

# Computer Science



## Career Profile

Computer science applies the power of the computer to solve some of the most perplexing problems of science, engineering, and business. The program at the School of Mines focuses on the scientific and engineering aspects of the field, and trains students to develop highly complex programs from initial concept to final product.

Computer scientists work in all types of industries and organizations: aeronautical sciences, biomedical research, business, astronomy, geology, and others. Computer scientists created a flight simulator for the space shuttle that helps train astronauts. They create programs that simulate the aerodynamic properties of new types of aircraft and racing vehicles. Industrial robots that perform jobs too dangerous for humans are guided by computer programs. Computer scientists develop programs that help us to better predict the weather and to predict earthquakes.

Computer scientists in the biomedical field create programs that analyze and test new drugs and chemical compounds, programs that help researchers in the area of genetic manipulation, programs that help physicians diagnose and treat medical problems, and programs that help nurses monitor patients and dispense medications.

In the world of business, computer scientists create programs that allow financial analysts to model the economy and predict future trends.

## Accreditation

The South Dakota School of Mines and Technology is accredited by the Higher Learning Commission of the North Central Association of Colleges and Secondary Schools, the recognized accrediting agency for the north central states. In 2006, the HLC voted to

continue accreditation of the School of Mines. The School of Mines has been accredited since 1925.

The computer science curriculum is also accredited by the Computing Sciences Accreditation Board (CSAB).

## Labs and Facilities

Computer Science is a rapidly changing field, and we make certain that our equipment and curriculum keep pace with changing technology. You will have access to personal computers and workstations. You will also have a chance to learn about computer networks by using the networks on campus. There are a variety of computing platforms available. Resources include an extensive PC network, a Linux lab, and a lab equipped with SunRays tied to Sun Enterprise 450 servers.

## Faculty

Chair: Dr. Kyle Riley

Professors: Dr. Edward Corwin, Dr. Roger Johnson, Dr. Toni Logar, Dr. Manuel Penaloza, and Dr. John Weiss

Associate Professor: Dr. Jeffrey McGough

Assistant Professor: Dr. Jianbin Wei

Instructors: Mr. Val Manes and Mr. Roger Schrader

## Features and Strengths

Computer science is one of the largest of the science programs at the School of Mines. The major features a well-developed curriculum that emphasizes both the software and the hardware aspects of the discipline. The faculty in the department consider teaching undergraduates to be their most important activity, and they pride themselves on the personal contact they have with their students.

## Program Overview

The primary goal of the program is to prepare graduates to enter a dynamic and rapidly changing field as competent computer scientists. Graduates will be capable in all phases of software development including design, development, and testing, and they will have a firm understanding of hardware technologies.

## Outcomes

- School of Mines computer science graduates received salary offers that average more than \$55,000.
- 100 percent of 2005-06 School of Mines computer science graduates were placed in their field or entered a graduate program within a year of graduation.
- 80 percent of graduates gain real-life experience through internships and co-ops.
- Companies hiring computer science graduates include Microsoft, Rockwell Collins, Boeing, IBM, L3 Communications, and Gateway.

## Student Organizations

Students at the School of Mines also have a variety of opportunities for extra-curricular activities that range from music, intramurals, and drama to ski and snowboarding clubs, and more than 75 other clubs and professional student organizations. These are

important activities for our students and we encourage them to take full advantage of out-of-classroom events.

The Center for Advanced Manufacturing and Production (CAMP) is designed to teach students engineering, science and design skills, as well as the ability to work in teams. Team members design, build, market and raise the money for their projects. All students are welcome to work on CAMP projects.

## Research

Students have the opportunity to be involved in research with professors conducting work on projects in friction stir-welding, satellite image processing, and software for various CAMP projects.

