B.S. in Engineering

The Bachelor of Science in Engineering provides students with the knowledge and hands-on experience essential for a successful engineering career, equipping them to develop innovative solutions for contemporary challenges. Designed from a multidisciplinary perspective, the B.S. in Engineering covers topics ranging from mechanical, electrical, aeronautical and systems engineering.

At the **Worldwide & Online Campus**, the Bachelor of Science in Engineering will prepare students to enter research, development and design positions. Online Engineering degree graduates are well-prepared to function effectively on multidisciplinary teams and contribute to the advancement in engineering-related projects upon graduation. The Bachelor of Science in Engineering is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org/, under the General Criteria and Engineering, General Engineering, Engineering Physics and Engineering Science Program Criteria.

At the **Asia Campus**, the B.S. in Engineering prepares students to become adept, professional engineers who stand out in their careers after graduation. The Bachelor of Science in#Engineering#is accredited by the Engineering Accreditation Commission of ABET,https://www.abet.org/, under the General Criteria and Engineering, General Engineering, Engineering Physics and Engineering Science Program Criteria. Additional modules may be required based on placement examination results in mathematics and English.

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.

Worldwide Program Requirements

General Education Requirements	38
Core Requirements	85
Total Credits	**123**

Program Details

The Bachelor of Science in Engineering requires successful completion of a minimum of 123 credit hours. Students enrolled in the Worldwide Undergraduate Online program may complete the degree in 20 terms, or approximately four years, assuming full-time enrollment and continuous progress. Students pursuing this undergraduate degree must earn a minimum cumulative grade point average (CGPA) of 2.00 for all work completed at the University. The courses required to earn this degree are listed below.

Students should be aware that many courses have prerequisites and/or corequisites. Students are responsible for ensuring that all prerequisite and degree requirements are satisfied prior to enrollment in advanced coursework. The suggested plan of study is provided as a guide. A student's actual plan of study may vary based on term of admission, course availability, transfer credit, and other academic considerations. Students should consult with their academic advisor to develop an individualized plan of study.

The curriculum includes a comprehensive sequence of coursework in engineering, engineering science, aeronautical engineering, electrical engineering, computer engineering, mechanical engineering, mathematics, and physical sciences, culminating in a two-course capstone design experience. Students should work closely with their academic advisor to ensure prerequisite requirements are met and courses are completed in the recommended sequence.

General Education Requirements

Embry-Riddle courses in the general education categories of Communication, Humanities, Social Sciences, Physical/Life Sciences, Mathematics, and Computer Science/Information Technology are given in the list below, assuming prerequisites are met. Courses from other institutions are acceptable if they fall into these broad categories and are at the level specified.

Communication		9
COMM 122	English Composition	
COMM 219	Speech	
COMM 221	Technical Communication	
Humanities - Lower Level		3
Social Sciences - Lower Level		3
ECON 225	Engineering Economics	
Humanities - Upper Level		3
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		6
PHYS 150	Physics with Calculus I	
PHYS 160	Physics with Calculus II	
Total Credits		**38**

Core Requirements

Aeronautical Engineering		
AERO 309	Aerodynamic Performance of Flight Vehicles	3
ENGR 350	Engineering Project Management	3
Engineering		
ENGR 101W	Introduction to Engineering	3
ENGR 120	Graphical Communications	3
ENGR 330	Systems and Signal Processing	3
ENGR 330L	Systems and Signal Processing Laboratory	1
ENGR 400	Fundamentals of Energy Systems	3
ENGR 450	Systems and Controls	3
Engineering Science		
ESCI 201	Statics	3
ESCI 202	Solid Mechanics	3
ESCI 204	Dynamics	3
ESCI 326	Engineering Materials and Structures	3
Computer Engineering		
CESC 220	Digital Circuit Design	3
CESC 220L	Digital Circuit Design Laboratory	1

Electrical Engineering		
ELEC 220	Circuits	3
ELEC 220L	Circuits Laboratory	1
ELEC 230	Electronics	3
ELEC 230L	Electronics Laboratory	1
Physical Science		
PHYS 250	Physics with Calculus III	3
PHYS 250W	Physics with Calculus III Laboratory	2
ESCI 206	Fluid Mechanics	3
ESCI 208	Thermodynamics	3
Mechanical Engineering		
MECH 370	Introduction to Robotics	3
MECH 370L	Introduction to Robotics I Laboratory	1
ESCI 324	Measurements and Instrumentation	2
ESCI 324L	Measurements and Instrumentation Laboratory	1
MECH 470	Mechatronics	3
MECH 470L	Mechatronics Laboratory	1
Mathematics		
MATH 243	Calculus and Analytical Geometry III	4
MATH 345	Differential Equations and Matrix Methods	4
MATH 412	Probability and Statistics	3
Capstone		
ENGR 490	Capstone Design Project I	3
ENGR 491	Capstone Design Project II	3
Total Credits		**85**

