
Electrical Engineering

Bachelor of Science

The Bachelor of Science degree in Electrical Engineering provides the student with the opportunity to acquire a broad background in circuit theory, communication systems, computers, control systems, electromagnetic fields, energy sources and systems, and electronic devices. Emphasis on design places the Embry-Riddle Electrical Engineering student in a unique position to increase employment opportunities after graduation.

Three tracks are available in the Electrical Engineering program: Avionics, Systems, and Non-Track. The first year and a half are common, with a one course difference so students do not need to make a track decision until the beginning of their third year. The objectives of the Electrical Engineering degree are to produce graduates who:

- Are prepared to be immediately productive as well-rounded electrical engineers in the aerospace aviation and related fields.
- Understand the importance of life-long learning and pursue professional development including advanced degrees and professional registration.
- Are able to systematically apply the fundamental principles of science and mathematics to solve engineering problems.
- Understand engineering design processes that will meet system and component requirements as well as comply with health and environmental regulations.
- Are effective at both oral and written communications.

- Work effectively within a team, in both supporting and leadership roles.
- Are able to apply their knowledge to real-world multidisciplinary challenges facing society.
- Are able to apply the latest tools and technology to engineering problems.
- Understand the impact of engineering solutions in a global, economic, environmental, political, social, and ethical context.

Degree Requirements

The Bachelor of Science in Electrical Engineering requires the successful completion of a minimum of 129 credit hours.

Aerospace Systems Track

The modern aircraft is an assembly of a wide spectrum of components, all operating together in a large and complex system. The aircraft then operates in the National Airspace System where it must operate in harmony with other aircraft, air traffic management, navigation, and safety systems, all at a reasonable cost. This example shows the importance of systems engineering and the broad range of subjects covered.

FRESHMAN YEAR

See the common Freshman Year outline on page 160.

Total Credits

32

Academic Programs at the Daytona Beach Campus

SOPHOMORE YEAR

| Course | Title | Credits |
|----------------------|---|--------------|
| CEC 220 | Digital Circuit Design | 3 |
| CEC 222 | Digital Circuit Design Laboratory | 1 |
| | -OR- | |
| COM219 | Speech | 3 |
| CEC 320 | Microprocessor | 3 |
| CEC 322 | Microprocessor Laboratory | 1 |
| COM221 | Technical Report Writing | 3 |
| CS 225 | Computer Science II | 4 |
| EE 223 | Linear Circuit Analysis | 3 |
| EE 224 | Electrical Engineering Laboratory | 1 |
| MA 243 | Calculus and Analytic Geometry III | 4 |
| MA 345 | Differential Equations and Matrix Methods | 4 |
| PS 250 | Physics III for Engineers | 3 |
| PS 253 | Physics Laboratory for Engineers | 1 |
| SYS 301 | Introduction to Systems Engineering | 3 |
| Total Credits | | 33/34 |

JUNIOR YEAR

| Course | Title | Credits |
|----------------------|--|-----------|
| CEC 315 | Signals and Systems | 3 |
| EC 225 | Engineering Economics | 3 |
| EE 300 | Linear Circuits II | 3 |
| EE 301 | Linear Circuits Laboratory | 1 |
| EE 302 | Electronic Devices | 3 |
| EE 304 | Electronic Devices Laboratory | 1 |
| SYS 302 | System Engineering Design Considerations | 3 |
| SYS 303 | Optimization in Systems Engineering | 3 |
| SYS 304 | Systems Engineering in Management, Risk, and Decision Making | 3 |
| HU/SS | Lower-Level Humanities | 3 |
| MA 412 | Probability and Statistics | 3 |
| MA 441 | Mathematical Methods for Engineering & Physics I | 3 |
| Total Credits | | 32 |

SENIOR YEAR

| Course | Title | Credits |
|-----------------------------|--|----------------|
| EE 308 | Intro to Electrical Communications | 3 |
| EE 401 | Control Systems Analysis & Design | 3 |
| EE 402 | Control Systems Laboratory | 1 |
| EE XXX | Upper-Level Technical Elective | 6 |
| HU/SS | Upper-Level Elective | 3 |
| EE | Open Technical Elective | 3 |
| SYS 403 | Systems Engineering Life Cycle Costing | 3 |
| SYS 405 | Aerospace Systems, Guidance, and Control | 3 |
| SYS 410 | Space Systems and Mission Analysis | 3 |
| SYS 417 | Senior Systems Engineering Project | 3 |
| Total Credits | | 31 |
| TOTAL DEGREE CREDITS | | 128/129 |

Avionics Track

The Avionics track of the Electrical Engineering program provides preparation for students interested in the field of avionics. Fields of study include wired and wireless systems, digital communications, electromagnetics, high-frequency RF systems, and aeronautical navigation and communications systems. Students choosing the Non-Track option may replace EE 307 and EE 310 (Avionics I and II) with approved CEC/EE/MA/PS/SE 3/4 upper-level electives, and EE 420/421 (Avionics Senior Design) with an approved senior design sequence.

