

M.S. in Civil Engineering

Civil engineers are the visionaries behind the roads, bridges, and infrastructure that keep our world moving. At the **Daytona Beach Campus**, the Master of Science in Civil Engineering brings aerospace technology to a traditional field, creating a cutting-edge educational experience. Housed in the Civil Engineering Department of the College of Engineering, this fully accredited program builds on undergraduate education with advanced studies in transportation, materials, geotechnical, and structural engineering. Students learn in a small, close-knit community with approachable, responsive faculty and staff who provide personalized mentorship and meaningful academic support.

Students choose from a thesis or non-thesis track tailored to career goals in engineering and applied research. This graduate program allows students to gain hands-on experience in state-of-the-art labs, including advanced materials and testing labs exploring composites and concrete strength, and the Multimodal Intelligent Transportation Lab dedicated to airport traffic planning and infrastructure innovation.

Program-Level Student Learning Outcomes

Students will:

- Employ fundamental civil engineering practices to analyze, design, and implement civil systems.
- Apply advanced civil engineering concepts to topics within the discipline or selected concentration.
- Communicate civil engineering issues using related analysis, original research, or lab exploration.

Daytona Beach Program Requirements

Core Requirements	12
Option	18
Total Credits	30

Core Requirements

Choose One Track:

General Civil Engineering Track

CIVE 506	Transportation Systems Engineering	3
CIVE 508	Environmental Engineering	3
CIVE 510	Design and Analysis of Airfield and Highway Pavement	3
CIVE 514	Advanced Concrete Analysis and Design	3
Non-Thesis Option:		18
CIVE Graduate Electives (Advisor approved; 6-18 credits)		
Non-CIVE Graduate Electives (Advisor approved; 0-12 credits)		
Total Credits		30

Transportation Engineering Track

CIVE 506	Transportation Systems Engineering	3
CIVE 522	Advanced Geometric Design of Highways and Streets	3
CIVE 523	Transportation Planning	3
CIVE 602	Transportation Safety	3
Electives: *		18
ASCI 602	The Air Transportation System	
AVMG 645	Airport Operations and Management	
AVMG 650	Airline/Airport Relations	
AVMG 651	Strategic Airport Planning	
CIVE 510	Design and Analysis of Airfield and Highway Pavement	
CIVE 512	Intelligent Transportation Systems	

CIVE 520	Railroad Engineering and High Speed Rail	
CIVE 524	Access Management	
CIVE 534	Transportation Simulation and Modeling	
CIVE 604	Advanced Signal Control and Design	
DSCI 505	Statistics for Data Science	
DSCI 540	Data Mining	
HFCT 501	Human Factors in Systems	
HFCT 616	Human Factors of Transportation	
MATH 506	Probability and Statistical Inference	
MGMT 604	International Management and Aviation Policy	
MKTG 515	Strategic Marketing Management in Aviation	
MSAV 508	Advanced Airport Modeling	
MSAV 554	Project Management in Aviation/Aerospace	
MSAV 662	Statistical Analysis for Aviation/Aerospace	
SCLM 511	Operations Research	
SPAC 511	Geospatial Analytics	
Total Credits		30

* Maximum of 12 credits outside CIVE

Structural Engineering Track

AERO 515	Introduction to the Finite Element Method	3
CIVE 514	Advanced Concrete Analysis and Design	3
CIVE 516	Advanced Steel Analysis and Design	3
CIVE 526	Advanced Foundation Engineering	3
Electives: *		18
AERO 502	Strength and Fatigue of Materials	
AERO 510	Aircraft Structural Dynamics	
AERO 523	Linear Systems	
AERO 525	Structural Design Optimization	
AERO 532	Engineering Materials and Failure Analysis	
CIVE 502	Wind Engineering	
CIVE 504	Bridge Engineering	
CIVE 510	Design and Analysis of Airfield and Highway Pavement	
CIVE 518	Structural Reliability	
CIVE 528	Structural Health Monitoring in Civil Infrastructure	
CIVE 530	Composites in Civil Infrastructure	
Total Credits		30