Suggested Plan of Study

Year One

Requirements	Credits
ENGR 101W - Introduction to Engineering	3
COMM 122 - English Composition	3
Semester Hours	**6**

Requirements	Credits
MATH 241 - Calculus and Analytical Geometry I	4
ENGR 115 - Introduction to Computing for Engineers	3
Humanities - Lower Level	3
Semester Hours	**10**

Requirements	Credits
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 150 - Physics with Calculus I	3
Semester Hours	**7**

Requirements	Credits
PHYS 160 - Physics with Calculus II	3
COMM 219 - Speech	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 29

Year Two

Requirements	Credits
ENGR 120 - Graphical Communications	3
MATH 243 - Calculus and Analytical Geometry III	4
COMM 221 - Technical Communication	3
Semester Hours	**10**

Requirements	Credits
MATH 345 - Differential Equations and Matrix Methods	4
ESCI 201 - Statics	3
Semester Hours	**7**

Requirements	Credits
ESCI 202 - Solid Mechanics	3
ESCI 206 - Fluid Mechanics	3
ECON 225 - Engineering Economics	3
Semester Hours	**9**

Requirements	Credits
ESCI 204 - Dynamics	3
PHYS 250 - Physics with Calculus III	3
PHYS 250W - Physics with Calculus III Laboratory	2
Semester Hours	**8**

Total Credits

Total Hours for All Requirements: 34

Year Three

Requirements	Credits
ESCI 208 - Thermodynamics	3
ELEC 220 - Circuits	3
ELEC 220L - Circuits Laboratory	1
Semester Hours	**7**

Requirements	Credits
ELEC 230 - Electronics	3
ELEC 230L - Electronics Laboratory	1
CESC 220 - Digital Circuit Design	3
CESC 220L - Digital Circuit Design Laboratory	1
Semester Hours	**8**

Requirements	Credits
MECH 370 - Introduction to Robotics	3
MECH 370L - Introduction to Robotics I Laboratory	1
ESCI 324 - Measurements and Instrumentation	2
ESCI 324L - Measurements and Instrumentation Laboratory	1
Semester Hours	**7**

Requirements	Credits
AERO 309 - Aerodynamic Performance of Flight Vehicles	3
ESCI 326 - Engineering Materials and Structures	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 28

Year Four

Requirements	Credits
ENGR 330 - Systems and Signal Processing	3
ENGR 330L - Systems and Signal Processing Laboratory	1
MECH 470 - Mechatronics	3
MECH 470L - Mechatronics Laboratory	1
Semester Hours	**8**

Requirements	Credits
ENGR 450 - Systems and Controls	3
MATH 412 - Probability and Statistics	3
ENGR 350 - Engineering Project Management	3
Semester Hours	**9**

Requirements	Credits
ENGR 490 - Capstone Design Project I	3
Humanities - Upper Level	3
ENGR 400 - Fundamentals of Energy Systems	3
Semester Hours	**9**

Requirements	Credits
ENGR 491 - Capstone Design Project II	3
Social Sciences - Upper Level	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 32

Estimated Cost of Attendance

Estimated Cost of Attendance: California Student Information (https://catalog.erau.edu/student-life/student-affairs/california-student/)

Asia Program Requirements

General Education Requirements	38
Core Requirements	85
Program Support Courses	4
Total Credits	**127**

Program Details

The Bachelor of Science in Engineering at the Asia Campus requires successful completion of a minimum of 127 credit hours. Students should consult their advising report to determine which modules, if any, have been granted as exemptions. The courses required to earn this degree are listed below.

Students should be aware that many modules have prerequisites and/or corequisites. Students are responsible for ensuring that all prerequisite and degree requirements are satisfied prior to enrollment in advanced coursework. The suggested plan of study is provided as a guide. A student's actual plan of study may vary based on instructor availability, the number of modules taken during a term, and other academic considerations.

Based on placement examination results, students may be required to complete one or more of the following modules prior to beginning the program: COMM 104, COMM 106, MATH 100, and/or MATH 106. Students should consult with their academic advisor to develop an individualized plan of study.

Note: Asia campus students follow Worldwide prerequisite requirements unless otherwise specified.

