COMPUTER ENGINEERING

College of Engineering and Mines
Department of Electrical and Computer Engineering
(907) 474-7137
www.uaf.edu/ece/

B.S. Degree

Minimum Requirements for Degree: 135 credits

The mission of the UAF Electrical and Computer Engineering Department is to offer the highest quality, contemporary education in electrical and computer engineering at the undergraduate and graduate levels and to perform research appropriate to the technical needs of the state of Alaska, the nation and the world.

Computer engineering is a relatively new discipline. It lies somewhere in the middle between computer science, which covers theory, algorithms, software, networking, graphics and computer architecture—and electrical engineering, which covers microelectronics, electrical circuits and devices, networks, communications systems, computer architecture, hardware design and systems analysis. Computer engineers design, analyze, produce, operate, program and maintain computer and digital systems. They apply theories and principles of science and mathematics to the design of hardware, software, networks and processes to solve technical problems.

Over the past decade, computers have evolved into complex systems that may consist of single machines or many interconnected computers linked by a data network. In one form or another, computers now control most telephone and communications systems, process control and manufacturing automation systems, management information systems, household appliances, automobiles, transportation systems and medical instrumentation. Computers also form the core of the Internet. To work in the constantly evolving discipline of computer systems engineering, the computer engineer must acquire competence in both digital computer hardware and the fundamentals of software engineering.

Careers in computer engineering are as wide and varied as computer systems themselves. Systems range from embedded computer systems found in consumer products or medical devices; control systems for automobiles, aircraft and trains; to more wide-ranging applications in telecommunications, financial transactions and information systems. The Bureau of Labor Statistics lists computer engineering as the fastest growing occupation in the U.S., with 299,000 jobs in 1998 to a predicted 622,000 jobs in 2008.

The computer engineering program education objectives are:

1. Breadth: To provide students with a broad education emphasizing computer engineering that will serve as the foundation for productive careers in the public or private sectors, graduate education and lifelong learning.
2. Depth: To provide students with understanding of the fundamental knowledge prerequisite for practice and/or advanced study in computer engineering, including its scientific principles, rigorous analysis and creative design. The BSEE program offers depth concentration in communications, computer engineering, and power and control.
3. Practical Experience: To provide students with hands-on experience in the design, implementation and validation of computer systems in an environment that fosters and encourages innovation and creativity.
4. Professional Skills: To develop skills for clear communication and responsible teamwork and instill professional attitudes and ethics, so that students are prepared for the complex modern work environment and lifelong learning.
5. Learning Environment: To provide an environment that enables students to pursue their goals in an innovative program that is rigorous and challenging, open and supportive.

These objectives serve the department, college and university missions by insuring that all graduates of the program have received a high quality, contemporary education that prepares them for a rewarding career in computer engineering.

Candidates for the B.S. degree are required to take the state of Alaska Fundamentals of Engineering Examination in their general field.

For more information about the computer engineering program mission, goals and educational objectives, visit www.uaf.edu/ece/.

Major—B.S. Degree

1. Complete the general university requirements (page 112). (As part of the core curriculum requirements, complete: MATH 200X, CHEM 105X and CHEM 106X or PHYS 213X.)
2. Complete the B.S. degree requirements (See page 117. As part of the B.S. degree requirements, complete: MATH 201X, PHYS 211X and PHYS 212X.)
3. Complete the following program (major) requirements:*

CS 201—Computer Science I	3
CS 202—Computer Science II	3
CS 301—Assembly Language Programming	3
CS 311—Data Structures and Algorithms	3
CS 321—Operating Systems	3
CS 331—Programming Languages	3
EE 102—Introduction to Electrical Engineering	3
EE 203—Electrical Engineering Fundamentals I	4
EE 204— Electrical Engineering Fundamentals II	4
EE 333W—Physical Electronics	4
EE 334—Electronic Circuit Design	4
EE 311—Applied Engineering Electromagnetics	3
EE 331—High Frequency Lab	1
EE 343—Digital Systems Analysis and Design	4
EE 443—Computer Engineering Analysis and Design	4
EE 444W,O—Embedded Systems Design	4
EE 463—Communication Networks	3
ES 101—Introduction to Engineering	2
ESM 450W—Economic Analysis and Operations	3
MATH 202X—Calculus	4
MATH 302—Differential Equations	3
MATH 307—Discrete Mathematics	3
Approved electives**	9
Approved engineering science elective***	3

