

B.S. in Civil Engineering

The B.S. in Civil Engineering gives students the tools they need to make an impact in tomorrow's world. Throughout this program, students will gain a thorough understanding of civil engineering through a well-structured curriculum and hands-on laboratory experience.

This undergraduate degree is housed in the Department of Civil Engineering in the Daytona Beach Campus' College of Engineering and gives students the option to develop personalized study programs in topics ranging from hurricane and wind engineering to energy conservation, green engineering and even the design of extraterrestrial habitations. Upon graduation, you'll have the foundation necessary to pass the Fundamentals of Engineering exam and become a professional engineer.

Students will have the opportunity to participate in the American Society of Civil Engineers (ASCE), Institute of Transportation Engineers (ITE), and Engineers Without Borders (EWB) chapters, complete a senior design project, and explore opportunities in research.

The Bachelor of Science in Civil Engineering is accredited by the Engineering Accreditation Commission (<https://www.abet.org/accreditation/accreditation-criteria/criteria-for-accrediting-engineering-programs-2025-2026/>) of ABET (<https://www.abet.org/>), under the commission's General Criteria and Program Criteria for Civil and Similarly Named Engineering Programs.

Program-Level Student Learning Outcomes

Students will:

- Have an ability to communicate effectively with a range of audiences.
- Have an ability to function effectively on a team whose members together provide leadership, create a collaborative environment, establish goals, plan tasks, and meet objectives.
- Have an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
- Have an ability to generate engineering drawings using modern graphical tools common to civil engineering.
- Have an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- Have an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
- Have an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- Have an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Daytona Beach Program Requirements

General Education Requirements	39
Core Requirements	30
Program Support Courses	48
Specified Electives	9
Technical Elective	3
Total Credits	129

Program Details

The Bachelor of Science in Civil Engineering program requires successful completion of a minimum of 129 semester hours. The program may be completed in eight regular semesters, assuming appropriate background

and full-time enrollment. Students pursuing this undergraduate degree must earn a minimum cumulative grade point average (CGPA) of 2.00 for all work completed at the University.

General Education Requirements

For a full description of Embry-Riddle General Education guidelines, please see the General Education (<https://catalog.erau.edu/daytona-beach/general-education/>) section of this catalog. These minimum requirements are applicable to all degree programs.

Communication	9
COMM 122 English Composition	
COMM 219 Speech	
COMM 221 Technical Communication	
Humanities - Lower Level	3
Social Sciences - Lower Level	3
Humanities/Social Sciences - Lower or Upper Level	3
Humanities/Social Sciences - Upper Level	3
Computer Science/Information Technology	3
ENGR 115 Introduction to Computing for Engineers	
Mathematics	8
MATH 241 Calculus and Analytical Geometry I	
MATH 242 Calculus and Analytical Geometry II	
Physical/Life Sciences	7
PHYS 150 Physics with Calculus I	
PHYS 160 Physics with Calculus II	
BIOL 120L Foundations of Biology I Laboratory	
or ASTR 224 Introductory General Astronomy Laboratory	
Total Credits	39

Core Requirements

CIVE 140 Engineering Measurements	1
CIVE 140L Engineering Measurements Laboratory	1
CIVE 222 Introduction to Environmental Engineering	3
CIVE 304 Structural Analysis	3
CIVE 307 Civil Engineering Materials I	3
CIVE 307L Civil Engineering Materials I Laboratory	1
CIVE 311 Introduction to Transportation Engineering	3
CIVE 320 Soil Mechanics	3
CIVE 320L Soil Mechanics Laboratory	1
CIVE 437 Hydraulics and Hydrology	3
CIVE 471 Senior Design I	3
CIVE 481 Senior Design II	4
CIVE 490 The Civil Engineering Profession	1
Total Credits	30

Program Support Courses

BIOL 120 Foundations of Biology I	3
or GEOS 215 Introduction to Geoscience	
or ASTR 224 Astronomy	
CHEM 110 General Chemistry I	3
CHEM 110L General Chemistry I Laboratory	1
ENGR 101 Introduction to Engineering	2
ENGR 120 Graphical Communications	3
ESCI 201 Statics	3
ESCI 202 Solid Mechanics	3
ESCI 204 Dynamics	3
MATH 243 Calculus and Analytical Geometry III	4
MATH 345 Differential Equations and Matrix Methods	4
MATH 412 Probability and Statistics	3

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MECH 309	Fluid Dynamics	3
UNIV 101	College Success	1

