

## school of sustainable engineering and the built environment



construction  
engineering

### **The Master of Science in Engineering (MSE) in Construction**

**Engineering** graduate program is a multi-disciplinary program encompassing the areas of geotechnical engineering, structural engineering, transportation engineering, and construction engineering and management-related topics. The degree focuses on a combination of design and management topics preparing the student for a career working at the interface of design and construction; it is especially desirable to those students who are interested in a career emphasizing construction of infrastructure.

The program is designed for students who are interested in continuing their education in engineering with a focus on construction. The MSE Construction Engineering degree will also help graduates meet new licensure and professional practice requirements such as those recommended by the American Society of Civil Engineers (ASCE), the professional society for all civil engineers, which is strongly pushing for a master's degree as the minimum degree required for all practicing civil engineers.

### **Construction engineering at Arizona State University**

A construction engineering degree focuses on planning, design, and management for the construction of facilities such as highways, bridges, airports, railroads, industrial plants, buildings, pipelines, dams, and reservoirs. One of about fifteen programs nationwide, ASU's construction engineering curriculum combines the design principles of civil engineering with the business knowledge of construction management.

Construction engineers typically engage in the design of temporary structures, cost estimating, planning and scheduling, materials procurement, selection of equipment, and cost control. They also serve as a key interface between the design activities and field construction.

We are educating engineers who can be licensed as professional engineers; they will be problem solvers with technical capabilities.

### **Career paths**

As a Construction Engineering graduate, you will be prepared to begin as a field engineer, project engineer, or project designer working for facility owners, design firms, construction companies, specialty subcontractors, or material suppliers.

As your career progresses, you should be able to take on leadership roles in the delivery of sustainable facilities in the built environment and then progress through successively higher levels of management responsibility, both domestically and abroad.



## **Coursework**

*Total credit hours required for the degree program: 30*

### **Core courses**

At least one core course designate from each of the three areas-- structures, geotechnical and transportation--must be selected.

*Total credit hrs for required core courses: 9 credits minimum*

#### **Structures Courses**

- CEE 521 Stress Analysis
- CEE 536 Structural Dynamics
- CEE 598 Structural Damage Evaluation and Strengthening

#### **Geotechnical Courses**

- CEE 553 Advance Soil Mechanics
- CEE 598 Soil Improvement
- CEE 598 Earth Structures

#### **Transportation Courses**

- CEE 511 Pavement Analysis and Design
- CEE 512 Pavement Performance and Management
- CEE 583 Highway Materials, Construction, and Quality

### **Elective Courses**

At least one but not more than two courses from engineering mathematics and data analysis courses

At least three but not more than five construction management courses

*Total credit hrs for program electives: 21 credits minimum*

Sample of Elective Courses:

#### **Structures Elective Courses**

- CEE 522 Experimental Stress Analysis
- CEE 524 Advanced Steel Structures
- CEE 526 Finite Elements for Engineers
- CEE 527 Advanced Concrete Structures
- CEE 530 Prestressed Concrete
- CEE 532 Developing Software for Engineering Appl.

#### **Geotechnical Elective Courses**

- CEE 550 Soil Behavior
- CEE 551 Advanced Geotechnical Testing
- CEE 554 Shear Strength and Slope Stability
- CEE 557 Geoenvironmental Engineering
- CEE 559 Geotechnical Earthquake Engineering
- CEE 598 Geosynthetics Design
- CEE 598 Foundations

#### **Transportation Elective Courses**

- CEE 515 Properties of Concrete
- CEE 583 Highway Materials, Construction, and Quality
- CEE 598 Urban Infrastructure Anatomy& Sust. Develop.

#### **Construction Management Elective Courses**

- CON 540 Construction Productivity
- CON 543 Construction Equipment Engineering
- CON 545 Construction Project Management
- CON 551 Alternative Project Delivery Methods
- CON 554 Trenchless Construction Methods
- CON 557 Principles of Leadership for Project Managers
- CON 575 Information Technology in Construction
- CON 598 Front End Planning
- CON 598 Public Works Capital Construction
- CON 598 Introduction to Safety Management
- CON 598 Marketing for Construction
- CON 598 Sensing and Modeling Methods for Construction Engin.
- CON/CEE 598 Construction Industry Best Practices

#### **Engineering Mathematics and Data Analysis Elective Courses**

- MAE 501 Linear Algebra in Engineering
- MAE 502 Partial Differential Equations in Engineering
- IEE 570 Advance Quality Control
- IEE 572 Design of Engineering Experiments
- IEE 578 Regression Analysis
- IEE 581 Topic: Six Sigma Methods
- IEE 582 Response Surfaces and Process Optimization

**400-Level Courses.** No more than three credit hours of 400-level coursework can be included on graduate student program of study. This approved course must be taken outside of the CEE and CON programs.

## **M.S.E. PROGRAM**

The Graduate Supervisory Committee (GSC) shall consist of all tenure-track SSEBE faculty, including at least 2 from the Construction Program. The advisor shall serve as the chair of the GSC.

The Plan of Study (POS) must be in accordance with Graduate College and School of Sustainable Engineering and The Built Environment (SSEBE) requirements. The candidate must complete at least 30 semester hours of approved course work, including at least nine (9) hours of Core courses covering three subject areas.

A written Comprehensive Exam will be administered twice per year, usually the last Friday of classes during the regular fall and spring semesters. The exam is intended to demonstrate proficiency in core class and Construction subjects. The core subject areas are Structural Geotechnical, and Transportation Engineering.

Students will be given 4 hours to complete the exam and are expected to spend roughly one hour per subject area. The exam is open book. The exam will be graded by members of the SSEBE faculty and a pass/fail decision made as a collective group. A student who fails the comprehensive exam the first time may petition to retake the exam once more no sooner than 90 days after the first exam and no later than one year. A student must be registered for at least one credit every fall and spring until they are officially completed with their degree and pass the comprehensive exam.