

Computer Science

Over the past 50 years computers have developed from a novelty with a few technical numerical applications to a ubiquitous tool, essential to science and technology, to business and finance, to government, to communications, and even to entertainment. Computer Science has grown from a specialization in mathematics or business or electrical engineering to an independent, broadly based area of study covering all aspects of the use and understanding of computers and the computation process.

Computer Science education concentrates on the creation and understanding of computer software. The curriculum focuses first on programming and then on the central processes that support programming: operating systems, programming languages, and computational theory. The program of study culminates with a senior design project that produces a working program for a real world problem.

Computers and Business Concentration

An understanding of business fundamentals is essential for students planning a career in applied computer science in a business environment. This program of study provides a foundation in computer science, business and information management. It includes courses in accounting, management, marketing, database fundamentals, and design and implementation of software systems. The curriculum leads to the Bachelor of Science in Computer Science degree.

International Engineering Concentration

Computer science is a global profession and today's computer scientists must be able to work and interact in a variety of diverse cultural and technical environments. The international engineering concentration gives computer science students an opportunity to study culture and foreign language at the same time as they pursue their computer science degrees.

The concentration includes at least one semester of study abroad with courses taken in a foreign language. In addition, students may participate in a four-to-five month international internship. Foreign language skills can be earned through a variety of means, including formal university coursework, intensive summer language programs, and previous education.

Foreign language education and the study-abroad experience satisfy the cultural context requirements of the University Studies Program. The curriculum leads to the Bachelor of Science in Computer Science degree.

Educational Objectives

The computer science program prepares students to:

- Apply the fundamentals of computer science to solve software-oriented computing problems.
- Communicate effectively within and outside the discipline.
- Extend their knowledge by independent learning and continuing education.

- Appreciate the role of computer science in the societal context and appreciate the importance of ethics in the practice of the profession.
- Work effectively with others.

Program Learning Outcomes

We expect that our graduating students will have:

- The ability to utilize operating systems and software tools that are similar to those used in the computing profession.
- Proficiency in the use of modern and widespread programming languages.
- The ability to be competitive in securing entry-level software and computer systems jobs.
- The capability to analyze, design, and implement software projects comparable to those found in industry.
- The ability to describe, and be proficient in, the application of important computer science concepts.
- Written, oral, and visual presentations skills.
- An understanding of ethics, professionalism, and the role of computer scientists in society.
- An understanding of the benefits and skills necessary to engage in independent learning.
- Skills to independently learn new computer science material and identify available resources for additional assistance.
- The ability to be effective team members.
- High educational and work quality standards.

Graduate Program

For details of the M.S., Ph.D. and mathematics-computer science Ph.D. requirements, see the *Graduate Bulletin*.

Computer Science Undergraduate Major

Computer science requirements are subject to minor program changes. The published curricula are general guides. Students should consult the department web pages (<http://www.cs.uwyo.edu>) for current information.

Students must complete ENGL 4010; COSC 1010, 1030, 2030, 2150, 3011, 3015, 3020, 3050, 4950, 4955, theory course: 4100 or 4200, operating systems course: 4740, programming language course: 4780 or 4785, system course: 4820 or 4760; and 12 semester hours of COSC courses at the 3000+ level that are not fulfilling another requirement. Three hours can be from the Computer Engineering [CPEN] electives.

The science requirement is PHYS 1210 and 1220, or 1310 and 1320, or LIFE/BIOL 1010 and 2022 or 2023, or CHEM 1020 and 1030; Also, two additional 4 credit lab science courses, which meet the USP S, SB, SP, or SE requirements, including EE 2390, ES 2210, and 2120.

The mathematics requirement is COSC 2300, MATH 2200, 2205, STAT 4220 and six semester hours selected from among MATH 2210, or higher numbered courses, COSC 4340 or STAT 3000- or 4000-level courses, except for MATH 2350, 2355, 4000 and variable-credit courses. Recommend: MATH 2250 and 3500.

The foreign language requirements is two semesters of a single foreign language (or one semester at the 2nd or 3rd-semester level), 2 semesters of American Sign Language, or satisfactory score on one of the following; Departmental Examination, College Level Examination Program, Advanced Placement Examination. Refer to languages department section in this bulletin for detailed information.

In addition to taking the courses listed above, students must also choose courses that satisfy the following University Studies Program requirements: Writing 1 (WA), Writing 2 (WB), Writing 3 (WC), three cultural context courses (CH, CS, CA), oral communications (O), U.S. and Wyoming Constitutions requirement (V), Global Awareness (G), Information Literacy (L), U.S. Diversity (D), Intellectual Community (I) and Physical Activity (P).

