

EMBEDDED SYSTEMS, ASSOCIATE IN SCIENCE DEGREE

Banner Code: 1_AS_ELES

Control Number: 41487

Financial Aid Eligible

The Embedded Systems Associate of Science degree provides an opportunity for students interested in working in embedded systems to earn an associate's degree. This degree is geared towards students who want to take their programming and circuit building skills to the next level. Students will become proficient in programming a variety of microcontrollers to perform tasks in an embedded application in C-based programming languages. Students who have obtained this certificate will be proficient at the use of multimeters and oscilloscopes to analyze circuit design and troubleshoot problems. Students will gain familiarity with digital communication protocols. This certificate is designed to teach students the skills necessary to build a career working with embedded electronics commonly found in consumer devices, IoT-connected devices, and autonomous vehicles.

Students earning this degree are encouraged to pursue a bachelor's degree in an Electrical Engineering or Computer Science discipline.

Students must complete the Robotics Technician Certificate of Achievement (12-13 units) as a prerequisite to entry into the Embedded Systems program.

Program Outcomes

1. Students will acquire skills necessary to program common microcontrollers using C.
2. Students will gain familiarity with different communication protocols to interface between electronic systems.
3. Students will be proficient at using multimeters, oscilloscopes, and spectrum analyzers to analyze circuits.
4. Students will acquire the skills necessary to methodically identify problems in circuits and propose solutions.

Review Graduation Requirements (<https://catalog.cccd.edu/orange-coast/graduation-requirements/associate-degree/>) and General Education (<https://catalog.cccd.edu/orange-coast/general-education-patterns/>).

Required Prerequisite

Robotics Technician Certificate of Achievement (12-13 Units)

Course	Title	Units
Required Courses		
ELEC A100 or MATH A115 or MATH A120	Electronic Problem Solving College Algebra Trigonometry	3-4
ELEC A111	D.C. Circuits	3
ELEC A121	Robotics 1- Mechanics & Design	3

Course	Title	Units
ELEC A122	Robotics 2- Sensors, Control Theory, and Programming	3
Total Units		12-13

Required Courses

Course	Title	Units
ELEC A102	Safety, Maintenance, and Calibration	1
ELEC A103 or ELEC A290	Computer Hardware Configuration & Diagnostics Electronic Troubleshooting	3
ELEC A223	Embedded Control Systems	4
ELEC A224	Digital Communication Systems	3
Total Major Units		23 - 24
<i>OCC AS General Education</i> ^{1,2}		<i>up to 21</i>
<i>Transferable electives as needed to satisfy unit requirements</i>		<i>varies</i>
Total Minimum Degree Units - OCC AS GE		60

¹ Some program major units may also meet GE requirements.

² Cal-GETC pattern (up to 34 units) may be substituted.

These sequences at Orange Coast College are general course curriculum maps for students to finish all major and general education requirements for two-year completion of degrees, and/or fulfillment of transfer requirements. The course sequence may include course prerequisites and other placement requirements. **Students are advised to meet with an Orange Coast College Counselor to review course selections and sequences to ensure that completion of this program will meet a student's transfer and career goals.**

Course	Title	Units
Year 1		
Semester 1		
ELEC A100 or MATH A115	Electronic Problem Solving ¹ or College Algebra	3
ELEC A111	D.C. Circuits	3
ELEC A121	Robotics 1- Mechanics & Design	3
ELEC A122	Robotics 2- Sensors, Control Theory, and Programming	3
ELECTIVE (DEGREE APPLICABLE) ²		3
Units		15
Semester 2		
ELEC A223	Embedded Control Systems	4
ELEC A224	Digital Communication Systems	3
ELEC A102	Safety, Maintenance, and Calibration	1
ELEC A103 or ELEC A290	Computer Hardware Configuration & Diagnostics or Electronic Troubleshooting	3
OCC AS GE AREA 1A- CHOOSE ONE		3
Units		14
Year 2		
Semester 1		
OCC AS GE AREA 1B - CHOOSE ONE		3-4
OCC AS GE AREA 4 - CHOOSE ONE		3

Course	Title	Units
OCC AS GE AREA 5 - CHOOSE ONE		3-4
OCC AS GE AREA 6 - CHOOSE ONE		3
ELECTIVE (DEGREE APPLICABLE) ²		3
Units		15-17
Semester 2		
OCC AS GE AREA 2 - CHOOSE ONE ³		3
OCC AS GE AREA 3 - CHOOSE ONE		3
ELECTIVE (DEGREE APPLICABLE) ²		10
Units		16
Total Units		60-62

¹ MATH A115 Satisfies OCC AS GE, Area 4

² VARIES TO REACH MINIMUM 60 DEGREE APPLICABLE UNITS

³ If MATH A115 NOT COMPLETED