B.S. in Software Engineering

The Bachelor of Science degree in Software Engineering is designed to prepare students for an entry-level software engineering position in industry that supports the design and implementation of software systems with the focus on real-time, embedded, and safety-critical applications. Such systems are critical in aviation, space, medicine, and other disciplines that rely on high-quality, dependable software.

In a few years of completing their undergraduate degree, graduates of the Bachelor of Science in Software Engineering:

- Have established themselves in successful engineering careers in aviation, aerospace, and related fields and/or are pursuing advanced degrees.
- Are serving society and their professions as involved and responsible citizens, leaders, and role models.
- Are problem solvers, systems thinkers, and innovators.

Program-Specific Criteria

Admissions Criteria

In addition to meeting the Worldwide Campus admissions requirements, applicants for admission into the BS in Software Engineering, BS in Engineering, and BS in Engineering Technology degree programs must:

- Complete the English and Math Skills Assessments prior to admission to determine academic preparedness for entry into ENGL 123 English Composition and MATH 241 Calculus I.
- Current high school students and recent graduates under the age of 20 must meet established admissions requirements and demonstrate a 3.0 high school CGPA, with coursework that reflects 4 years of college preparatory mathematics and 2 years of college preparatory science, including a laboratory science.
- Transfer applicants must meet established admissions requirements and demonstrate a 2.5 cumulative grade point average (CGPA); transfer credit deemed equivalent to demonstrate academic preparedness for immediate entry into ENGL 123 English Composition and MATH 241 Calculus I, will be considered for admission into the program. Skills Assessment scores will be used for advising purposes if English and Math transfer credit demonstrates academic preparedness for admission into the program.

Students who fail to satisfy the guidelines for full admission may be considered for conditional admission under circumstances determined by the Admissions Office OR may be considered for admission into an alternate program. A written petition for admission, current resume and other supporting documentation may be requested for consideration of admission. Exceptions will be reviewed on a case by case basis.

Current Worldwide students requesting a change of program to the BS in Software Engineering, BS in Engineering, or BS in Engineering Technology degree programs must demonstrate successful completion of the first year of the suggested plan of study in the AS in Engineering Fundamentals degree plan with a 2.5 GPA. Students may then work with their campus advisor to determine eligibility to add or change to the BS in Software Engineering, BS in Engineering, or BS in Engineering Technology degree programs. Exceptions will be reviewed on a case by case basis.

Capstone Requirements:

1. Senior status is defined as having completed all Freshmen, Sophomore, and Junior year courses of the BSSE program as published in the Suggested Plan of Study.

2. All courses **must** be completed prior to enrolling in SWEN 490 with the exception of those identified in Terms 3 and 4 of the Senior year as published in the BSSE Suggested Plan of Study.

Estimated Cost of Attendance

Students will:

- Have an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- 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 communicate effectively with a range of audiences.
- 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 function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- 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.

DEGREE REQUIREMENTS

General Education

General Education		
Embry-Riddle courses in the general education categories of Communication Theory and Skills, and Humanities and Social Sciences may be chosen from those listed 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 Theory and Skills		
ENGL 123	English Composition	3
ENGL 221	Technical Report Writing	3
COMD 219	Speech	3
Mathematics		
MATH 241	Calculus and Analytical Geometry I	4
MATH 242	Calculus and Analytical Geometry II	4
Computer Science / Information		
CPSC 223	Scientific Programming in C	3
Physical and Life Sciences		
PHYS 150	Physics I for Engineers	3
PHYS 250	Physics III for Engineers	3
PHYS 253	Physics Laboratory for Engineers	2
Humanities		
Humanities Lower-Level		3
Humanities Upper-Level		3
Social Sciences		
Psychology Lower-Level		3
Psychology Upper-Level		3
Total Credits		**40**

Core/Major

Professional Education		
ENGR 101	Introduction to Engineering	3
Total Credits		**3**
Computer Engineering		
CESC 220	Digital Circuit Design	3
CESC 222	Digital Circuit Design Laboratory	1
CESC 320	Microprocessor Systems	3
CESC 322	Microprocessor Systems Laboratory	1
CESC 450	Real-Time Embedded Systems	3
CESC 470	Computer Architecture	3
Total Credits		**14**
Computer Science		
CPSC 222	Introduction to Discrete Structures	3
CPSC 225	Computer Science II	3
CPSC 227	Computer Science II Laboratory	1
CPSC 315	Data Structures and Analysis of Algorithms	3
CPSC 317	Files and Database Systems	3
CPSC 332	Organization of Programming Languages	3
CPSC 362	Computing Theory	3
CPSC 420	Operating Systems	3
CPSC 432	Information and Computer Security	3
Total Credits		**25**
Software Engineering		
SWEN 300	Software Engineering Practices	3
SWEN 310	Analysis and Design of Software Systems	3
SWEN 320	Software Construction	3
SWEN 420	Software Quality Assurance	3
Total Credits		**12**
Mathematics		
STAT 412	Probability and Statistics	3
Mathematics Upper-Level		3
Total Credits		**6**
Electives		
CESC/CPSC/ELEC/SWEN Upper-Level		6
CESC 300	Computing in Aerospace and Aviation	3
CPSC 335	Introduction to Computer Graphics	3
SWEN 410	Software Modeling	3
Total Credits		**15**
Capstone		
SWEN 450	Software Team Project I	3
SWEN 451	Software Team Project II	3
Total Credits		**6**
Total Degree Requirements		**121**