Additional requirements: 6 upper-division hours in non COSC courses (UDNC). All COSC, MATH, and STAT courses must have a grade of C or better. The student's program must fulfill the university requirement of 48 semester credit hours in upper division (junior/senior) or graduate-level courses.

Suggested B.S. Program in Computer Science

Course Sequence of Major requirements

Students are free to satisfy program requirements in any order that complies with course prerequisites.

FRESHMAN YEAR: <i>Fall</i>	<i>Hrs.</i>
ES 1000	1
COSC 1010	4
MATH 2200	4
SCIENCE I	4
ENGL 1010	3

FRESHMAN YEAR: <i>Spring</i>	<i>Hrs.</i>
COSC 1030	4
MATH 2205	4
Science II	4
USP O Course	3
PEAC 1001	1

SOPHOMORE YEAR: <i>Fall</i>	<i>Hrs.</i>
COSC 2150	3
COSC 2030	4

COSC 2300	3
Foreign Language I	4
USP Cultural Context	3

SOPHOMORE YEAR: Spring *Hrs.*

COSC 3011	3
COSC 3020	4
MATH elective	3
Foreign Language II	4
USP Cultural Context	3

JUNIOR YEAR: Fall *Hrs.*

COSC 3015	3
Operating System Course	3
COSC Elective	3
Science elective	4
USP V Course	3

JUNIOR YEAR: Spring *Hrs.*

COSC elective	4
COSC 3050	1
Science elective	4
MATH elective	3
USP Cultural Context	3

SENIOR YEAR: Fall *Hrs.*

COSC 4950	1
System Course	3
STAT 4220	3
Theory Course	3
ENGL 4010	3
UDNC	3

SENIOR YEAR: Spring *Hrs.*

COSC 4955	2
COSC elective	3
COSC elective	3
Programming Language course	3
UDNC	3

Computer Science Computers and Business Concentration Undergraduate Major

Computer science Computers and Business concentration requirements are subject to minor program changes. The published curricula are general guides. Students should consult the department web pages (<http://www.cs.uwyo.edu>) for current information.

Students must complete ENGL 4010; COSC 1010, 1030, 2030, 2150, 3011, 3020, 3050, 4210, 4220, 4950, 4955, system course: 4820 or 4760; and 9 semester hours of COSC courses at 3000+ level that are not fulfilling another requirement.

The science requirement is PHYS 1210 and 1220, or 1310 and 1320, or LIFE/BIOL 1010 and 2022 or 2023, or CHEM 1020 and 1030; Also, two additional 4 credit lab science courses, which meet the USP S, SB, SP, or SE requirements, including EE 2390, ES 2210, and 2120.

The mathematics requirement is COSC 2300, MATH 2350 and 2355 or 2200 and 2205, STAT 2010, 2050, or 2070.

The business requirement is ACCT 1010, ACCT 1020, IMGT 2400, IMGT 3400, MGT 3210, MKT 3210, and six semester hours of Business courses at the 3000+ level that are not fulfilling another requirement.

In addition to taking the courses listed above, students must also choose courses that satisfy the following University Studies Program requirements: Writing 1 (WA), Writing 2 (WB), Writing 3 (WC), three cultural context courses (CH, CS, CA), oral communications (O), U.S. and Wyoming Constitutions requirement (V), Global Awareness (G), Information Literacy (L), U.S. Diversity (D), Intellectual Community (I) and Physical Activity (P).

Additional requirements: 3 upper-division semester hours in a non COSC course (UDNC). All COSC, MATH, Business and STAT courses must have a grade of C or better. The student's program must fulfill the university requirement of 48 semester credit hours in upper division (junior/senior) or graduate-level courses.

Suggested B.S. Program in Computer Science Computers and Business Concentration

Course Sequence of Major requirements

Students are free to satisfy program requirements in any order that complies with course prerequisites.

FRESHMAN YEAR: <i>Fall</i>	<i>Hrs.</i>
ES 1000	1
COSC 1010	4
Science I	4
ENGL 1010	3
MATH 2200	4

FRESHMAN YEAR: <i>Spring</i>	<i>Hrs.</i>
COSC 1030	4
Science II	4
PEAC 1001	1
MATH 2205	4

USP O Course 3

SOPHMORE YEAR: Fall Hrs.

