QUESTIONNAIRE FOR REVIEW
of the
COMPUTER SCIENCE PROGRAM

submitted by

South Dakota School of Mines and Technology
Institution

June 25, 2001
Date

to the
Computing Accreditation Commission

for the
2001-2002
accreditation cycle

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I. Objectives and Assessments

**INTENT:** The program has documented, measurable objectives, including expected outcomes for graduates. The program regularly assesses its progress against its objectives and uses the results of the assessments to identify program improvements and to modify the program’s objectives.

The **Intent** must be met in order for a program to be deemed accreditable. One way to meet the **Intent** of this criterion is to satisfy each one of the **Standards** listed below. To do this, answer the questions associated with the **Standards**. If one or more **Standards** are not satisfied, it is incumbent upon the institution to demonstrate and document clearly and unequivocally how the **Intent** is met in some alternative fashion.

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

**Standard I-1. The program must have documented, measurable objectives.**

**Standard I-2. The program’s objectives must include expected outcomes for graduating students.**

A. Objectives.

Please attach items that support or precede the objectives, e.g.,

- mission statements from institution, college, department, program
- plans (institution, college, department, etc.)
- all objectives including student outcomes (itemize)
- process for assessments
- who is involved in assessment and improvement?
- data from assessments
- inputs from any supporting Office of Assessment

1. Indicate below or attach to this document your educational objectives for this program. These objectives must include expected outcomes for graduating students.

The computer science program at the South Dakota School of Mines and Technology is characterized by a strong emphasis on scientific computing and its application to science and engineering. Our program reflects our roots in an engineering college, with more emphasis on mathematics and on hardware than is typically found in a liberal arts environment. We are preparing our graduates to pursue careers within the computer industry as systems programmers, software engineers, systems designers, and scientific programmers, as well as giving them a firm foundation for further study at the graduate level. Specifically, the objectives of the computer science program at the South Dakota School of Mines and Technology are:
Upon graduation, all students will:

1. know a variety of programming languages;
2. possess detailed knowledge of at least one high-level language;
3. have experience on a variety of computer systems;
4. possess problem solving and algorithm development skills;
5. understand the software development process;
6. be knowledgeable about the theoretical foundations of computing;
7. have a strong background in computer hardware;
8. possess an extensive background in computer-related mathematics;
9. have an appreciation of the scientific method;
10. have developed the ability to interact and communicate with others;
11. have experience working in teams;
12. possess the foundations to be life-long learners in the rapidly-changing field of computer science;
13. understand and respect the professional standards of ethics expected of a computer scientist and understand the societal impact of computing;
14. have completed a course of study which is current and responsive to industrial trends.

2. Describe how your program’s objectives align with your institution’s mission.

The mission of the South Dakota School of Mines and Technology is:

1. To prepare men and women for an enhanced quality of life by providing a broad educational environment which fosters a quality educational experience leading to baccalaureate and post-baccalaureate degrees emphasizing science and engineering.
2. To contribute to the expansion of knowledge through programs of basic and applied research, scholarship, and other creative endeavors.
3. To utilize the special capabilities and expertise on the campus to address regional, national, and international needs.

The principal objectives in support of this mission are:

1. To make the South Dakota School of Mines and Technology an outstanding undergraduate educational institution, enhanced by quality graduate education.
2. To enhance our national recognition as an educational institution with emphasis in science and engineering.

3. To continue to develop centers of excellence in research and graduate education using faculty expertise, and to further develop interdisciplinary research that involves faculty from several departments.

4. To create and continually ensure an environment which nurtures growth of the intellect, character, and spirit of students, faculty, and staff.

5. To build mutually beneficial partnerships with the broader community.

6. To increase significantly the resources available to the institution.

This statement of mission and objectives serves as a framework for the continued growth of excellence at the South Dakota School of Mines and Technology.

The goals and objectives of the computer science program are in agreement with this mission. Providing an excellent education for students at all levels is the primary goal of the department. Excellence in teaching is stressed for all faculty and is the most important component of a faculty member’s duties. Research and scholarly activity which contribute to the discipline is also encouraged and supported. It is a departmental goal, as well as an institutional goal, to address regional, national, and international needs in computer science. To meet this goal, the faculty continually update course materials and participate in cutting-edge research involving both graduate and undergraduate students. As a result, the computer science program plays an important part in the development and support of high-tech companies in the Black Hills and the rest of the state. Several companies (e.g. Martin & Associates, Comuniq, Dakota Scientific Software) have located in Rapid City to utilize the expertise available at SDSM&T, particularly in the computer science department. Relationships between the department and industry have brought significant research and development work to the region as well.
B. Implementation of Objectives. Please complete the following table.

<table>
<thead>
<tr>
<th>Objective</th>
<th>How Measured</th>
<th>When Measured</th>
<th>Improvements Identified</th>
<th>Improvements Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1 Language Variety</td>
<td>Student performance in CSC 370 (Programming Languages)</td>
<td>Each time the course is taught</td>
<td>Need to include Java</td>
<td>Java is now a substantial part of CSC 370.</td>
</tr>
<tr>
<td>S2 Language Detail</td>
<td>Student performance in CSC 150 (Computer Science I), CSC 250 (Computer Science II), CSC 371 (Data Structures)</td>
<td>Each time the courses are taught</td>
<td>More OOP desirable</td>
<td>CSC 371 includes more OOP.</td>
</tr>
<tr>
<td>S3 System Variety</td>
<td>Student performance in CSC 472 (Operating Systems)</td>
<td>Each time the course is taught</td>
<td>More UNIX desirable</td>
<td>CSC 370, CSC 371, and CSC 372 use UNIX platforms.</td>
</tr>
<tr>
<td>S4 Algorithms</td>
<td>Student performance in CSC 371</td>
<td>Each time the course is taught</td>
<td>More exposure to analysis of algorithms desired</td>
<td>Analysis of algorithms course added to curriculum</td>
</tr>
<tr>
<td>S5 Development</td>
<td>Student performance in all software courses, particularly CSC 477 (Software Engineering), CSC 478 (Senior Design)</td>
<td>Each time the courses are taught</td>
<td>Introduce this topic earlier in the curriculum</td>
<td>The lab in CSC 150 exposes students to software development. Increased coverage in CSC 250.</td>
</tr>
<tr>
<td>S6 Theory</td>
<td>Student performance in CSC 251 (Finite Structures)</td>
<td>Each time the course is taught</td>
<td>More exposure to analysis of algorithms desired</td>
<td>Analysis of algorithms course added to curriculum</td>
</tr>
<tr>
<td>Objective</td>
<td>How Measured</td>
<td>When Measured</td>
<td>Improvements Identified</td>
<td>Improvements Implemented</td>
</tr>
<tr>
<td>-----------</td>
<td>--------------------------------------------------</td>
<td>--------------------------------------------</td>
<td>-------------------------------------------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td>S7 Hardware</td>
<td>Student performance in CSC 341 (COD), CSC 440 (Advanced Digital)</td>
<td>Each time the courses are taught</td>
<td>Lab experience desirable</td>
<td>A lab has been added to CSC 440.</td>
</tr>
<tr>
<td>S8 Math</td>
<td>Student performance in math classes</td>
<td>Each time the courses are taught</td>
<td>None to date</td>
<td>None to date</td>
</tr>
<tr>
<td>S9 Science</td>
<td>Student performance in science classes</td>
<td>Each time the courses are taught</td>
<td>A more balanced exposure to the sciences desirable</td>
<td>New curriculum requires one year of each of chemistry and physics.</td>
</tr>
<tr>
<td>S10 Communication</td>
<td>Senior Design Presentations evaluated by a faculty team and student performance in ENGL 279, 289 (Technical Comm. I and II)</td>
<td>Each time the courses are taught</td>
<td>Increase discipline-specific presentation opportunities</td>
<td>Increased student presentations in computer science classes</td>
</tr>
<tr>
<td>S11 Teamwork</td>
<td>Student performance in CSC 477, 478. Many courses have smaller team projects. Co-op</td>
<td>Each time the courses are taught</td>
<td>None to date</td>
<td>None to date</td>
</tr>
<tr>
<td>S12 Life-long Learners</td>
<td>Alumni Surveys</td>
<td>Every five years</td>
<td>None to date</td>
<td>None to date</td>
</tr>
<tr>
<td>Objective</td>
<td>How Measured</td>
<td>When Measured</td>
<td>Improvements Identified</td>
<td>Improvements Implemented</td>
</tr>
<tr>
<td>-----------</td>
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</tr>
<tr>
<td>S13 Ethics</td>
<td>Student performance in Hum 375 (Computers in Society)</td>
<td>Each time the course is taught</td>
<td>None to date</td>
<td>None to date</td>
</tr>
<tr>
<td>S14 Currency</td>
<td>IAC Recruiters</td>
<td>Annual When available</td>
<td>Additional electives and labs desired</td>
<td>Additional electives include two GUI courses, an image processing course, and a parallel computing course. Java has replaced Ada in CSC 370. A new UNIX lab was added.</td>
</tr>
</tbody>
</table>
Standard I-3. Data relative to the objectives must be routinely collected and documented, and used in program assessments.

Standard I-4. The extent to which each program objective is being met must be periodically assessed.

Standard I-5. The results of the program's periodic assessment must be used to help identify opportunities for program improvement.

C. Assessments. Describe your procedure for periodically assessing the extent to which each of the above objectives is being met by your program.

Include:

- Frequency and timing of assessments
- What data are collected (should include information on initial student placement and subsequent professional development)
- How data are collected
- From whom data are collected (should include students and computing professionals)
- How assessment results are used and by whom

Attach copies of the actual documentation that was generated by your data collection and assessment process since the last CSAC visit (or for the past three years if this is the first visit). Include survey instruments, data summaries, analysis results, etc.

Student and program assessment tools:

1. The Major Field Achievement Test (MFAT) is given every spring, and results are reviewed in the fall. The Major Field Achievement Test is produced by the Educational Testing Service (ETS) as an instrument for measuring the computer science knowledge of students across the country. Senior computer science majors are required to take the test as part of the Senior Design course. There is no penalty for poor performance – the scores are only used for internal assessment. The exams are taken in May, and the results, both individual student reports and summary data, are sent to the department during the summer. The chair reviews the scores and the summaries and prepares a report detailing the national percentile ranking of the students who had taken the test. Although individual scores are available for reference, they are confidential and are not widely distributed. The summary data is distributed early in the fall semester and discussed at a subsequent department meeting. When percentile results deviate from the expected range, the faculty look more closely at the individual scores and the examination content. For example, in 1996 the scores on the Computer Organization section were surprisingly low. The faculty researched the content of the examination to determine if our course content was significantly different from that tested on the MFAT. The content was not significantly different,
however, a scoring anomaly caused the unusually weak showing. Although no problem was found, the mechanism is in place for determining significant divergence from national norms and for responding to identified needs. A composite of summary data from five of the past six examinations is included in Appendix 7. A brief description of the exam taken from the ETS web site is also included in Appendix 7.

2. An alumni survey is done every five years and results are reviewed when compiled. A list of alumni and their addresses is compiled by the Alumni Association and a survey is sent to each person for whom contact information exists who has graduated more than five years ago. After the surveys are returned, the results are tabulated and distributed to the faculty. The results are discussed at a department meeting. The surveys provide information about the types of careers and salaries our graduates have. A series of questions also assess our program.

In the 1996 survey 84% of the respondents agreed or strongly agreed that their Tech education prepared them well for their careers, 76% agreed or strongly agreed that they received a comprehensive education, and 91% agreed or strongly agreed that they were prepared to be life-long learners. Suggestions from that survey included the following: add networking, GUI design, parallel processing, PC experience, UNIX, object-oriented programming, and C++. All of those suggestions were implemented. Suggestions to add real-time programming and X-Windows programming were not implemented. In the 2001 survey, 89% of the respondents agreed or strongly agreed that their Tech education prepared them well for their careers, 87% agreed or strongly agreed that they received a comprehensive education, and 96% agreed or strongly agreed that they were prepared to be life-long learners.

The most common suggestion from the current surveys is to add an appreciation for the business side of computer science. Additional suggestions include more team projects, more database courses, and more networking material. These suggestions will be discussed in computer science curriculum meetings in the fall. Summaries from the past two surveys are included in Appendix 7.

3. The Collegiate Assessment of Academic Proficiency examination (CAAP), published by ACT, is used to assess mid-career student performance. Students who have completed 45 credits are required to take the examination. Although it is not specific to computer science, it does provide assessment information about the quality of the general education our students are receiving. Sub-scores are computed for writing, reading, mathematics, science reasoning, and critical thinking. The scores required to pass this examination are set for the entire state. With one exception, all computer science students at SDSM&T have passed this examination in its entirety. The one exception was an international student who was unable to pass the writing section on the first try. The results of this examination are collected by the Office of Academic and Enrollment Services and disseminated to the faculty. The results are reviewed by department chairs and
discussed in faculty meetings. No weaknesses have been identified to date, but corrective action indicated by the results would be addressed at the department and university levels. A brief description of the CAAP examination, taken from the ACT web site, is included in Appendix 7. Additional information may be found at http://www.act.org/caap.

4. A group of alumni are invited to serve a three year term on our Industrial Advisory Council (IAC). An effort is made to select participants from a variety of industries to provide a broad perspective. The group convenes for several days on campus, listens to presentations on changes in the department, talks to students, faculty, and administrators, and prepares a report. Each year they answer the question “what are the trends in industry and how well is Tech positioned to participate in these trends.” They also prepare an assessment of the strengths and weaknesses of the department. They make a formal presentation to the president, vice president for academic affairs, dean of the college of systems engineering, and computer science faculty. Their suggestions are discussed at a subsequent department meeting and have resulted in several changes to our curriculum. One example is the addition of an undergraduate parallel processing course. Others include introducing UNIX earlier in the curriculum, increasing undergraduate involvement in departmental research projects, and an emphasis on co-op and internship experiences. Their primary concern in 2001 was strengthening technical communications. This fall, the department will review the Advisory Council’s comments and use other assessment data, such as the writing sub-scores from the CAAP to gain insight into how best to strengthen students’ technical communication skills. Copies of the presentations from the past three IAC meetings are included in Appendix 7.

5. Placement office data is compiled and circulated every year. The Career Planning Office tracks student job offers and placement information. Each year they provide a summary containing the percentage of students who have found employment in their chosen field, the average starting salary, and the names of companies which have hired our graduates. The faculty receive copies of this information and discuss it in a department meeting. Recent years have seen 100% placement with offers continually increasing to this year’s high of an average starting salary in excess of $49,000. However, faculty still review the list of employers to note any changes in the types of jobs our students are taking. This is a good indication of whether or not our program is meeting its goal of preparing students for careers in all areas of computer science and particularly in areas which require software, hardware, and mathematics preparation.
6. Co-op reports are evaluated after every co-op done for credit. The individual evaluations are done by the industrial supervisor and the departmental co-op coordinator. Reports are collected by the co-op coordinator and circulated to the computer science faculty. In addition, the Career Planning Office collects statistics on the number of students participating in co-op and internship programs, the types of jobs they had, and their salaries. This information is sent to the department annually and, in conjunction with the reports and evaluations, is discussed by the department. Multi-year summaries are also produced by the Career Planning Office and distributed to the faculty for discussion. This data is helpful for identifying emerging trends.

7. Oral exit interviews are done with graduating seniors every semester by the department chair. Students are asked many of the questions from the alumni survey discussed above, specifically those focusing on the student's attitudes about the quality of education received at the institution. To ensure confidentiality, individual responses are not shared with the faculty. It is the responsibility of the department chair to disseminate aggregate information obtained from the interviews. Students are generally very positive about their education and have few or no concerns. Should concerns be expressed, they would be brought by the chair to the computer science curriculum committee for consideration and possible action.

8. Faculty discuss the program with recruiters. Companies visit campus each semester to recruit graduates, co-op students, and summer interns. Whenever possible, at least one faculty member meets with each recruiter to discuss his or her perspective on the quality of our program and our students. The recruiters are a valuable source of information about industrial trends and provide input used in curriculum assessment.

Faculty assessment tools:

1. A student opinion survey is conducted for every section of every class each semester it is taught. The survey is administered near the end of the semester, typically one or two weeks before the end of classes. The surveys are collected and taken to the department office in a sealed envelope by a designated student. The faculty member does not see the results of the survey until after final grades have been issued. The survey results are tabulated, and the original documents plus the summary are returned to the department chair. The chair writes a Narrative Summary assessing the strengths and weaknesses of the faculty member's performance in each class, meets with the faculty member to discuss the results, and returns the surveys and copies of all summaries to the faculty member. The students often write comments on the survey forms which can be very useful in making adjustments to a course. The faculty in the department of Mathematics and Computer Science are widely regarded as excellent teachers.
However, an institutional mechanism exists for providing a prescriptive plan if a performance deficit should be identified. A sample survey form is included in Appendix 7.

2. The Faculty Development Office provides Small Group Instruction Diagnosis (SGID) services to the faculty. The Center for Teaching Excellence (CTE) developed this assessment tool which has been widely used in our department and elsewhere on campus. Briefly, a faculty member from outside the department performs the diagnosis and reports the results to the faculty member. Many faculty have found this useful for making mid-semester adjustments to difficult classes. A summary of the process taken from the CTE web site is included in Appendix 7, and additional information may be found at http://www.hpcnet.org/sgid.

3. While student opinion surveys are useful for assessing teaching effectiveness, they are not the only source of information. Each spring, every faculty member prepares an annual self-evaluation which requires the preparer to document evidence of excellence in teaching, research, and service. The annual evaluation is submitted to the department chair who prepares written comments on the information provided. The chair and the faculty member discuss the original document and the chair’s comments and possible mechanisms for improvement. Since teaching is the primary focus of the department, items relating to teaching effectiveness are particularly scrutinized. Creating new courses and revising or updating existing courses is an essential activity which is recognized in the section titled “significant contributions to teaching”. A sample faculty evaluation form is included in Appendix 7.

Standard I-6. The results of the program’s assessments and the actions taken based on the results must be documented.

D. Program Improvement. Describe your use of the results of the program’s assessments to identify program improvements and modifications to objectives.

Include:
- any major program changes within the last five years
- any significant future program improvement plans based upon recent assessments

As a result of our on-going assessment program, the following changes have been made:

1. In the fall of 1997, a structured lab was added to CSC 150 (Computer Science I).

2. In the spring of 2001, an additional laboratory was added to provide students with improved access to assembly language and Linux.

3. In the fall of 2000, a new workstation lab was funded by Sun Microsystems.
4. In the fall of 1999, we strengthened object-oriented design and object-oriented programming in our curriculum, particularly in CSC 250 (Computer Science II) and CSC 371 (Data Structures).

5. In the fall of 2001, we will add an Analysis of Algorithms (CSC 372) course in place of Numerical Analysis.

6. In the fall of 2001, we will add a lab to CSC 440 (Advanced Digital Systems).

7. In the fall of 2001, we will define the science requirement to require one year of chemistry and a lab and one year of physics and a lab.

8. Starting in the fall of 2001, our instructor's position in Computer Science has been permanently funded. This will allow us to keep class sizes low in the freshman courses.

9. In the fall of 2000, Java replaced Ada in CSC 370 (Concepts of Programming Languages).

10. In the spring of 2001, UNIX exposure was increased by incorporating it into CSC 371. Starting fall 2001, it will also be used for assignments in CSC 372. UNIX receives extensive coverage in CSC 472 (Operating Systems).

11. Undergraduate electives have been added in parallel computing, image processing, graphical user interface (GUI) design, and GUI programming. Image processing was offered in the fall of 1997, GUI design was offered for the first time in the fall of 1999, and GUI programming was offered in the fall of 2000. Parallel computing was offered as a special topics course and will be included in the rotation of electives effective fall 2001.

All of these improvements were made as a direct result of departmental assessment activities. For example, alumni surveys indicated that laboratory equipment was not sufficient for student needs. As a result of this feedback, the additional lab (item 2) was added. Those surveys, plus information from student interviews, recruiters, and the IAC, resulted in a more thorough coverage of object-oriented techniques (item 4), the addition of Analysis of Algorithms (item 5), incorporating Java into the curriculum (item 9), increased coverage of UNIX (item 10), and the addition of GUI courses (item 11). The IAC was directly responsible for the new workstation lab (item 3) and the addition of a parallel computing elective (item 11).

Additional details on these improvements are described in the curriculum section of this document.
E. Program Evolution.

1. Describe in what respect, if at all, the philosophy and direction of computer science education has changed at your institution during the last five years (or since the last evaluation, whichever is the shorter duration).

   The basic philosophy of the department has not changed. We continue to value excellence in classroom teaching and continually make changes to our courses to reflect prevailing trends in computer science. For example, as mentioned above, we are incorporating more OOP in our classes and more UNIX-based material. The department views research, both discipline-specific and pedagogical, as important to keeping current in the field. However, the research focus of the department has shifted towards industrial partnerships rather than pure research projects. This change has increased undergraduate research opportunities.

2. Describe any major developments and/or progress made in connection with the program in the last five years (or since the last evaluation, whichever is the shorter duration) that is not included in your response to I.D.