## Curriculum Listing

<http://catalog.sdsmt.edu>

### COMPUTER SCIENCE CURRICULUM/CHECKLIST

#### Freshman Year

##### First Semester

ENGL 101	Composition I	3
CHEM 112	General Chemistry I	3
CHEM 112L	General Chemistry I Lab	1
MATH 123	Calculus I	4
CSC 150	Computer Science I	3
	Humanities or Social Sciences Elective(s) <sup>1</sup>	3
<b>TOTAL</b>		<b>17</b>

##### Second Semester

MATH 125	Calculus II	4
CHEM 114	General Chemistry II	3
CSC 250	Computer Science II	4
CSC 251	Finite Structures	4
PE	Physical Education	1
<b>TOTAL</b>		<b>16</b>

#### Sophomore Year

##### First Semester

MATH 225	Calculus III	4
CSC 314	Assembly Language	4
CENG 244	Intro to Digital Systems	4
PE	Physical Education	1
	Humanities or Social Sciences Elective(s) <sup>1</sup>	3
<b>TOTAL</b>		<b>16</b>

##### Second Semester

ENGL 279	Technical Communications I	3
CSC 317	Computer Organization and Architecture	4
CSC 300	Data Structures	4
	Humanities or Social Sciences Elective(s) <sup>1</sup>	6
<b>TOTAL</b>		<b>17</b>

#### Junior Year

##### First Semester

ENGL 289	Technical Communications II	3
MATH 321	Differential Equations	4
PHYS 211	University Physics I	3
CSC 372	Analysis of Algorithms	3
	Elective or CSC Elective <sup>1</sup>	3
<b>TOTAL</b>		<b>16</b>

### For More Information contact:

Dr. Kyle Riley  
 Chair, Mathematics and Computer Science  
 (605) 394-2471  
 Kyle.Riley@sdsmt.edu  
 <www.mcs.sdsmt.edu>

#### Second Semester

MATH 315	Linear Algebra	4
MATH 441	Engineering Statistics I	2
MATH 442	Engineering Statistics II	2
CSC 461	Programming Languages	4
PHYS 213	University Physics II	3
PHYS 213L	University Physics II Lab	1
<b>TOTAL</b>		<b>16</b>

#### Senior Year

##### First Semester

CSC 470	Software Engineering	3
CSC 440	Advanced Digital Systems	4
CSC 484	Database Mgmt Systems	3
	Electives or CSC Electives <sup>1</sup>	6
<b>TOTAL</b>		<b>16</b>

##### Second Semester

CSC 456	Operating Systems	4
CSC 465	Senior Design Project	3
HUM 375	Computers in Society <sup>1</sup>	3
	Electives or CSC Electives <sup>1</sup>	5
<b>TOTAL</b>		<b>15</b>

#### 128 credits required for graduation

#### Curriculum Notes

- CSC 470 and CSC 465 form a two-course sequence. It is expected that they will be taken in successive semesters.
- An exit exam, such as the Major Field Achievement Test in Computer Science, will be given as part of CSC 465. The overall results of this exam will be used to assess the computer science program.
- CSC 105 may not be counted toward any mathematics, computer science, or engineering degree. Other majors should consult their departments on policy regarding these courses.
- MUEN 101, 121, 122 can be used to substitute for one or two of the required two Physical Education credits.

<sup>1</sup>Elective courses must be chosen to satisfy all of the following requirements:

1. Sixteen (16) semester hours in humanities or social science. At least six (6) hours must be in humanities and at least six (6) hours must be in social sciences.
2. Six (6) credit hours of humanities and six (6) credit hours of social science must be completed within the first sixty-four (64) hours. It is important to refer to the general education requirements under bachelor of science graduation requirements for further information.
3. Thirty (30) total hours in humanities, social science, or other nontechnical disciplines that serve to broaden the background of the student. This may include all english classes, two (2) credits of physical education, and those courses used to meet requirement (1) above.
4. A minimum of three (3) computer science elective courses numbered 400 or above must be taken. MATH 471 also counts as a computer science elective. A three (3) credit Co-op may be substituted for one computer science elective. Special topics and independent study courses may not be used to satisfy the computer science elective requirement.