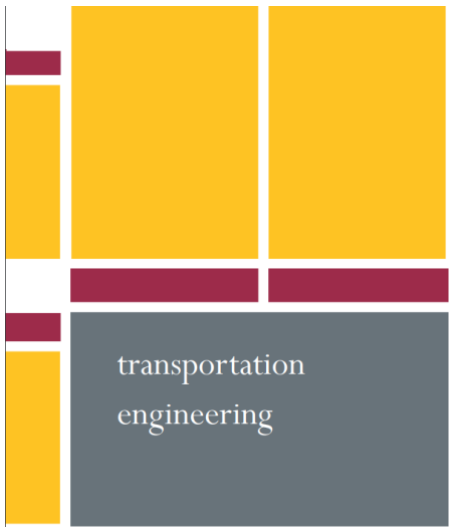
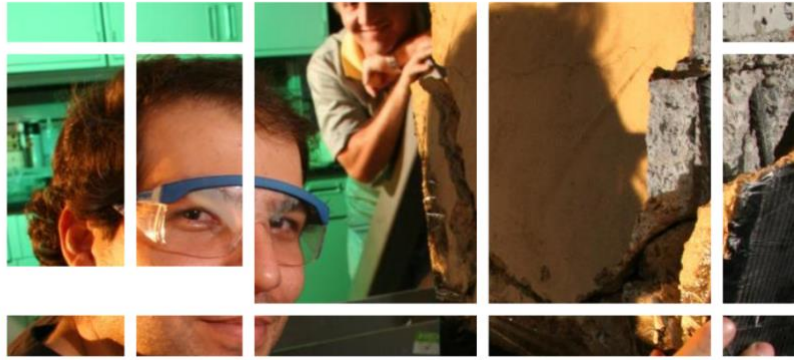


School of Sustainable Engineering and the Built Environment

civil, environmental and sustainable
engineering



The ASU Transportation Engineering specialty area has two general themes: [Transportation Systems](#) and [Pavements and Materials](#). The Transportation Systems thrust addresses a broad range of education and research focus areas, including traffic operations and simulation, connected and automated transportation technologies, intelligent transportation systems, traveler safety and risk, traveler behavior and values, transportation systems modeling and simulation, and multimodal transportation planning and policy applications. The Pavements and Materials thrust addresses pavement analysis and design, pavement performance and management, material testing and characterization, and development of new and more efficient construction materials, such as asphalt and concrete that are more durable, resilient, and sustainable.

Recent graduates have been employed in a variety of different organizations and companies both in the private and the public sector. Job opportunities include academia (tenure track and research faculty positions), small and large consulting firms that deal with transportation systems and pavements, federal agencies such as Federal Highway Administration (FHWA), state agencies such as the Arizona Department of Transportation (ADOT), county and city engineering offices, and national laboratories such as the National Renewable Energy Laboratory (NREL). Students typically enjoy employment and career opportunities that span the spectrum and fulfill the needs and desires of our graduates.

TRANSPORTATION SYSTEMS FACULTY

[Ram Pendyala](#), Professor

[Mikhail Chester](#), Professor

[Xuesong Zhou](#), Associate Professor

PAVEMENTS AND MATERIALS FACULTY

[Michael Mamlouk](#), Professor (Specialty Area Coordinator)

[Kamil Kaloush](#), Professor

[Hasan Ozer](#), Associate Professor

M.S. PROGRAM—Thesis Option

The advisor, in consultation with the student, will establish a Graduate Supervisory Committee (GSC). The GSC shall be composed of a minimum of three members from the School of Sustainable Engineering and the Built Environment (SSEBE) tenure-track faculty with at least two being from among the Transportation Faculty. Participation of individuals from institutions external to the ASU is allowed, subject to approval of the graduate programs chair and graduate college. The advisor serves as the chair of the GSC.

The Plan of Study (iPOS) must be in accordance with Graduate College and Civil, Environmental and Sustainable Engineering (CESE) Program requirements. The candidate must complete at least 30 semester hours of approved course and research work, subject to the following requirements:

- at least twelve (12) hours of SSEBE graduate courses in the Transportation Specialty Area,
- at least six (6) hours of additional graduate courses relevant to the area of transportation,
- at least three (3) hours of Statistics or Math (see sample course list at end of document),
- no more than three (3) hours of Reading and Conference (CEE590), and
- at least six (6) hours of thesis (CEE599). The thesis must be original research in nature. A final oral examination in defense of the thesis written work is required.

M.S. PROGRAM—Comprehensive Exam Option

The Graduate Supervisory Committee (GSC) shall consist of three transportation faculty members whose courses the student has taken/completed. The Specialty Area Coordinator shall serve as the chair of the GSC for all non-thesis coursework-only MS students.

The Plan of Study (iPOS) must be in accordance with Graduate College and Civil, Environmental and Sustainable Engineering (CESE) Program requirements. The candidate must complete at least 30 semester hours of approved course work, subject to the following requirements:

- at least fifteen (15) hours of SSEBE graduate courses in the Transportation Specialty Area,
- at least six (6) hours of additional graduate courses relevant to the area of transportation,
- at least three (3) hours of Statistics or Math (see sample course list at end of document),
- no more than three (3) hours of Reading and Conference (CEE590),
- at least three (3) hours of Applied Project (CEE 593) work that will be completed during the last semester; a technical paper documenting the project activities and a final presentation defending the work are required.

M.S. PROGRAM—Non-thesis Option

The Graduate Supervisory Committee (GSC) shall consist of three transportation faculty members whose courses the student has taken/completed. The Specialty Area Coordinator shall serve as the chair of the GSC for all non-thesis coursework-only MS students.