4. Complete State of Alaska Fundamentals of Engineering examination
5. Minimum credits required 135

**Student must earn a C grade or better in each course in the major requirements.*

***Recommended electives are: EE 353, EE 354, EE 434, EE 451, EE 461, EE 464, CS 302, CS 381, CS 402, CS 411, CS 421, CS 431, CS 441, CS 471, CS 481*

****Engineering science elective to be chosen from ES 208, ES 331, ES 334, ES 341, ES 346.*

Note: Page numbers refer to the UAF 2006-2007 academic catalog, which can be viewed online at www.uaf.edu/catalog/.

Baccalaureate Core Requirements

All degrees (e.g. B.A., B.S., etc.) require additional courses. Refer to specific degree and program requirements.

COMMUNICATION (9)

Complete the following:
ENGL 111X .....(3) _____
ENGL 190H may be substituted.

Complete one of the following:
ENGL 211X **OR** ENGL 213X .....(3) _____

Complete one of the following:
COMM 131X **OR** COMM 141X.....(3) _____

PERSPECTIVES ON THE HUMAN CONDITION (18)

Complete all of the following four courses:
ANTH 100X/SOC 100X.....(3) _____
ECON 100X **OR** PS 100X .....(3) _____
HIST 100X.....(3) _____
ENGL/FL 200X.....(3) _____

Complete one of the following three courses:
ART/MUS/THR 200X, HUM 201X **OR** ANS 202X..... (3) _____

Complete one of the following six courses:
BA 323X, COMM 300X, JUST 300X, NRM 303X,
PS 300X **OR** PHIL 322X.....(3) _____
OR complete 12 credits from the above courses **PLUS**
- two semester-length courses in a single Alaska Native language or other non-English language **OR**
- three semester-length courses (9 credits) in American Sign Language taken at the university level.

MATHEMATICS (3)

Complete one of the following:
MATH 107X, MATH 161X **OR** MATH 103X.....(3-4) _____
** No credit may be earned for more than one of MATH 107X or 161X.*

OR complete one of the following:*
MATH 200X, MATH 201X, MATH 202X,
MATH 262X **OR** MATH 272X.....(4) _____
**Or any math course having one of these as a prerequisite*

NATURAL SCIENCES (8)

Complete any two (4-credit) courses:
ATM 101X .....(4) _____
BIOL 100X.....(4) _____
BIOL 103X.....(4) _____
BIOL 104X.....(4) _____
BIOL 105X.....(4) _____
BIOL 106X.....(4) _____
BIOL 111X.....(4) _____
BIOL 112X.....(4) _____
CHEM 100X .....(4) _____
CHEM 103X .....(4) _____
CHEM 104X .....(4) _____
CHEM 105X .....(4) _____
CHEM 106X .....(4) _____
GEOG 205X .....(4) _____
GEOS 100X .....(4) _____
GEOS 101X .....(4) _____
GEOS 112X .....(4) _____
GEOS 120X .....(4) _____
GEOS 125X .....(4) _____
MSL 111X.....(4) _____
PHYS 102X.....(4) _____
PHYS 103X.....(4) _____
PHYS 104X.....(4) _____
PHYS 115X.....(4) _____
PHYS 116X.....(4) _____
PHYS 175X.....(4) _____
PHYS 211X.....(4) _____
PHYS 212X.....(4) _____
PHYS 213X.....(4) _____

LIBRARY AND INFORMATION RESEARCH (0–1)
Successful completion of library skills competency test **OR**
LS 100X or 101X prior to junior standing .....(0–1) _____

UPPER-DIVISION WRITING AND ORAL COMMUNICATION (0)

Complete the following:
Two writing intensive courses designated (W) .....(0) _____
One oral communication intensive course designated (O) .....(0) _____
OR two oral communication intensive courses designated (O/2), at the upper-division level (see degree and/or major requirements).....(0) _____

TOTAL CREDITS REQUIRED.....38–39

UNIVERSITY OF ALASKA FAIRBANKS
Office of Admissions and the Registrar • P.O. Box 757480 • Fairbanks, AK 99775-7480 • admissions@uaf.edu • www.uaf.edu