Bachelor of Science in Computer Systems Engineering

The Bachelor of Science (BS) in Computer Systems Engineering program at the University of Alaska Anchorage teaches students the fundamental principles of computer systems engineering and topical issues in computing so they may pursue advanced degrees or enter the workplace as productive, competent engineers. The program seeks to further the profession of computer systems engineering through professional activities and public service within the local community and beyond. Faculty engage in and disseminate research to advance the development of computer systems engineering and provide innovative technological solutions to address the needs of modern society.

The BS in Computer Systems Engineering is accredited by the Engineering Accreditation Commission of ABET, https://www.abet.org (https://www.abet.org/).

Admission Requirements

- Complete the Admission Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/admissions/undergraduate/).

Special Considerations

- Students who intend to enroll in this program of study are strongly encouraged to complete the following content in high school with a minimum grade of C: Trigonometry (1/2 year), Physics (1 year), Algebra (2 years), Chemistry (1 year), and English (3 years). Insufficient preparation may increase the number of semesters required to complete the degree.
- A student who is unable to earn a minimum grade of C in any course offered by the college may retake that course up to two additional times. A student who fails to earn a minimum grade of C on the second attempt will be required to meet with an academic advisor and a member of the College of Engineering professional advising staff to develop a plan for improvement of academic performance before continuing in the program. Failure to earn a minimum grade of C on the third attempt will result in removal from the program. Re-admittance requires a letter of appeal from the student with an explanation of any mitigating factors and how these factors have been addressed. Re-admittance is subject to approval by the department chair of the program.

Graduation Requirements

- Complete the General University Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/).
- Complete the General Education Requirements for Baccalaureate Degrees (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/gers/).

- The Quantitative Skills GER will be met and exceeded by the following degree requirements: MATH A251 or MATH A251F, MATH A252 or MATH A252F, and MATH A253.
  - The Natural Sciences GER will be met and exceeded by the following degree requirements: PHYS A211, PHYS A211L, PHYS A212, and PHYS A212L.
- All computer systems engineering majors must take a standardized test of knowledge of computer science approved by the computer science and engineering faculty for the purpose of evaluating program effectiveness. There is no minimum score required for graduation. This test will normally be taken during the senior year.
- Complete the following major requirements with a minimum grade of C:

Code	Title	Credits
Core Courses		
CSCE A101	Introduction to Computer Science	3
CSCE A201	Computer Programming I	4
CSCE A211	Computer Programming II	4
CSCE/EE A241	Computer Hardware Concepts	4
CSCE A248	Computer Organization and Assembly Language Programming	3
CSCE A311	Data Structures and Algorithms	3
CSCE A321	Operating Systems	3
CSCE A342	Digital Circuits Design	3
CSCE A365	Computer Networks	3
CSCE A448	Computer Architecture	3
CSCE A465	Computer and Network Security	3
CSCE A470	Computer Science and Engineering Capstone Project	3
EE A203 & A203L	Fundamentals of Electrical Engineering I and Fundamentals of Electrical Engineering I Laboratory	4
EE A333	Electronic Devices	4
EE A353	Circuit Theory	3
ESM A450	Economic Analysis and Operations	3
MATH A251 or MATH A251F	Calculus I F.A.T. Calculus I	4-6
MATH A252 or MATH A252F	Calculus II F.A.T. Calculus II	4-6
MATH A253	Calculus III	4
MATH A261	Introduction to Discrete Mathematics	3
MATH A302	Ordinary Differential Equations	3
PHIL A305	Professional Ethics	3
PHYS A211 & A211L	General Physics I and General Physics I Laboratory	4
PHYS A212 & A212L	General Physics II and General Physics II Laboratory	4
STAT A307	Probability and Statistics	4

Advanced Engineering Electives

Complete 12 credits from the following: [1]		12
Any upper-division elective with a CSCE prefix		
EE/PHYS A314	Electromagnetics	
EE/PHYS A324	Electromagnetics II	
EE A324L	Electromagnetics Laboratory II	
EE A354	Engineering Signal Analysis	
EE A441	Integrated Circuit Design	
EE A451	Digital Signal Processing	
EE A462	Communication Systems	
EE A465	Telecommunications	
Total		**98-102**

[1] *At least 6 credits must be from CSCE courses. A maximum of 3 credits from CSCE A395, a maximum of 3 credits from CSCE A495 and a maximum of 6 credits from CSCE A498 may be applied toward this degree requirement. Other relevant courses may be accepted by approved petition.*

A minimum of 120 credits is required for the degree, of which 39 credits must be upper-division.