Several departmental and institutional changes have been made to address the laboratory concern expressed during the previous CSAB visit in 1995. The statement of the concern and the actions taken are described below.

The concern:
“1. The adequate implementation and continued oversight of all computer laboratory facilities including: maintenance and/or replacement of obsolete equipment, adequacy of laboratory space, hours of daily availability for computing equipment, access to hardware and software documentation, and adequacy of laboratory instructional support during and after normal class times.”

- maintenance and/or replacement of obsolete equipment

   To address this concern, funding has been dedicated to allow institutional lab machines to be replaced on a 3-year cycle. Maintenance needs are coordinated and addressed centrally on the basis of requests to the ITS Help Desk. A web-based problem tracking and reporting system has significantly improved the timeliness of responses to service requests.

- adequacy of laboratory space

   The department has more than doubled its laboratory space by adding a twenty-PC laboratory, increasing the size of our workstation laboratory, and adding student project space.
• hours of daily availability for computing equipment

Access to computing facilities has significantly increased in the past five years. Two of the campus computer laboratories are accessible to students 24 hours a day. Students have Internet access from off campus and from their residence hall rooms (about 75 percent of the entire residence hall population pays the $100 per year charge to be connected to a very high-speed service). The library complex is available until midnight and the student union until 10 p.m. All other labs are accessible throughout regular working hours.

• access to hardware and software documentation

This concern has been addressed by the availability of on-line documentation.

• adequacy of laboratory instructional support during and after normal class times.

The department provides significant programming assistance to students. In addition to faculty assistance, students may obtain programming help from teaching assistants approximately thirty hours per week. Structured labs with in-class programming help are provided in CSC 150 and CSC 314.

The second concern was that students could graduate without a full year of a laboratory science. Specifically:

"2. The possibility of students completing their science sequences without a full range of laboratory experience."

It is not possible for a student to graduate without a full-year of a laboratory science. All students are required to take at least two semesters of calculus-based Physics. Students must also take two additional science courses in either calculus-based Physics or Chemistry, and one laboratory.

In addition to these improvements and the improvements discussed in part D above, the following developments have also benefited our program:

• We have strengthened our Industrial Advisory Council. This group has been active in our self-assessment process.

• We have approximately doubled the space allocated to computer science. An additional classroom, an additional lab, student project space, office space, and a conference room have been added to the department.

• We have strengthened our ties with industry and significantly increased external funding to the department. This has had a positive impact on the undergraduate program by providing undergraduate research opportunities and by strengthening undergraduate course content and offerings.
The number of local computer science companies has increased. This has created opportunities for co-ops and internships, part-time employment, faculty research, and guest lecturers.

F. Program Current Status.

1. List the strengths of the unit offering the computer science program.

The principal strengths of the program are:

- The quality of students available to the program is good. The demanding curriculum, including a significant mathematics component in addition to substantial computer science courses, attracts serious, highly motivated students from the naturally prescreened pool of SD Tech students. The students have an excellent work ethic and cooperate well within group projects. A large number of foreign students, including a sizable contingent from Norway, provide a cosmopolitan blend to the otherwise largely small-town, rural backgrounds of our student body.

- The Master's program in Computer Science enhances the ability to hire faculty, helps to provide equipment and research projects for undergraduates, and provides a pool of teaching assistants to help computer science professors.

- Developing industrial partnerships have created opportunities for faculty and students at all levels to be involved in research and software development.

- The computer science and mathematics programs are housed in the same department. Expertise in all areas of mathematics, including applied mathematics, statistics and probability, and numerical analysis is readily available. This has influenced the computer science curriculum to include a strong complement of mathematics which has proven desirable to employers. Interested and qualified mathematics faculty can assist with computer science courses. Many of the undergraduate research projects are in computational and applied mathematics. Some students major or minor in mathematics in addition to earning a degree in computer science.

- The overall mission of the college enhances the program. The school is primarily a science and engineering college, providing a broad choice of technical electives. The computer science curriculum reflects the assets of the school by including strong mathematics, science, and hardware components. Students are able to take computer-related courses in other departments. Software and computing equipment are readily available because of a common need among the various departments.
• The industrial co-op and summer internship program provides the opportunity for computer science students to gain industrial experience before they graduate. It not only gives the students motivation and a direction in the program, but also provides feedback to the department on current industrial trends and needs. Fifteen of the eighteen students graduating in AY 1999-2000 and all of the students graduating in AY 2000-2001 participated in the co-op/internship program. Co-ops are encouraged by allowing co-op to substitute for one upper-level computer science elective.

• With the exception of CSC 150, the first course in programming, all mathematics and computer science courses that count towards the major in computer science are taught by full-time faculty.

• The state governing body (Board of Regents) supports a very nonrestrictive policy toward the offering of experimental courses; only local authorization, with little lead time, is needed. This simplifies and expedites the offering of new courses. Of course, continued offering of a course does require a full, formal procedure.

2. List any weaknesses or limitations of the institution or unit offering the computer science program.

   The shortage of computer-related industries in the immediate area does not afford our students the interaction with practitioners which would be available in a metropolitan area. Within the past five years, some new computer-related industries have located in the area, but not as many as we would like. This problem is overcome, to a certain extent, by the co-op program, industrial partnerships in the department, and the Senior Design projects.

3. List any significant plans for future development of the program.

   We have submitted a proposal for a Ph.D. program in Computer Science. Implementation of this program is contingent upon approval of the National Underground Laboratory at Homestake and will require additional base funding for Computer Science from the state. We anticipate that it will have a positive effect on the B. S. degree in Computer Science by increasing opportunities for our students. The current emphasis on excellence in undergraduate teaching and advising will not change.
II. Student Support

**INTENT:** Students can complete the program in a reasonable amount of time. Students have ample opportunity to interact with their instructors. Students are offered timely guidance and advice about the program’s requirements and their career alternatives. Students who graduate the program meet all program requirements.

The **Intent** must be met in order for a program to be deemed accreditable. One way to meet the **Intent** of this criterion is to satisfy each one of the **Standards** listed below. To do this, answer the questions associated with the **Standards**. If one or more **Standards** are not satisfied, it is incumbent upon the institution to demonstrate and document clearly and unequivocally how the **Intent** is met in some alternative fashion.

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

**Standard II-1. Courses must be offered with sufficient frequency for students to complete the program in a timely manner.**

A. Frequency of Course Offerings.

1. List below the course numbers, titles, and credit hours of courses required for the major which are offered less frequently than once per year. Explain how it is determined when they will be offered, *e.g.*, rotation, odd-numbered years, or whatever.

   All of the required courses are offered every year.

2. List below the course numbers, titles, and credit hours of courses allowed for the major but not required (*i.e.*, either free electives or lists of courses from which students must choose a certain number), and explain how it is determined when they will be offered.

   CSC 361 - Linear Optimization (3 credits)
   CSC 421 - Graphical User Interfaces (3 credits)
   CSC 422 - GUI Programming (3 credits)
   CSC 431 - Computer Graphics (3 credits)
   CSC 441 - Data Communications (4 credits)
   CSC 445 - Theory of Computation (3 credits)
   CSC 451 - Intro to Artificial Intelligence (3 credits)
   CSC 464 - Image Processing (3 credits)
   CSC 461 (MATH 471*) - Numerical Analysis (3 credits)
   CSC 473 - Parallel Computing** (3 credits)
   CP *** - Co-op
At least two electives are offered each semester. Each course is offered at least every other year.

A typical rotation of electives is:

Even fall
CSC 422 - GUI Programming (3 credits)
CSC 451 - Intro to Artificial Intelligence (3 credits)
CSC 461 (MATH 471*) - Numerical Analysis (3 credits)

Odd spring
CSC 445 - Theory of Computation (3 credits)
CSC 473 - Parallel Computing** (3 credits)

Odd fall
CSC 421 - Graphical User Interfaces (3 credits)
CSC 464 - Image Processing (3 credits)

Even spring
CSC 441 - Data Communications (4 credits)
CSC 431 - Computer Graphics (3 credits)
CSC 361 - Linear Optimization (3 credits)

* Renumbered course
** New course
*** Number depends on level and semester and is offered every semester.

Standard II-2. Computer science courses must be structured to ensure effective interaction between faculty/teaching assistants and students in lower division courses and between faculty and students in upper division courses.

B. Interaction with Faculty.

1. Describe how you achieve effective interaction between students and faculty or teaching assistants in lower division courses, particularly in large sections.

SDSM&T is a small school with an emphasis on quality instruction. Programming class sizes rarely exceed 35 and lab sections are capped at 20. All courses except CSC 150 are taught by full-time faculty. All instructors are required to be available to the students. The minimum expected is three hours per week, but, within the Mathematics and Computer Science department, the faculty maintain an open door policy providing students with many hours per day for assistance. It is also expected that the faculty make time available if students are
unable to meet during the chosen hours. Sections that have labs will also have lab/teaching assistants. Teaching assistants are also expected to maintain office hours providing additional assistance.

2. Describe how you achieve effective interaction between students and faculty in upper division courses. Give detailed explanation and/or documentation how you do this for sections with more than thirty students, if applicable.

Upper-division courses are taught by tenure-track faculty. All faculty are required to be available to the students in the manner described above. Courses rarely exceed an enrollment of 35. When a course size becomes large, it is split into multiple sections.

Standard II-3. Guidance on how to complete the program must be available to all students.

C. Student Guidance. Describe what determines the requirements that a student will follow and how the student is informed of these requirements.

The degree requirements are published in the school catalog and are also available at the department office. Students receive a catalog upon enrollment. Their mentors (see explanation of the mentoring program below) use the catalog as a textbook for the eight-week mentoring course and provide the students with information about starting the various degree programs. After selecting a major, the student then meets with an advisor from the particular field (required for adding courses). The student is stepped through the requirements and given a program of study (requirements and flowchart) at the first meeting. All students meet with advisors at least twice per year. Through access to the campus student database (Colleague) and its degree audit module, advisors track the students’ progress as they move through the program.

Standard II-4. Students must have access to qualified advising when they need to make course decisions and career choices.

D. Student Advisement. Describe your system of advisement for students on how to complete the program. Indicate how you ensure that such advisement is available to all students.

All first-time undergraduate degree-seeking students are assigned a mentor at freshmen orientation. Mentors are faculty members who have been selected to
work with first-year students because of their special interest in, and commitment to, new students. The mentors assist the students in all aspects of starting college life including, but not limited to, academic advising. In addition to helping first-year students interpret their placement scores and plan a class schedule, the mentors offer guidance on setting educational and career goals, on managing time effectively, and on getting involved in campus and professional activities. This mentoring is done through the summer orientation sessions, and, during their first semester, an eight-week orientation course, individual student-mentor meetings, and various social activities. Contact with an advisor in the student's department begins in the second semester of the freshman year although the student is not officially assigned to a department advisor until the sophomore year. Advising duties are evenly divided among all the faculty (CS and Math) and faculty are available on a daily basis. Advisors provide copies of the requirements, requirement checklists, and flow charts to the student. The student must obtain the signature of the advisor to register for classes, so contact with the advisor occurs every semester. This way, advisors can monitor student progress, advise students of changes in offerings and direct the student towards electives, co-ops, and internships.

E. Access to Qualified Advising. When students need to make course decisions and career choices, what is their procedure for obtaining advising? Do they have adequate access to qualified professionals when necessary?

All students have access to qualified advising. All departmental faculty are versed in the undergraduate courses and can assist a student in course decisions. If more information is desired regarding a class or special circumstances regarding a class, the advisor will direct the student to the course instructor. Advisors also know the areas of expertise of the faculty and can direct students to these individuals for consultation in career paths. Many of the faculty are involved with industry collaborations and thus can provide in-depth information regarding careers with industry. The career planning office is available as well to provide advice to students. That office also provides workshops in resume writing, interview skills, and other topics relevant to finding employment. In Fall 2001, students will also have access to “Choices,” an electronic method of exploring career options, and will have the opportunity to take an interest inventory via the campus computer system.

Each semester, the Office of Academic and Enrollment Services provides training for mentors and advisors. Topics covered in this training include updates on Board of Regents and university general education requirements, policies and procedures, placement and proficiency testing, course changes, and new services available for students.
Standard II-5. There must be established standards and procedures to ensure that graduates meet the requirements of the program.

F. Meeting the Requirements. Describe your standards and procedures for ensuring that graduates have met all of the requirements of the program.

All advisors have access to student transcripts and degree audits. Students meet with their advisors in the senior year and go over their course listing and degree audit to determine if all requirements have been met. The recently implemented electronic degree audit makes it possible for advisors to monitor the student’s progress earlier and more frequently. When the student is ready to graduate, advisors perform a final degree check and send the results to Academic and Enrollment Services (AES). At AES, the degree check is verified using a checklist provided by the department, the college catalog, and campus policy documents. The student’s name is then forwarded to the Degrees Committee. If the Degrees Committee approves, the student’s name goes to the full faculty for final approval.
III. Faculty

*INTENT:* Faculty members are current and active in the discipline and have the necessary technical breadth and depth to support a modern computer science program. There are enough faculty members to provide continuity and stability, to cover the curriculum reasonably, and to allow an appropriate mix of teaching and scholarly activity.

The *Intent* must be met in order for a program to be deemed accreditable. One way to meet the *Intent* of this criterion is to satisfy each one of the *Standards* listed below. To do this, answer the questions associated with the *Standards*. If one or more *Standards* are not satisfied, it is incumbent upon the institution to demonstrate and document clearly and unequivocally how the *Intent* is met in some alternative fashion.

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described. If different programs have different faculty members, please identify which faculty are associated with which program(s), and the percentage of time allotted, if they are associated with more than one.

**Standard III-1. There must be enough full-time faculty members with primary commitment to the program to provide continuity and stability.**

A. Faculty Size. The purpose of this section is to determine whether you have sufficient faculty to offer courses often enough for students to complete the program in a timely manner.

In the previous section you gave the course numbers of courses required for the major which are offered less frequently than once per year, and those allowed for the major but not required, and explained how it is determined when they will be offered. Explain (if applicable) any difficulties you have offering required or optional courses frequently enough, particularly as they might be affected by faculty size.

The department is able to offer all required courses at least once each year, with many classes offered each semester. Electives are offered on a two-year rotation, but students have at least two elective options each semester. The size of the faculty is adequate to maintain this schedule of offerings.

B. Faculty with Primary Commitment.

1. Read the definition of “Primary Commitment” in the *Guidance* (Section III, point 3) and list here the number of faculty whose primary commitment is to this program: **7.5**.
The purpose of the next questions is to ascertain the degree of continuity and stability provided by these faculty.

2. Please list below the number of faculty with primary commitment to the program in each academic rank, broken down within rank by tenure status.

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>Tenure status</th>
<th>Effort in CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harold Carda</td>
<td>Professor</td>
<td>tenured</td>
<td>50%</td>
</tr>
<tr>
<td>Ed Corwin</td>
<td>Professor</td>
<td>tenured</td>
<td>100%</td>
</tr>
<tr>
<td>Antonette Logar*</td>
<td>Professor</td>
<td>tenured</td>
<td>100%</td>
</tr>
<tr>
<td>New hire</td>
<td>Instructor</td>
<td>not tenure track</td>
<td>100%</td>
</tr>
<tr>
<td>Jeff McGough</td>
<td>Assistant Professor</td>
<td>tenure track</td>
<td>50%</td>
</tr>
<tr>
<td>Roger Opp</td>
<td>Professor</td>
<td>tenured</td>
<td>50%</td>
</tr>
<tr>
<td>Manuel Penaloza</td>
<td>Professor</td>
<td>tenured</td>
<td>100%</td>
</tr>
<tr>
<td>Gregg Stubbendieck</td>
<td>Assistant Professor</td>
<td>tenure track</td>
<td>100%</td>
</tr>
<tr>
<td>John Weiss</td>
<td>Associate Professor</td>
<td>tenured</td>
<td>100%</td>
</tr>
</tbody>
</table>

*currently chair of the department with 25% effort in administration.

**Standard III-2. Full-time faculty members must oversee all course work.**

All courses above CSC 150 are taught exclusively by full-time faculty. CSC 150, the first course in C++ programming, is taken by a large number of students from across the campus. Multiple lecture sections (4 or 5) and multiple lab sections (8 or 9) are required to meet this demand. Creation of the syllabus, content, exams, and management of that course are assigned to a full-time faculty member. In addition, at least one lecture is taught by a full-time faculty member.

**Standard III-3. Full-time faculty members must cover most of the total classroom instruction.**

C. Faculty Oversight. Full-time faculty must oversee all course work allowed towards the major. That means that they must either teach a course or be the course chairperson or coordinator for all sections taught by other than full-time faculty, such as adjunct faculty or teaching assistants. For those courses with sections not taught by full-time faculty during the past academic year, list the course numbers below and the name of the full-time faculty coordinator. (The past academic year is the academic year immediately prior to the year in which this report is prepared.)

As mentioned above, the only course in which teaching assistants or part-time faculty are employed is CSC 150.

Primary responsibility: Dr. Antonette Logar, Chair
Standard III-4. The interests and qualifications of the faculty members must be sufficient to teach the courses and to plan and modify the courses and curriculum.

Standard III-5. All faculty members must remain current in the discipline.

Standard III-6. All faculty members must have a level of competence that would normally be obtained through graduate work in computer science.

Standard III-7. Some full-time faculty members must have a Ph.D. in computer science.

D. Interests, Qualifications, Scholarly Contributions. The criteria state that the interests, qualifications, and scholarly contributions of the faculty must be sufficient to teach the courses, plan and modify the courses and curriculum, and to remain abreast of current developments in computer science. This information should be contained in the faculty vitae attached to this report and need not be repeated here. This would be an appropriate place to insert a description of general departmental or institutional activities that promote faculty currency, if such exist. (A sample vita questionnaire is attached in section G below. Although it is not necessary to follow this format, it is important that whatever format is followed contain all the information asked for. And, to make things easier for the visiting team, please see that all faculty vitae are in the same format, whichever format is used.)

Departmental activities that promote currency:
- The department has strong industrial relationships. These relationships include research activities on campus, feedback from alumni on our industrial advisory council, meetings with recruiters, and visiting speakers. These interactions serve to keep the department abreast of developments in industry.
- The department has an established colloquium series which provides a forum for learning about advances in the field. Faculty and students are encouraged to participate, and outside speakers are actively recruited.
- The department maintains a departmental library of books and periodicals for reference by faculty and students. The latest editions of ACM and IEEE publications are readily available.
- The department engages in an on-going self-assessment process concerning the incorporation of new material into the curriculum.

Standard III-8. All full-time faculty members must have sufficient time for scholarly activities and professional development.

E. Scholarly Activities. Describe the means for ensuring that all full-time faculty members have sufficient time for scholarly activities and professional development.

University policy states that each faculty member shall teach 12 credit hours per semester. Faculty in Computer Science generally teach 2 courses per semester, or at
most two preparations. The reduced teaching load is in recognition of the time required for scholarly pursuits and for keeping current in the field.

Standard III-9. Advising duties must be a recognized part of faculty members’ workloads.

F. Support for Advising. Advising duties must be a recognized part of faculty members’ workloads, which means that faculty with large numbers of advisees must be granted released time. Explain your advising system and how the time for these duties is credited.

Advising is evenly distributed across all faculty in the department. Thus, the approximately 160 undergraduate computer science majors are apportioned to 12 faculty members and the 22 graduate students are divided between two faculty members. As a result, no one advisor has a substantial advising load and release time is not necessary. However, advising is an important part of a faculty member’s responsibilities and is a separate category within the annual performance review. The faculty in the department of Mathematics and Computer Science are widely regarded as excellent advisors.

G. Information Regarding Faculty Members.

On separate pages, please furnish the following information for all faculty members that teach courses allowed for the major, including those who have administrative positions in the department (chair, associate chair, etc.). Use the form given below as guidance. This form need not be followed exactly, but all the information asked for should be supplied. Please do use a common format for all vitas. Please limit information to no more than three pages per person, if at all possible. Please place the form(s) for administrator(s) first, followed by the others in alphabetical order.

In case more than one program is involved, especially with separate campuses, please indicate clearly the program(s) an individual is assigned to, and the percentage of time to each, if more than one.
Resume - Prof. Harold Carda

1. Name, current academic rank, and tenure status:

   Harold Carda, Professor, Tenured

2. Date of original appointment to this faculty, followed by dates and ranks of advancement:

   1965-1968 - Instructor
   1968-1976 - Assistant Professor
   1976-1988 - Associate Professor
   1989 - Professor

3. Degrees with fields, institutions, and dates

<table>
<thead>
<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A.</td>
<td>Mathematics &amp; Electronics</td>
<td>Southern State Teachers College</td>
<td>1961</td>
</tr>
<tr>
<td>M.N.S.</td>
<td>Mathematics &amp; Physics</td>
<td>University of South Dakota</td>
<td>1964</td>
</tr>
</tbody>
</table>

4. If you do not have a formal degree in computer science, describe any course work you may have taken, or other ways in which you have achieved competence in computer science; there is no necessity to repeat information here which is contained in later sections of this document.