General Education Requirements

Communication		9
COMM 122	English Composition	
COMM 219	Speech	
COMM 221	Technical Communication	
Humanities - Lower Level		3
SOSC 210	Introduction to Sociology	
Social Sciences - Lower Level		3
ECON 225	Engineering Economics	
Humanities/Social Sciences - Upper Level		6
HUMN 400	Science and Aviation/Aerospace Technology in Society	
HUMN 330	Values and Ethics	
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		6
PHYS 150	Physics with Calculus I	
PHYS 160	Physics with Calculus II	
Total Credits		**38**

Core Requirements

Aeronautical Engineering		
AERO 309	Aerodynamic Performance of Flight Vehicles	3
ENGR 350	Engineering Project Management	3
Engineering		
ENGR 101W	Introduction to Engineering	3
ENGR 120	Graphical Communications	3
ENGR 330	Systems and Signal Processing	3
ENGR 330L	Systems and Signal Processing Laboratory	1
ENGR 400	Fundamentals of Energy Systems	3
ENGR 450	Systems and Controls	3
Engineering Science		
ESCI 201	Statics	3
ESCI 202	Solid Mechanics	3
ESCI 204	Dynamics	3
ESCI 326	Engineering Materials and Structures	3
Computer Engineering		
CESC 220	Digital Circuit Design	3
CESC 220L	Digital Circuit Design Laboratory	1
Electrical Engineering		
ELEC 220	Circuits	3
ELEC 220L	Circuits Laboratory	1
ELEC 230	Electronics	3
ELEC 230L	Electronics Laboratory	1
Physical Science		
PHYS 250	Physics with Calculus III	3
PHYS 250W	Physics with Calculus III Laboratory	2
ESCI 206	Fluid Mechanics	3
ESCI 208	Thermodynamics	3

Mechanical Engineering		
MECH 370	Introduction to Robotics	3
MECH 370L	Introduction to Robotics I Laboratory	1
ESCI 324	Measurements and Instrumentation	2
ESCI 324L	Measurements and Instrumentation Laboratory	1
MECH 470	Mechatronics	3
MECH 470L	Mechatronics Laboratory	1
Mathematics		
MATH 243	Calculus and Analytical Geometry III	4
MATH 345	Differential Equations and Matrix Methods	4
MATH 412	Probability and Statistics	3
Capstone		
ENGR 490	Capstone Design Project I	3
ENGR 491	Capstone Design Project II	3
Total Credits		**85**

Program Support Courses

UNIV 101	College Success	1
Singapore Specific		
COIN 496	Co-Operative Education *	3
or SCLM 420	Management of Production and Operations	
Total Credits		**4**

* COIN 496 is a mandatory 3-credit course module intended for all undergraduate students to take as part of the Bachelor of Science in Engineering offered through the Singapore location. Under certain extenuating circumstances, COIN 496 may be substituted on a case-by-case basis for SCLM 420 Management of Production and Operations in discussion with the Academic Advising Team. COIN 496 is an industry attachment serving as a structured supervised internship through which a student is personally coached by expert faculty. COIN 496 intends to add value to the student experience and benefit student employability upon completion of the degree program.

Suggested Plan of Study

Part-Time

Year One

Requirements	Credits
COMM 122 - English Composition	3
MATH 241 - Calculus and Analytical Geometry I	4
UNIV 101 - College Success	1
Semester Hours	**8**

Requirements	Credits
ENGR 101W - Introduction to Engineering	3
ENGR 115 - Introduction to Computing for Engineers	3
Semester Hours	**6**

Requirements	Credits
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 150 - Physics with Calculus I	3
Semester Hours	**7**

Requirements	Credits
MATH 243 - Calculus and Analytical Geometry III	4
SOSC 210 - Introduction to Sociology	3
Semester Hours	**7**

Total Credits

Total Hours for All Requirements: 28

Year Two

Requirements	Credits
ENGR 120 - Graphical Communications	3
ESCI 201 - Statics	3
Semester Hours	**6**

Requirements	Credits
PHYS 160 - Physics with Calculus II	3
COMM 221 - Technical Communication	3
Semester Hours	**6**

Requirements	Credits
ESCI 202 - Solid Mechanics	3
ESCI 206 - Fluid Mechanics	3
Semester Hours	**6**

Requirements	Credits
MATH 345 - Differential Equations and Matrix Methods	4
PHYS 250 - Physics with Calculus III	3
Semester Hours	**7**

Total Credits

Total Hours for All Requirements: 25

Year Three

Requirements	Credits
ESCI 204 - Dynamics	3
COMM 219 - Speech	3
PHYS 250W - Physics with Calculus III Laboratory	2
Semester Hours	**8**

Requirements	Credits
ECON 225 - Engineering Economics	3
CESC 220 - Digital Circuit Design	3
CESC 220L - Digital Circuit Design Laboratory	1
Semester Hours	**7**

Requirements	Credits
ELEC 220 - Circuits	3
ELEC 220L - Circuits Laboratory	1
ELEC 230 - Electronics	3
ELEC 230L - Electronics Laboratory	1
Semester Hours	**8**

Requirements	Credits
ESCI 208 - Thermodynamics	3
ENGR 330 - Systems and Signal Processing	3