FRESHMAN YEAR

See common Freshman Year outline on page 160

| | |
|----------------------|-----------|
| Total Credits | 32 |
|----------------------|-----------|

SOPHOMORE YEAR

| Course | Title | Credits |
|----------------------|---|-----------|
| CEC 315 | Signals and Systems | 3 |
| CEC 320 | Microprocessor Systems | 3 |
| CEC 322 | Microprocessor Systems Laboratory | 1 |
| COM221 | Technical Report Writing | 3 |
| CS 225 | Computer Science II | 4 |
| EE 223 | Linear Circuits Analysis | 3 |
| EE 224 | Electrical Engineering Laboratory I | 1 |
| MA 243 | Calculus III | 4 |
| MA 345 | Differential Equations and Matrix Methods | 4 |
| PS 250 | Physics III | 3 |
| PS 253 | Physics Laboratory for Engineers | 1 |
| SYS 301 | Introduction to Systems Engineering | 3 |
| Total Credits | | 33 |

JUNIOR YEAR

| Course | Title | Credits |
|---------|---|---------|
| CEC 220 | Digital Circuit Design | 3 |
| CEC 222 | Digital Circuit Design Laboratory | 1 |
| COM219 | Speech | 3 |
| EC 225 | Engineering Economics | 3 |
| EE 300 | Linear Circuit Analysis II | 3 |
| EE 302 | Electronic Devices and Circuits | 3 |
| EE 304 | Electronic Circuits Laboratory | 1 |
| EE 307 | Avionics I | 3 |
| EE 308 | Introduction to Electrical Communications | 3 |
| EE 340 | Electric and Magnetic Fields | 3 |
| MA 412 | Probability and Statistics | 3 |

Academic Programs at the Daytona Beach Campus

| | | |
|--------|--|---|
| MA 441 | Mathematical Methods for Engineering & Physics I | 3 |
|--------|--|---|

Total Credits 32

SENIOR YEAR

| Course | Title | Credits |
|---------|--|---------|
| CEC 410 | Digital Signal Processing | 3 |
| CEC 411 | Digital Signal Processing Laboratory | 1 |
| CEC 460 | Telecommunication Systems | 3 |
| EE 310 | Avionics II | 3 |
| EE 401 | Control Systems Analysis and Design | 3 |
| EE 417 | Digital Communications | 3 |
| EE 420 | Avionics Preliminary Design | 3 |
| EE 421 | Avionics Detail Design | 3 |
| EE 430 | Introduction to Radio Frequency Circuits | 3 |
| EE 430L | Radio Frequency Circuits Laboratory | 1 |
| HU/SS | Lower-Level | 3 |
| HU/SS | Upper-Level | 3 |

Total Credits 32

TOTAL DEGREE CREDITS 129

Non-Track Option

The non-track option of the Electrical Engineering program gives students the opportunity to pursue topics in their own areas of interest. Many fields of study are common with the Avionics track, including wired and wireless systems, digital communications, electromagnetics, and high-frequency RF systems.

FRESHMAN YEAR

See the common Freshman Year outline on page 160

Total Credits 32

SOPHOMORE YEAR

| Course | Title | Credits |
|---------|---|---------|
| CEC 315 | Signals and Systems | 3 |
| CEC 320 | Microprocessor Systems | 3 |
| CEC 322 | Microprocessor Systems Laboratory | 1 |
| COM221 | Technical Report Writing | 3 |
| CS 225 | Computer Science II | 4 |
| EE 223 | Linear Circuits Analysis | 3 |
| EE 224 | Electrical Engineering Laboratory I | 1 |
| MA 243 | Calculus III | 4 |
| MA 345 | Differential Equations and Matrix Methods | 4 |
| PS 250 | Physics III | 3 |
| PS 253 | Physics Laboratory for Engineers | 1 |
| SYS 301 | Introduction to Systems Engineering | 3 |

Total Credits 33

JUNIOR YEAR

| Course | Title | Credits |
|---------|--|---------|
| CEC 220 | Digital Circuit Design | 3 |
| CEC 222 | Digital Circuit Design Laboratory | 1 |
| EC 225 | Engineering Economics | 3 |
| EE 300 | Linear Circuit Analysis II | 3 |
| EE 302 | Electronic Devices and Circuits | 3 |
| EE 304 | Electronic Circuits Laboratory | 1 |
| EE 308 | Introduction to Electrical Communications | 3 |
| EE 340 | Electric and Magnetic Fields | 3 |
| EE 417 | Digital Communications | 3 |
| EE/CEC | Upper-Level Elective | 3 |
| MA 412 | Probability and Statistics | 3 |
| MA 441 | Mathematical Methods for Engineering & Physics I | 3 |

Total Credits 32

SENIOR YEAR

| Course | Title | Credits |
|--------------|--|---------|
| CEC 410 | Digital Signal Processing | 3 |
| CEC 411 | Digital Signal Processing Laboratory | 1 |
| EE/CEC/MA/PS | Upper-Level Technical Elective | 3 |
| EE 401 | Control Systems Analysis and Design | 3 |
| EE 420 | EE Preliminary Design | 3 |
| EE 421 | EE Detail Design | 3 |
| EE 430 | Introduction to Radio Frequency Circuits | 3 |
| EE 430L | Radio Frequency Circuits Laboratory | 1 |
| CEC 460 | Telecommunication Systems | 3 |
| HU/SS | Lower-Level | 3 |
| HU/SS | Upper-Level | 6 |

Total Credits 32

TOTAL DEGREE CREDITS 129