   See Below

5. Conferences, workshops, and professional development programs in which you have participated to improve teaching and professional competence in computer science:

   IEEE Workshop on Computers - 1983
   IEEE Workshop on LAN's and Computer Architecture - 1985
   CDC Workshop on Network Design - 1986
   TI Digital Processor Workshop - 1988
   George Washington University Short Course: Digital Communications - 1989
   UCLA Short Course: Signal Processing and Digital Communications - 1990
   UCLA Short Course: Data Compression Techniques - 1993
   Texas A & M Short Course: Wavelets – 1994
   UCLA Short Course Multirate Digital Filters & Applications - 1995

6. Other related computing experience including teaching, industrial, governmental, etc. (Where, when, description and scope of duties):

   1961-1963 High School Mathematics and Science teacher
   1965 Aerospace Engineer with NASA, Houston, TX
   1983-1984 Conducted 4 Computer Workshops for businessmen and teachers.
7. Consulting—list agencies and dates, and briefly describe each project:

EXCELLTECH Corporation - testing and verification of EXCELLNET network.

8. Department, college, and/or university committees of which you are a member:

Departmental Committees:
- Undergraduate Computer Science Committee
- West River Math Contest Committee
- Undergraduate Mathematics Committee
- Honors Committee Chair

University Committees:
- Information Technology Discipline Committee

9. Principal publications of the last five years. Give in standard bibliographic format.

None

10. Other scholarly activity: grants, sabbaticals, software development, etc.:

- Semester Sabbatical for retraining in Computer Science
- Masters Research Advisor – Implementation of a Sockets Based, Client – Server Database
- Senior research project on Simulink solution of differential equations

11. Scientific, professional, and honor societies of which you are a member:

- IEEE
- IEEE Computer Society
- IEEE Communications Society
- IEEE Information Theory Society
- IEEE Signal Processing Society

12. Honors and awards:

None

13. Courses taught this and last academic year term-by-term. (This year is the year in which this report was prepared; last year was the year prior to this.) If you were on sabbatical leave, please enter the information for the previous year. Please list each section of the same course separately.

<table>
<thead>
<tr>
<th>year/term</th>
<th>course number</th>
<th>course title</th>
<th>credits</th>
<th>No. of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 1999</td>
<td>Math 231</td>
<td>Ordinary Differential Equations</td>
<td>4</td>
<td>42</td>
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<tr>
<td>Fall 1999</td>
<td>Math 123</td>
<td>Calculus I</td>
<td>4</td>
<td>29</td>
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<td>Fall 1999</td>
<td>CSC 440</td>
<td>Advanced Digital Systems</td>
<td>3</td>
<td>27</td>
</tr>
<tr>
<td>Spring 00</td>
<td>Math 124</td>
<td>Calculus II</td>
<td>4</td>
<td>43</td>
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<tr>
<td>Spring 00</td>
<td>Math 225</td>
<td>Calculus III</td>
<td>4</td>
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<td>Spring 00</td>
<td>CSC 341</td>
<td>Computer Organization and Design</td>
<td>4</td>
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<td>Fall 00</td>
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<td>Course Name</td>
<td>Credits</td>
<td>Hours</td>
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<td>----------------------------------</td>
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<td>-------</td>
</tr>
<tr>
<td>Fall 00</td>
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<td>4</td>
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<tr>
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<td>CSC 440</td>
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<td>3</td>
<td>10</td>
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<tr>
<td>Fall 00</td>
<td>CSC 702</td>
<td>Non-thesis Research</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Fall 00</td>
<td>CSC 794</td>
<td>Independent Study</td>
<td>5</td>
<td>3</td>
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<tr>
<td>Spring 01</td>
<td>Math 225</td>
<td>Calculus III</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>Spring 01</td>
<td>CSC 341</td>
<td>Computer Organization and Design</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Spring 01</td>
<td>CSC 441</td>
<td>Data Communications</td>
<td>4</td>
<td>19</td>
</tr>
</tbody>
</table>

14. Other assigned duties performed during the academic year, with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time faculty, please indicate here which courses.

   Committee Assignments                  5 hrs/wk
   Department Administrative Duties       2 hrs/wk
   Academic advising                      1 hr/wk

15. Number of students for which you serve as academic advisor: 12

16. Estimate the percentage of your time devoted to scholarly and/or research activities: 10 % Please give a brief description of your major research and scholarly activities:

17. If you are not a full-time faculty member, state what percentage of full-time you work: ___%

   Percentage of this time allocated to the computer science program being evaluated: 50 %
Resume - Dr. Edward Corwin

1. Name, current academic rank, and tenure status:

   Edward Corwin, Professor, Tenured

2. Date of original appointment to this faculty, followed by dates and ranks of advancement:

   Associate Professor, 8/81
   Professor, 8/87

3. Degrees with fields, institutions, and dates

<table>
<thead>
<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. S.</td>
<td>Math</td>
<td>Lehigh University</td>
<td>1974</td>
</tr>
<tr>
<td>M. S.</td>
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<td>Comp Sci</td>
<td>Texas Tech University</td>
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<tr>
<td>Ph. D.</td>
<td>Comp Sci</td>
<td>Texas Tech University</td>
<td>1995</td>
</tr>
</tbody>
</table>

4. If you do not have a formal degree in computer science, describe any course work you may have taken, or other ways in which you have achieved competence in computer science; there is no necessity to repeat information here which is contained in later sections of this document.

   Not applicable

5. Conferences, workshops, and professional development programs in which you have participated to improve teaching and professional competence in computer science:

   In the last five years:

   - Small College Computing Conference (1996)
   - International Conference on Neural Networks (1996)
   - Bush Faculty Development Seminar - Technology in the classroom (1997)
   - CSAC Evaluator Training (2000)

6. Other related computing experience including teaching, industrial, governmental, etc. (Where, when, description and scope of duties):

   Lecturer in Department of Computer Science at Texas Tech University
   Fall 1989 - Fall 1991
   Duties: teach data structures and analysis of algorithms

   Instructor in Computer Science for the University of Maryland’s European Division
   Fall 1988 - Spring 1989
   Duties: teach computer science courses including data structures, operating systems, database design, BASIC, assembly language, C

   Software Engineer for ETA Systems (St. Paul, Minnesota)
   Summer 1984, July 1985-July 1986, Summer 1987 (on leave from SDSM&T)
   Duties: Design and implementation of parallel operating systems software
Assistant Professor in Division of Natural Science at Indiana University Southeast  
Fall 1978 - Spring 1981  
Duties: teach computer science and mathematics.

Software Engineer for the Naval Air Development Center in Warminster, Pennsylvania. Contract through Computer Sciences Corporation.  
Fall 1977 - Spring 1978  
Duties: design and implementation of operating systems and numerical software

7. Consulting—list agencies and dates, and briefly describe each project:

Consultant for Comuniq, Inc.  
Summer 2000 – present  
Duties include design and implementation of digital signal processing software.

Sun Microsystems, 1999 – present  
Tools for high performance computing

8. Department, college, and/or university committees of which you are a member:

Chair of the Faculty  
CS graduate committee  
CS undergraduate committee  
CENG undergraduate committee  
Parking committee [Chair]  
Faculty Club board  
ACM Programming Team Coach  
Putnam Team Coach

9. Principal publications of the last five years. Give in standard bibliographic format.


10. Other scholarly activity: grants, sabbaticals, software development, etc.: 

11. Scientific, professional, and honor societies of which you are a member:
   
   ACM
   Tau Beta Pi

12. Honors and awards:
   
   None

13. Courses taught this and last academic year term-by-term. (This year is the year in which this report was prepared; last year was the year prior to this.) If you were on sabbatical leave, please enter the information for the previous year. Please list each section of the same course separately.

<table>
<thead>
<tr>
<th>year/term</th>
<th>course number</th>
<th>course title</th>
<th>credits</th>
<th>No. of students</th>
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<tr>
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<td>CSC 251</td>
<td>Finite Structures</td>
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<td>Fall 1999</td>
<td>CSC 499</td>
<td>Graphical User Interfaces</td>
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<td>20</td>
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<td>Spr 2000</td>
<td>CSC 371</td>
<td>Data Structures</td>
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<td>24</td>
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<td>36</td>
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<td>Fall 2000</td>
<td>CSC 694</td>
<td>Independent Study</td>
<td>6</td>
<td>2</td>
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<td>Spr 2001</td>
<td>CSC 472</td>
<td>Operating Systems</td>
<td>4</td>
<td>37</td>
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<td>Spr 2001</td>
<td>CSC 445/545</td>
<td>Theory of Computation</td>
<td>3</td>
<td>16</td>
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</table>

14. Other assigned duties performed during the academic year, with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time faculty, please indicate here which courses.

   None not listed above

15. Number of students for which you serve as academic advisor: 12

16. Estimate the percentage of your time devoted to scholarly and/or research activities: 20% Please give a brief description of your major research and scholarly activities:

   See 7 and 9 above

17. If you are not a full-time faculty member, state what percentage of full-time you work: [ ]%
    Percentage of this time allocated to the computer science program being evaluated: 100%
Resume - Dr. Antonette Logar

1. Name, current academic rank, and tenure status:

   Antonette Logar, Professor and Chair, Tenured

2. Date of original appointment to this faculty, followed by dates and ranks of advancement:

   Assistant Professor, 8/86
   Associate Professor, 8/95
   Professor, 8/00

3. Degrees with fields, institutions, and dates

<table>
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<th>Date</th>
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<tr>
<td>B. S.</td>
<td>Geology</td>
<td>Lehigh University</td>
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<td>J. D.</td>
<td>Law</td>
<td>University of Louisville</td>
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<td>B. S.</td>
<td>Comp Sci</td>
<td>South Dakota School of Mines and Technology</td>
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<td>M. S.</td>
<td>Comp Sci</td>
<td>University of Minnesota</td>
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<td>Ph. D.</td>
<td>Comp Sci</td>
<td>Texas Tech University</td>
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4. If you do not have a formal degree in computer science, describe any course work you may have taken, or other ways in which you have achieved competence in computer science; there is no necessity to repeat information here which is contained in later sections of this document.

   Not applicable

5. Conferences, workshops, and professional development programs in which you have participated to improve teaching and professional competence in computer science:

   In the last five years:

   Small College Computing Conference (1996)
   Bush Faculty Development Seminars (1996)
   International Conference on Neural Networks (1996)
   Bush Faculty Development Seminar - Technology in the classroom (1997)
   Bush Faculty Forums on Distance Education (1997)
   Landsat 7 seminar presented by EROS on the Tech campus (1999)
   Western Research Alliance seminar (1999)
   CSAC Evaluator Training (2000)
   Student Attitudes and Longitudinal Assessment (2000)

6. Other related computing experience including teaching, industrial, governmental, etc. (Where, when, description and scope of duties):

   1998 : Researcher at NASA Global Hydrology and Climate Center, Huntsville, Alabama

   1988-1989 : Lecturer in Computer Science, University of Maryland, European Division, Wiesbaden, Germany.

7. Consulting—list agencies and dates, and briefly describe each project:

Sun Microsystems, 1999 – present
Tools for high performance computing

Raytheon / EROS Data Center, 1999 – present
Satellite data processing software

8. Department, college, and/or university committees of which you are a member:

Graduate Program Coordinator
CS undergraduate committee
CS Search Committee
CENG undergraduate committee
Graduate Education and Research Council
SDSM&T Alumni Board
Assessment Committee
Tenure and Promotion Committee (non-unit)
Outstanding Recent Graduate Committee
ACM Programming Team Coach
Technology Fellows Oversight Committee

9. Principal publications of the last five years. Give in standard bibliographic format.


10. Other scholarly activity: grants, sabbaticals, software development, etc.: 

11. Scientific, professional, and honor societies of which you are a member:

IEEE
Tau Beta Pi

12. Honors and awards:

SDSM&T's Nominee for the Boeing Outstanding Educator Award, 1995
Benard A. Ennenga Award for Excellence in Teaching, 1996
Presidential Outstanding Professor Award, 1997
Leadership Rapid City, 1998

13. Courses taught this and last academic year term-by-term. (This year is the year in which this report was prepared; last year was the year prior to this.) If you were on sabbatical leave, please enter the information for the previous year. Please list each section of the same course separately.

<table>
<thead>
<tr>
<th>year/term</th>
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<th>course title</th>
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<td>Trigonometry</td>
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<td>Math 294</td>
<td>Independent Study</td>
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</table>

14. Other assigned duties performed during the academic year, with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time faculty, please indicate here which courses.

- Coordinator for CSC 150, Computer Science I, 2 hours per week
- Coordinator for Computer Science Graduate Program, 3 hours per week
- Department Chair, 10 hours per week

15. Number of students for which you serve as academic advisor: 12

16. Estimate the percentage of your time devoted to scholarly and/or research activities: 15% Please give a brief description of your major research and scholarly activities:

See 7 and 9 above

17. If you are not a full-time faculty member, state what percentage of full-time you work: __% Percentage of this time allocated to the computer science program being evaluated: __100__%
Resume - Dr. Jeff McGough

1. Name, current academic rank, and tenure status:

   Jeff Scot McGough, Assistant Professor, Not tenured

2. Date of original appointment to this faculty, followed by dates and ranks of advancement:

   Appointment: 8/98

3. Degrees with fields, institutions, and dates

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<th>Institution</th>
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<tr>
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<td>Ph.D.</td>
<td>Mathematics</td>
<td>University of Utah</td>
<td>1993</td>
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</table>

4. If you do not have a formal degree in computer science, describe any course work you may have taken, or other ways in which you have achieved competence in computer science; there is no necessity to repeat information here which is contained in later sections of this document.

   Postdoctoral Fellowship in Scientific Computing,
   Center for Scientific Computing, University of Utah, 1993-94.

5. Conferences, workshops, and professional development programs in which you have participated to improve teaching and professional competence in computer science:

   June 1998, Utah State University Conference on Industrial Mathematics, Discussions with industry representatives on math and computing education issues.


6. Other related computing experience including teaching, industrial, governmental, etc. (Where, when, description and scope of duties):

   1999 - Present: SunTech Collaboration Member,
   SunTech: Sun Microsystems and SDSMT Department of Mathematics and Computer Science Collaboration,
   SunTech projects: Parallel/High Performance Computing Tools,
   Duties: Project Lead for 3 projects.
   (Note, in the 1999-2000 academic year, SunTech was the largest Academic collaboration for Sun Microsystems world wide)

7. Consulting-list agencies and dates, and briefly describe each project:

   June 2000 - Sun Microsystems
   One month (on site) with the Performance Library Group. Worked with the group on a suite of parallelization tools. This included some testing, documentation, etc.

8. Department, college, and/or university committees of which you are a member:

36
9. Principal publications of the last five years. Give in standard bibliographic format.


10. Other scholarly activity: grants, sabbaticals, software development, etc.:

NSF Award: $22,238, DUE-9980687
A New On-Line Mathematics Testing, Remediation and Assessment Strategy for Engineering Majors,

Junior Faculty Research Award, $10,000
Univ. of Nevada-Reno, 1995-1997

11. Scientific, professional, and honor societies of which you are a member:

SIAM

12. Honors and awards:

1995-97 Junior Faculty Research Award, Univ. of Nevada-Reno, Computational Biology
13. Courses taught this and last academic year term-by-term. (This year is the year in which this report was prepared; last year was the year prior to this.) If you were on sabbatical leave, please enter the information for the previous year. Please list each section of the same course separately.

<table>
<thead>
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<th>course title</th>
<th>credits</th>
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<td>Trigonometry</td>
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<td>CSC 472</td>
<td>Operating Systems</td>
<td>3</td>
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<td>2000/S</td>
<td>CSC 494</td>
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<td>2000/F</td>
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14. Other assigned duties performed during the academic year, with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time faculty, please indicate here which courses.

Faculty director - System Administration, 5 hours per week. Responsible for the department Unix systems, which includes the Sun Cluster and SunRays, the Sun Workstations and the Linux systems. This includes management of clustering software, web server and web pages, user accounts and other items. No compensation is provided, it is considered service. Normally I have one or two students to assist in the routine tasks.

15. Number of students for which you serve as academic advisor: 15

16. Estimate the percentage of your time devoted to scholarly and/or research activities: 20 % Please give a brief description of your major research and scholarly activities:

I have published in the areas are nonlinear analysis, scientific computing, partial differential equations and mathematical modeling. My current work involves parallel algorithms, parallelization tools, numerical linear algebra and geometry.

The work with Sun is in the area of high performance software and parallelization tools. I also currently have an NSF grant to explore web based mathematics instruction for engineering. We have developed code that will generate a unique exam (following a instructor provided template) for a student, then grade and assess the results.

17. If you are not a full-time faculty member, state what percentage of full-time you work: ___ % Percentage of this time allocated to the computer science program being evaluated: 50 %
Resume - Prof. Roger Opp

1. Name, current academic rank, and tenure status:

   Roger L. Opp, Professor, Tenured

2. Date of original appointment to this faculty, followed by dates and ranks of advancement:

   1966-1970 - Assistant Professor
   1970-1981 - Associate Professor
   1981 - Professor

3. Degrees with fields, institutions and dates:

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<th>Field</th>
<th>Institution</th>
<th>Date</th>
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<tr>
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<td>Northern State College</td>
<td>1962</td>
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<td>M. S.</td>
<td>Mathematics</td>
<td>South Dakota School of Mines &amp; Technology</td>
<td>1965</td>
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4. If you do not have a formal degree in computer science, describe any course work you may have taken, or other ways in which you have achieved competence in computer science; there is no necessity to repeat information here which is contained in later sections of this document.

   1-week Workshop in Minneapolis on CAD (CD2000 Software)

5. Conferences, workshops, and professional development programs in which you have participated to improve teaching and professional competence in computer science:

6. Other related computing experience including teaching, industrial, governmental, etc. (Where, when, description and scope of duties):

   Design and delivery of a Calculus course for the Air Force Institute of Technology, Ellsworth AFB, SD
   Participation in preparation of tutorial material for a funded CAUSE project
   Teaching Extension courses
   Preparation of software for campus Keynote graphics terminals
   Development of TI software to simulate IBM turbo Pascal graphics
   Development of SUBMIT program for the Network
   Analyzed a carnival game of chance for RC Police Dept.

7. Consulting—list agencies and dates, and briefly describe each project:

   Select Inc./Rapid City Chamber of Commerce: An Analysis of an Economic Development Model
   Institute of Atmospheric Sciences: Development of a SUN workstation graphical display software for lightning data.
   Black Hills Materials: Software development
   Mikohn Gaming Corp.: Software development

39
8. Department, college, and/or university committees of which you are a member:
   Departmental Committees:
   Undergraduate Computer Science Committee
   Undergraduate Mathematics Committee

9. Principal publications of the last five years. Give in standard bibliographic format.

   Ground-Water Flow Direction in Anisotropic Media: West Virginia
   Geological and Economic Survey (co-authored with Dr. Perry Rahn)
   Submitted March 30, 2001, acceptance pending

   B-Splines Using Convolution: Journal for Computing in Small Colleges
   Submitted May 25, 2001, acceptance pending

10. Other scholarly activity: grants, sabbaticals, software development, etc.:

11. Scientific, professional, and honor societies of which you are a member:

12. Honors and awards:

   Professor-of-the-Year Award (Standard Oil), 1973
   Presidential Outstanding Professor Award, 1985
   South Dakota Intercollegiate Conference Hall of Fame, 1997

13. Courses taught this and last academic year term-by-term. (This year is the year in which this report was
    prepared; last year was the year prior to this.) If you were on sabbatical leave, please enter the
    information for the previous year. Please list each section of the same course separately.

    | year/term | course number | course title         | credits | No. of students |
    |-----------|---------------|----------------------|---------|-----------------|
    | Fall 1999 | CSC 314       | Assembly Language    | 4       | 19              |
    | Fall 1999 | CENG 314      | Assembly Language    | 3       | 9               |
    | Fall 1999 | MATH 391      | Studies in Math I    | 3       | 11              |
    | Spr 2000  | CSC 314       | Assembly Language    | 4       | 24              |
    | Spr 2000  | CENG 314      | Assembly Language    | 3       | 9               |
    | Spr 2000  | CSC 431/631   | Computer Graphics    | 3       | 30              |
    | Spr 2000  | CSC 394       | Independent Study    | 1       | 1               |
    | Fall 2000 | CSC 314       | Assembly Language    | 4       | 23              |
    | Fall 2000 | CENG 314      | Assembly Language    | 3       | 9               |
    | Fall 2000 | MATH 123      | Calculus I           | 4       | 42              |
    | Fall 2000 | CSC 394       | Independent Study    | 2       | 2               |
    | Spr 2001  | CSC 314       | Assembly Language    | 4       | 23              |
    | Spr 2001  | CENG 314      | Assembly Language    | 3       | 14              |
    | Spr 2001  | CSC 702       | Non-thesis Research  | 3       | 1               |
    | Spr 2001  | MATH 421      | Complex Variables    | 3       | 13              |

14. Other assigned duties performed during the academic year, with average hours per week. Indicate
    which, if any, carry extra compensation. If you are course coordinator for courses taught by other than
    full-time faculty, please indicate here which courses.
Evaluation of transfer credits (2 hrs/wk)
Academic advising (2 hrs/wk)

15. Number of students for which you serve as academic advisor: 12

16. Estimate the percentage of your time devoted to scholarly and/or research activities: 10% Please give a brief description of your major research and scholarly activities:

See 7 and 9 above

17. If you are not a full-time faculty member, state what percentage of full-time you work: ___%
   Percentage of this time allocated to the computer science program being evaluated: 50%
Resume - Dr. Manuel Penaloza

1. Name, current academic rank, and tenure status:

   Penaloza, Manuel A., Professor, Tenured

2. Date of original appointment to this faculty, followed by dates and ranks of advancement:

   Assistant Professor, 1989
   Associate Professor, 1994
   Professor, 2001

3. Degrees with fields, institutions and dates:

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<th>Degree</th>
<th>Field</th>
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<td>Ph. D.</td>
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4. If you do not have a formal degree in computer science, describe any course work you may have taken, or other ways in which you have achieved competence in computer science; there is no necessity to repeat information here which is contained in later sections of this document.

