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 faculty of the Electrical and Computer Engineering Department at UAF seek to provide a positive learning environment that enables students to pursue their goals in an innovative program that is rigorous and challenging, open and supportive. The B.S. program develops practical skills by emphasizing hands-on experience in the design, implementation, and validation of electrical systems in an environment that fosters and encourages innovation and creativity. This approach builds the foundation for the following program's educational objectives:

1. Breadth: Graduates will utilize their broad education emphasizing computer engineering to serve as the foundation for productive careers in the public or private sectors, graduate education, and lifelong learning.

2. Depth: Graduates will apply their understanding of the fundamental knowledge prerequisite for the practice of and/or advanced study in computer engineering, including its scientific principles, rigorous analysis, and creative design.

3. Professional Skills: Develop skills for clear communication and responsible teamwork, and cultivate professional attitudes and ethics, so that graduates are prepared for the complex modern work environment and for lifelong learning.

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 124). (As part of the core curriculum requirements, complete: MATH F200X, CHEM F105X and CHEM F106X or PHYS F213X.)

2. Complete the B.S. degree requirements. (See page 129. As part of the B.S. degree requirements, complete: MATH F201X, PHYS F211X and PHYS F212X.)

3. Complete the following program (major) requirements:*
   CS F201—Computer Science I...3
   CS F202—Computer Science II..3
   CS F301—Assembly Language Programming 3
   CS F311—Data Structures and Algorithms..............................3
   CS F321—Operating Systems...3
   CS F331—Programming Languages...3
   EE F102—Introduction to Electrical Engineering 3
   EE F203—Electrical Engineering Fundamentals I...................4
   EE F204— Electrical Engineering Fundamentals II.................4
   EE F333W—Physical Electronics...4
   EE F334—Electronic Circuit Design 4
   EE F311—Applied Engineering Electromagnetics...................3
   EE F331—High Frequency Lab..1
   EE F343—Digital Systems Analysis and Design.......................4
   EE F443—Computer Engineering Analysis and Design 4
   EE F444W,O—Embedded Systems Design................................4
   EE F463—Communication Networks..3
   ES F101—Introduction to Engineering....................................2
   ESM F450W—Economic Analysis and Operations...................3
   MATH F202X—Calculus III 4
   MATH F302—Differential Equations 3
   MATH F307—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 F353, EE F354, EE F434, EE F451, EE F461, EE F464, CS F302, CS F381, CS F402, CS F411, CS F421, CS F431, CS F441, CS F471, CS F481

*** Engineering science elective to be chosen from ES F208, ES F331, ES F334, ES F341, ES F346.

U N I V E R S I T Y   O F   A L A S K A   F A I R B A N K S
Admissions • P.O. Box 757480 • Fairbanks, AK 99775-7480 • admissions@uaf.edu • www.uaf.edu

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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 F111X .... (3) _____
 ENGL F190H may be substituted.

Complete one of the following:
ENGL F211X **OR** ENGL F213X .... (3) _____

Complete one of the following:
COMM F131X **OR** COMM F141X .... (3) _____

PERSPECTIVES ON THE HUMAN CONDITION (18)

Complete all of the following four courses:
ANTH F100X/SOC F100X .... (3) _____
ECON F100X **OR** PS F100X .... (3) _____
HIST F100X .... (3) _____
ENGL/FL F200X .... (3) _____

Complete one of the following three courses:
ART/MUS/THR F200X, HUM F201X **OR** ANS F202X .... (3) _____

Complete one of the following six courses:
BA F323X, COMM F300X, JUST F300X, NRM F303X,
PS F300X **OR** PHIL F322X .... (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 F103X, MATH F107X, MATH F161X **OR**
STAT F200X .... (3 – 4) _____
 * No credit may be earned for more than one of MATH F107X or F161X.

OR complete one of the following:*
MATH F200X, MATH F201X, MATH F202X,
MATH F262X **OR** MATH F272X.................................... (4) _____
 *Or any math course having one of these as a prerequisite.

NATURAL SCIENCES (8)

Complete any two (4-credit) courses:
ATM F101X.. (4) _____
BIOL F100X... (4) _____
BIOL F103X... (4) _____
BIOL F104X... (4) _____
BIOL F111X... (4) _____
BIOL F112X... (4) _____
BIOL F115X... (4) _____
BIOL F116X... (4) _____
CHEM F100X... (4) _____
CHEM F103X... (4) _____
CHEM F104X... (4) _____
CHEM F105X... (4) _____
CHEM F106X... (4) _____
GEOG F205X.. (4) _____
GEOS F100X.. (4) _____
GEOS F101X.. (4) _____
GEOS F112X.. (4) _____
GEOS F120X.. (4) _____
GEOS F125X.. (4) _____
MSL F111X.. (4) _____
PHYS F102X.. (4) _____
PHYS F103X.. (4) _____
PHYS F104X.. (4) _____
PHYS F115X.. (4) _____
PHYS F116X.. (4) _____
PHYS F175X.. (4) _____
PHYS F211X.. (4) _____
PHYS F212X.. (4) _____
PHYS F213X.. (4) _____

LIBRARY AND INFORMATION RESEARCH (0 – 1)

Successful completion of library skills competency test **OR**
LS F100X or F101X 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