

M.S. in Civil Engineering

The Master's degree program in Civil Engineering offers tracks in Structural Engineering, Transportation Engineering, Environmental Sustainability and Resilience, and a general Master of Science in Civil Engineering. Each Master's degree track has both thesis or non-thesis options. The thesis option will consist of 12 credits of core courses, 9 credits of elective courses, and 9 thesis credits. The program of study is intended to be completed over three semesters plus the summer semester for research. The non-thesis option will consist of the 12-credit core course curriculum plus 18 elective credits in an advisor-approved program of study. Each degree option may be pursued either as a five-year combined BS/MS program for Embry-Riddle Civil Engineering students or as a three-semester program for those with a B.S. from another institution or Embry-Riddle engineering discipline.

The degree program requires a minimum of 30 credit hours of graduate-level work.

Admissions Criteria

Students will:

- Analyze and design geotechnical objects/components for various infrastructure systems.
- Create geotechnical systems based on knowledge of advanced topics in geomechanics and geotechnical engineering, as appropriate to their chosen concentration.
- Communicate effectively on issues pertaining to geotechnical engineering.

Degree Requirements

The Master of Science in Civil Engineering is granted to students who complete the course work described below. Students may choose Non-Thesis or Thesis Option.

Non-Thesis Option

CIV Required Courses	12
Electives	18
Total Credits	30

Thesis Option

Civil Engineering Required Courses	12
Electives	9
Thesis Research (3 cr of CIV 700A plus 6 cr of Thesis Research)	9
Total Credits	30

Transportation Engineering Track

Required courses	12
CIV 506	Transportation Systems Engineering
CIV 522	Advanced Geometric Design of Highways and Streets
CIV 532	Transportation Planning
CIV 602	Transportation Safety
Transportation Electives	18
Max 12 credits outside CIV	
BA 511	Operations Research
BA 514	Strategic Marketing Management in Aviation
BA 604	International Management and Aviation Policy
BA 645	Airport Operations and Management
BA 650	Airline/Airport Relations
BA 651	Strategic Airport Planning
CIV 510	Design and Analysis of Airfield and Highway Pavement

CIV 512	Intelligent Transportation Systems
CIV 520	Railroad Engineering and High Speed Rail
CIV 524	Access Management
CIV 534	Transportation Simulation and Modeling
CIV 604	Advanced Signal Control and Design
DS 540	Data Mining
HFS 600	Human Factors in Systems
HFS 616	Human Factors of Transportation
MA 505	Statistics I
MA 506	Probability and Statistical Inference
MSA 508	Advanced Airport Modeling
MSA 511	Earth Observation and Remote Sensing
MSA 540	The Air Transportation System
MSA 554	Project Management in Aviation Aerospace
MSA 662	Statistical Analysis for Aviation/Aerospace

Total Credits **30**

Structural Engineering Track

Required Courses	12
AE 514	Introduction to the Finite Element Method
CIV 514	Advanced Concrete Analysis and Design
CIV 516	Advanced Steel Analysis and Design
CIV 526	Advanced Foundation Engineering
Structures Electives	18
Max 9 credits outside CIV	
AE 502	Strength and Fatigue of Materials
AE 510	Aircraft Structural Dynamics
AE 523	Linear Systems
AE 532	Failure Analysis of Materials
CIV 502	Wind Engineering
CIV 504	Bridge Engineering
CIV 510	Design and Analysis of Airfield and Highway Pavement
CIV 518	Structural Reliability
CIV 528	Structural Health Monitoring in Civil Infrastructure
CIV 530	Composites in Civil Infrastructure
ME 525	Structural Design Optimization
Total Credits	30

General Civil Engineering Track

Required Courses	12
CIV 506	Transportation Systems Engineering
or CIV 532	Transportation Planning
CIV 514	Advanced Concrete Analysis and Design
or CIV 516	Advanced Steel Analysis and Design
CIV 510	Design and Analysis of Airfield and Highway Pavement
or CIV 526	Advanced Foundation Engineering
CIV 508	Environmental Engineering
Civil Electives	18
Non-Thesis Option:	
CIV Graduate Electives (Advisor approved (6-18 credits))	
Non-CIV Graduate Electives (Advisor approved) (0-12 credits)	
Total Credits	30

Environmental Sustainability & Resilience Track**Required Courses 12**

CIV 508 Environmental Engineering
or CIV 540 Drainage Engineering

CIV 536 Advanced Flood Modeling
or CIV 538 Air Pollution Control

CIV 542 Environmental Data Science

CIV 544 Environmental Sustainability and Resilience

General Electives 9

CEC 526 Sensor Data Fusion

CEC 530 Image Processing and Machine Vision

CIV 502 Wind Engineering

CIV 526 Advanced Foundation Engineering

CIV 528 Structural Health Monitoring in Civil Infrastructure

DS 540 Data Mining

DS 544 Data Visualization

EP 501 Numerical Methods for Engineers and Scientists

EP 708 Remote Sensing: Active and Passive

EP 712 Geophysical Fluid Dynamics

MA 506 Probability and Statistical Inference

MA 553 High Performance Scientific Computing

MA 588 Numerical Methods in Fluids

ME 500 Clean Energy Systems

MHSR 530 Environmental Security

MHSR 540 Foundations of Resilience

MSA 511 Earth Observation and Remote Sensing

MSES 550 Atmospheric Conditions in Emergency Services

RSCH 665 Statistical Analysis

SFTY 530 Safety, Health and Environmental Legislation,
Litigation & Compliance

WEAX 517 Advanced Meteorology

Thesis 9

CIV 700 Thesis

Total Credits 30

EP 501	Numerical Methods for Engineers and Scientists	3
EP 708	Remote Sensing: Active and Passive	3
EP 712	Geophysical Fluid Dynamics	3
MA 506	Probability and Statistical Inference	3
MA 553	High Performance Scientific Computing	3
MA 588	Numerical Methods in Fluids	3
MSA 511	Earth Observation and Remote Sensing	3
MHSR 530	Environmental Security	3
MHSR 540	Foundations of Resilience	3
Thesis		9
CIV 700	Thesis	
Total Credits		30

Geomechanics & Geotechnical Engineering Track**Required Courses**

CIV 526 Advanced Foundation Engineering 3

CIV 548 Numerical Methods in Geotechnical Engineering 3

CIV 552 Advanced Soil Mechanics 3

CIV 556 Risk and Reliability in Geotechnical Engineering 3

Geomechanics & Geotechnical Engineering Electives

Max 9 credits outside CIV

AE 514 Introduction to the Finite Element Method 3

CIV 502 Wind Engineering 3

CIV 510 Design and Analysis of Airfield and Highway Pavement 3

CIV 528 Structural Health Monitoring in Civil Infrastructure 3

CIV 546 Designing with Geosynthetics 3

CIV 550 Unsaturated Soil Mechanics 3

CIV 554 Soil Dynamics and Earthquake Engineering 3

DS 540 Data Mining 3

DS 544 Data Visualization 3