Honors in Computer Systems Engineering

The Bachelor of Science in Computer Systems Engineering recognizes distinguished achievements by conferring programmatic honors in computer systems engineering. In order to receive honors in computer systems engineering, a student must meet the following requirements:

- Meet the requirements for Graduation with Honors;
- Meet the requirements for a Bachelor of Science in Computer Systems Engineering;
- Earn a minimum GPA of 3.50 in the courses required for the major;
- Show active participation in a computer science related organization such as a UAA club or community group. Membership in a national professional organization such as the Association for Computing Machinery (ACM) or the Institute of Electrical and Electronics Engineers (IEEE) is encouraged but insufficient to meet this requirement. To apply for honors, students must submit a written reflection to the computer science and engineering department chair by the graduation application deadline that explains how participation enhanced the student's learning experience in computer science.

Program Student Learning Outcomes

Students graduating with a Bachelor of Science in Computer Systems Engineering will be able to:

- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
- 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.
- Communicate effectively with a range of audiences, including technical and non-technical audiences for business, end-user, client, and computing contexts.
- 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.
- Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.

Sample Plan

The academic plan below is one pathway through the degree/certificate. It includes all requirements, taking into account recommendations from program faculty. Each student's plan may vary according to their initial course placement (http://catalog.uaa.alaska.edu/academicpoliciesprocesses/academicstandardsregulations/courseplacement/), intended course load, additional majors and/or minors, and their placement into required prerequisite courses. Any change in the plan below can have an unforeseen impact on the rest of the plan. **Therefore, it is very important to meet with your academic advisor to verify your personal academic plan.**

Please review the following terms, definitions, and resources associated with the sample academic plan below.

- Each course in the far left column links to a pop-up bubble with a course description, prerequisite requirements, and associations with university requirements. For example, if a course fulfills a general education requirement, you will see that in the pop-up bubble.
- **GER**: indicates a General Education Requirement (http://catalog.uaa.alaska.edu/undergraduateprograms/baccalaureaterequirements/gers/). GERs that also count toward degree/certificate requirements appear as a specific course in the plan. For these courses, "GER" is not indicated explicitly in the table, but if you click on the course, you will see the course's GER status in the pop-up bubble.
- **Program Elective**: indicates a specific course selection determined by program faculty to fulfill a degree/certificate requirement. Students should seek assistance from their academic advisor.
- **Elective**: indicates an open selection of 100-400 level university courses to fulfill elective credits needed to meet the minimum total credits toward the degree/certificate.
- **Upper Division Program Elective**: indicates a specific 300-400 level course selection determined by the program faculty to fulfill a degree/certificate requirement. Students should seek assistance from their academic advisor.
- **Upper Division Elective**: indicates an open selection of 300-400 level courses to fulfill elective credits needed to meet the minimum

total credits toward the degree/certificate. These courses must be upper division in order to meet General University Requirements for the particular degree/certificate type.

First Year

Fall

		Credits
CSCE A101	Introduction to Computer Science	3
MATH A251 or MATH A251F	Calculus I or F.A.T. Calculus I	4-6
WRTG A111	Writing Across Contexts	3
GER Oral Communication Skills		3
	Credits	**13-15**

Spring

CSCE A201	Computer Programming I	4
MATH A252 or MATH A252F	Calculus II or F.A.T. Calculus II	4-6
MATH A261	Introduction to Discrete Mathematics	3
GER Written Communication Skills (200-level)		3
	Credits	**14-16**

Second Year

Fall

CSCE A211	Computer Programming II	4
CSCE A241	Computer Hardware Concepts	4
MATH A253	Calculus III	4
PHYS A211 & A211L	General Physics I and General Physics I Laboratory	4
	Credits	**16**

Spring

CSCE A248	Computer Organization and Assembly Language Programming	3
CSCE A311	Data Structures and Algorithms	3
PHYS A212 & A212L	General Physics II and General Physics II Laboratory	4
STAT A307	Probability and Statistics	4
GER Social Sciences		3
	Credits	**17**

Third Year

Fall

CSCE A342	Digital Circuits Design	3
EE A203 & A203L	Fundamentals of Electrical Engineering I and Fundamentals of Electrical Engineering I Laboratory	4
MATH A302	Ordinary Differential Equations	3
GER Humanities [2]		3
GER Social Sciences		3
	Credits	**16**

Spring

CSCE A321	Operating Systems	3

CSCE A448	Computer Architecture	3
EE A353	Circuit Theory	3
ESM A450	Economic Analysis and Operations	3
Upper Division Program Elective		3
	Credits	**15**

Fourth Year

Fall

CSCE A365	Computer Networks	3
PHIL A305	Professional Ethics	3
GER Fine Arts		3
Upper Division Program Elective		3
Upper Division Program Elective		3
	Credits	**15**

Spring

CSCE A465	Computer and Network Security	3
CSCE A470	Computer Science and Engineering Capstone Project	3
EE A333	Electronic Devices	4
Upper Division Program Elective		3
	Credits	**13**
	Total Credits	**119-123**

[1] *MATH A251 or MATH A251F have prerequisites.*

[2] *Choose a course that also fulfills the Alaska Native-Themed GER.*