   Not applicable

5. Conferences, workshops, and professional development programs in which you have participated to improve teaching and professional competence in computer science:

   Technology and Distance Education workshop, SDSM&T. August 23-27, 1997.

   Vice President’s workshop: “The Tech Quality Plan and Industry Interaction”, Thursday, April 11, 1996.


   “Allowing Students to be Learners: Creating an Active Classroom Environment.” Presenter: Dr. Jeffrey R. Pribyl. Place/Time: SDSM&T, January 14, 1993, 10am to noon, Chem. 228.

“A Cooperative Learning Workshop”, Date: 7/15/92. Presenter: Dr. Karl Smith, BHSU, 9:00 a.m. to 3:30 p.m.

“Active Learning and Equality in the classroom.” Presenter: Ms. Linda Hilsen. Date: Thursday, 4/9/92. Place/Time: Black Hills State University (BHSU), 3:30 to 6:30 PM.

“Critical Thinking Workshop.” Date: Thursday 03/19/92, 3:30 p.m. to 5:30 p.m., SDSM&T.

“Writing to learn Mathematics and Science.” Dates: Thursday, 02/27/92, from 3:30 p.m. to 7:30 p.m., SDSM&T.

6. Other related computing experience including teaching, industrial, governmental, etc. (Where, when, description and scope of duties):

1994 - 1995 Participation in several workshops and teleconferences related to the evaluation and test of the NASA EOSDLS Core System.
1992 - 1995 Participation in workshops and meeting related to the software implementation for the ASTER instrument to be launched in 1998.
Summer 1989 Instructor, Arizona State University, Computer Science Dept.
1985 - 1989 Teaching Associate, Arizona State University, Computer Science Dept.
1976 - 1985 Principal Professor, Institute of Mathematics, Escuela Superior Politecnica del Litoral (ESPOL), Guayaquil, Ecuador.
1982 - 1983 Instructor, Universidad Tecnica de Machala, Machala, Ecuador.
1982 Operations Manager, Filanbanco Bank, Guayaquil, Ecuador.
1981 - 1982 Instructor, Universidad Catolica de Guayaquil, Guayaquil, Ecuador.
1980 Manager, Data Processing Center, Instituto Oceanografico de la Armada, Guayaquil, Ecuador.
1978 - 1981 Head of the Computer Science Technology Department, ESPOL, Guayaquil, Ecuador.
1975 Computer Operator. PDP 11-40, University of New Mexico.
1974 - 1975 Teaching Assistant, University of New Mexico.
1972 Instructor, Universidad Laica Vicente Rocafuerte, Guayaquil, Ecuador.
President of a Software Company, Data Logica Cia., Guayaquil, Ecuador.

7. Consulting—list agencies and dates, and briefly describe each project:
1983 Restructuring of the Data Processing Center, Instituto de Seguridad Social.
1982 Responsible for the computerized election at Guayas, Ecuador.
1981 Head of a Committee to provide technical training to the Central Bank, Guayaquil, Ecuador.
1981 Development of a computer discipline, Vocational High School, Veintiocho de Mayo, Guayaquil, Ecuador.

8. Department, college, and/or university committees of which you are a member:

Departmental Committees:
Undergraduate Computer Science Committee
Graduate Computer Science Committee
West River Math Contest Committee

43
University Committees:
Undergraduate Computer Engineering Committee

9. Principal publications of the last five years. Give in standard bibliographic format.


10. Other scholarly activity: grants, sabbaticals, software development, etc.:


11. Scientific, professional, and honor societies of which you are a member:

Association for Computing Machinery (ACM).
The Institute of Electrical and Electronic Engineers (IEEE).
Computer And Their Applications (CATA)

12. Honors and awards:

Scholarship from The Latin American Scholarship of American Universities (LASPAU) Organization. To pursue the B.S and M.S. degrees at University of New Mexico.

13. Courses taught this and last academic year term-by-term. (This year is the year in which this report was prepared; last year was the year prior to this.) If you were on sabbatical leave, please enter the information for the previous year. Please list each section of the same course separately.

<table>
<thead>
<tr>
<th>year/term</th>
<th>course number</th>
<th>course title</th>
<th>credits</th>
<th>No. of students</th>
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<tr>
<td>Fall 1999</td>
<td>CSC 477</td>
<td>Software Engineering</td>
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<td>Fall 1999</td>
<td>CSC 484</td>
<td>Database Systems</td>
<td>3</td>
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<td>Fall 1999</td>
<td>CSC 794</td>
<td>Independent Study</td>
<td>2</td>
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<td>Spr 2000</td>
<td>CSC 478</td>
<td>Senior Design</td>
<td>3</td>
<td>21</td>
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<td>Spr 2000</td>
<td>CSC 761</td>
<td>Advanced Artificial Intelligence</td>
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<td>Spr 2000</td>
<td>CSC 702</td>
<td>Non-thesis Research</td>
<td>2</td>
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<td>Fall 2000</td>
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<td>Non-thesis Research</td>
<td>5</td>
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<td>CSC 794</td>
<td>Independent Study</td>
<td>3</td>
<td>1</td>
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</table>

14. Other assigned duties performed during the academic year, with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time faculty, please indicate here which courses.

On sabbatical leave.

15. Number of students for which you serve as academic advisor: 12

16. Estimate the percentage of your time devoted to scholarly and/or research activities: 20 % Please give a brief description of your major research and scholarly activities:

See 7 and 9 above

17. If you are not a full-time faculty member, state what percentage of full-time you work: % Percentage of this time allocated to the computer science program being evaluated: 100 %
Resume - Dr. Gregg Stubbendieck

1. Name, current academic rank, and tenure status:
   Gregg Stubbendieck, Assistant Professor, Not Tenured

2. Date of original appointment to this faculty, followed by dates and ranks of advancement:
   August 2000

3. Degrees with fields, institutions, and dates

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<th>Degree</th>
<th>Field</th>
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<th>Date</th>
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<tr>
<td>Ph.D.</td>
<td>CS</td>
<td>Texas Tech University</td>
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<tr>
<td>M.A.</td>
<td>CS</td>
<td>Texas Tech University</td>
<td>1991</td>
</tr>
<tr>
<td>B.A.</td>
<td>CS + Math</td>
<td>University of Nebraska, Lincoln</td>
<td>1987</td>
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</tbody>
</table>

4. If you do not have a formal degree in computer science, describe any course work you may have taken, or other ways in which you have achieved competence in computer science; there is no necessity to repeat information here which is contained in later sections of this document.
   N/A

5. Conferences, workshops, and professional development programs in which you have participated to improve teaching and professional competence in computer science:
   The Collaboration for Advancement of College Teaching and Learning Conference, November, 2000, Minneapolis, MN.

6. Other related computing experience including teaching, industrial, governmental, etc. (Where, when, description and scope of duties):
   Teaching Assistant, Texas Tech University, 1992. Data Structures, 1 section lecture.
   Contract Software Development, Florida Hospital, Orlando, FL. 1993. Developed software for a facility-wide time and attendance application, custom email gateway, other internal projects.
   Sterling Software, Bellevue, NE, 1994-1995. Develop graphical user interface for a satellite data handling system used in global weather forecasting.

7. Consulting—list agencies and dates, and briefly describe each project:
   Comuniq, Inc., Rapid City, SD, August 2000-present. Research and development of digital signal processing algorithms for Internet telephony.
8. Department, college, and/or university committees of which you are a member:

   Leadership Development Committee
   Design Fair

9. Principal publications of the last five years. Give in standard bibliographic format.

   N/A

10. Other scholarly activity: grants, sabbaticals, software development, etc.:

    N/A

11. Scientific, professional, and honor societies of which you are a member:

    IEEE Computer Society
    Association for Computing Machinery
    Upsilon Pi Epsilon – ACM honor society

12. Honors and awards:

    N/A

13. Courses taught this and last academic year term-by-term. (This year is the year in which this report was prepared; last year was the year prior to this.) If you were on sabbatical leave, please enter the information for the previous year. Please list each section of the same course separately.

    | year/term | course number | course title                        | credits | No. of students |
    |-----------|---------------|-------------------------------------|---------|----------------|
    | 2000/Fall | CSC 484       | Database Systems                    | 3       | 16             |
    | 2000/Fall | CSC 477-1     | Software Engineering                | 3       | 22             |
    | 2000/Fall | CSC 477-2     | Software Engineering                | 3       | 13             |
    | 2000/Fall | CSC 294       | Independent Studies                 | 3       | 1              |
    | 2001/Sp   | CSC 370       | Concepts of Programming Languages   | 3       | 16             |
    | 2001/Sp   | CSC 762       | Neural Networks                      | 3       | 17             |
    | 2001/Sp   | CSC 694       | Independent Studies                 | 1       | 2              |
    | 2001/Sp   | CSC 702       | Non-Thesis Project                  | 3       | 1              |
    | 2001/Sp   | CSC 478       | Senior Projects                     | 3       | 15             |

14. Other assigned duties performed during the academic year, with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time faculty, please indicate here which courses.

    COOP Coordinator, ¼ hour per week
    ACM Student Chapter Advisor, ½ hour per week

15. Number of students for which you serve as academic advisor: 4

16. Estimate the percentage of your time devoted to scholarly and/or research activities: 35% Please give a brief description of your major research and scholarly activities:

    Pattern recognition with neural networks—ongoing projects with graduate students.
Parallel and high performance computing—academic research on industry contract.

MODIS—developed graphical user interface for a satellite data resampling tool.

17. If you are not a full-time faculty member, state what percentage of full-time you work: ___ %
   Percentage of this time allocated to the computer science program being evaluated: ___100___ %

N/A
Resume - Dr. John M. Weiss

1. Name, current academic rank, and tenure status:

   John M. Weiss, Associate Professor, Tenured

2. Date of original appointment to this faculty, followed by dates and ranks of advancement:

   8/91-present  Associate Professor of Computer Science, SDSM&T
   8/84-8/91    Assistant Professor of Computer Science, Virginia Commonwealth University

3. Degrees with fields, institutions, and dates

<table>
<thead>
<tr>
<th>Degree</th>
<th>Field</th>
<th>Institution</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.S.</td>
<td>Computer Science</td>
<td>Vanderbilt University</td>
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<tr>
<td>Ph.D.</td>
<td>Biochemistry</td>
<td>Vanderbilt University</td>
<td>1980</td>
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<tr>
<td>B.A.</td>
<td>Molecular Biophysics and Biochemistry</td>
<td>Yale University</td>
<td>1974</td>
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</table>

4. If you do not have a formal degree in computer science, describe any course work you may have taken, or other ways in which you have achieved competence in computer science; there is no necessity to repeat information here which is contained in later sections of this document.

5. Conferences, workshops, and professional development programs in which you have participated to improve teaching and professional competence in computer science:

   Small College Computing Conference (Rocky Mountain Section)
   Small College Computing Symposium
   SIGCSE
   Bush Faculty Development Program

6. Other related computing experience including teaching, industrial, governmental, etc. (Where, when, description and scope of duties):

   June 1999    Technology for Teaching and Learning (TTL) instructor, SDSM&T
   5/84-8/84    Research Assistant for Software Development
                Radiology Department, Vanderbilt University

7. Consulting—list agencies and dates, and briefly describe each project:

   6/93-8/93    Computer consultant to Custer State Park Forest Service. Updated
                forest service management applications software.
   8/92-1/93    Computer consultant to eddie bowers publishing company, inc. Wrote software
                to accompany the textbook Health Wellness (S. Roberts, 1993).
   1/90-8/90    Computer consultant, Department of Health and Sport Science, University of
                Richmond. Wrote software for health and fitness testing in PE classes.

8. Department, college, and/or university committees of which you are a member:

   Chair, MCS Computer Science Committee
   MCS Scheduling Committee
   MCS CSAB Preparation Committee
   West River Mathematics Contest Committee
   University Library Committee
University Campus Planning Committee
Computer Science Admissions Advisory Committee
Computer Science CLEP Committee
Faculty Advisory Council (elected by faculty as science representative)

9. Principal publications of the last five years. Give in standard bibliographic format.


IGARSS’97.

Kliche, Chou, Weiss, Christopher and Welch, “Global Survey of Jet Contrails Using AVHRR
Data: Spatial Distributions and Optical Property Retrievals”, IGARSS’97.


College Computing Symposium, Apr 1996.


1995.

10. Other scholarly activity: grants, sabbaticals, software development, etc.:

1/00-present Project lead and software engineer on Raytheon/EROS Data Center/SDSM&T
collaboration (MODIS Reprojection Tool project).
8/99-5/00 Participant in high-performance scientific software collaboration between Sun
Microsystems and SDSM&T (SunTech).
6/94-6/98 Awarded 3-year NASA grant to study atmospheric effects of commercial
subsonic aviation (contrail detection work).
8/93-6/95 Image processing project with Horizons, Inc. Awarded 2-year ARPA grant to study the commercialization potential of synthetic aperture radar.

Fall 94 Agenda for Excellence Grant (SDSM&T) for hardware upgrades to SGI workstations in the Computer Science Workstation Laboratory.

Fall 93 Agenda for Excellence Grant (SDSM&T) for multimedia work.

6/92-7/92 Research consultant and software engineer on NASA grant to study arctic scene segmentation in satellite imagery.

6/91-7/91 Computer consultant and software engineer on NIH SBIR grant entitled EEG Compression and Archiving.

5/88-9/88 University Council Grant (VCU): Tolerance Approach to Sensitivity Analysis

5/84-8/84 Research Fellowship (Diasonic, Inc.): Ultrasonic Tissue Characterization

1/83-5/84 Graduate Teaching Assistantship (Computer Science Department, Vanderbilt University)

9/81-8/82 Postdoctoral Fellowship (Fight For Sight, Inc.): Molecular Mechanisms Underlying Optic Nerve Growth

8/80-8/82 Visual Sciences Postdoctoral Training Grant (NIH/NEI): Tissue Culture Model For Retino-Tectal Transmission

7/81-6/82 Vanderbilt University Research Council Grant: Molecular Control of Optic Nerve Regeneration

6/76-5/79 Cell & Molecular Biology Training Grant (NIH)

11. Scientific, professional, and honor societies of which you are a member:

Association for Computing Machinery (SIGGRAPH)
IEEE (Computer Society, Engineering in Medicine and Biology, PAMI)

12. Honors and awards:

13. Courses taught this and last academic year term-by-term. (This year is the year in which this report was prepared; last year was the year prior to this.) If you were on sabbatical leave, please enter the information for the previous year. Please list each section of the same course separately.

<table>
<thead>
<tr>
<th>year/term</th>
<th>course number</th>
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<th>credits</th>
<th>No. of students</th>
</tr>
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<tr>
<td>Fall 1999</td>
<td>CSC 371</td>
<td>Data Structures</td>
<td>4</td>
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<tr>
<td></td>
<td>CSC 664</td>
<td>Introduction To Digital Image Processing And Computer Vision</td>
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<td>CSC 751</td>
<td>Image Processing</td>
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<td></td>
<td>CSC 702</td>
<td>Graduate Research (Non-Thesis)</td>
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<td>Spring 2000</td>
<td>CSC 370</td>
<td>Programming Language Concepts</td>
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<td>CSC 752</td>
<td>Computer Vision</td>
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<td>CSC 494</td>
<td>Independent Studies In Computer Science</td>
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<td>CSC 702</td>
<td>Graduate Research (Non-Thesis)</td>
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<td>2</td>
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<td>Fall 2001</td>
<td>CSC 422/522</td>
<td>GUI Programming</td>
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<td></td>
<td>CSC 451</td>
<td>Introduction To Artificial Intelligence</td>
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<td>CSC 661</td>
<td>Artificial Intelligence</td>
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<td>CSC 702</td>
<td>Graduate Research (Non-Thesis)</td>
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<td>Spring 2001</td>
<td>CSC 371</td>
<td>Data Structures</td>
<td>4</td>
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<td>CSC 494</td>
<td>Independent Studies In Computer Science</td>
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<td>CSC 794</td>
<td>Independent Studies In Computer Science</td>
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<td>2</td>
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<tr>
<td></td>
<td>CSC 702</td>
<td>Graduate Research (Non-Thesis)</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>
14. Other assigned duties performed during the academic year, with average hours per week. Indicate which, if any, carry extra compensation. If you are course coordinator for courses taught by other than full-time faculty, please indicate here which courses.

15. Number of students for which you serve as academic advisor: 15

16. Estimate the percentage of your time devoted to scholarly and/or research activities: 25% Please give a brief description of your major research and scholarly activities:

For the last year I have been heading the MODIS Project, a large collaborative software effort with Raytheon Corporation and the EROS Data Center.

17. If you are not a full-time faculty member, state what percentage of full-time you work: ___%
   Percentage of this time allocated to the computer science program being evaluated: 100%
IV. Curriculum.

INTENT: The curriculum is consistent with the program's documented objectives. It combines technical requirements with general education requirements and electives to prepare students for a professional career in the computer field, for further study in computer science, and for functioning in modern society. The technical requirements include up-to-date coverage of basic and advanced topics in computer science as well as an emphasis on science and mathematics.

(Curriculum standards are specified in terms of semester hours of study. Thirty semester hours generally constitutes one year of full-time study and is equivalent to 45 quarter hours. A course or a specific part of a course can only be applied toward one standard.)

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

A. Title of Degree Program. Give the title of the degree program under review, as specified on the transcript and diploma:

Transcript:  Bachelor of Science in Computer Science

Diploma:  Bachelor of Science in Computer Science

B. Credit Hour Definition. One credit hour normally means one hour of lecture or three hours of laboratory per week. One academic year normally represents from twenty-eight to thirty weeks of classes, exclusive of final examinations. Please describe below if your definitions differ from these.

No differences.

C. Prerequisite Flow Chart. Attach a flow chart showing the prerequisite structure of computer science courses required or allowed towards the major.

Notes on the following flowchart:
- CSC 372 (Analysis of Algorithms) replaces CSC 461 (Numerical Analysis, renumbered to MATH 471) as a required course. This change takes affect in the fall of 2001.
- CHEM 114 is shown as a requirement in the following chart. Students are encouraged to take CHEM 114 but are currently allowed to substitute a third Physics class in its place. Starting in the fall of 2001, CHEM 114 will be required.
- Systemic common course numbering required that MATH 124 (Calculus II) be renumbered as MATH 125 and MATH 231 (Differential Equations) be renumbered as MATH 321. These number changes are shown in the chart.
D. Course Requirements of Curriculum (term by term and year by year)

Required and elective courses: In the tables on the following pages, List the courses in the order in which they are normally taken in the curriculum, classified in the appropriate categories. The data should clearly indicate how the program satisfies the CSAC/CSAB criteria for curriculum as prescribed in the current issue of Criteria for Accrediting Programs in Computer Science in the United States. These tables are designed for the semester calendar; they may be easily altered for the quarter calendar.

Required courses: List courses by department abbreviation (Math, Chem, CS, etc.), number, title, and number of credits. Apportion the credits for each course by category.

Elective courses: Designate these courses "elective." If an elective is restricted to a particular category, then tabulate the credit hours in that category and indicate the category in the listing, e. g., "elective—science." In addition, be sure that you have supplied information elsewhere in this document indicating how you ensure that students take the course in the specified category (e. g., advisement, graduation check sheets, etc.). For free electives (i. e., those not restricted to a particular category), list the credits under Other. Use footnotes for any listings that require further elaboration.

