

# CIVIL ENGINEERING - MASTER OF SCIENCE IN CIVIL ENGINEERING

In support of the mission and vision statements for the graduate program, the department adopts the following goals for the Master of Science (M.S.) in Civil Engineering degree:

1. Prepare students to fulfill the academic prerequisites specified by the Americans Society of Civil Engineers (ASCE) for Licensure and Professional Practice in Civil Engineering.
2. Prepare students to attain the Body of Knowledge specified by ASCE necessary for entry into the practice of civil engineering at the professional level.
3. Prepare students in conducting applied research in areas relevant to the practice of civil engineering.
4. Prepare students for advanced graduate studies towards a terminal degree.

Students may choose from the geotechnical, structural, or water resources engineering options following the Thesis or Non-Thesis track, requirements of which are specified below. Exceptions to these requirements must be approved by the head of the department. Further information related to the M.S. degree may be found under the Academic Programs of Study (<https://catalogs.nmsu.edu/nmsu/regulations-policies/>) section of the catalog.

## Option: Geotechnical Engineering

### Thesis Track

Prefix	Title	Credits
<b>Background Courses</b> <sup>4</sup>		
C E 357	Soil Mechanics	
C E 457	Foundation Design	
GEOL 1110G	Physical Geology (or higher-level courses)	
C E 445	Reinforced Concrete Design (or higher-level courses based on ACI)	
<b>Core Courses</b> <sup>1</sup>		<b>9</b>
Select three from the following:		
C E 508	Advanced Soil Behavior	
C E 509	Deep Foundations	
C E 579	Ground Improvement	
<b>Optional Courses</b>		<b>12-13</b>
Select four from the following:		
C E 452	Geohydrology	
C E 460	Site Investigation	
C E 470	Design of Municipal and Hazardous Waste Landfills	
C E 479	Pavement Analysis and Design	
C E 485	Design of Earth Dams	
C E 507	Design of Earth Retaining Structures	
C E 585	Slope Stability Analysis and Design	
<b>Select 3 credits from courses outside the area or department (450 or higher)</b> <sup>2</sup>		<b>3</b>
<b>Research Credits</b>		<b>6</b>

C E 599	Master's Thesis	
<b>Total Credits</b>		<b>30-31</b>

- <sup>1</sup> A course listed as core may be taken as one of the four optional courses if it is not counted already as one of the three core courses.
- <sup>2</sup> The selected course outside the area or department must be previously approved by the academic advisor or student's Graduate Committee.
- <sup>3</sup> A maximum of 6 credits are counted toward the Master's Degree program.
- <sup>4</sup> A course listed as background provides fundamental knowledge to pursue graduate studies in geotechnical engineering but does not satisfy the course requirements for the MS degree (exception: CE 457).

*Total credits needed for the Thesis Track are 24 credits of coursework and 6 credits of C E 599 Master's Thesis research.*

### Non-Thesis Track

The background and core courses for the Non-Thesis Track in Geotechnical Engineering are the same as those listed under the Thesis Track. Under optional courses, Non-Thesis students must select one additional course (i.e., total of five optional courses) from the list provided for the Thesis Track. In addition, Non-Thesis students must complete 3 credits of CE 598 - Special Research Programs in place of 6 credits of CE 599 and pass a final exit exam covering coursework and their research project.

*Total credits needed for the Non-Thesis Track are 27 credits of coursework and 3 credits of C E 598 Special Research Programs.*

## Option: Structural Engineering

### Thesis Track

Prefix	Title	Credits
<b>Background Courses</b> <sup>2</sup>		
C E 315	Structural Analysis	
C E 444	Elements of Steel Design (based on AISC)	
C E 445	Reinforced Concrete Design (based on ACI)	
<b>Core Courses</b>		<b>15</b>
C E 501	Advanced Mechanics of Materials	
C E 515	Finite Element Methods	
C E 544	Advanced Design of Steel Structures	
C E 545	Advanced Concrete Design	
C E 571	Structural Dynamics	
<b>Optional Courses</b> <sup>3</sup>		<b>9</b>
Select three from the following:		
C E 490	Introduction to Artificial Intelligence for Civil Engineers	
C E 502	Advanced Mechanics of Steel Structures	
C E 504	Advanced Engineering Design	
C E 507	Design of Earth Retaining Structures	
C E 509	Deep Foundations	
C E 510	Introduction to Nondestructive Testing	
C E 547	Bridge Engineering	
C E 554	Wood Design	
C E 555	Masonry Design	
C E 590	Advanced Artificial Intelligence for Civil Engineers	
<b>Research Credits</b>		<b>6</b>

C E 599	Master's Thesis <sup>1</sup>	
<b>Total Credits</b>		<b>30</b>

<sup>1</sup> A maximum of 6 credits are counted toward the Master's Degree program.