COSC 2030 4

COSC 2150 3

ACCT 1010 3

COSC 2300 3

USP Cultural Context 3

SOPHMORE YEAR: Spring Hrs.

COSC 3011 3

IMGT 2400 3

USP Cultural Context 3

ACCT 1020 3

COSC 3020 4

JUNIOR YEAR: Fall Hrs.

IMGT 3400 3

STAT 2050 4

Science Elective 4

USP V Course 3

COSC Elective 3

JUNIOR YEAR: Spring Hrs.

Business Elective 3

Science Elective 3

USP Cultural Context 3

COSC 3050 3

MGT 3210 3

SENIOR YEAR: Fall Hrs.

COSC 4950 1

COSC 4210 3

System Course 3

Business Elective 3

ENGL 4010 3

MKT 3210 3

SENIOR YEAR: Spring Hrs.

COSC 4955 2

COSC 4220 3

COSC Elective 3

COSC Elective 3

UDNC 3

Computer Science International Engineering Concentration

Computer Science International Engineering concentration requirements are subject to minor program changes. The published curricula are general guides. Students should consult the department web pages (<http://www.cs.uwyo.edu>) for current information.

Students must complete ENGL 4010; COSC 1010, 1030, 2030, 2150, 3011, 3015, 3020, 3050, 4950, 4955, theory course: 4100 or 4200, operating system course: 4740, programming language course: 4780 or 4785, system course: 4820 or 4760; and 12 semester hours of COSC courses at 3000+ level and not fulfilling another requirement. Three hours can be from the Computer Engineering [CPEN] electives.

The science requirement is PHYS 1210 and 1220, or 1310 and 1320, or LIFE/BIOL 1010 and 2022 or 2023, or CHEM 1020 and 1030; Also, two additional 4 credit lab science courses, which meet the USP S, SB, SP, or SE requirements, including EE 2390, ES 2210, and 2120.

The mathematics requirement is COSC 2300, MATH 2200, 2205, STAT 4220 and six semester hours selected from among MATH 2210, or higher numbered courses, COSC 4340 or STAT 3000- or 4000-level courses, except for MATH 2350, 2355, 4000 and variable-credit courses. Recommend: MATH 2250 and 3500.

The foreign language requirement is four semesters of a single foreign language and one semester of study abroad. Foreign language skills can be earned through a variety of means, including formal university coursework, intensive summer language programs, and previous education.

In addition to taking the courses listed above, students must also choose courses that satisfy the following University Studies Program requirements: Writing 1 (WA), Writing 2 (WB), Writing 3 (WC), oral communications (O), U.S. and Wyoming Constitutions requirement (V), Information Literacy (L), Intellectual Community (I) and Physical Activity (P).

Additional requirements: six upper-division hours in non COSC courses (UDNC). All COSC, MATH, and STAT courses must have a grade of C or better. The student's program must fulfill the university requirement of 48 semester credit hours in upper division (junior/senior) or graduate-level courses.

Suggested B.S. Program in Computer Science International Engineering Concentration

Course Sequence of Major requirements

Students are free to satisfy program requirements in any order that complies with course prerequisites.

FRESHMAN YEAR: <i>Fall</i>	<i>Hrs.</i>
ES 1000	1
COSC 1010	4

MATH 2200	4
Foreign Language I	4
ENGL 1010	3

FRESHMAN YEAR: Spring *Hrs.*

COSC 1030	4
MATH 2205	4
Foreign Language II	4
USP O Course	3
PEAC 1001	1

SOPHOMORE YEAR: Fall *Hrs.*

COSC 2150	3
COSC 2030	4
COSC 2300	3
Foreign Language III	4
Science I	3

SOPHOMORE YEAR: Spring *Hrs.*

COSC 3011	3
COSC 3020	4
MATH elective	3
Foreign Language IV	4
Science II	4

JUNIOR YEAR: Fall *Hrs.*

COSC 3015	3
Operating System Course	3
COSC Elective	3
Science elective	4
USP V Course	3

JUNIOR YEAR: Spring *Hrs.*

<i>Study Abroad</i>	
COSC elective	4
Science elective	4
MATH elective	3
UDNC	3

SENIOR YEAR: Fall *Hrs.*

COSC 4950	1
System Course	3
STAT 4220	3
Theory Course	3
ENGL 4010	3
UDNC	3

SENIOR YEAR: <i>Spring</i>	<i>Hrs.</i>
COSC 4955	2
COSC 3050	1
COSC elective	3
COSC elective	3
Programming Language course	3