Note: Individual courses may be split between or among curriculum areas if the course content justifies the split. For example, a discrete mathematics course may have some of its credits under mathematics and some under computer science. In such cases, assign credits to categories in multiples of one-half credit.
<table>
<thead>
<tr>
<th>Year</th>
<th>Course (Dept., Number, Title)</th>
<th>Comp Science Core</th>
<th>Comp Science Advanced</th>
<th>Math</th>
<th>Science</th>
<th>General Ed</th>
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<td>First Semester Freshman Year</td>
<td>CHEM 112 Gen. Chemistry I</td>
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<td>Second Semester Freshman Year</td>
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<td>First Semester Sophomore Year</td>
<td>CENG 244 Intro. to Digital Systems</td>
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<td>CSC 314 Assembly Language</td>
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<td>Second Semester Sophomore Year</td>
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<td></td>
<td>Elective - HU/SS</td>
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<tr>
<td></td>
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<tr>
<td>SUBTOTALS</td>
<td>27</td>
<td>12</td>
<td>7</td>
<td>18</td>
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</table>

¹ MATH 124 becomes MATH 125 in fall 2001.
<table>
<thead>
<tr>
<th>Year</th>
<th>Course (Dept., Number, Title)</th>
<th>Comp Science Core</th>
<th>Comp Science Adv.</th>
<th>Math</th>
<th>Science</th>
<th>General Ed</th>
<th>Other</th>
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<tbody>
<tr>
<td>Junior</td>
<td>CSC 461 Numerical Analysis²</td>
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<td>ENGL 289 Technical Comm. II</td>
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<tr>
<td></td>
<td>MATH 231 Ordinary Diff. Eqn.</td>
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<td></td>
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</tr>
<tr>
<td>Junior</td>
<td>CSC 370 Programming Language Concepts</td>
<td>3</td>
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<tr>
<td></td>
<td>MATH 315 Matrices &amp; Linear Algebra</td>
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<td>MATH 481 Eng. Statistics</td>
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<tr>
<td></td>
<td>MATH 482 Eng. Statistics</td>
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<tr>
<td></td>
<td>PHYS 213 University Physics II</td>
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<td>PHYS 214 Physics II Lab</td>
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<td>Senior</td>
<td>CSC 440 Adv. Digital Systems</td>
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<tr>
<td></td>
<td>CSC 477 Software Engineering</td>
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<td></td>
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<td></td>
<td>Elective - CSC</td>
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<tr>
<td></td>
<td>Elective - General</td>
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<td></td>
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<tr>
<td>Senior</td>
<td>CSC 472 Operating Systems</td>
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<td></td>
<td>CSC 478 Senior Designs</td>
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<tr>
<td></td>
<td>HUM 375 Computers in Society</td>
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<td>3</td>
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<tr>
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<td>Elective - CSC</td>
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<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Elective - General</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>SUBTOTALS</strong></td>
<td><strong>3</strong></td>
<td><strong>28</strong></td>
<td><strong>12</strong></td>
<td><strong>7</strong></td>
<td><strong>12</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>TOTALS</strong></td>
<td><strong>30</strong></td>
<td><strong>28</strong></td>
<td><strong>24</strong></td>
<td><strong>14</strong></td>
<td><strong>30</strong></td>
<td><strong>2</strong></td>
</tr>
</tbody>
</table>

² CSC 372 Analysis of Algorithms replaces CSC 461 Numerical Analysis as a required course, starting fall 2001. CSC 461 becomes MATH 471.
³ CSC 440 Advanced Digital Systems will add a lab component for a total of 4 credits, starting fall 2001.
⁴ 29 credits starting fall 2001 (see CSC 440 footnote).
⁵ 29 credits starting fall 2001 (see CSC 440 footnote).
The Intent stated at the beginning of this section must be met in order for a program to be deemed accreditable. One way to meet the Intent of this criterion is to satisfy each one of the Standards listed below. To do this, answer the questions associated with the Standards. If one or more Standards are not satisfied, it is incumbent upon the institution to demonstrate and document clearly and unequivocally how the Intent is met in some alternative fashion.

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

**Standard IV-1. The curriculum must include at least 40 semester hours of up-to-date study in computer science topics.**

1. If it is not obvious from the above tables that the curriculum includes at least 40 semester hours (60 quarter hours) of computer science topics, please explain.

   30 credits CSC core + 28 credits CSC advanced = 58 credits of CSC courses are required.

   Starting fall 2001, CSC 440 changes from 3 credits to 4 credits:
   30 credits CSC core + 29 credits CSC advanced = 59 credits of CSC courses are required.

**Standard IV-2. The curriculum must contain at least 30 semester hours of study in mathematics and science as specified below under Mathematics and Science.**

2. If it is not obvious from the above tables that the curriculum includes at least 30 semester hours (45 quarter hours) of study in mathematics and science, please explain.

   24 credits math + 14 credits science = 38 credits of math and science are required.

**Standard IV-3. The curriculum must include at least 30 semester hours of study in humanities, social sciences, arts and other disciplines that serve to broaden the background of the student.**

**Standard IV-4. The curriculum must be consistent with the documented objectives of the program.**
3. If it is not obvious from the above tables that the curriculum includes at least 30 semester hours (45 quarter hours) of study in humanities, social sciences, arts, and other disciplines that serve to broaden the background of the student, please explain.

A total of 30 credits is required in this area. All science and engineering students at SDSM&T must take freshman English (ENGL 101, 3 credits), two semesters of technical communications courses (ENGL 279-289, 6 credits), and a minimum of 16 credits in the humanities and social sciences. At least 6 credits must be in humanities (3 of which must be HUM 375 Computers in Society) and at least 6 must be in social science. The remaining hours are represented by elective credits and the computer science faculty has mandated that these will be used for non-technical electives.

**Standard IV-5. All students must take a broad-based core of fundamental computer science material consisting of at least 16 semester hours.**

4. If it is not obvious from the above tables that the curriculum includes a broad-based core of fundamental computer science material consisting of at least 16 semester hours (24 quarter hours), please explain.

30 credits of CSC core courses are required.

CSC 150 Computer Science I (3 credits)
CSC 250 Computer Science II (4 credits)
CSC 251 Finite Structures (4 credits)
CENG 244 Intro to Digital Systems (4 credits)
CSC 314 Assembly Language (4 credits)
CSC 341 Computer Organization and Design (4 credits)
CSC 370 Programming Languages (3 credits)
CSC 371 Data Structures (4 credits)

**Standard IV-6. The core materials must provide basic coverage of algorithms, data structures, software design, concepts of programming languages and computer organization and architecture.**

5. The core materials must provide basic coverage of the following five areas. Please indicate below the approximate number of hours in the core devoted to each topic. (This material can be gathered from your course descriptions, but it will ease the job for the visiting team if you do this in advance.)

<table>
<thead>
<tr>
<th>Area</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Algorithms</td>
<td>4</td>
</tr>
<tr>
<td>Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>Software Design</td>
<td>4</td>
</tr>
<tr>
<td>Concepts of Programming Languages</td>
<td>6</td>
</tr>
<tr>
<td>Computer Organization and Architecture</td>
<td>8</td>
</tr>
</tbody>
</table>
Standard IV-7. Theoretical foundations, problem analysis, and solution design must be stressed within the program's core materials.

6. The following areas must be stressed within the program's core materials. Indicate the course numbers of courses embodying a significant portion of these areas:

<table>
<thead>
<tr>
<th>Theoretical Foundations:</th>
<th>CENG 244, CSC 250, CSC 251, CSC 314, CSC 341, CSC 370, CSC 371</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Analysis:</td>
<td>CSC 150, CENG 244, CSC 250, CSC 251, CSC 314, CSC 341, CSC 370, CSC 371</td>
</tr>
<tr>
<td>Solution Design:</td>
<td>CSC 150, CENG 244, CSC 250, CSC 314, CSC 341, CSC 370, CSC 371</td>
</tr>
</tbody>
</table>

Standard IV-8. Students must be exposed to a variety of programming languages and systems and must become proficient in at least one higher-level language.

7. Typically, to what programming languages and operating systems are your students exposed?

Students program in C++ in many courses throughout the Computer Science major. They are exposed to other languages in CSC 370 Programming Language Concepts, such as Ada, Fortran, Java, and Lisp. In the CSC 477-478 Software Engineering-Senior Design sequence, students are exposed to prototyping languages such as Visual Basic. Elective courses such as CSC 421-422 GUI Programming, CSC 451 Artificial Intelligence, and CSC 473 Parallel and Distributed Systems may introduce specialized languages such as JavaScript, Lisp, Prolog, Tcl/Tk, Visual Basic, and parallel Fortran.

Students use Microsoft Windows in their early programming courses (CSC 150, CS 1 and CSC 250, CS 2), and MS-DOS in CSC 314 Assembly Language. The 300-level courses in Data Structures, Algorithms, and Programming Languages introduce students to Linux and UNIX. Students study operating systems, especially UNIX, in CSC 472 Operating Systems. Upper-level courses typically use Windows or UNIX platforms for assignments.

8. In what computer language(s) do your students become proficient?

All students become proficient in C++, which is used in the majority of programming courses. Students also become proficient assembly language programmers in the CSC 314 Assembly Language course. Some students gain proficiency in other languages such as Lisp, Java, and Visual Basic, depending on the upper-level courses and projects they select.
Standard IV-9. All students must take at least 16 semester hours of advanced course work in computer science that provides breadth and builds on the core to provide depth.

9. If it is not obvious from the tables above that your students take at least 16 semester hours (24 quarter hours) of advanced computer science, please explain.

28 credits of advanced CSC courses are required\(^6\).

The following courses (19 credits) are required:
CSC 440 Advanced Digital Systems (3 credits)
CSC 461 Numerical Analysis (3 credits)\(^7\)
CSC 472 Operating Systems (4 credits)
CSC 477 Software Engineering (3 credits)
CSC 478 Senior Design (3 credits)
CSC 484 Database (3 credits)

Students must also take 3 of the following upper-level elective courses:
CSC 372 Analysis of Algorithms (3 credits)\(^8\)
CSC 421 GUI (3 credits)
CSC 422 GUI Programming (3 credits)
CSC 431 Computer Graphics (3 credits)
CSC 441 Data Communications (4 credits)
CSC 445 Theory of Computation (3 credits)
CSC 451 Artificial Intelligence (3 credits)
CSC 464 Image Processing (3 credits)
CSC 473 Parallel and Distributed Systems (3 credits)\(^9\)

10. List below the advanced areas in which your students may study. Make clear by your use of “and” and “or” and parentheses which areas are required and which may be chosen from (e. g., A and two of (B or C or D)).

Students must take advanced courses in numerical algorithms, computer hardware, operating systems, database, and software engineering. These six courses provide depth, particularly in the areas of algorithms, software engineering, and computer organization. Enhanced understanding of programming languages and data structures is also developed in these courses. Students are also required to select three advanced CSC courses (or two courses plus a co-op) from artificial intelligence, computer graphics, data communications

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\(^6\) 29 credits, starting fall 2001. CSC 440 increases from 3 credits to 4 credits.
\(^7\) Becomes elective and renamed MATH 471 in fall 2001.
\(^8\) CSC 372 Analysis of Algorithms replaces CSC 461 Numerical Analysis as a required course, starting fall 2001. CSC 461 becomes MATH 471, which may be used as an upper-level elective.
\(^9\) Previously offered as CSC 499, this course becomes CSC 473 in fall 2001.
and networking, GUI programming, image processing, parallel and distributed computing, and theory of computation. The elective offerings provide additional depth in the areas listed above.

The required courses CSC 477 Software Engineering and CSC 478 Senior Design form a capstone sequence for our seniors.

**Standard IV-10. The curriculum must include at least 15 semester hours of mathematics.**

11. If it is not obvious from the tables above that your students take at least 15 semester hours (23 quarter hours) of mathematics, please explain.

24 credits of math courses are required:

- MATH 123 Calculus I (4 credits)
- MATH 124 Calculus II (4 credits)\(^10\)
- MATH 225 Calculus III (4 credits)
- MATH 231 Ordinary Differential Equations (4 credits)
- MATH 315 Linear Algebra (4 credits)
- MATH 481-482 Engineering Statistics (4 credits)

**Standard IV-11. Course work in mathematics must include discrete mathematics, differential and integral calculus, and probability and statistics.**

12. If it is not obvious from course titles in the above tables, then explain below which required courses contain discrete mathematics, differential and integral calculus, and probability and statistics.

Students are required to take a total of 24 credits of specified mathematics courses. These include a three-semester sequence in calculus, and one semester each of courses in differential equations, matrices and linear algebra, and probability and statistics.

In addition to the mathematics courses listed above, computer science majors are required to take a 4-credit course, CSC 251 Finite Structures. This course covers topics in the mathematical foundations of computer science usually taught in courses entitled discrete mathematics. These topics include logic and proofs, combinatorics, sets, relations, functions, algorithm analysis, and elementary graph theory.

**Standard IV-12. The curriculum must include at least 12 semester hours of science.**

\(^{10}\) Becomes MATH 125 in fall 2001.
13. If it is not obvious from the tables above that your students take at least 12 semester hours (18 quarter hours) of science, please explain.

Prior to fall 2001, students were required to take one semester Chemistry, a two-semester Physics sequence, one additional lecture course in either Physics or Chemistry, and a Physics or Chemistry lab. Starting fall 2001, students are required to take a two-semester Chemistry sequence with one semester Chemistry lab, and a two-semester Physics sequence with one semester Physics lab. In either case, the requirement for 12 credits of science is exceeded.

**Standard IV-13. Course work in science must include the equivalent of a two-semester sequence in a laboratory science for science or engineering majors.**

14. If it is not obvious from the tables above and from course descriptions and/or your catalog that the science requirement includes a full year (two-semester or three-quarter) sequence in a laboratory science for science and engineering majors, please explain.

Students are required to take at least one full-year sequence in calculus-based Physics in addition to a Chemistry course, a laboratory, and an additional lecture course in Physics or Chemistry. These Chemistry and Physics courses are required for science and engineering majors. Most students have taken a full-year sequence in Chemistry with a laboratory. Thus, most students have two full-year sequences of laboratory science. To further strengthen this requirement, starting with fall 2001, a full-year sequence of Chemistry will be required.

**Standard IV-14. Science course work additional to that specified in Standard IV-13 must be in science courses or courses that enhance the student's ability to apply the scientific method.**

15. If it is not obvious from the tables above and from course descriptions and/or your catalog that the remainder of the science requirement is met with science courses or courses that enhance the student's abilities in the application of the scientific method, please explain. (Mathematics, statistics, and courses normally considered part of the computer science discipline should not be included here).

The required science courses in Chemistry and Physics clearly meet this standard. They are both rigorous full-year lab science sequences. The Physics sequence requires calculus.
Standard IV-15. The oral communications skills of the student must be developed and applied in the program.

Standard IV-16. The written communications skills of the student must be developed and applied in the program.

16. Each student's oral and written communications skills must be developed and applied in the program, i.e., in courses required for the major. This information should be included in course descriptions; please give course numbers below.

<table>
<thead>
<tr>
<th>Oral</th>
<th>ENGL 101, ENGL 279, ENGL 289, HUM 375, CSC 477, CSC 478</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written</td>
<td>ENGL 101, ENGL 279, ENGL 289, HUM 375, CSC 461, CSC 472,</td>
</tr>
<tr>
<td></td>
<td>CSC 477, CSC 478</td>
</tr>
</tbody>
</table>

Primary responsibility for developing and assuring competence in oral and written communication rests with the Humanities Department, although individual departments are encouraged to develop these skills throughout their curricula.

Each student must take a freshman English course and two courses in technical communications. The freshman English course develops written communication skills, emphasizing grammar, style, and the organization and development of expository prose. The technical communications courses focus on both written communication and oral presentations in the context of the student's chosen discipline. As part of these courses, students develop written proposals which necessitate information gathering both from library sources and from interviews with faculty and administrators. Technical oral presentations and written reports in the second of these courses are coordinated, whenever possible, with work done as part of the student's senior design course. Students who fail to meet the standards in these courses must repeat the course until a passing grade is obtained.

Within the computer science curriculum itself, several courses, notably the software engineering and the senior design courses, place heavy emphasis on development of written documentation and presentation of oral reports. In these courses, students typically work in teams, further encouraging the development of communications and interpersonal skills.
Standard IV-17. There must be sufficient coverage of social and ethical implications of computing to give students an understanding of a broad range of issues in this area.

17. Social and ethical implications of computing must be covered in the program. This information should be included in course descriptions; please give course numbers below.

Students are required to take HUM 375 (Computers in Society). This course examines the social impact of computers and the social responsibilities of individuals. CSC 477 (Software Engineering) covers a number of topics related to computer ethics, including software protection and a description of the Internet worm.

A Code of Ethics for the Computer Science Major is given to each student in CSC 250 (Computer Science II). Class time is used to explain in detail each of the points described in the Code. The Student Chapter of the ACM distributes the ACM Code of Ethics for Computer Scientists.

The SDSM&T Academic Integrity Policy (page 68 of the 2000-2001 SDSM&T Catalog) is enforced throughout the Computer Science curriculum. This policy stresses the importance of submitting your own work, and always giving credit where due. Copying code and other forms of unethical behavior are not tolerated. Students are given penalties ranging from loss of credit on an assignment to failure in the course, depending on the severity of the violation.
E. Course Descriptions.
For each required or elective computer science course that can be counted for credit in
the curriculum being reviewed for accreditation, include a two-page or three-page course
outline at this point in the self-study. If your documentation does not exactly follow this
format, be sure that all of the indicated information (if applicable) is present, and please
in any case adhere to a common format for all course descriptions.

Note: The outline format calls for information on the content of the course
in the areas of computer science theory, communications skills
development and application, social and ethical implications of
computing, and problem analysis and solution design experiences.
This is not intended to suggest that every course must have some
coverage of each of these topics. For a given course, please
include the information from a listed area only if the course has
significant content in that specific area.

In addition, similar outlines should also be included for required mathematics and science
courses taken by computer science students.

The course outline for each required or elective computer science course must also be
included in a display of course materials that is available for study at all times during the
program evaluation site visit. The course material display must include at least the
following for each computer science course that can be counted in the computer science
segment of the curriculum being evaluated.

1. Textbook and other required material (e. g., manuals, reference booklets,
standards documents, and so forth)
2. Syllabus and course policies
3. A complete set of assignments, tests, and important handouts
4. Samples of graded student work on all assignments, written reports and other
documents, and tests. Examples of excellent, satisfactory, and poor student
work should be included.
5. If some of the above documentation is online (e. g., in an instructor’s web
site), please indicate this, and have a computer available at or near the course
displays so that the team can view it. Please give here the URL(s) for
accessing any such materials:
Current Catalog Description

Prerequisites: Completion of MATH 102 or MATH 115 completed with a grade of "C-" or better or an acceptable score on the Algebra Placement Examination. Problem solving, algorithm development, and basic language syntax including data types, control structures, and procedures and functions.

Textbook


References

None.

Course Goals

This course will serve as an introduction to programming in C++. Students will learn how to design and code C++ programs.

Prerequisites by Topic

Algebra

Major Topics Covered in the Course

Data types
Variables
Simple I/O
Assignment statements
Conditional execution
Logical operators
Switch
Iteration
Functions
Arrays
Classes & objects
Laboratory projects (specify number of weeks on each)

10 structured laboratories, one or two weeks each
3 or 4 outside programming assignments, 3 or 4 weeks on each

Estimate CSAB Category Content

<table>
<thead>
<tr>
<th>CORE</th>
<th>ADVANCED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Structures</td>
<td>Computer Organization and Architecture</td>
</tr>
<tr>
<td>Algorithms</td>
<td>Concepts of Programming Languages</td>
</tr>
<tr>
<td>Software Design</td>
<td>1</td>
</tr>
</tbody>
</table>

Oral and Written Communications

Every student is required to submit at least 0 written reports (not including exams, tests, quizzes, or commented programs) of typically ____ pages and to make 0 oral presentations of typically ____ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

The Computer Usage Policy and Code of Conduct are discussed but no test questions cover this material.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

No significant theoretical material is covered in this course.

Problem Analysis

Please describe the analysis experiences common to all course sections.

Students learn how to analyze problems for computer solutions.
Solution Design

Please describe the design experiences common to all course sections.

Students learn how to design C++ programs.
Course Title: Computer Science II
Course Coordinator: Dr. Logar
Total Credits: 4

Current Catalog Description

Prerequisite: CSC 150 or CENG 241 or equivalent or permission of instructor. This course provides an introduction to structured programming principles. It includes fundamental computer science concepts, such as recursion, sorting, dynamic memory allocation, linked lists and trees.

Textbook


References

None.

Course Goals

This course extends the student’s knowledge of programming in C++ begun in CSC 150. Students learn how to design and code C++ programs using dynamic memory, classes and objects, recursion, and basic data structures. Students are also given an introduction to analysis of algorithms.

Prerequisites by Topic

Fundamentals of C++ including:
- Data types
- Variables
- Simple I/O
- Assignment statements
- Conditional execution
- Logical operators
- Switch
- Iteration
- Functions
- Arrays
- Classes & objects
Major Topics Covered in the Course

- Review of C++
- Principles of software engineering
- Recursion
- Data abstraction
- Linked lists
- Stacks
- Queues
- Simulations
- Class relationships
- Efficiency of algorithms
- Sorting
- Trees

Laboratory projects (specify number of weeks on each)

Four programming assignments, 3 to 4 weeks each.