Environmental Program Support Elective

Choose One of the Following: 3

CIVE 415	Sustainable Food Production and Aquaponics	
CIVE 417	Air Pollution	
CIVE 440	Drainage Engineering	
CIVE 399	Special Topics in Civil Engineering	
CIVE 499	Special Topics in Civil Engineering	

Transportation Program Support Elective

Choose One of the Following: 3

CIVE 443	Traffic Data Collection Method and Computer Application in Traffic Engineering	
CIVE 447	Airport Design I	
CIVE 457	Airport Design II	
CIVE 399	Special Topics in Civil Engineering	
CIVE 499	Special Topics in Civil Engineering	

Structures Program Support Elective

Choose One of the Following: 3

CIVE 431	Reinforced Concrete Design	
CIVE 432	Structural Steel Design	
CIVE 399	Special Topics in Civil Engineering	
CIVE 499	Special Topics in Civil Engineering	

Geotechnical Program Support Elective

Choose One of the Following: 3

CIVE 421	Geotechnical and Foundation Engineering	
CIVE 422	Design of Pavement Structures	
CIVE 424	Rehabilitation of Pavement Structures	
CIVE 399	Special Topics in Civil Engineering	
CIVE 499	Special Topics in Civil Engineering	

Total Credits 48

Specified Electives

Any CIVE Course *	3
Any CIVE Course *	3
Any CIVE Course *	3
Total Credits	9

* Including graduate courses, not otherwise used to satisfy a specialty elective requirement.

Technical Elective

Technical Elective	3
Total Credits	3

Suggested Plan of Study

Year One

Requirements	Credits
ENGR 101 - Introduction to Engineering	2
MATH 241 - Calculus and Analytical Geometry I	4
CHEM 110 - General Chemistry I and CHEM 110L - General Chemistry I Laboratory	4
ENGR 115 - Introduction to Computing for Engineers	3
COMM 122 - English Composition	3

UNIV 101 - College Success	1
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Semester Hours 17

Requirements	Credits
ENGR 120 - Graphical Communications	3
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 150 - Physics with Calculus I	3
Humanities - Lower Level (Series 140)	3
Social Sciences - Lower Level	3

Semester Hours 16

Total Credits

Total Hours for All Requirements: 33

Year Two

Requirements	Credits
PHYS 160 - Physics with Calculus II	3
MATH 243 - Calculus and Analytical Geometry III	4
ESCI 201 - Statics	3
COMM 219 - Speech	3
COMM 221 - Technical Communication	3

Semester Hours 16

Requirements	Credits
CIVE 140 - Engineering Measurements and CIVE 140L - Engineering Measurements Laboratory	2
CIVE 222 - Introduction to Environmental Engineering	3
ESCI 202 - Solid Mechanics	3
MATH 345 - Differential Equations and Matrix Methods	4
BIOL 120 - Foundations of Biology I, GEOS 215 - Introduction to Geoscience, or ASTR 224 - Astronomy	3
BIOL 120L - Foundations of Biology I Laboratory or ASTR 224L - Introductory General Astronomy Laboratory	1

Semester Hours 16

Total Credits

Total Hours for All Requirements: 32

Year Three

Requirements	Credits
CIVE 304 - Structural Analysis	3
CIVE 307 - Civil Engineering Materials I and CIVE 307L - Civil Engineering Materials I Laboratory	4
CIVE 311 - Introduction to Transportation Engineering	3
ESCI 204 - Dynamics	3
CIVE Environmental Elective	3

Semester Hours 16

Requirements	Credits
CIVE 320 - Soil Mechanics and CIVE 320L - Soil Mechanics Laboratory	4
MECH 309 - Fluid Dynamics	3
CIVE Transportation Elective	3
CIVE Structures Elective	3
Humanities/Social Sciences - Lower or Upper Level	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 32

Year Four

Requirements	Credits
CIVE 437 - Hydraulics and Hydrology	3
CIVE 471 - Senior Design I	3
CIVE 490 - The Civil Engineering Profession	1
MATH 412 - Probability and Statistics	3
CIVE Elective	3
CIVE Geotechnical Elective	3
Semester Hours	16

Requirements	Credits
CIVE 481 - Senior Design II	4
Humanities/Social Sciences - Upper Level	3
CIVE Elective	3
CIVE Elective	3
Technical Elective	3
Semester Hours	16

Total Credits

Total Hours for All Requirements: 32