ENGR 330L - Systems and Signal Processing Laboratory	1
Semester Hours	**7**

Total Credits

Total Hours for All Requirements: 30

Year Four

Requirements	Credits
AERO 309 - Aerodynamic Performance of Flight Vehicles	3
MECH 370 - Introduction to Robotics	3
MECH 370L - Introduction to Robotics I Laboratory	1
Semester Hours	**7**

Requirements	Credits
ESCI 324 - Measurements and Instrumentation	2
ESCI 324L - Measurements and Instrumentation Laboratory	1
ESCI 326 - Engineering Materials and Structures	3
Semester Hours	**6**

Requirements	Credits
MECH 470 - Mechatronics	3
MECH 470L - Mechatronics Laboratory	1
ENGR 350 - Engineering Project Management	3
Semester Hours	**7**

Requirements	Credits
ENGR 450 - Systems and Controls	3
MATH 412 - Probability and Statistics	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 26

Year Five

Requirements	Credits
ENGR 400 - Fundamentals of Energy Systems	3
ENGR 490 - Capstone Design Project I	3
Semester Hours	**6**

Requirements	Credits
HUMN 400 - Science and Aviation/ Aerospace Technology in Society	3
COIN 496 - Co-Operative Education or SCLM 420 - Management of Production and Operations	3
Semester Hours	**6**

Requirements	Credits
ENGR 491 - Capstone Design Project II	3
HUMN 330 - Values and Ethics	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 18

Full-Time

Year One

Requirements	Credits
COMM 122 - English Composition	3
MATH 241 - Calculus and Analytical Geometry I	4
ENGR 101W - Introduction to Engineering	3
UNIV 101 - College Success	1
Semester Hours	**11**

Requirements	Credits
ENGR 115 - Introduction to Computing for Engineers	3
MATH 242 - Calculus and Analytical Geometry II	4
PHYS 150 - Physics with Calculus I	3
Semester Hours	**10**

Requirements	Credits
MATH 243 - Calculus and Analytical Geometry III	4
SOSC 210 - Introduction to Sociology	3
ENGR 120 - Graphical Communications	3
Semester Hours	**10**

Requirements	Credits
ESCI 201 - Statics	3
PHYS 160 - Physics with Calculus II	3
COMM 221 - Technical Communication	3
Semester Hours	**9**

Total Credits

Total Hours for All Requirements: 40

Year Two

Requirements	Credits
ESCI 202 - Solid Mechanics	3
ESCI 206 - Fluid Mechanics	3
MATH 345 - Differential Equations and Matrix Methods	4
Semester Hours	**10**

Requirements	Credits
PHYS 250 - Physics with Calculus III	3
ESCI 204 - Dynamics	3
COMM 219 - Speech	3
PHYS 250W - Physics with Calculus III Laboratory	2
Semester Hours	**11**

Requirements	Credits
ECON 225 - Engineering Economics	3
CESC 220 - Digital Circuit Design	3
CESC 220L - Digital Circuit Design Laboratory	1
ELEC 220 - Circuits	3
ELEC 220L - Circuits Laboratory	1
Semester Hours	**11**

Requirements	Credits
ELEC 230 - Electronics	3
ELEC 230L - Electronics Laboratory	1
ESCI 208 - Thermodynamics	3
ENGR 330 - Systems and Signal Processing	3
ENGR 330L - Systems and Signal Processing Laboratory	1
Semester Hours	**11**

Total Credits

Total Hours for All Requirements: 43

Year Three

Requirements	Credits
AERO 309 - Aerodynamic Performance of Flight Vehicles	3
MECH 370 - Introduction to Robotics	3
MECH 370L - Introduction to Robotics I Laboratory	1
ESCI 324 - Measurements and Instrumentation	2
ESCI 324L - Measurements and Instrumentation Laboratory	1
Semester Hours	**10**

Requirements	Credits
ESCI 326 - Engineering Materials and Structures	3
MECH 470 - Mechatronics	3
MECH 470L - Mechatronics Laboratory	1
ENGR 350 - Engineering Project Management	3
Semester Hours	**10**

Requirements	Credits
ENGR 450 - Systems and Controls	3
MATH 412 - Probability and Statistics	3
ENGR 400 - Fundamentals of Energy Systems	3
Semester Hours	**9**

Requirements	Credits
ENGR 490 - Capstone Design Project I	3
HUMN 400 - Science and Aviation/ Aerospace Technology in Society	3
COIN 496 - Co-Operative Education or SCLM 420 - Management of Production and Operations	3
Semester Hours	**9**

Total Credits

Total Hours for All Requirements: 38

Year Four

Requirements	Credits
ENGR 491 - Capstone Design Project II	3
HUMN 330 - Values and Ethics	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 6