Estimate CSAB Category Content

<table>
<thead>
<tr>
<th>CORE</th>
<th>ADVANCED</th>
<th>CORE</th>
<th>ADVANCED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Data Structures</td>
<td></td>
<td>Computer Organization and Architecture</td>
</tr>
<tr>
<td></td>
<td>Algorithms</td>
<td></td>
<td>Concepts of Programming Languages 1</td>
</tr>
<tr>
<td></td>
<td>Software Design</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Oral and Written Communications

Every student is required to submit at least 0 written reports (not including exams, tests, quizzes, or commented programs) of typically ______ pages and to make 0 oral presentations of typically ______ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e. g., test questions, essays, oral presentations, and so forth)?

None.
Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Some analysis of algorithms is done in this class. About three weeks is spent on this topic.

Problem Analysis

Please describe the analysis experiences common to all course sections.

Students continue to learn how to analyze problems for computer solutions including object-oriented analysis. An incremental approach to analysis is stressed using problems that do not lend themselves to brute force solution.

Solution Design

Please describe the design experiences common to all course sections.

Students learn how to design C++ programs using classes including object-oriented design. An incremental approach to design is stressed using problems that do not lend themselves to brute force solution.
Current Catalog Description

Prerequisite: Completion of MATH 1023 (college algebra) or Math 115 completed with a grade of "C-" or better or an acceptable score on the Algebra Placement Examination or permission of instructor. Selected topics from Boolean algebra, set theory, congruencies, equivalence relations, complexity, graph theory, combinatorics, induction, difference equations and logic.

Textbook


References

None.

Course Goals

To give the student a mathematical basis for the concepts used in computer science theory and algorithms.

Prerequisites by Topic

- Cartesian coordinates
- Linear and quadratic equations
- Systems of linear equations
- Inequalities
- Logarithms

Major Topics Covered in the Course

- Logic
- Propositional equivalences
- Predicates and quantifiers
- Sets and set operations
- Boolean functions and representing Boolean functions
- Logic gates
Minimization of circuits
Functions
Sequences and summations
Growth of functions
Algorithms and complexity
Modular arithmetic
Overview of matrices
Methods of proof
Mathematical induction
The basics of counting
The pigeonhole principle
Permutations and combinations
Discrete probability
Recurrence relations
Solving recurrence relations
Inclusion/exclusion
Introduction to graphs and terminology
Representing graphs
Connectivity
Shortest path problems
Introduction to trees
Tree traversal
Spanning trees

Laboratory projects (specify number of weeks on each)

None.

Estimate CSAB Category Content

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

This course is primarily a theoretical course. Theoretical material covered includes the following.

1. Foundations
   (a) Logic (8 hours)
   (b) Set theory (4 hours)
   (c) Functions (3 hours)
   (d) Sequences and summations (3 hours)
   (e) Complexity of algorithms (4 hours)
   (f) Matrices (2 hours)
   (g) Methods of proof (6 hours)
2. Counting and discrete probability (7 hours)
3. Recurrence relations (4 hours)
4. Graph theory
   (a) Terminology and applications (3 hours)
   (a) Path and circuits (2 hours)
   (b) Shortest path algorithm (1 hour)
5. Trees
   (a) Tree terminology and applications (2 hours)
   (b) Binary search trees (1 hour)
   (c) Spanning trees and traversals (1 hour)
6. Boolean algebra and combinational circuits (5 hours)

Problem Analysis

Please describe the analysis experiences common to all course sections.

An introduction to analysis of algorithms is covered. Students are exposed to analysis of search, graph, and tree algorithms.

Solution Design

Please describe the design experiences common to all course sections.

None.
Current Catalog Description

Prerequisites: CSC 250 or permission of instructor. Addressing modes, branching, interrupts, machine language, floating-point coprocessor, and concepts of machine organization for the Intel family of processors; also includes general principles of modularity, recursion, and mixed-language programming.

Textbook


References

None.

Course Goals

To provide a machine-level view of various high-level activities such as input/output, decision and looping constructs, modularity and information passing, recursion, array handling; to study various support chips and hardware interrupts; to study real-number processing using the numeric coprocessor; to be able to write stand-alone assembly-language programs and to do mixed-language programming.

Prerequisites by Topic

Familiarity with at least one high-level language which supports arrays, pointers, integer and floating-point computation, loops, and recursion.

Major Topics Covered in the Course

- PC architecture
- input/output
- addressing modes
- branching
- modularity
- bit manipulations
arrays
string operations
interrupts
mixed-language programs
recursion
floating-point coprocessor

Laboratory projects (specify number of weeks on each)

Input/output (3 weeks)
Arrays (2 weeks)
Graphics (1 week)
Strings (1 week)
Interrupt handlers (3 weeks)
Recursion (1 week)
Coprocessor (3 weeks)

Estimate CSAB Category Content

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e. g., test questions, essays, oral presentations, and so forth)?

None.
Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Number systems 0.5 weeks
Divide and conquer 1 week
Circular queues 0.5 weeks
Floating point storage 1 week

Problem Analysis

Please describe the analysis experiences common to all course sections.

Problem analysis is emphasized in the structured labs and in the programming assignments.

Solution Design

Please describe the design experiences common to all course sections.

Students learn to design solutions to problems using assembly language and mixed language programming.
Department and Course Number: CSC 341
Course Title: Computer Organization and Design
Course Coordinator: Prof. Carda
Total Credits: 4

Current Catalog Description

Prerequisites: CSC 314 and CENG 244, or permission of instructor. This course covers the evolution of computer architecture, CPU organization, combinational and sequential logic implementation of CPU functions, computer arithmetic, data types, hardwired and micro-programmed control design, system analysis using simulation and queuing theory.

Textbook


References

None.

Course Goals

Provide students with a knowledge of computer architecture principles, different design approaches, evaluation of computer systems and the interaction between hardware and software, provide the ability to analyze, converse and intelligently read literature concerning computer systems.

Prerequisites by Topic

Assembly language
Digital logic

Major Topics Covered in the Course

Evolution of computer architecture
CPU organization
Combinational and sequential logic implementation of CPU functions
Computer arithmetic
Data types
Hardwired and micro-programmed control design
Data flow
System analysis using simulation and queuing theory
CISC and RISC systems
Computer busses and computer input/output systems.

**Laboratory projects** (specify number of weeks on each)

All of the following are projects in groups of three or four:
1. write a program that implements a two-pass assembler for a simulated CPU - three weeks
2. writing a program that simulates a CPU and user interface – 4 weeks
3. writing a program that simulates a microprogram control unit for the simulated CPU, using the simulated assembler to generate the object code – 4 weeks

**Estimate CSAB Category Content**

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**Social and Ethical Issues**

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e. g., test questions, essays, oral presentations, and so forth)?

None.

**Theoretical Content**

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Turing machines two days
Computer arithmetic two weeks
Problem Analysis

Please describe the analysis experiences common to all course sections.

Analyze computer performance using simulation and analytical methods, analyze different design implementations

Solution Design

Please describe the design experiences common to all course sections.

Implementation of ALU functions such as addition, subtraction, Boolean operations, multiplication and division, timing signal generation, registers and CPU control
Department and Course Number: CSC 361
Course Title: Linear Optimization
Course Coordinator: Dr. Riley
Total Credits: 3

Current Catalog Description

Prerequisite: MATH 231 or MATH 315 or permission of instructor. Convex sets and functions, linear inequalities and combinatorial problems; topics in linear programming from fundamental theorems of simplex method through sensitivity analysis, duality, transportation and assignment problems.

Textbook


References

None.

Course Goals

The focus of this course will be linear programming. Many problems from industry and science require the optimization over a set of linear equations and linear inequalities. The methods and theory that can be used to solve these types of problems will be our main concern. The simplex method will play a big role in the material covered, but will also spend considerable time on sensitivity analysis. Some of our work will require the use of the Excel spreadsheet and some other selected software.

Prerequisites by Topic

Math 231 (Differential Equations) or Math 315 (Linear Algebra)

Major Topics Covered in the Course

Linear Programming
Optimization
Simplex Method

Laboratory projects (specify number of weeks on each)

Lab projects will vary with instructor.
Estimate CSAB Category Content

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

The focus of this course is the theory of linear optimization and the content is primarily theoretical.

Problem Analysis

Please describe the analysis experiences common to all course sections.

Development of the central theoretical ideas is done through applications. The problem is modeled and a solution is developed. Algorithms are presented to address the identified solution.
Solution Design

Please describe the design experiences common to all course sections.

Solution design is seen in the context of implementing numerical algorithms in the classroom examples and assigned projects.
Current Catalog Description

Prerequisites: CSC 251 and CSC 250, or permission of instructor. Introduction to theory and practice of programming languages. Theoretical topics include formal languages, programming language paradigms, design issues, specification of syntax and semantics, data abstraction, control mechanisms, scope, parameter passing. Students will also be given a survey of modern programming languages, such as Ada, C++, Lisp, and Prolog.

Textbook


References


Course Goals

The goal of this course is to give the student an introduction to the theory and practice of programming languages. From a theoretical standpoint, we will discuss topics such as formal languages, programming paradigms, data abstraction, control mechanisms, binding and scope, and parameter passing. From a practical standpoint, we will consider prototypical examples of different programming language paradigms, including block structured (C, Fortran, Pascal), concurrent (Ada, Java), object-oriented (C++, Java, Smalltalk), and functional (LISP, JESS).

Prerequisites by Topic

Computer Science I & II
Discrete math
Major Topics Covered in the Course

Formal languages
Programming paradigms
Data abstraction
Object-oriented programming
Control mechanisms
Binding and scope
Parameter passing

Laboratory projects (specify number of weeks on each)

Projects vary by semester, depending upon which particular programming languages are discussed in the class. Projects give students first hand exposure to programming language concepts, enhancing lecture content. Typically, there are three to four programming assignments, with three to four weeks for each.

Estimate CSAB Category Content

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.
Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Formal languages (8 hours)
Programming paradigms (4 hours)
Data abstraction (2 hours)
Control mechanisms (3 hours)
Binding and scope (3 hours)
Parameter passing (1 hour).

Problem Analysis

Please describe the analysis experiences common to all course sections.

Programming assignments are designed to give students some experience with different types of languages. Students must analyze the assigned programming problem in the context of the assigned language.

Solution Design

Please describe the design experiences common to all course sections.

Students must design solutions to programming problems in the context of the assigned programming languages.
Current Catalog Description

Prerequisite: CSC 251 and CSC 250 or permission of instructor. Considers lists, queues, trees, hashing, and graphs, with emphasis on analysis of algorithms.

Textbook


References

None.

Course Goals

This course extends the student’s knowledge of programming in C++ begun in CSC 150 and continued in CSC 250. Students learn more OOP techniques, including templates and inheritance. Students are also introduced to UNIX/Linux in this course.

Algorithm analysis is a fundamental element throughout the course. Basic and advanced data structures are presented, including lists (stacks, queues), trees (binary search trees, height-balanced trees, splay trees), and graphs. Algorithms are presented along with data structures, including searching-sorting techniques, hashing, greedy methods, and divide-and-conquer approaches.

Prerequisites by Topic

One year of college-level C++ programming, and a course in discrete mathematics.

Major Topics Covered in the Course

Introduction to algorithm analysis.
Simple data structures (linked lists, stacks, queues, binary trees).
Advanced data structures (height-balanced trees, heaps, graphs).
Related algorithms (searching and sorting, hashing, graph algorithms).
Advanced topics (greedy methods, dynamic programming, NP-completeness).
Advanced C++ topics (templates, inheritance).
Introduction to UNIX/Linux.
Laboratory projects (specify number of weeks on each)

Four programming assignments, 3 to 4 weeks each.

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Analysis of algorithms is covered thoroughly in this class (2 weeks).

Problem Analysis

Please describe the analysis experiences common to all course sections.

Students learn how to analyze problems and their solutions using algorithm analysis. This approach is used throughout the course.
Solution Design

Please describe the design experiences common to all course sections.

Students design C++ programs using object-oriented design techniques.
Department and Course Number:  CSC 372
Course Title:  Analysis of Algorithms
Course Coordinator:  Dr. Corwin
Total Credits:  3

Note:  This course will be offered for the first time in the fall of 2001. The description below is subject to change based on experience once it has been taught.

Current Catalog Description

Prerequisites: CSC 371 and MATH 124. Design and analysis of algorithms for numeric and nonnumeric problems, general problem-solving approaches, theory of computation. Topics will be selected from searching, sorting, graph algorithms, numerical algorithms, geometric algorithms, cryptography, and parallel algorithms.

Textbook


References

None.

Course Goals

This course will reinforce and extend the material in CSC 371, Data Structures. Students will learn how to perform analyses of complex algorithms while learning more about data structures, such as graphs and trees, and algorithms for dealing with them.

Prerequisites by Topic

C++ programming
Data structures
Differential and integral calculus

Major Topics Covered in the Course

Analysis of algorithms
searching
sorting
graph algorithms
numerical algorithms
geometric algorithms
cryptography
parallel algorithms

Laboratory projects (specify number of weeks on each)

There will be about four assignments each of which will be three or four weeks.

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

The theoretical foundations of analysis of algorithms will be covered. Also, some of the algorithms discussed will require some theoretical background.
Problem Analysis

Please describe the analysis experiences common to all course sections.

This course will focus on analysis. Students will analyze problems from various fields in Computer Science.

Solution Design

Please describe the design experiences common to all course sections.

Students will design solutions to many problems. Several of these will be done in assignments.
Current Catalog Description

Prerequisite: CSC 371. This course in event-driven graphical user interface programming will cover selected topics such as windows programming, Visual Basic, and Java.

Textbook


References


Course Goals

The goal of the course is to introduce the student to the design of graphical user interfaces and their implementation.

Prerequisites by Topic

Data structures
C++ programming

Major Topics Covered in the Course

Design principles for user interfaces
Visual Basic
Designing for the web
HTML
JavaScript
Java
Tcl/Tk
Laboratory projects (specify number of weeks on each)

Projects will differ with each offering of the course. Typically about four assignments each taking two to four weeks will be assigned. Topics covered could include:

- Visual Basic GUI implementation
- Web site design
- JavaScript
- Java GUI implementation
- Tcl / Tk
- Active Server Pages

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Oral and Written Communications

This course is fairly new having only been taught once in the past. It is quite likely that there will be a significant written communications aspect to assignments. The exact nature of this type of assignment will change, so it is not included below.

Every student is required to submit at least \_0\_ written reports (not including exams, tests, quizzes, or commented programs) of typically \_0\_ pages and to make \_0\_ oral presentations of typically \_0\_ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e. g., test questions, essays, oral presentations, and so forth)?

The first offering of the course did not discuss much in the area of social and ethical implications. However, one of the suggestions from our Industrial Advisory Council was to add internationalization and accessibility as topics covered in this course. These topics should be covered in future offerings.
Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

No significant theoretical material is required.

Problem Analysis

Please describe the analysis experiences common to all course sections.

Students learn how to approach problems in Graphical User Interfaces from a high level. This will include an analysis of the requirements of the interface.

Solution Design

Please describe the design experiences common to all course sections.

Students design graphical user interfaces. Often this includes designing code to implement aspects of the interface.
Current Catalog Description

Prerequisite: CSC 371 or permission of instructor. This course in event-driven graphical user interface (GUI) programming will cover topics such as C++ programming for Windows. Students enrolling in CSC 522 will be held to a higher standard than those enrolling in CSC 422.

Textbook


References

None.

Course Goals

Virtually all professional software packages provide a GUI, and the majority of them run under Windows. This course gives students exposure to the event-driven windows programming skills that are needed to compete for software engineering jobs in today’s marketplace.

Prerequisites by Topic

C++ programming skills, through data structures.

Major Topics Covered in the Course

Introduction to Windows programming.
Windows and messages.
Text and fonts.
Basic graphics.
Keyboard and mouse input.
Menus and dialog boxes.
Images and palettes.
Sound and music.
Multitasking and multithreading.
Dynamic link libraries (DLLs).
Laboratory projects (specify number of weeks on each)

Three programming projects (3-4 weeks each).

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Oral and Written Communications

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This course is new, having been taught for the first time in fall 2000. The original intent was to have the class work on a GUI project for Rockwell International, which would have resulted in significant amounts of oral and written communications, but the scheduling did not work out. It is possible that there will be an oral and written communications aspect to assignments in the future.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

The first offering of the course did not discuss much in the area of social and ethical implications. However, one of the suggestions from our Industrial Advisory Council was to add internationalization and accessibility as topics covered in this course. These topics should be covered in future offerings.
Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Theoretical material was limited to discussions of the major differences between programming for a text-based, command line-driven interface and programming for a GUI. This course was largely applications-oriented, not theoretical.

Problem Analysis

Please describe the analysis experiences common to all course sections.

- Students learn how to write GUI programs to solve problems. This experience includes an analysis of the requirements of the interface.

Solution Design

Please describe the design experiences common to all course sections.

Students write several GUI programs in this course. Each programming assignment requires them to design the graphical user interface and write the C code to implement the interface and the problem solution.
Current Catalog Description

Prerequisites: CSC 250, CSC 314, and MATH 225 or permission of instructor. Introduction to computer graphics hardware and software. Drawing points, lines, polygons, simple curves. Coordinate systems, 2-D transformations, windowing, clipping. Drawing complex curves: splines, Bezier curves, fractals. Surfaces, 3-D transformations, projections. Hidden-line and hidden-surface algorithms. Light sources and shading.

Textbook


References

None.

Course Goals

The course goals are: to learn the scan-Conversion process; to understand matrix representations of transformations; to understand the reduction of world coordinates (2D and 3D) to ultimate pixel positions; to understand curve representations in terms of various splines; to study various hidden-surface removal techniques

Prerequisites by Topic

Assembly language and C++ programming; vector and 3D calculus

Major Topics Covered in the Course

Scan-conversion algorithms
2D and 3D transformations
Windowing
Clipping
Projections
3D viewing
Curves
Color
Laboratory projects (specify number of weeks on each)

Scan-conversion of a line (3 weeks)
Fill-algorithm (2 weeks)
Orthographic projection (4 weeks)
Perspective projection (2 weeks)
B-spline (3 weeks)

Estimate CSAB Category Content

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Oral and Written Communications

Every student is required to submit at least ___ 0 ___ written reports (not including exams, tests, quizzes, or commented programs) of typically ____ pages and to make ___ 0 ___ oral presentations of typically ____ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Midpoint algorithms (2 weeks)
The mathematics of transformations and projections (3 weeks)
The mathematics of splines: blending functions (2 weeks)
Problem Analysis

Please describe the analysis experiences common to all course sections.

Students analyze space/time tradeoffs associated with various hidden-surface removal algorithms.

Solution Design

Please describe the design experiences common to all course sections.

Solution design is discussed in the context of the programming assignments.
Current Catalog Description

Prerequisites: CSC 341 or permission of instructor. Content: Memory and disk systems, bus and I/O systems, parallel processing. Applications of digital systems in real-time processing. Graduation credit will not be allowed for both this course and CENG 446.

Textbook


References

None.

Course Goals

Provide the ability to understand, converse and intelligently read literature concerning memory and storage factors, parallel processing and digital signal processing.

Prerequisites by Topic

Computer organization and design

Major Topics Covered in the Course

Cache and virtual memory systems, including performance dependencies
Data storage techniques
Use and design of pipelined and parallel processing systems
Real-time analog signal processing
Case study of a current digital signal processors.

Laboratory projects (specify number of weeks on each)

Create MS DOS files and subdirectories using the DOS file structure, one week
Program that simulates a virtual memory system, four weeks
Program that performs digital filtering, one week
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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Memory performance, one week
Optic and magnetic storage principles, one week
Interconnection strategies for parallel processing, one week
Digital filtering, one week

Problem Analysis

Please describe the analysis experiences common to all course sections.

Analyze the factors influencing the performance of virtual and cache memory systems
Analyze factors affecting the performance of parallel and pipelined systems

104
Solution Design

Please describe the design experiences common to all course sections.

Cache, virtual memory and secondary memory design
Current Catalog Description

Prerequisites: CSC 250 and CENG 244 or permission of instructor. This course provides an introduction to digital communications concepts, characteristics of signals and transfer media, multiplexing, error control, circuit and packet switching, multi-access techniques, A/D and D/A conversion, local area networks. Graduation credit will not be allowed for both this course and CENG 444.

Textbooks


References

*Data Communications*, Halsall, Addison-Wesley , 1996

Course Goals

Provide an understanding of basic communication concepts, be able to intelligently communicate in the field, be able to read and understand literature in the field.

Prerequisites by Topic

- C++ programming
- Digital logic

Major Topics Covered in the Course

- Signal coding
- Error handling
- Data compression
- OSI model
- Circuit and packet switching
- Local area networks
Circuit and packet switching
Protocols and the Internet

**Laboratory projects** (specify number of weeks on each)

Implementation of client/server software using sockets (1 week)
Simulation of a communications system (5 weeks)

**Estimate CSAB Category Content**

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**Social and Ethical Issues**

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e. g., test questions, essays, oral presentations, and so forth)?

None.