Plan of Study (BSSE)

Planning Your Course Progression

Engineering courses (ENGR, ESCI, ELEC, AERO, MECH, CESC) are offered four times a year. Other supporting courses (i.e., Calculus, Physics, English, etc.) are offered more frequently. The suggested Plan of Study shows a sequence of courses for a typical four- year program. There are four terms a year. In a given year there are four tracks that these terms are offered. For example, the first track starts with term 1 in August and then progresses with term 2 in October, term 3 in January and then term 4 in March. The other three tracks follow the same progression but with different start dates for the first term as indicated in the figure. BSE--- students should follow this approach when planning their course progression.

Year One

Term 1		**Credits**
ENGR 101	Introduction to Engineering	3
CPSC 222	Introduction to Discrete Structures	3
CPSC 223	Scientific Programming in C	3
	Credits Subtotal	**9.0**
Term 2		
CPSC 225	Computer Science II	3
CPSC 227	Computer Science II Laboratory	1
MATH 241	Calculus and Analytical Geometry I	4
	Credits Subtotal	**8.0**
Term 3		
MATH 242	Calculus and Analytical Geometry II	4
ENGL 123	English Composition	3
	Humanities Lower-Level (HUMN)	3
	Credits Subtotal	**10.0**
Term 4		
COMD 219	Speech	3
PHYS 150	Physics I for Engineers	3
	Credits Subtotal	**6.0**
	Credits Total:	**33.0**

Year Two

Term 1		**Credits**
PHYS 250	Physics III for Engineers	3
PHYS 253	Physics Laboratory for Engineers	2
SWEN 300	Software Engineering Practices	3
	Credits Subtotal	**8.0**
Term 2		
CESC 220	Digital Circuit Design	3
CESC 222	Digital Circuit Design Laboratory	1
STAT 412	Probability and Statistics	3
	Credits Subtotal	**7.0**
Term 3		
CESC 320	Microprocessor Systems	3
CESC 322	Microprocessor Systems Laboratory	1
	Upper-Level MATH Elective (MATH 432)	3
	Credits Subtotal	**7.0**
Term 4		
ENGL 221	Technical Report Writing	3
	Psychology Lower-Level	3
	Credits Subtotal	**6.0**
	Credits Total:	**28.0**

Year Three

Term 1		**Credits**
CPSC 315	Data Structures and Analysis of Algorithms	3
CPSC 362	Computing Theory	3
CPSC 317	Files and Database Systems	3
	Credits Subtotal	**9.0**
Term 2		
CPSC 332	Organization of Programming Languages	3
SWEN 310	Analysis and Design of Software Systems	3

CPSC 420	Operating Systems	3
	Credits Subtotal	**9.0**
Term 3		
CESC 470	Computer Architecture	3
SWEN 320	Software Construction	3
	Credits Subtotal	**6.0**
Term 4		
	Specified Elective (CESC 300)	3
	Humanities Upper-Level (HUMN)	3
	Credits Subtotal	**6.0**
	Credits Total:	**30.0**

Year Four

Term 1		**Credits**
CPSC 432	Information and Computer Security	3
CESC 450	Real-Time Embedded Systems	3
SWEN 420	Software Quality Assurance	3
	Credits Subtotal	**9.0**
Term 2		
	Specified Elective (CPSC 335)	3
	Specified Elective (SWEN 410)	3
	CPSC Upper-Level Elective (CPSC 462)	3
	Credits Subtotal	**9.0**
Term 3		
SWEN 450	Software Team Project I	3
	CPSC Upper-Level Elective (CPSC 455)	3
	Credits Subtotal	**6.0**
Term 4		
SWEN 451	Software Team Project II	3
	Psychology Lower-Level	3
	Credits Subtotal	**6.0**
	Credits Total:	**30.0**

Total Degree Requirements	**121**