

# COMPUTER ENGINEERING

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

## B.S. Degree

Minimum Requirements for Degree: 135 credits

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.

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/](http://www.uaf.edu/ece/).

## MAJOR—B.S. Degree

1. Complete the general university requirements (page 107). (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 114. 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 2005-2006 academic catalog, which can be viewed online at [www.uaf.edu/catalog/](http://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**