* Maximum of 9 credits outside CIVE

Environmental Sustainability and Resilience Track

Choose Four of the Following:		12
CIVE 508	Environmental Engineering	
CIVE 536	Advanced Flood Modeling	
CIVE 538	Air Pollution Control	
CIVE 540	Drainage Engineering	
CIVE 544	Environmental Sustainability and Resilience	
CIVE 560	Applied Data Science and Numerical Methods in Civil Engineering	
Electives:		9
CESC 526	Sensor Data Fusion	
CESC 530	Image Processing and Machine Vision	
CIVE 502	Wind Engineering	
CIVE 526	Advanced Foundation Engineering	
CIVE 528	Structural Health Monitoring in Civil Infrastructure	

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DSCI 540	Data Mining	
DSCI 544	Data Visualization	
ENGP 501	Numerical Methods for Engineers and Scientists	
ENGP 708	Remote Sensing: Active and Passive	
ENGP 712	Geophysical Fluid Dynamics	
ESVS 550	Atmospheric Conditions in Emergency Services	
MATH 506	Probability and Statistical Inference	
MATH 553	High Performance Scientific Computing	
MATH 588	Data-driven Numerical Methods for Differential Equations	
MECH 500	Clean Energy Systems	
MHSR 530	Environmental Security	
MHSR 540	Foundations of Resilience	
SPAC 511	Geospatial Analytics	
RSCH 665	Statistical Analysis	
SFTY 530	Safety, Health and Environmental Legislation, Litigation and Compliance	
WEAX 517	Advanced Meteorology	
CIVE 700	Graduate Thesis	
Total Credits		30

Geomechanics and Geotechnical Engineering Track

CIVE 526	Advanced Foundation Engineering	3
CIVE 548	Numerical Methods in Geotechnical Engineering	3
CIVE 552	Advanced Soil Mechanics	3
CIVE 556	Risk and Reliability in Geotechnical Engineering	3
Electives: *		18
AERO 515	Introduction to the Finite Element Method	
CIVE 502	Wind Engineering	
CIVE 510	Design and Analysis of Airfield and Highway Pavement	
CIVE 528	Structural Health Monitoring in Civil Infrastructure	
CIVE 546	Designing with Geosynthetics	
CIVE 550	Unsaturated Soil Mechanics	
CIVE 554	Soil Dynamics and Earthquake Engineering	
DSCI 540	Data Mining	
DSCI 544	Data Visualization	
ENGP 501	Numerical Methods for Engineers and Scientists	
ENGP 708	Remote Sensing: Active and Passive	
ENGP 712	Geophysical Fluid Dynamics	
MATH 506	Probability and Statistical Inference	
MATH 553	High Performance Scientific Computing	
MATH 588	Data-driven Numerical Methods for Differential Equations	
SPAC 511	Geospatial Analytics	
MHSR 530	Environmental Security	
MHSR 540	Foundations of Resilience	
Total Credits		30

* Maximum of 9 credits outside CIVE

Option I: Non-Thesis

Electives (500-600 level)	18
Total Credits	18

Option II: Thesis

CIVE 700	Graduate Thesis	9
Electives (500-600 level)		9
Total Credits		18

Suggested Plans of Study

General Civil Engineering - Thesis

Year One

Requirements	Credits
CIVE 506 - Transportation Systems Engineering or 523 - Transportation Planning	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 510 - Design and Analysis of Airfield and Highway Pavement or 526 - Advanced Foundation Engineering	3
Specified Elective	3
CIVE 700 - Graduate Thesis	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
CIVE 508 - Environmental Engineering	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Requirements	Credits
CIVE 514 - Advanced Concrete Analysis and Design or 516 - Advanced Steel Analysis and Design	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12