**Theoretical Content**

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Fourier analysis (2 weeks)
Nyquist and Shannon’s theorems (1 week)
Information theory and compression coding (1 week)
Problem Analysis

Please describe the analysis experiences common to all course sections.

Analyze factors influencing communications behavior and performance

Solution Design

Please describe the design experiences common to all course sections.

Design of a communications system incorporating flow control, error handling and data compression techniques
Current Catalog Description

Prerequisite: CSC 251 or permission of instructor. This course will cover automata as a model of computation, computability, and complexity including the theory of NP-Complete problems. Students enrolling in CSC 545 will be held to a higher standard than those enrolling in CSC 445.

Textbook

Theory of Computation: Formal Languages, Automata, and Complexity, J. Glenn Brooksheer, Benjamin Cummings, 1989

References

None.

Course Goals

To give the student an appreciation of the fundamental theory underlying computer science.

Prerequisites by Topic

Set theory
Functions
Logic
Induction
Recursion

Major Topics Covered in the Course

Set Theory and Grammars
Finite Automata and Regular Languages
Pushdown Automata and Context-Free Languages
Turing Machines and Phrase-Structure Languages
Computability
Complexity
Laboratory projects (specify number of weeks on each)

None.

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None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

This course is essentially all theoretical material. Approximate coverage is given below.

1. Set Theory and Grammars (3 hours)
2. Finite Automata and Regular Languages (10 hours)
3. Pushdown Automata and Context-Free Languages (10 hours)
4. Turing Machines and Phrase-Structure Languages (10 hours)
5. Computability (4 hours)
6. Complexity (5 hours)
Problem Analysis

Please describe the analysis experiences common to all course sections.

Students learn what aspects of a problem might make it solvable using different computational systems.

Solution Design

Please describe the design experiences common to all course sections.

Students design solutions to problems using various computational systems.
Current Catalog Description

Prerequisite: CSC 371 or permission of instructor. Introduction to the theory and practice of artificial intelligence. Topics include AI languages such as Lisp or Prolog, problem solving using heuristic state space search, knowledge representations, game playing, expert systems, fuzzy logic, neural networks.

Textbook

Lisp handout (prepared by the instructor).

References

None.

Course Goals

To give students an introduction to the field of artificial intelligence, and expose them to methods of AI problem solving using a classic AI programming language.

Prerequisites by Topic

Programming expertise through data structures in a high-level programming language. Lisp is covered in this course; no prior Lisp experience is assumed.

Major Topics Covered in the Course

Fundamentals of Lisp programming.
High-level problem-solving methods: state space search.
Knowledge representation, reasoning, and expert systems.
Advanced topics (planning, learning).

Laboratory projects (specify number of weeks on each)

Four programming assignments, one in C and three in Lisp, approximately 3 weeks each.
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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

Social and ethical implications of AI are discussed in class; oral participation by students is encouraged. Assigned readings in the textbook plus outside readings (such as Bill Joy’s “Does the future need us?” article in Wired Magazine, April 2001) further reinforce these concepts. Students are graded on their understanding by means of test questions.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

The theory of exhaustive and heuristic state space search (2 weeks) is presented as high-level symbolic AI problem solving. Propositional, predicate, and fuzzy logics (2 weeks) are discussed in the context of knowledge representations, inference, and expert systems. Some neural network and genetic algorithm theory is presented (2 weeks).
Problem Analysis

Please describe the analysis experiences common to all course sections.

Students analyze AI problems, considering combinatorial explosion, heuristics, and time-space trade-offs.

Solution Design

Please describe the design experiences common to all course sections.

Students design Lisp programs using the functional programming paradigm.
Current Catalog Description

Prerequisites: MATH 225 and either MATH 231 or MATH 315. Interpolation, solution of higher degree algebraic and transcendental equations, least squares, numerical differentiation and integration, direct and iterative methods for solving systems of linear, algebraic equations, approximation theory.

Textbook


References

None.

Course Goals

Introductory course in Numerical Analysis. The goal is to provide the student with the fundamentals of numerical methods and an introduction to scientific computing. Some topics that will be covered are: machine arithmetic, interpolation, solutions to linear systems, iterative methods, numerical differentiation, and numerical integration.

Prerequisites by Topic

Math 225 (Calculus III) and either Math 231 (Differential Equations) or Math 315 (Linear Algebra)

Major Topics Covered in the Course

Interpolation
Nonlinear Equations
Numerical Differentiation and Integration
Ordinary Differential Equations
Solution of Linear Systems
Eigenvalues
Approximation theory
Laboratory projects (specify number of weeks on each)

Lab projects will vary with instructor.

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Oral and Written Communications

Every student is required to submit at least 1 written reports (not including exams, tests, quizzes, or commented programs) of typically 5 pages and to make 1 oral presentations of typically 15 minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

This course has been taught using a traditional lecture style. Instructors have used in-class written exams, take-home exams, graded homework assignments and projects. Types of projects have varied from several smaller projects (3-4 weeks in length) to single larger projects (10 week length). In the last few years, they have also included a coding aspect. Recently, projects have been required to have an oral presentation component.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

This course is essentially all theoretical material.
Problem Analysis

Please describe the analysis experiences common to all course sections.

Development of the central mathematical ideas has been done through applications. The problem is modeled and a solution is developed. Algorithms are presented to address the mathematical solution.

Solution Design

Please describe the design experiences common to all course sections.

Solution design is seen in the context of implementing numerical algorithms in the classroom examples and assigned projects.
Department and Course Number: CSC 464
Course Title: Introduction to Digital Image Processing and Computer Vision
Course Coordinator: Dr. Weiss
Total Credits: 3

Current Catalog Description

Prerequisites: CSC 371 and MATH 124. Introduction to digital image processing and computer vision, including image digitization and display, image enhancement and restoration, frequency domain techniques using the Fourier transform, image encoding, segmentation, and feature detection.

Textbook


References

None.

Course Goals

This course will give students an introduction to the theory and practice of image processing and computer vision.

Prerequisites by Topic

C++ programming skills through data structures, and math skills that include at least a year of calculus.

Major Topics Covered in the Course

- Image digitization and display
- Image enhancement and restoration
- Image encoding
- Image segmentation and feature detection

Laboratory projects (specify number of weeks on each)

Two programming assignments, approximately 4 weeks each.
One group programming project with oral presentation and written report, 6 weeks.
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Oral and Written Communications

Every student is required to submit at least 1 written reports (not including exams, tests, quizzes, or commented programs) of typically 10 pages and to make 1 oral presentations of typically 20 minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

The mathematics of image processing, including geometric transformations (1 week)
Fourier transforms (1 week)
Convolution and correlation (1 week)
Sampling theory (1 week)
Coding theory (1 week).

Problem Analysis

Please describe the analysis experiences common to all course sections.

Students analyze image processing problems and their solutions using algorithm analysis techniques.
Solution Design

Please describe the design experiences common to all course sections.

Students design C++ programs to solve image processing problems.
Current Catalog Description

Prerequisite: CSC 314 and CSC 371 or permission of instructor. This course will cover operating systems in large mainframes, minicomputers, workstations, and personal computers. It will include memory management, job scheduling, queuing, paging, device management, concurrent processing, interprocess communication, and virtual systems. Graduation credit will not be allowed for both this course and CENG 472.

Textbook


References

*A Student’s Guide to UNIX*, Hahn, McGraw Hill, 1996. (or any other guide to UNIX)

Course Goals

The goal of this course is to introduce the student to concepts common to all operating systems. Additionally, the student receives a solid foundation in the problems of virtual memory operating systems and an in-depth study of one modern operating system. Typically, the focus is on the UNIX operating system.

Prerequisites by Topic

- Data structures
- C programming
- Computer organization

Major Topics Covered in the Course

- Computer-system structures
- Operating-system structures
- Processes
- CPU scheduling
- Process synchronization
Deadlock
Memory management
Virtual memory
File systems
Protection and security
Interprocess communication

If time allows, topics may include Parallel and Distributed Systems, and Networking

Laboratory projects (specify number of weeks on each)

Projects vary by semester. Typically, there will be three or four programming projects each taking three or four weeks to complete. At least one of the projects will involve a short (3 page) paper describing aspects of the solution and results. Programming projects will often include such topics as:

- shared memory
- semaphores
- creating multiple processes or threads
- writing a simple shell [That is, the start of a program that could be a shell, not a simple use of an existing shell]

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Oral and Written Communications

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Theoretical aspects of the following topics are included in the course.
- CPU scheduling (1 hour)
- Process synchronization (2 hours)
- Deadlock (2 hours)
- Virtual memory (2 hours)
- File systems (2 hours)
- Protection (1 hour)
- Protection and Security (1 hour)

Problem Analysis

Please describe the analysis experiences common to all course sections.

Students analyze problems in operating systems design. See the laboratory projects section above for some examples. Much of the course discusses analysis and design of the kernel of an operating system.

Solution Design

Please describe the design experiences common to all course sections.

Students design solutions to problems in operating systems design. See the laboratory projects section above for some examples. Much of the course discusses analysis and design of the kernel of an operating system.
Current Catalog Description

Prerequisite: CSC 472 or permission of instructor. This is an introductory course in parallel computing. The course will cover concurrent and parallel programming, and parallel architectures and algorithms. Specific topics from threads, message passing, clustering, and high performance computing will be discussed.

Textbook


References

*Parallel Programming with MPI*, Pacheco, Morgan Kaufmann, 1996.

Course Goals

Introductory course in parallel computing. We will focus on parallel programming, algorithms and the relation to architectures. The course is software oriented with applications in high performance computing and scientific computing. The text will provide the main thread and the background. Lectures will not come directly from the text as this will be a guide through an immense subject. Students are expected to read the relevant sections in the text and, on occasion, look at the reference material.

Prerequisites by Topic

- CSC 472 - Operating Systems,
- CSC 250 - C (C++) or Java or Fortran background,
- CSC 314 - Assembly Language

Major Topics Covered in the Course

Architectures and models
Parallel programming basics
Benchmarks, timing, profiling
High performance computing
Code Optimization (DAGs)
Fortran 95
Data parallel programming
Multithreading concepts
Shared memory
Synchronization & barriers
Parallel numerical algorithms
Pthreads
Message passing
MPI
Clusters
Roughly 3 hours is spent on each topic above.

Laboratory projects (specify number of weeks on each)

This will vary with instructor. No laboratory component is currently used. Students will need access to the Sun and Linux clusters to complete assignments.

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Students will normally have 3 exams, homework and projects. This depends on the instructor. The past two years, undergraduates would take the graduate version of the course and have 2 in-class exams, 5 homework assignments and 3 programming assignments (Fortran 95, Pthreads, MPI).
Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

A significant portion of this course has a theoretical component (roughly 30%). The following sections of the course have theoretical aspects.

- High performance computing
- Code optimization (DAGs)
- Data parallel programming
- Multithreading concepts
- Shared memory
- Message passing
- Synchronization & barriers

Problem Analysis

Please describe the analysis experiences common to all course sections.

Programming projects are problem solving exercises. Students are given a problem from the sciences and must apply the theory given in lecture to complete the program.

Solution Design

Please describe the design experiences common to all course sections.

Solution design is seen in the context of implementing numerical algorithms in the classroom examples and assigned projects.
Department and Course Number: **CSC 477**
Course Title: **Software Engineering**
Course Coordinator: **Dr. Stubbendieck**
Total Credits: **3**

**Current Catalog Description**

Prerequisites: CSC 371 or permission of instructor. This course will cover the study of software engineering principles, tools, and techniques used in the development of high-quality software. It includes software planning, ethical issues, team programming, cost estimation, software life cycles, and documentation milestones. This course together with CSC 478 form a two-course sequence.

**Textbook**

*Classical & Object-Oriented Software Engineering with UML & C++, 4th edition,*

**References**

None.

**Course Goals**

The goal of this course is to introduce the student to software engineering and team projects through lecture and direct experience. Students are divided into project teams. Each student project team uses the principles presented in the course to design a solution to their particular project problem. The teams will implement their solutions in the succeeding course, CSC 478.

**Prerequisites by Topic**

Data Structures

**Major Topics Covered in the Course**

- Software lifecycles
- Requirements gathering
- Requirements specification
- System specification
- Design and analysis
- Estimation and planning
- Software engineering tools
Software engineering processes
Team programming
Documentation
Metrics

Laboratory projects (specify number of weeks on each)

Student project teams maintain a single project throughout the semester. During this course, a project is taken through the initial phases (prior to implementation) of the software lifecycle, with three presentations per team required throughout the semester. Each presentation requires three to four weeks of preparation.

Estimate CSAB Category Content

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Oral and Written Communications

Every student is required to submit at least 3 written reports (not including exams, tests, quizzes, or commented programs) of typically 10 pages and to make 3 oral presentations of typically 10 minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

No significant theoretical material is covered.
Problem Analysis

Please describe the analysis experiences common to all course sections.

Each student team must analyze the requirements of its assigned project in order to carry out the design.

Solution Design

Please describe the design experiences common to all course sections.

Each student team designs a solution to their particular project problem. Designs are presented in oral and written form. The design document produced in this course provides the blueprint for the implementation phase in CSC 478.
Current Catalog Description

Prerequisites: CSC 477, or permission of instructor. Normally open only to Computer Science majors in their senior year. This is a team project design course. The course covers topics of current interest in computer science.

Textbook

None.

References

None.

Course Goals

The goal of this course is to introduce the student to team projects through direct experience. Project teams are established in the preceding course, CSC 477. Student teams implement their project solutions and present the results formally. Since each project satisfies a real world need, students encounter challenges typical of software development projects, including shifting requirements, team dynamics, and project cancellation.

Prerequisites by Topic

Software Engineering

Major Topics Covered in the Course

Students present topics of current interest which arise from their project implementations. Students also give status reports at weekly review meetings as part of the ongoing design and implementation process.

Laboratory projects (specify number of weeks on each)

The semester is devoted to project completion and final presentation.
Estimate CSAB Category Content

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Oral and Written Communications

Every student is required to submit at least 1 written reports (not including exams, tests, quizzes, or commented programs) of typically 10 pages and to make 1 oral presentations of typically 20 minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

No significant theoretical material is covered.

Problem Analysis

Please describe the analysis experiences common to all course sections.

During implementation, it is common for students to revisit previous analysis in light of new information or changed requirements.

Solution Design

Please describe the design experiences common to all course sections.

Students must continue to design during implementation as more information is gathered or the project requirements shift.
Current Catalog Description

Prerequisite: CSC 371 or permission of instructor. This course covers database concepts and design with emphasis on the relational database model. Students will study commercial database systems and the industry standard language SQL.

Textbook


References

None.

Course Goals

The goals of this course are to introduce the student to database management systems, relational database concepts, commercial database systems, queries, SQL, and related topics.

Prerequisites by Topic

Data Structures

Major Topics Covered in the Course

Database management system fundamentals
Database design
Relational algebra
Theoretical foundations
Queries
SQL
Architectures
Tuning
Transactions
Recovery and security
Distributed databases
File Organizations and indexes
Laboratory projects (specify number of weeks on each)

Three programming assignments, 4 weeks each.

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Oral and Written Communications

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e. g., test questions, essays, oral presentations, and so forth)?

Ethical and social issues relating to database systems are covered in general discussions and with respect to database security. Students are not directly graded on their understanding of ethical topics in this course.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Relational Algebra (6 hours)
Normal Forms (4 hours)
Queries (3 hours)
Problem Analysis

Please describe the analysis experiences common to all course sections.

Students are required to analyze database designs, including constraints and relationships.

Solution Design

Please describe the design experiences common to all course sections.

Students must design a database for implementation in a commercial database system.
Department and Course Number: CENG 244
Course Title: Introduction to Digital Systems
Course Coordinator: Dr. Simonson
Total Credits: 4

Current Catalog Description

Prerequisite: GE 112, GE 115, or equivalent. This course is designed to provide Computer Engineering, Electrical Engineering, and Computer Science students with an understanding of the basic concepts of digital systems and their hardware implementation. Topics covered include: combinational logic circuits, sequential logic circuits, and CPU control.

Textbook


References

None

Course Goals

To introduce the student to the basic concepts of digital systems using integrated circuits.

Prerequisites by Topic

College Algebra

Major Topics Covered in the Course

Binary number system
Binary arithmetic
Conversion among binary, decimal, and hexadecimal numbers
Codes and code conversion
Error detection and correction
Logic gates
Karnaugh maps
Timing diagrams
Combinational logic
Multiplexers
Decoders
Programmable logic devices
Decoders
Flip-flops
Registers
State diagrams, state tables; and algorithmic state machines

Laboratory projects (specify number of weeks on each)

Logic circuits (3 weeks)
EPROM programming (1 week)
Adder circuits (1 week)
Programmable array logic (1 week)
Seven-segment display (1 week)
Shift registers (1 week)
Multiplexers (1 week)
Course capstone project (3 weeks)
JK and D flip-flops (2 weeks)

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Oral and Written Communications

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None
Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Binary number system (1 hour)
Binary arithmetic (2 hours)
Conversion among binary, decimal, and hexadecimal numbers (2 hours)
Codes and code conversion (1 hour)
Error detection and correction (1 hour)
Logic gates (2 hours)
Karnaugh maps (2 hours)
Timing diagrams (2 hours)
Combinational logic (2 hours)
Multiplexers (2 hours)
Decoders (1 hour)
Programmable logic devices (1 hour)
Decoders (1 hour)
Flip-flops (6 hours)
Registers (2 hours)
State diagrams and state tables (3 hours)
Algorithmic state machines (11 hours)

Problem Analysis

Please describe the analysis experiences common to all course sections.

Approximately 50% of the course is devoted to problem analysis through assigned problem.

Solution Design

Please describe the design experiences common to all course sections.

Approximately 50% of the course is devoted to problem design through problem assignments and laboratory assignments.
Current Catalog Description

Prerequisites: High school chemistry (or CHEM 100 completed with a grade of C- or better), high school algebra or MATH 021, and an acceptable score on the Chemistry Diagnostic Test. An in-depth examination of the principles of chemistry including properties of matter, atomic structure, stoichiometry, reactions in aqueous solution, thermochemistry, electronic structure, periodic properties, bonding, states of matter, and intermolecular forces.

Textbook


References

None.

Course Goals

CHEM 112 is a first year lecture course in Chemistry that provides an in-depth examination of the principles of chemistry including properties of matter, atomic structure, stoichiometry, reactions in aqueous solution, thermochemistry, electronic structure, periodic properties, bonding, states of matter, and intermolecular forces.

Prerequisites by Topic

Algebra

Major Topics Covered in the Course

Chemical and physical behavior of matter
Factors controlling chemical combination
The atomic/subatomic level description of atoms
Modern concepts of chemical bonding and structure
The gram-mole relationships of chemical combination
The use of dimension analysis as a problem-solving tool
Chemical structure
The Periodic Table as a tool and guide in application of chemical principles

Laboratory projects (specify number of weeks on each)

A separate course, Chem 113, provides a laboratory component.

**Estimate CSAB Category Content**

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**Oral and Written Communications**

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**Social and Ethical Issues**

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

**Theoretical Content**

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Atomic structure of matter
Nuclear and electronic structure of the atom
Properties of solutions
Problem Analysis

Please describe the analysis experiences common to all course sections.

Problem analysis is emphasized in assignments.

Solution Design

Please describe the design experiences common to all course sections.

None.
Current Catalog Description

Pre-requisite or co-requisite: CHEM 112. The fundamentals of chemical laboratory techniques and practice, the behavior of chemical compounds and quantitative measurements illustrating the laws of chemical combination.

Textbook

Prepackaged set of experiments from the Modular Laboratory Program in Chemistry (Chemical Education Resources, Palmyra, PA)

References

None.

Course Goals

To provide the student with experiences in experimental chemistry principles of significance and applicability to most technical fields of science and engineering and to provide the student with the opportunity to develop skills in the fundamental techniques of laboratory manipulations.

Prerequisites by Topic

Chem 112

Major Topics Covered in the Course

Topics from the lecture course, Chem 112, are reinforced in the laboratory.

Laboratory projects (specify number of weeks on each)
  - Relating Mass and Volume (1 week)
  - Detecting Signs of Chemical Change (1 week)
  - Separating and Isolating the Components of a Binary Mixture of Solids (1 week)
  - Separating and Isolating the Components of a Binary Mixture of Solids (1 week)
  - Empirical Formula of an Oxide (1 week)
  - Single Replacement Reactions and Relative Reactivity (1 week)
  - Percent Water in a Hydrate (1 week)
Heat of Neutralization (1 week)
Synthesizing Alum (1 week)
Separating and Determining the Mass of Calcium Ion in a Calcium-Enriched Tablet (1 week)
Paper Chromatography of Selected Transition-metal Cations (1 week)
Determining the Molar Concentration of a Sodium Hydroxide Solution (1 week)
Titrating Vinegar (1 week)

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Oral and Written Communications

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

None.

Problem Analysis

Please describe the analysis experiences common to all course sections.

Problem analysis is emphasized in the structured laboratory assignments.
Solution Design

Please describe the design experiences common to all course sections.