<sup>2</sup> A course listed as background provides fundamental knowledge to pursue graduate studies in structural engineering but does not satisfy the course requirements for the MS degree.

<sup>3</sup> A course listed as optional may replace one of the five core courses if it is not counted already as one of the three optional courses (requires department head approval)

Total credits needed for the Thesis Track are 24 credits of coursework and 6 credits of C E 599 Master's Thesis research.

## Non-Thesis Track

The background and core courses for the Non-Thesis Track in Structural Engineering are the same as those listed under the Thesis Track. Under optional courses, Non-Thesis students must select one additional course (i.e., total of four optional courses) from the list provided for the Thesis Track. In addition, Non-Thesis students must complete 3 credits of CE 598 - Special Research Programs in place of 6 credits of CE 599 and pass a final exit exam covering coursework and their research project.

Total credits needed for the Non-Thesis Track are 27 credits of coursework and 3 credits of C E 598 Special Research Programs.

## Option: Water Resources Engineering Thesis Track

Prefix	Title	Credits
<b>Requirements</b>		
Core courses		12
Statistics		3
Area of Interest Courses		9
C E 599	Master's Thesis	6
<b>Total Credits</b>		<b>30</b>

## Non-Thesis Track

Prefix	Title	Credits
<b>Requirements</b>		
Core courses		12
Statistics		3
Area of Interest Courses		15
<b>Total Credits</b>		<b>30</b>

## Foundation Requirements

1. ABET- Accredited BS in Civil, Agricultural, Geological Engineering, or closely related field or equivalent (as per existing Civil Engineering Department regulations)
2. One course in surface water hydrology
3. One course in hydrogeology or geohydrology
4. At least three semesters of hydraulics and hydraulic design

## Core Courses

Prefix	Title	Credits
<b>Core Courses</b>		
C E 531	Open Channel Hydraulics	
C E 557	Water Resources Development	
		<b>12</b>

C E 581	Ground Water Hydrology	
C E 582	Statistical Hydrology	
<b>Statistics</b>		<b>3</b>
A ST 505	Statistical Inference I (or advanced statistics class if student is qualified)	
<b>Total Credits</b>		<b>15</b>

## Area of Interest Courses (Flexible)

### Agricultural/ Civil/ Environmental Engineering

Prefix	Title	Credits
A EN 459	Groundwater, Wells & Pumps	
A EN 478	Irrigation and Drainage Engineering	
C E 452	Geohydrology	
C E 482	Hydraulic Structures	
C E 483	Surface Water Hydrology	
C E 485	Design of Earth Dams	
C E 503	Special Design and Analysis Program	
C E 504	Advanced Engineering Design	
C E 682	Topics in Hydrodynamics II	
ENVE 557	Surface Water Quality Modeling	
ENVE 630	Fate and Transport of Environmental Contaminants	
GEOG 581	GIS Design	
SOIL 652	Advanced Soil Physics	

### Modeling/ Fluid Mechanics

Prefix	Title	Credits
M E 530	Intermediate Fluid Mechanics	
M E 533	Numerical Methods for Fluid Mechanics and Heat Transfer	

### Management/Optimization

Prefix	Title	Credits
I E 533	Linear Programming	
I E 534	Nonlinear Programming	
I E 535	Discrete Optimization	

Electives outside College of Engineering: A ST, AEEC, GEOG, GEOL, MATH, STAT, and SOIL (must be approved by the Advisor and Committee Members).

### Notes:

1. International students must be registered at least 9 credits per semester.
2. International students may be required to take English language courses to show proficiency in English.
3. At least half of the credits of the Master's Degree program must be 500 level or higher.