

**school of sustainable
engineering and the built
environment**

civil, environmental and sustainable



Geotechnical and Geoenvironmental Engineers are concerned with anything built on, in, or of the earth. These concerns involve both the mechanical properties of geo materials and transport processes for fluids and gases through geo materials. Geotechnical and Geoenvironmental Engineering includes the analysis and design of foundation systems, slope stability analysis, design and construction of earthworks (including pavement subgrades, embankments, dams and levees, and earthfills), evaluation and control of seepage and flow through porous media, analysis and design of waste containment systems, and geotechnical aspects of earthquake engineering.

geotechnical /
geoenvironmental
engineering

Geotechnical and Geoenvironmental Engineering at ASU is focused upon unsaturated soil mechanics, waste mechanics, and geotechnical earthquake engineering. ASU is a leader in unsaturated soil mechanics applied to the performance of pavement subgrades and the impact of expansive soil upon foundations. ASU's unsaturated soil mechanics laboratory is one of the finest in the world and has been responsible for many innovations in unsaturated soil testing. ASU's Enamul and Mahmuda Hoque laboratory has unique, large scale equipment for static and dynamic testing of waste materials. Research on the seismic design of geosynthetic lined landfills being conducted at ASU combines our strengths in waste properties and seismic analysis and design. Geotechnical research at ASU also includes groundbreaking work on microbially-induced carbonate precipitation for remediation of earthquake hazards in conjunction with the ASU Biodesign Institute's Center for Environmental Biotechnology. The work of the Geotechnical and Geoenvironmental Engineering group at ASU on mitigation of geologic hazards (expansive soils, earthquake engineering) and environmental protection and remediation (landfill engineering) has many synergies with the School of Sustainable Engineering for the Built Environment and ASU's emphasis on resilient and sustainable infrastructure.

LIST OF COURSES

The graduate geotechnical courses taught in CEE and some of the recommended courses outside the geotechnical area that may be included in a Master's or post-Master's POS are listed below. Other graduate level courses may be included in a POS with the approval of the student's Graduate Supervisory Committee (GSC).

Graduate Geotechnical Courses

- CEE 550 Soil Behavior
- CEE 551 Advanced Geotechnical Testing**
- CEE 553 Advanced Soil Mechanics
- CEE 554 Shear Strength and Slope Stability
- CEE 555 Advanced Foundations**
- CEE 557 Geoenvironmental Engineering**
- CEE 558 Unsaturated Soil Mechanics**
- CEE 559 Geotechnical Earthquake Engineering**
- CEE 598 Foundations*
- CEE 598 Geosynthetics Design**
- CEE 598 Geotechnical Aspects of Pavement Design**
- CEE 598 Theoretical Soil Mechanics
- CEE 598 Soil Improvement
- CEE 598 Signals and Inverse Problems
- CEE 598 Engineering Geology***
- CEE 598 Intro to Biogeotechnical Engineering

*CEE 452 may be taken as CEE 598 for graduate credit if you have not taken an undergraduate Foundation Engineering course.

**Course offered every other year.

***New course in Fall 2017.

****New Course in Spring 2018

GEOTECHNICAL FACULTY

- [Edward Kavazanjian](#), Professor (Specialty Area Coordinator)
- [Sandra Houston](#), Professor
- [Leon van Paassen](#), Associate Professor
- [Claudia Zapata](#), Associate Professor
- [Christopher Lawrence](#), Lecturer
- [Nariman Mahabadi](#), Instructor

It is important for all doctoral students to read the [Civil, Environmental and Sustainable Engineering Ph.D. program manual](#).

M.S. PROGRAM with Thesis

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 SSEBE tenure-track faculty with at least two being from the Geotechnical Group. The advisor shall serve as the chair of the GSC.

As soon as possible, but no later than the middle of the semester following the completion of the 9 hours of coursework that will count towards their degree, the student, in consultation with the GSC, must file a individual plan of study (iPOS) with the Department. Changes to the iPOS must be approved by the GSC and the advisor.

The Plan of Study (POS) must be in accordance with Graduate College and School of Sustainable Engineering and the Built Environment requirements. The candidate must complete at least 30 semester hours of approved course and research work distributed as follows:

- 1) at least fifteen (15) hours of Graduate Geotechnical courses, including nine (9) hours of core courses (CEE 554, 553, and 550)
- 2) at least two more geotechnical engineering classes from the list of courses
- 3) not more than three (3) hours of CEE590
- 4) not more than 6 hours of thesis (CEE599) and research

No 700-level graduate courses may be included in the POS for a M.S. degree.

For Transferring students, the transfer credits will have to be approved first by the Graduate College and then by the GSC as being equivalent to one or more courses at ASU.

M.S. PROGRAM—No Thesis

The Graduate Supervisory Committee (GSC) shall consist of at least 3 tenure-track SSEBE faculty, including at least 2 from the Geotechnical Group. The advisor shall serve as the chair of the GSC. As soon as possible, but no later than the middle of the semester following completion of 9 hours of course work towards the M.S. degree, the student, in consultation with the GSC, must file an individual plan of study (iPOS) with the School. Changes to the POS must be approved by the advisor and the GSC.

LIST OF COURSES

The graduate geotechnical courses taught in CEE and some of the recommended courses outside the geotechnical area that may be included in a Master's or post-Master's POS are listed below. Other graduate level courses may be included in a POS with the approval of the student's Graduate Supervisory Committee (GSC).

Graduate Geotechnical Courses

- CEE 550 Soil Behavior
- CEE 551 Advanced Geotechnical Testing**
- CEE 553 Advanced Soil Mechanics
- CEE 554 Shear Strength and Slope Stability
- CEE 555 Advanced Foundations**
- CEE 557 Geoenvironmental Engineering**
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- CEE 559 Geotechnical Earthquake Engineering**
- CEE 598 Foundations*
- CEE 598 Geosynthetics Design**
- CEE 598 Geotechnical Aspects of Pavement Design**
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- CEE 598 Signals and Inverse Problems
- CEE 598 Engineering Geology***
- CEE 598 Intro to Biogeotechnical Engineering

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M.S. PROGRAM—No Thesis (Cont.)

The iPOS must be in accordance with university Graduate College and School of Sustainable Engineering and the Built Environment requirements. SSEBE requirements for the Master of Science (M.S.) degree are given in the [Graduate Handbook](#). The candidate must complete at least 30 semester hours of approved course work, including at least nine (9) hours of core courses (CEE554, 553, and 550) and 9 additional hours of Graduate Geotechnical courses. The iPOS may not contain more than 3 hours of CEE 590 and 3 hours of CEE 592. The iPOS may contain up to 6 hours of 400-level courses not in the geotechnical curriculum.

No 700-level graduate courses may be included in the POS for the M.S. degree.

A final comprehensive exam will be developed and administered by the Geotechnical Group. The exam is generally administered at the end of the semester in which the candidate has completed the iPOS. The exam is usually an 8-hour exam administered over a 2-day period (4-hours per day) in which each member of the GSC submits one or two questions to the candidate that are based upon courses the candidate took as part of the POS. The GSC decision on whether to pass or fail the student will be based on the results from the comprehensive exam. A student who fails the comprehensive exam the first time can retake the exam *once more*.