General Civil Engineering - Non-Thesis

Year One

Requirements	Credits
CIVE 506 - Transportation Systems Engineering or 523 - Transportation Planning	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 510 - Design and Analysis of Airfield and Highway Pavement or 526 - Advanced Foundation Engineering	3

Specified Elective	3
Specified Elective	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
CIVE 508 - Environmental Engineering	3
Specified Elective	3
Semester Hours	6

Requirements	Credits
CIVE 514 - Advanced Concrete Analysis and Design or 516 - Advanced Steel Analysis and Design	3
Specified Elective	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12

Transportation Engineering - Thesis

Year One

Requirements	Credits
CIVE 506 - Transportation Systems Engineering	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 602 - Transportation Safety	3
Specified Elective	3
CIVE 700 - Graduate Thesis	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
CIVE 522 - Advanced Geometric Design of Highways and Streets	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Requirements	Credits
CIVE 523 - Transportation Planning	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12

Transportation Engineering - Non-Thesis

Year One

Requirements	Credits
CIVE 506 - Transportation Systems Engineering	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 602 - Transportation Safety	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
CIVE 522 - Advanced Geometric Design of Highways and Streets	3
Specified Elective	3
Semester Hours	6

Requirements	Credits
CIVE 523 - Transportation Planning	3
Specified Elective	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12

Structural Engineering - Thesis

Year One

Requirements	Credits
CIVE 514 - Advanced Concrete Analysis and Design	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 516 - Advanced Steel Analysis and Design	3
Specified Elective	3
CIVE 700 - Graduate Thesis	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
CIVE 526 - Advanced Foundation Engineering	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Requirements	Credits
AERO 515 - Introduction to the Finite Element Method	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12

Structural Engineering - Non-Thesis

Year One

Requirements	Credits
CIVE 514 - Advanced Concrete Analysis and Design	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 516 - Advanced Steel Analysis and Design	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
CIVE 526 - Advanced Foundation Engineering	3
Specified Elective	3
Semester Hours	6

Requirements	Credits
AERO 515 - Introduction to the Finite Element Method	3
Specified Elective	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12

Environmental Sustainability and Resilience - Thesis

Year One

Requirements	Credits
CIVE 508 - Environmental Engineering or 540 - Drainage Engineering	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 536 - Advanced Flood Modeling or 538 - Air Pollution Control	3
Specified Elective	3

CIVE 700 - Graduate Thesis	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
Specified Elective	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Requirements	Credits
CIVE 544 - Environmental Sustainability and Resilience	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12

Environmental Sustainability and Resilience - Non-Thesis

Year One

Requirements	Credits
CIVE 508 - Environmental Engineering or 540 - Drainage Engineering	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 536 - Advanced Flood Modeling or 538 - Air Pollution Control	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
Specified Elective	3
Specified Elective	3
Semester Hours	6

Requirements	Credits
CIVE 544 - Environmental Sustainability and Resilience	3
Specified Elective	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12

Geomechanics and Geotechnical Engineering - Thesis

Year One

Requirements	Credits
CIVE 552 - Advanced Soil Mechanics	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 526 - Advanced Foundation Engineering	3
Specified Elective	3
CIVE 700 - Graduate Thesis	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
CIVE 548 - Numerical Methods in Geotechnical Engineering	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Requirements	Credits
CIVE 556 - Risk and Reliability in Geotechnical Engineering	3
CIVE 700 - Graduate Thesis	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12

Geomechanics and Geotechnical Engineering - Non-Thesis

Year One

Requirements	Credits
CIVE 522 - Advanced Geometric Design of Highways and Streets	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Requirements	Credits
CIVE 526 - Advanced Foundation Engineering	3
Specified Elective	3
Specified Elective	3
Semester Hours	9

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
CIVE 548 - Numerical Methods in Geotechnical Engineering	3

Specified Elective	3
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Semester Hours	6
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Requirements	Credits
CIVE 556 - Risk and Reliability in Geotechnical Engineering	3
Specified Elective	3
Semester Hours	6

Total Credits

Total Hours for All Requirements: 12