The Plan of Study (iPOS) must be in accordance with Graduate College and Civil, Environmental and Sustainable Engineering (CESE) Program requirements. The candidate must complete at least 30 semester hours of approved course work, subject to the following requirements:

- at least eighteen (18) hours of SSEBE graduate courses in the Transportation Specialty Area,
- at least six (6) hours of additional graduate courses relevant to the area of transportation,
- at least three (3) hours of Statistics or Math (see sample course list at end of document),
- no more than three (3) hours of Reading and Conference (CEE590),
- pass a written comprehensive exam administered by the GSC. The exam is intended to demonstrate proficiency in at least three topic areas, depending on the courses taken by the student.

PAVEMENTS AND MATERIALS THRUST

The Pavements and Materials Program at Arizona State University encompasses a multitude of areas such as analysis and design of flexible and rigid pavements, pavement performance and evaluation, pavement maintenance and rehabilitation, characterization of base, subbase and subgrade materials, finite elements methods, asphalt mix design, properties of portland cement concrete, lifecycle cost analysis, probabilistic methods, viscoelastic and nonlinear behavior of materials, statistical and computer applications in pavement engineering, and development of new materials that are durable, resilient, and sustainable.

Pavements and Materials Engineering is an interdisciplinary field that synthesizes knowledge from a wide range of subjects. People who have careers in transportation engineering often study, provide solutions, and implement strategies for the design of roads, highways, airport runways, and continually develop better and more efficient transportation facilities.

The pavements and materials faculty members are engaged in statewide, national, and international research in these areas, and graduate students typically become involved in these exciting and cutting-edge research projects. The graduate course offerings at ASU reflect varied pavements and materials specialty topics and provide a broad-based rigorous graduate education. The graduate curriculum is designed to provide a strong foundation in pavements and materials, while providing the flexibility needed to meet changing needs within the field.

The pavements and materials students benefit from a thriving Arizona economy with an excellent job market, and typically secure jobs in state or federal government agencies, national laboratories, consulting firms, and academia.

TRANSPORTATION SYSTEMS THRUST

The Transportation Systems thrust in SSEBE at ASU is a multi-disciplinary program with a core set of courses offered in Civil, Environmental, and Sustainable Engineering (CESE) and many complementary courses offered in other programs and schools across campus, including Geographical Sciences and Urban Planning, Business, Industrial and Systems Engineering, Mathematics, Computer Science, and Psychology. There are many faculty members across the ASU campus involved in transportation-related research, leading to numerous opportunities to explore and pursue a wide range of research topics and interests across schools. The core Transportation Systems faculty in SSEBE conduct research in travel behavior analysis and modeling, traffic operations, traffic safety, statistical and econometric methods, traffic simulation, sustainable transportation, multimodal transportation planning, intelligent transportation systems, and transportation, land-use, and health.

In addition to the undergraduate and graduate courses offered in CESE, a number of complementary courses are offered in various schools across the institution. Students in Transportation Systems often take courses in economics, business, industrial engineering, mathematics, statistics, computer science, geography, psychology, sociology, and planning. There are at least 50 additional graduate level courses at ASU that may serve to fulfill the graduate coursework requirements (upon approval of GSC), reflecting a wide range of topics and complementary skills. The subjects listed above and courses satisfying graduation requirements – representing a student's Plan of Study (iPOS), are selected by the student with help and approval of the student's GSC.

It is important for all doctoral students to read the [Civil, Environmental and Sustainable Engineering Ph.D. program manual](#) for detailed information about program requirements for the award of the Ph.D. degree.

LIST OF COURSES OFFERED BY SSEBE IN THE TRANSPORTATION SPECIALTY AREA

Undergraduate

- CEE 372 Transportation Engineering
- CEE 412 Pavement Analysis and Design
- CEE 474 Transportation Systems Planning
- CEE 475 Highway Geometric Design
- CEE 483 Hwy Materials, Construction, & Quality
- CEE 494 Airport Design
- CEE 494 Intermodal Transportation Facilities Engineering

Graduate

- CEE 506 Life Cycle Assessment
- CEE 507 Urban Infrastructure Anatomy
- CEE 511 Pavement Analysis and Design
- CEE 512 Pavement Performance & Management
- CEE 513 Pavement Evaluation, Maintenance, and Rehabilitation
- CEE 514 Bituminous Materials & Mixtures
- CEE 571 Traffic Flow Theory
- CEE 573 Transportation Operations
- CEE 574 Transportation Systems Planning
- CEE 575 Transportation Modelling & Simulation
- CEE 576 Highway Geometric Design
- CEE 577 Public Transportation Systems
- CEE 578 Activity-Travel Behavior Modeling
- CEE 579 Transportation Data Collection & Analysis
- CEE 583 Hwy Materials, Construction, & Quality
- CEE 598 Advanced Pavement Design
- CEE 598 Geotechnical Aspects of Pavements
- CEE 598 Airport Design
- CEE 598 Transportation Safety

The following courses are a few examples of courses that satisfy the mathematics/statistics course requirement. Students should check with the transportation specialty area coordinator or their thesis advisor before registering for courses in the mathematics / statistics subject area.

- CEE 598 Numerical Methods in Civil Engineering
- IEE 572 Design of Engineering Experiments
- IEE 578 Regression Analysis
- IEE 582 Response Surfaces and Process Optimization
- MAE 501 Linear Algebra in Engineering
- MAE 502 Partial Differential Equations in Engineering
- MAT 521 Iterative Methods
- MAT 523 Numerical Optimization
- MAT 524 Parallel Numerical Algorithms
- MAT 530 Numerical Solution of Ordinary Differential Equations
- MAT 533 Computational Elliptic and Parabolic Differential Equations
- MAT 576 Theory of Partial Differential Equations