

# MASTER OF SCIENCE IN CIVIL ENGINEERING

The Master of Science in Civil Engineering program is a coursework and research-based degree program, requiring a written master's thesis. Students must specialize in one of three technical areas: construction, structural, or transportation engineering. Degree candidates must complete a minimum of 32 credit hours, 6 to 8 of which are for research and thesis credits. Up to 12 credit hours of 400-level undergraduate coursework (except CAE 431 and CAE 432) may be included in the M.S. program with prior adviser approval. An oral defense of the thesis constitutes the comprehensive examination, and no additional written comprehensive examination is required.

## Curriculum

### Construction Engineering and Management

Code	Title	Credit Hours
<b>Required Courses</b>		<b>(12)</b>
CAE 570	Legal Issues in Civil Engineering	3
CAE 571	Lean Construction and Control	3
CAE 574	Economic Decision Analysis in Civil Engineering	3
CAE 577	Construction Equipment Management	3
<b>Elective Courses</b>		<b>(12-14)</b>
Select 12-14 credit hours <sup>1</sup>		12-14
<b>Thesis Research</b>		<b>(6-8)</b>
CAE 591	Research and Thesis for M.S. Degree	6-8

**Minimum degree credits required: 32**

<sup>1</sup> The majority of elective courses should be taken in CAE. Courses from other disciplines including ARCH, EMGT, MMAE, or others are also acceptable with advisor approval.

### STRUCTURAL ENGINEERING

Code	Title	Credit Hours
<b>Required Courses</b>		<b>(12)</b>
CAE 503	Advanced Structural Analysis	3
CAE 518	Advanced Reinforced Concrete	3
CAE 525	Advanced Steel Structures	3
CAE 529	Dynamics of Structures	3
<b>Major Elective Courses</b>		<b>(9)</b>
Select 9 credit hours from the list of courses below <sup>1</sup>		9
CAE 408	Bridge and Structural Design	3
CAE 410	Introduction to Wind and Earthquake Engineering	3
CAE 411	Structural Analysis II	3
CAE 435	Experimental Analysis of Structures	3
CAE 436	Design of Masonry and Timber Structures	3
CAE 437	Homeland Security Concerns in Engineering Systems	3
CAE 506	Building Envelope Rehabilitation	3
CAE 508	Advanced Bridge Engineering	3
CAE 514	Mathematical Methods for Structural Engineering	3
CAE 519	Structural Forensic Engineering	3
CAE 522	Structural Model Analysis	4
CAE 523	Statistical Analysis of Engineering Data	3
CAE 530	Finite Element Method of Analysis	3
CAE 535	Nonlinear Finite Element Analysis	3
CAE 537	Homeland Security Concerns in Building Designs	3
CAE 551	Prestressed Concrete	3
CAE 561	Structural Reliability and Probabilistic Bases of Design	3

CAE 586	Seismic Design of Building and Bridge Structures	3
<b>General Elective Course</b>		<b>(3)</b>
Select up to 3 credit hours of general elective <sup>2</sup>		3
<b>Thesis Research</b>		<b>(6-8)</b>
CAE 591	Research and Thesis for M.S. Degree	6-8

**Minimum degree credits required: 32**

<sup>1</sup> Course substitutions can be made with advisor approval.

<sup>2</sup> General electives can be taken from the major electives list or other courses in CAE, ARCH, EMGT, MMAE, or other disciplines with advisor approval.

## Transportation Engineering

Code	Title	Credit Hours
<b>Required Courses</b>		<b>(12-13)</b>
Select a minimum of four courses from the following (with adviser consent):		12-13
CAE 523	Statistical Analysis of Engineering Data	3
CAE 543	Demand Models for Urban Transportation	3
CAE 544	Urban Transportation Planning	4
CAE 546	Public Transportation Systems	3
CAE 548	Transportation Systems Management	3
CAE 555	Transportation Systems Evaluation	3
CAE 575	Systems Analysis in Civil Engineering	3
MATH 525	Statistical Models and Methods	3
<b>Thesis Research</b>		<b>(6-8)</b>
CAE 591	Research and Thesis for M.S. Degree	6-8
<b>Elective Courses</b>		<b>(12-14)</b>
Select 12-14 credit hours from the following: <sup>1</sup>		12-14
CAE 419	Introduction to Transportation Engineering and Design	3
CAE 540	Asphalt and Concrete Mix Design	3
CAE 541	Pavement Evaluation and Management	3
CAE 545	Traffic Operations and Flow Theory	3
CAE 547	Advanced Traffic Engineering	3
CAE 549	Transportation Economics, Development and Policy	3
CAE 568	Transportation Asset Management	3
CAE 574	Economic Decision Analysis in Civil Engineering	3
CAE 580	Intelligent Transportation Systems	3
CAE 581	Algorithms in Transportation	3
MATH 522	Mathematical Modeling	3
MATH 542	Stochastic Processes	3
MATH 563	Mathematical Statistics	3
MATH 564	Regression	3
MATH 565	Monte Carlo Methods	3
MATH 571	Data Preparation and Analysis	3
MATH 574	Bayesian Computational Statistics	3

**Minimum degree credits required: 32**

<sup>1</sup> Other courses are allowed but are subject to adviser approval.