

B.S. in Engineering Physics

The B.S. in Engineering Physics provides students with the combined knowledge and skills of scientists and engineers. Students focus on scientific challenges and mission design related to space exploration, with a strong emphasis on engineering fundamentals.

On the **Daytona Beach Campus**, students have the opportunity to dive into everything from atmospheric physics to spacecraft control systems, learning how to design sensors and instruments that help unlock the mysteries of space.

The program includes access to the Engineering Physics Design Lab, which features high-processing engineering graphics workstations and state-of-the-art software. Additionally, the Atmospheric Physics Research Laboratory provides equipment for testing instruments and sensors in a chamber that closely replicates the vacuum of the space environment. The Bachelor of Science in Engineering Physics 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 Engineering, General Engineering, Engineering Physics, Engineering Science, and similarly named engineering programs.

Embry-Riddle also offers an accelerated degree program that allows students to complete both the bachelor's and master's degrees in Engineering Physics in five years.

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 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	64
Areas of Concentration	21
Open Elective	3
Total Credits	127

Program Details

The Bachelor of Science in Engineering Physics requires a minimum of 127 credit hours for graduation. The program is designed to be completed

in eight semesters of full-time study. Students must earn a cumulative grade point average of 2.5 or higher.

Students should be aware that many courses throughout the curriculum have prerequisite and/or corequisite requirements. Students are responsible for reviewing course descriptions before registering each semester to ensure proper course sequencing and timely progress toward degree completion.

To enroll in subsequent Engineering and Physics courses, students must earn a grade of C or higher in the following foundational courses:

MATH 241, MATH 242, and MATH 243
PHYS 226 and PHYS 228

In addition, students must maintain a minimum cumulative GPA of 2.5 across these five courses. Students who do not satisfy this progression requirement will not be permitted to continue in the Engineering Physics program.

General Education Requirements

Communication	9
COMM 122 English Composition	
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
CPSC 223 Scientific Programming in C	
Mathematics	8
MATH 241 Calculus and Analytical Geometry I *	
MATH 242 Calculus and Analytical Geometry II *	
Physical/Life Sciences	7
PHYS 226 Physics I *	
PHYS 226L Physics I Laboratory	
PHYS 228 Physics III *	
Total Credits	39

* MATH 241, MATH 242, PHYS 226 and PHYS 228 require a grade of C or higher.

Core Requirements

CHEM 110	General Chemistry I	3
CHEM 110L	General Chemistry I Laboratory	1
ENGP 101	Introduction to Engineering Physics and Space Physics	1
ENGP 221	Microcomputers and Electronic Instrumentation	3
ENGP 221L	Microcomputer and Electronic Instrumentation Laboratory	1
ENGP 240L	Machine Shop Laboratory	1
ENGP 301	Transport Phenomena	3
ENGP 311	Spaceflight Dynamics	3
ENGP 312	Space Systems Engineering	3
ENGP 323	Engineering Electricity and Magnetism	3
ENGP 330	Electro-Optical Engineering	3
ENGP 340	Engineering Physics Experimental Design	2
ENGP 431	Control System Theory and Engineering Applications	3
or ENGP 432	Applied Quantum Mechanics	
ENGP 490	Engineering Physics Capstone Design I	3
ENGP 491	Engineering Physics Capstone Design II	3
ENGR 120	Graphical Communications	3
MATH 243	Calculus and Analytical Geometry III **	4
MATH 345	Differential Equations and Matrix Methods	4

MATH 441	Mathematical Methods for Engineering and Physics I	3
MATH 442	Mathematical Methods for Engineering and Physics II	3
PHYS 228L	Physics III Laboratory	1
PHYS 303	Modern Physics	3
PHYS 303L	Modern Physics Laboratory	1
PHYS 320	Classical Mechanics I	3
PHYS 410	Space Physics I	3
Total Credits		64

** MATH 243 requires a grade of C or higher.

Areas of Concentration

Spacecraft Systems

ENGP 335	Nanomaterials and Nanoscience	3
or ESCI 320 & 320L	Engineering Materials Science and Engineering Materials Science Laboratory	
ENGP 413	Spacecraft Instrumentation	3
ESCI 201	Statics	3
ESCI 202	Solid Mechanics	3
ESCI 204	Dynamics	3
Engineering Electives (AERO/CESC/CIVE/CPSC/ELEC/ENGR/ENGP/ESCI/MECH/SFTW/SYSE and must be 300-400 level)		6
Total Credits		21

Spacecraft Instrumentation

CESC 220	Digital Circuit Design	3
CESC 220L	Digital Circuit Design Laboratory	1
CESC 315	Signals and Systems	3
CESC 320	Microprocessor Systems	3
CESC 320L	Microprocessor Systems Laboratory	1
CESC 410	Digital Signal Processing	3
CESC 410L	Digital Signal Processing Laboratory	1
ENGP 413	Spacecraft Instrumentation	3
Engineering Electives (AERO/CESC/CIVE/CPSC/ELEC/ENGR/ENGP/ESCI/MECH/SFTW/SYSE and must be 300-400 level)		3
Total Credits		21

Open Elective

Open Elective	3
Total Credits	3

Suggested Plans of Study

Spacecraft Systems Track

Year One

Requirements	Credits
ENGP 101 - Introduction to Engineering Physics and Space Physics	1
MATH 241 - Calculus and Analytical Geometry I	4
CHEM 110 - General Chemistry I	3
CHEM 110L - General Chemistry I Laboratory	1
COMM 122 - English Composition	3
HIST 110 - World History	3
Semester Hours	15

Requirements	Credits
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 226 - Physics I	3
PHYS 226L - Physics I Laboratory	1
ENGR 120 - Graphical Communications	3
ENGP 240L - Machine Shop Laboratory	1
CPSC 223 - Scientific Programming in C	3
Semester Hours	15

