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. It is highly recommended that students declare a Business minor, since they will meet all the requirements without any additional courses.

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.

Program Objectives

The following are the measurable objectives for graduated computer science students (Standard I-1):

- OB1: Have successfully applied the fundamentals of computer science to solve software-oriented computing problems.
- OB2: Have effectively communicated within and outside the discipline and work effectively with others.
- OB3: Have extended their knowledge by independent learning and continuing education.
- OB4: Appreciate the role of computer science in the societal context and appreciate the importance of ethics in the practice of the profession.

Program Learning Outcomes

The program of study in Computer Science enables students to achieve, by the time of graduation:

- (a) An ability to apply knowledge of computing and mathematics appropriate to the discipline;
- (b) An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
- (c) An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;
- (d) An ability to function effectively on teams to accomplish a common goal;
- (e) An understanding of professional, ethical, legal, security, and social issues and responsibilities;
- (f) An ability to communicate effectively with a range of audiences;
- (g) An ability to analyze the local and global impact of computing on individuals, organizations and society;
- (h) Recognition of the need for, and an ability to engage in, continuing professional development;
- (i) An ability to use current techniques, skills, and tools necessary for computing practices.
- (j) An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
- (k) An ability to apply design and development principles in the construction of software systems of varying complexity.

Computer Science Undergraduate Major

The computer science requirements are subject to minor program changes. The published curricula are general guides. Students should consult the department Web pages (www.cs.uwyo.edu) for current information.

Students must complete ENGL 1010, 4010; COSC 1010, 1030, 2030, 2150, 2300, 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 consists first of two tightly related lab sciences chosen from the following pairs: PHYS 1110 and 1120, 1210 and 1220, or 1310 and 1320, or LIFE 1010 and 2022 or 2023, or CHEM 1020 and 1030 or CHEM 1050 and CHEM 1060; two additional courses from among EE 2390 and any four-credit lab science, for the science major, which meets the USP S, SB, SP, or SE requirement, excluding LIFE 1002 and CHEM 1000.

The mathematics requirement is MATH 2200, 2205, STAT 4220 or MATH 4255 or MATH 4265 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.

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

In addition to the required courses listed above, students must choose courses that complete satisfaction of 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: Fall	Hours
ES 1000	1
COSC 1010	4
MATH 2200	4
Science I	4

ENGL 1010	3
Freshman Year: Spring	**Hours**
COSC 1030	4
MATH 2205	4
Science II	4
COJO 1010	3
PEAC 1001	1
Sophomore Year: Fall	**Hours**
COSC 2150	3
COSC 2030	4
COSC 2300	3
Foreign Language I	4
USP Cultural Context	3
Sophomore Year: Spring	**Hours**
COSC 3011	3
COSC 3020	4
Math Elective	3
Foreign Language II	4
USP Cultural Context	3
Junior Year: Fall	**Hours**
COSC 3015	3
Operating Systems Course	4
COSC Elective	4
Science Elective	4
USP V Course	3
Junior Year: Spring	**Hours**
COSC Elective	3
COSC 3050	1
Science Elective	4
MATH Elective	3
USP Cultural Context	3

Senior Year: Fall	Hours
COSC 4950	1
Systems Course	3
STAT 4220	3
Theory Course	3
ENGL 4010	3
Upper Division non-COSC (UDNC)	3

Senior Year: Spring	Hours
COSC 4955	3
COSC Electives	6
Programming Language Course	3
UDNC	3

Computer Science Computers and Business Concentration Undergraduate Major

The 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 1010, 4010; COSC 1010, 1030, 2030, 2150, 2300, 3011, 3020, 3050, 4210, 4220, 4820, 4950, 4955, one operating systems course: 3750, 4740 or 4750; and 6 semester hours of COSC courses at 3000+ level that are not fulfilling another requirement.

The science requirement consists first of two tightly related lab sciences chosen from the following pairs: PHYS 1110 and 1120, 1210 and 1220, or 1310 and 1320, or LIFE 1010 and 2022 or 2023, or CHEM 1020 and 1030 or CHEM 1050 and 1060; two additional courses from among EE 2390, and any four-credit lab science, for the science major, which meets the USP S, SB, SP, or SE requirement, excluding LIFE 1002 and CHEM 1000.

