses		
TRAN 615	Traffic Studies and Capacity	3
TRAN 625	Public Transportation Operations and Technology	3
TRAN 752	Traffic Control	3
Electives		
Select four of the following:		12
CE 611	Project Planning and Control	
EM 691	Cost Estimating for Capital Projects	
ENE 671	Environmental Impact Analysis	
HRM 601	Managing Organizational Behavior in Technology-Based Organizations	
IE 651	Industrial Simulation	

MATH 661	Applied Statistics
ME 635	Computer-Aided Design
MGMT 692	Strategic Management
MIS 648	Decision Support Systems for Managers
TRAN 552	Geometric Design of Transportation Facilities
TRAN 602	Geographic Information Systems
TRAN 608	Behavioral Issues in Transportation Studies
TRAN 640	Distribution Logistics
TRAN 653	Traffic Safety
TRAN 659	Flexible and Rigid Pavements
TRAN 700B	Master'S Project
TRAN 701B	Master's Thesis
TRAN 753	Airport Design and Planning
TRAN 754	Port Design and Planning
TRAN 755	Intelligent Transportation Systems
TRAN 760	Urban Trans Networks
Total Credits	**30**

Transportation Planning

Code	Title	Credits
Bridge Courses		
CE 350	Transportation Engineering [1]	3
CS 101	Computer Programming and Problem Solving	3
ECON 265	Microeconomics	3
MATH 105	Elementary Probability and Statistics	3
MATH 309	Mathematical Analysis for Technology	4
Total Credits		**16**

[1] Students who have demonstrated professional transportation work experience may have this course waived.

Code	Title	Credits
Core Courses		
TRAN 603	Introduction to Urban Transportation Planning	3
TRAN 610	Transportation Economics	3
TRAN 650	Urban Systems Engineering	3
or EM 602	Management Science	
Area of Specialization Required Courses		
TRAN 655	Land Use Planning	3
TRAN 625	Public Transportation Operations and Technology	3
or TRAN 705	Mass Transportation Systems	
TRAN 765	Multi-modal Freight Transportation Systems Analysis	3
Electives		
Select four of the following:		12
CE 611	Project Planning and Control	
ENE 671	Environmental Impact Analysis	
HRM 601	Managing Organizational Behavior in Technology-Based Organizations	
HRM 606	Human Resource Management	
MATH 661	Applied Statistics	
MGMT 691	Legal and Ethical Issues in a Digital World	
MGMT 692	Strategic Management	
MIS 620	E-Commerce Technologies	
TRAN 602	Geographic Information Systems	

TRAN 608	Behavioral Issues in Transportation Studies	
TRAN 615	Traffic Studies and Capacity	
TRAN 640	Distribution Logistics	
TRAN 643	Transportation Finance	
TRAN 653	Traffic Safety	
TRAN 720	Discrete Choice Modeling for Travel Demand Forecasting	
TRAN 753	Airport Design and Planning	
TRAN 755	Intelligent Transportation Systems	
Total Credits		**30**

Advanced Transportation Systems and Technologies

Code	Title	Credits
Bridge Courses		
CE 350	Transportation Engineering [1]	3
CS 101	Computer Programming and Problem Solving	3
ECON 265	Microeconomics	3
MATH 105	Elementary Probability and Statistics	3
MATH 309	Mathematical Analysis for Technology	4
Total Credits		**16**

[1] Students who have demonstrated professional transportation work experience may have this course waived.

Code	Title	Credits
Core Courses		
TRAN 603	Introduction to Urban Transportation Planning	3
TRAN 610	Transportation Economics	3
TRAN 650	Urban Systems Engineering	3
or EM 602	Management Science	
Area of Specialization Required Courses		
TRAN 615	Traffic Studies and Capacity	3
TRAN 755	Intelligent Transportation Systems	3
TRAN 765	Multi-modal Freight Transportation Systems Analysis	3
Electives		
Select four of the following:		12
CS 610	Data Structures and Algorithms	
CS 651	Data Communications	
CS 661	Systems Simulation	
ECE 642	Introduction to Communication Systems: Evolution to 5G and Beyond	
EM 714	Multicriteria Decision Making	
ENE 671	Environmental Impact Analysis	
HRM 601	Managing Organizational Behavior in Technology-Based Organizations	
IE 624	Heuristic Methods	
IE 642	Network Flows and Applications	
IE 644	Application of Stochastic Modeling in Systems Control	
IE 651	Industrial Simulation	
IE 705	Mathematical Programming in Management Science	
IE 706	A Queueing Approach to Performance Analysis	
MATH 661	Applied Statistics	
ME 635	Computer-Aided Design	
MIS 648	Decision Support Systems for Managers	
MRKT 636	Design and Development of High Technology Products	
TRAN 602	Geographic Information Systems	

TRAN 608	Behavioral Issues in Transportation Studies	
TRAN 625	Public Transportation Operations and Technology	
TRAN 640	Distribution Logistics	
TRAN 752	Traffic Control	
Total Credits		**30**