Total Credits

Total Hours for All Requirements: 30

Year Two

Requirements	Credits
MATH 243 - Calculus and Analytical Geometry III	4
PHYS 228 - Physics III	3
PHYS 228L - Physics III Laboratory	1
ESCI 201 - Statics	3
COMM 219 - Speech	3
HUMN 140 - Western Humanities I: Antiquity and the Middle Ages	3
Semester Hours	17

Requirements	Credits
MATH 345 - Differential Equations and Matrix Methods	4
ESCI 202 - Solid Mechanics	3
ESCI 204 - Dynamics	3
ENGP 221 - Microcomputers and Electronic Instrumentation	3
ENGP 221L - Microcomputer and Electronic Instrumentation Laboratory	1
COMM 221 - Technical Communication	3
Semester Hours	17

Total Credits

Total Hours for All Requirements: 34

Year Three

Requirements	Credits
MATH 441 - Mathematical Methods for Engineering and Physics I	3
PHYS 303 - Modern Physics	3
PHYS 303L - Modern Physics Laboratory	1
ENGP 301 - Transport Phenomena	3
ENGP 311 - Spaceflight Dynamics	3
HUMN 141 - Western Humanities II: Renaissance to Postmodern	3
Semester Hours	16

Requirements	Credits
MATH 442 - Mathematical Methods for Engineering and Physics II	3
PHYS 320 - Classical Mechanics I	3

ENGP 340 - Engineering Physics Experimental Design	2
ENGP 312 - Space Systems Engineering	3
ENGP 330 - Electro-Optical Engineering	3
Engineering Elective	3
Semester Hours	17

Total Credits

Total Hours for All Requirements: 33

Year Four

Requirements	Credits
PHYS 410 - Space Physics I	3
ENGP 323 - Engineering Electricity and Magnetism	3
ENGP 490 - Engineering Physics Capstone Design I	3
ENGP 335 - Nanomaterials and Nanoscience (or ESCI 320 - Engineering Materials Science and ESCI 320L - Engineering Materials Science Laboratory)	3
Humanities or Social Science - Upper Level	3
Semester Hours	15

Requirements	Credits
ENGP 413 - Spacecraft Instrumentation	3
ENGP 431 - Control System Theory and Engineering Applications or 432 - Applied Quantum Mechanics	3
ENGP 491 - Engineering Physics Capstone Design II	3
Engineering Elective	3
Open Elective	3
Semester Hours	15

Total Credits

Total Hours for All Requirements: 30

Spacecraft Instrumentation Track

Year One

Requirements	Credits
ENGP 101 - Introduction to Engineering Physics and Space Physics	1
MATH 241 - Calculus and Analytical Geometry I	4
CHEM 110 - General Chemistry I	3
CHEM 110L - General Chemistry I Laboratory	1
COMM 122 - English Composition	3
HIST 110 - World History	3
Semester Hours	15

Requirements	Credits
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 226 - Physics I	3
PHYS 226L - Physics I Laboratory	1

ENGR 120 - Graphical Communications	3
ENGP 240L - Machine Shop Laboratory	1
CPSC 223 - Scientific Programming in C	3
Semester Hours	15

Total Credits

Total Hours for All Requirements: 30

Year Two

Requirements	Credits
MATH 243 - Calculus and Analytical Geometry III	4
PHYS 228 - Physics III	3
PHYS 228L - Physics III Laboratory	1
CESC 220 - Digital Circuit Design	3
CESC 220L - Digital Circuit Design Laboratory	1
HUMN 140 - Western Humanities I: Antiquity and the Middle Ages	3
Semester Hours	15

Requirements	Credits
MATH 345 - Differential Equations and Matrix Methods	4
CESC 320 - Microprocessor Systems	3
CESC 320L - Microprocessor Systems Laboratory	1
ENGP 221 - Microcomputers and Electronic Instrumentation	3
ENGP 221L - Microcomputer and Electronic Instrumentation Laboratory	1
CESC 315 - Signals and Systems	3
COMM 221 - Technical Communication	3
Semester Hours	18

Total Credits

Total Hours for All Requirements: 33

Year Three

Requirements	Credits
MATH 441 - Mathematical Methods for Engineering and Physics I	3
PHYS 303 - Modern Physics	3
PHYS 303L - Modern Physics Laboratory	1
ENGP 301 - Transport Phenomena	3
ENGP 311 - Spaceflight Dynamics	3
HUMN 141 - Western Humanities II: Renaissance to Postmodern	3
Semester Hours	16

Requirements	Credits
MATH 442 - Mathematical Methods for Engineering and Physics II	3
PHYS 320 - Classical Mechanics I	3
ENGP 340 - Engineering Physics Experimental Design	2

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ENGP 312 - Space Systems Engineering	3
ENGP 330 - Electro-Optical Engineering	3
COMM 219 - Speech	3
Semester Hours	17

Total Credits

Total Hours for All Requirements: 33

Year Four

Requirements	Credits
PHYS 410 - Space Physics I	3
ENGP 323 - Engineering Electricity and Magnetism	3
ENGP 490 - Engineering Physics Capstone Design I	3
CESC 410 - Digital Signal Processing	3
CESC 410L - Digital Signal Processing Laboratory	1
Open Elective	3
Semester Hours	16

Requirements	Credits
ENGP 413 - Spacecraft Instrumentation	3
ENGP 431 - Control System Theory and Engineering Applications or 432 - Applied Quantum Mechanics	3
ENGP 491 - Engineering Physics Capstone Design II	3
Engineering Elective	3
Humanities or Social Sciences - Upper Level	3
Semester Hours	15

Total Credits

Total Hours for All Requirements: 31