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

The business requirement is ACCT 1010, ACCT 1020, MGT 1040, MGT 3110, MGT 3210, MKT 3210, FIN 3250 and three semester hours of business courses at the 3000+ level that are not fulfilling another requirement.

In addition to the required courses listed above, students must choose courses that complete satisfaction of 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.

It is highly recommended that students declare a Business minor, since they will meet all the requirements without any additional courses. If you are planning on attending graduate school, then you should take COSC 4740 for the operating systems course and COSC 4100 and COSC 4780 for the two computer science electives.

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: Fall	Hours
ES 1000	1
COSC 1010	4
MATH 2200	4
Science I	4
ENGL 1010	3

Freshman Year: Spring	Hours
COSC 1030	4
MATH 2205	4
Science II	4
COJO 1010	3
PEAC 1001	1

Sophomore Year: Fall	Hours
COSC 2030	4
COSC 2150	3

ACCT 1010	3
COSC 2300	3
USP Cultural Context	3

Sophomore Year: Spring	Hours
COSC 3011	3
MGT 1040	3
USP Cultural Context	3
ACCT 1020	3
COSC 3020	4

Junior Year: Fall	Hours
MGT 3110	3
STAT course	3
Science Elective	4
USP V Course	3
COSC Operating Systems Course	3-4

Junior Year: Spring	Hours
FIN 3250	3
Science Elective	4
COSC 4820	3
COSC 3050	1
MGT 3210	3

Senior Year: Fall	Hours
COSC 4950	1
COSC 4210	3
COSC Elective	3
Business Elective	3
ENGL 4010	3
MKT 3210	3

Senior Year: Spring	Hours
COSC 4955	2
COSC 4220	3

USP Cultural Context	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 office Web pages (http://www.cs.uwyo.edu/) for current information.

Students must complete ENGL 1010, 4010; COSC 1010, 1030, 2030, 2150, 2300, 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 consists first of two tightly related lab sciences, chosen from the following pairs: PHYS 1110 and 1120, 1210 and 1220, or 1310 and 1320, or LIFE 1010 and 2022 or 2023, or CHEM 1020 and 1030 or CHEM 1050 and 1060; two additional courses from among ASTR 2310, EE 2390, and any four-credit lab science, for the science major, which meets the USP S, SB, SP, or SE requirement, excluding LIFE 1002 and CHEM 1000.

The mathematics requirement is MATH 2200, 2205, STAT 4220 or MATH 4255 or MATH 4265 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.

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 the courses listed above, students must choose courses that complete satisfaction of 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; Fall	Hours
ES 1000	1
COSC 1010	4
MATH 2200	4
Foreign Language I	4
ENGL 1010	3

Freshman Year: Spring	Hours
COSC 1030	4
MATH 2205	4
Foreign Language II	4
COJO 1010	3
PEAC 1001	1

Sophomore Year: Fall	Hours
COSC 2150	3
COSC 2030	4
COSC 2300	3
Foreign Language III	4
Science I	3

Sophomore Year: Spring	Hours
COSC 3011	3
COSC 3020	4
MATH Elective	3
Foreign Language IV	3
Science II	4

Junior Year: Fall	Hours
COSC 3015	3
Operating Systems Course	4
COSC Elective	4

USP V Course	3
Junior Year: Spring (Study Abroad)	**Hours**
COSC Elective	4
Science Elective	4
MATH Elective	3
UDNC	3
Senior Year: Fall	**Hours**
COSC 4950	1
System Course	3
STAT 4220	3
Theory Course	3
ENGL 4010	3
UDNC	3
Senior Year: Spring	**Hours**
COSC 4955	2
COSC 3050	3
COSC Electives	6
Programming Language Course	3

Computer Science Minor Requirements

Requirements for a minor in Computer Science are as follows:

- A total of 18 credits of computer science courses
- All 18 credits must have a grade of C or better.