None.
Department and Course Number: **Chem 114**

Course Title: General Chemistry II

Course Coordinator: Dr. Arrington

Total Credits: 3

**Current Catalog Description**

Prerequisite: CHEM 112 completed with a grade of C- or better. Properties of solutions; chemical thermodynamics; kinetics; gaseous and acid-base equilibria; electrochemistry and redox reactions; selected topics in the descriptive chemistry of the elements.

**Textbook**


**References**

None.

**Course Goals**

Chemistry 114, *General Chemistry II*, is the second semester of a two-semester sequence that surveys the important concepts, principles, and models of chemistry. The main emphasis in the second semester is on the macroscopic properties of matter. The goals are to give students fundamental skills in solving quantitative problems in chemical equilibria, kinetics, thermodynamics and electrochemical principles, and to provide an introduction to the descriptive chemistry of elements.

**Prerequisites by Topic**

Chem 112

**Major Topics Covered in the Course**

- The physical properties of solutions
- Chemical kinetics
- Chemical thermodynamics
- Acid-base chemistry
- Chemical equilibrium (gas-phase, acid-base, and solubility equilibria)
- Electrochemistry

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Laboratory projects (specify number of weeks on each)

None.

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Oral and Written Communications

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Theory of equilibrium
Theory of electron transfer
Kinetic theory

Problem Analysis

Please describe the analysis experiences common to all course sections.

Problem analysis is emphasized in assignments.
Solution Design

Please describe the design experiences common to all course sections.

None.
Department and Course Number: HUM 375
Course Title: Computers in Society
Course Coordinator: Prof. Lee
Total Credits: 3

Current Catalog Description

Prerequisite: Junior or senior standing or permission of instructor. Examines the social impact of computers with emphasis on the development of the computer establishment, the cultural blueprint being shaped for the future, and the question of values and social responsibility in personal, business, and governmental sectors.

Textbook

None. Recent journals used.

References

Recent journals used.

Course Goals

The goal of this course is to give students an appreciation for the societal impact of computers.

Prerequisites by Topic

None.

Major Topics Covered in the Course

The economy, work and the workplace
Computers and social participation,
Social values: ethics, law, and privacy
Politics and the state
Technological risks
International perspectives and issues
Philosophical frontiers

Laboratory projects (specify number of weeks on each)

Laboratory projects vary with instructor.
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Oral and Written Communications

Every student is required to submit at least 2 written reports (not including exams, tests, quizzes, or commented programs) of typically 2 pages and to make 1 oral presentations of typically 5 minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

The entire course discusses social and ethical issues relating to computing.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

None.

Problem Analysis

Please describe the analysis experiences common to all course sections.

None.

Solution Design

Please describe the design experiences common to all course sections.

None.
Department and Course Number: **Math 123**

Course Title: Calculus I

Course Coordinator: Dr. Logar

Total Credits: 4

**Current Catalog Description**

Prerequisite: College Algebra. Prerequisite or Corequisite: Trigonometry. College Algebra prerequisite can be met by completing MATH 102 or MATH 1023 (College Algebra III) with a grade of C- or better or by an acceptable score on the Algebra Placement Examination. The Trigonometry corequisite can be met by completing MATH 1202 (Trigonometry II) with a grade of C- or better, or by achieving an acceptable score on the Trigonometry Placement Examination, or by concurrent enrollment with MATH 1201 and MATH 1202. Differentiation, antidifferentiation, and integration of algebraic and trigonometric functions, with applications in each area.

**Textbook**


**Course Goals**

To enable the student to differentiate and integrate algebraic and trigonometric functions and solve some of their applications.

**Prerequisites by Topic**

Trigonometry and Algebra.

**Major Topics Covered in the Course**

**Limits**
- Graphical, numerical, analytical
- Continuity
- Infinite limits
  - Differentiation
- Power rule, chain rule, product and quotient rules
- Implicit differentiation
- Higher order derivatives
Applications of differentiation
- Related rates
- Curve sketching
- Optimization

Integration
- Power rule
- Integration by substitution
- Riemann sums
- Fundamental Theorem of Calculus
- Numerical Integration

Applications of integration
- Area between curves
- Volume of surfaces of revolution
- Surface area and arc length

Laboratory projects (specify number of weeks on each)

Laboratory projects vary with instructor.

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Computer Organization and Architecture

Concepts of Programming Languages

Oral and Written Communications

Every student is required to submit at least 0 written reports (not including exams, tests, quizzes, or commented programs) of typically _____ pages and to make 0 oral presentations of typically _____ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.
Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Limits (4 hours)
Differentiation (8 hours)
Applications of differentiation (12 hours)
Integration (7 hours)
Applications of integration (10 hours)

Problem Analysis

Please describe the analysis experiences common to all course sections.

Applying analytical methods to solve application problems. Applications may include: setting up and solving optimization problems, setting up and solving problems involving related rates.

Solution Design

Please describe the design experiences common to all course sections.

None.
Current Catalog Description

Prerequisites: MATH 120 or MATH 1202 (trigonometry) completed with a grade of “C-” or better or an acceptable score on the departmental Trigonometry Placement Examination, and MATH 123 completed with a grade of “C-” or better. (Trigonometry is a critical prerequisite for this course. Students should ensure that they have passed MATH 1202 or the departmental Trigonometry Placement Examination before enrolling in MATH 124). Continuation of MATH 123 for transcendental functions, integration techniques, infinite series, parametric curves, and polar coordinates.

Textbook


Course Goals

To develop demonstrated competence in the basic topics of Calculus II (listed below) To improve problem solving capabilities.

Prerequisites by Topic

- Trigonometry
- Basic integration
- Basic differentiation

Major Topics Covered in the Course

- The logarithm function defined as an integral
- Integration/differentiation of the logarithmic function
- Inverse functions
- Integration/differentiation of exponential functions
- Inverse trigonometric functions and applications
- Hyperbolic functions

- Basic integration rules
- Integration by parts
- Trigonometric substitution
- Partial fraction decomposition
Integration using tables and computer algebra systems
Indeterminate forms and L’Hopital’s rule
Improper integrals

Sequences and series
The Integral Test
Comparisons of series
Alternating series
Ratio and root tests
Taylor polynomials and approximations
Power series
Representation of functions by power series
Taylor and Maclaurin series

Plane curves and parametric equations
Parametric equations and Calculus
Polar coordinates and polar graphs
Area and arc length in polar coordinates

Laboratory projects (specify number of weeks on each)

Laboratory projects vary with instructor.

Estimate CSAB Category Content

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Oral and Written Communications

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

- Theory of Taylor series
- Representation of a function (8 hours)
- Integration technique theory (12 hours)
- Theory of representation of points in alternative coordinate systems (2 hours)
- Limit theory (4 hours)
- Theory of inverse functions (2 hours)
- Theory connecting integration to differentiation (Fundamental Theorem of Calculus) (2 hours)

Problem Analysis

Please describe the analysis experiences common to all course sections.

None.

Solution Design

Please describe the design experiences common to all course sections.

None.
Department and Course Number: Math 225
Course Title: Calculus III
Course Coordinator: Dr. Logar
Total Credits: 4

Current Catalog Description

Prerequisite: Math 124 complete with a grade of "C-" or better. Polar coordinates, vector functions, functions of several variables, multiple and line integrals. Math 225 or 231 may be taken concurrently or in either order.

Textbook


Course Goals

To enable the student to solve problems involving vectors, integrate and differentiate functions of several variables, work in more than one coordinate system, and evaluate line integrals.

Prerequisites by Topic

Integration of functions of one variable
Differentiation of functions of one variable
Trigonometry
Algebra.

Major Topics Covered in the Course

Vectors in 2 and 3 dimensions
  • Addition, magnitude, angle between vectors, dot and vector products, representation using components, unit vectors, work, equations of lines and planes
Vector Calculus
  • Differentiation and integration of vector functions, position, velocity and acceleration vectors, tangential and normal components of acceleration, and curvature
Functions of several variables
  • Chain rule, total differential, gradient and directional derivatives, equation of tangent planes and normal lines, maximum and minimum of functions of two variables, sketching cylindrical and quadric surfaces
Multiple integrals
   - Iterated integrals, setting up and evaluation of double and triple integrals in
two and three dimensions, integrals in polar, cylindrical and spherical
coordinates, applications of multiple integrals

Line and surface integrals
   - Work and surface area
   - Green’s Theorem

Laboratory projects (specify number of weeks on each)

Laboratory projects vary with instructor.

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Oral and Written Communications

Every student is required to submit at least 0 written reports (not including
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0 oral presentations of typically 0 minutes duration. Include only
material that is graded for grammar, spelling, style, and so forth, as well as for
technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing
covered in all course sections. Estimate the class time spent on each topic. In what
ways are the students in this course graded on their understanding of these topics
(e. g., test questions, essays, oral presentations, and so forth)?

None.
Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Vectors (9 hours)
Vector Calculus (5 hours)
Functions of several variables (12 hours)
Multiple integrals (10 hours)
Line and surface integrals (8 hrs)

Problem Analysis

Please describe the analysis experiences common to all course sections.

Applying analytical methods to solve application problems. Applications may include: setting up and solving optimization problems involving functions of 2 or more variables, solving problems involving projectile motion

Solution Design

Please describe the design experiences common to all course sections.

None.
Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Analytical methods for solving first order differential equations (10 hours)
Numerical methods (6 hours)
Higher-order linear differential equations (8 hours)
Laplace transforms (10 hours)
Matrix methods (6 hours)
Solving first-order linear systems (4 hours)

Problem Analysis

Please describe the analysis experiences common to all course sections.

Applying analytical methods to solve application problems. Applications may include: electrical circuits, mechanical vibration, predator-prey models, chemical mixing problems, compartment models, and physical motion. Analysis skills typically involve verifying a solution satisfies the differential equations, and interpreting numerical results in the context of the physical problem.

Solution Design

Please describe the design experiences common to all course sections.

None.
Current Catalog Description

Prerequisite: Permission of instructor. Vector Spaces, linear transformations, and matrices.

Textbook


References

None.

Course Goals

To enable the student to perform basic matrix computations, solve systems of linear equations, and understand the theory of systems of equations in the context of vector spaces.

Prerequisites by Topic

- Fundamentals of solving systems of equations
- Vector algebra
- Basic matrix ideas
- Elementary ideas from differential equations

Major Topics Covered in the Course

- Matrices and Gaussian elimination
  - The geometry of linear equations
  - Gaussian elimination
  - Matrix notation and matrix multiplication
  - LU factorization
  - Inverses and transposes
  - Applications
Vector Spaces and linear equations
   Vector spaces and subspaces
   Solving $m$ equations in $n$ unknowns
   Linear independence, basis, and dimension
   Linear transformations
Orthogonality
   Inner products
   Least squares
   Gram-Schmidt orthogonalization
Determinants
   Properties of the determinant
   Formulas for the determinant
   Applications of determinants
Eigenvalues and Eigenvectors
   Definitions and fundamental computations
   Diagonalization
   Applications to differential equations

Laboratory projects (specify number of weeks on each)

Laboratory projects vary with instructor.

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Oral and Written Communications

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

This course is essentially all theoretical material.

Problem Analysis

Please describe the analysis experiences common to all course sections.

None.

Solution Design

Please describe the design experiences common to all course sections.

None.
Current Catalog Description

Math 481. Prerequisite: Math 225. An introduction to the core ideas in probability and statistics. Computation of probabilities using, for instance, counting techniques and Bayes’ rule. Introduction to discrete and continuous random variables, joint and conditional distributions, expectation, variance and correlation, random sampling from populations, hypothesis tests and confidence intervals, and least squares. This course is the first in a sequence of two 2-credit mini-courses in probability and statistics offered in a single term, the second being Math 482.

Math 482. Prerequisite: Math 481. In part, covers topics from Math 481 in more depth including additional standard distributions used to model real-world phenomena, additional standard hypothesis tests and confidence intervals. Other topics include building multiple regression models, parameter estimation, and reliability. Selected non-parametric and computer-intensive methods may also be covered. This course is the second in a sequence of two 2-credit mini-courses in probability and statistics offered in a single term, the first being Math 481.

Textbook


References

http://silver.sdsmt.edu/~rwjohnson/m481s01.htm

Course Goals

Introduce students to the key concepts in Probability and Statistics. Also, to give them just a bit of an experience in (a) working with a statistical software package and, in particular, (b) practice in analyzing data with this package.

Prerequisites by Topic

Math 225, Calculus III, is the prerequisite for Math 481. Math 481 is the prerequisite for Math 482.
Major Topics Covered in the Course

Math 481
- Probability (addition, multiplication, Bayes’ Rule, lotteries and reliability), Section 3.1, 6 days.
- Numerical summaries (sample mean, sample variance, sample standard deviation), 1 day.
- Discrete random variables (mean, variance, standard deviation), Sections 3.2 & 3.3, 2 days.
- Graphical data summaries (stem & leaf, boxplots, histograms), Sections 2.1, 2.2, 2.3, 2.4, 1 day.
- Continuous random variables (mean, variance, standard deviation), Section 3.4, 2 days.
- Normality and the central limit theorem, Sections 3.5, 3.6, 3 days.
- Estimation, Section 4.1, 1 day.
- Hypothesis testing (tests on a mean and on a proportion, confidence intervals), Sections 4.2, 3.7, 4.3, 4.4, 5 days.
- Correlation and simple linear regression, Selected portions of Sections 6.1, 6.2, 6.4, 3 days.

Math 482
- Some special discrete random variables (Poisson, geometric, hypergeometric, ...), end of Section 3.3, 2 days.
- Some special continuous random variables (Gamma, Weibull, ...), end of Section 3.4, 2 days.
- Estimation (method of moments), 2 days.
- Simulation (inverse cdf method), 2 days.
- Joint distributions and summary measures, 3 days.
- Two-sample tests (means, proportions), Sections 4.5, 4.6, 7 days.
- Experimental design (terminology, 2^2, 2^3 designs), Sections 7.1, 7.2, 7.3, 5 days.
- Multiple regression, Selected portions of Sections 6.3, 6.4, 6.5, 4 days.
- (Time permitting) Bootstrap estimates of standard error.

Laboratory projects (specify number of weeks on each)

Labs using the statistical software package Minitab:
Math 481 – 1. Reliability of a simple system (simulation)
   2. Central Limit Theorem (simulation)
Math 482 – 1. Generating random variables
   2. Performing a least-squares/multiple regression
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Oral and Written Communications

Every student is required to submit at least ____ written reports (not including exams, tests, quizzes, or commented programs) of typically ____ pages and to make ____ oral presentations of typically ____ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

Discussion topic – how a designed experiment (e.g., a test of the effectiveness of the drug AZT) might be stopped early when there is striking evidence that the treatment is effective.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Some theory, especially in the discussion of probability topics, is presented. When possible, material is presented heuristically. Emphasis is on computation and checking assumptions to validate these computations.

Problem Analysis

Please describe the analysis experiences common to all course sections.

None.
Solution Design

Please describe the design experiences common to all course sections.

None.
Department and Course Number: PHYS 211
Course Title: University Physics I
Course Coordinator: Dr. Corey
Total Credits: 3

Current Catalog Description

Prerequisites: Physics 111 or an acceptable score on the Physics I Qualifying Examination and concurrent registration in MATH 124. The basic physical principles of Newton’s laws of motion and the conservation laws concerning momentum, energy and angular momentum are applied to the linear and curvilinear motion of particles, simple harmonic motion and the rotation of rigid bodies.

Textbook

*University Physics*, Benson, John Wiley & Sons, 1995

References

None.

Course Goals

Students successfully completing this course will possess an understanding of the basics of classical mechanics. Practice in the application of fundamental physical laws will enable students to quantitatively describe the motion of macroscopic bodies under the influence of naturally occurring forces.

Besides gaining knowledge of the physical laws and how to apply them, students will be expected to improve their ability to use mathematics and problem solving skills.

Prerequisites by Topic

Introductory differential and integral calculus

Major Topics Covered in the Course

Review of vector algebra
Particle kinematics in one dimension
Equations of kinematics for constant acceleration
Vertical free fall
Newton’s First Law
Two-dimensional motion
Projectile motion
Uniform circular motion
Relative velocity
Force and mass
Newton’s second and third laws
Applications of Newton’s laws
Friction
Dynamics of circular motion
Satellite orbits
Work done by a constant and variable force
Work-Energy Theorem in one dimension
Power
Potential energy
Conservative forces
Conservation of mechanical energy
Gravitational potential energy
Linear momentum
Conservation of linear momentum
1-D Collisions
2-D Collisions
Rotational kinematics
Rotational dynamics
Torque
Angular momentum
Statics
Gravitation
Kepler’s laws
Simple harmonic oscillation
Pendulums

Laboratory projects (specify number of weeks on each)

None.

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Oral and Written Communications

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Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Basic Physics theory is discussed in this course.

Problem Analysis

Please describe the analysis experiences common to all course sections.

None.

Solution Design

Please describe the design experiences common to all course sections.

None.
Current Catalog Description

Prerequisites: PHYS 211 and MATH 124 and concurrent registration in either MATH 225 or MATH 231. Extends the application of the basic physical principles of PHYS 211 to electric and magnetic interaction of charged particles and electric currents. Electric fields, magnetic induction, and the basic dc and ac circuits are studied. PHYS 214 is suggested as an optional laboratory to be taken concurrently with this course.

Textbook

*University Physics*, Benson, John Wiley & Sons, 1995

References

None.

Course Goals

Students successfully completing this course will possess an understanding of the basics of classical electrostatics and electrodynamics. Practice in the application of fundamental physical laws will enable students to quantitatively describe the following phenomena; forces between point charges, electric fields due to point and continuous charge distributions, electric potentials due to point and continuous charge distributions, magnetic fields due to electric currents, the motions of charged particles in uniform electric and magnetic fields or combined electric and magnetic fields, and electric fields and potentials induced by a time varying magnetic flux. Students will also gain some experience in basic dc and ac circuit analysis.

Besides gaining knowledge of the physical laws and how to apply them, students will be expected to improve their ability to use mathematics and problem solving skills.

Prerequisites by Topic

Introductory physics as covered in PHYS 211 (University Physics I).
A mature knowledge of engineering calculus.
Major Topics Covered in the Course

Charge
Conductors and insulators
Coulomb’s law
The electric field
Motion of charges in uniform static fields
Continuous charge distributions
Dipoles, torque and potential energy in a uniform field
Gauss’s law
Electric potential, potential energy in a uniform field
Potential of point charges and systems of point charges
Electric field derived from potential
Potential from continuous charge distributions
Capacitance
Series and parallel combinations
Energy Stored in a capacitor
Energy density of the electric field
Current
Resistance
Ohm’s law
Electromotive force
Kirchhoff’s rules
Series and parallel connections
RC circuits
The magnetic field
Force on a current carrying conductor
Torque on a current loop
Charged particles in magnetic fields
Combined electric and magnetic fields
Magnetic field due to a long, straight wire
Magnetic force between parallel wires
Biot-Savart law for a current element
Ampere’s law
Electromagnetic induction
Magnetic flux
Faraday’s law
Lenz’s law
Induced electric fields
Self and mutual inductance
LR circuits
Energy stored in an inductor
Energy density of the magnetic field
LC oscillations
Magnetic properties of matter
Laboratory projects (specify number of weeks on each)

None.

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Computer Organization and Architecture

Concepts of Programming Languages

Oral and Written Communications

Every student is required to submit at least 0 written reports (not including exams, tests, quizzes, or commented programs) of typically ___ pages and to make 0 oral presentations of typically ___ minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Basic Physics theory is discussed in this course.

Problem Analysis

Please describe the analysis experiences common to all course sections.

None.
Solution Design

Please describe the design experiences common to all course sections.

None.
Department and Course Number: PHYS 214
Course Title: University Physics Laboratory
Course Coordinator: Dr. Corey
Total Credits: 1

Current Catalog Description

Prerequisite: Concurrent registration in or completion of PHYS 213. Introduction to physical phenomena and measurements. Recording and processing data, determining uncertainties, reporting results. The experiments supplement the work in PHYS 211 and PHYS 213.

Textbook


References

None.

Course Goals

Students successfully completing this course will possess a better understanding of the material covered in PHYS 213, (University Physics II).

Prerequisites by Topic

Introductory physics as covered in PHYS 211 (University Physics I).
A mature knowledge of engineering calculus.

Major Topics Covered in the Course

See laboratory projects, below.

Laboratory projects (specify number of weeks on each)

One week on each of the following topics:

Human reaction time
Vector nature of forces
Atwood's machine
Simple pendulum
Ballistic Pendulum
Hooke’s law
Moment of inertia
Equipotential surfaces
Kirchhoff’s rules
Wheatstone bridge
RC circuits: introduction to oscilloscope

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Oral and Written Communications

Every student is required to submit at least 12 written reports (not including exams, tests, quizzes, or commented programs) of typically 2 pages and to make 0 oral presentations of typically minutes duration. Include only material that is graded for grammar, spelling, style, and so forth, as well as for technical content, completeness, and accuracy.

Social and Ethical Issues

Please list the topics that address the social and ethical implications of computing covered in all course sections. Estimate the class time spent on each topic. In what ways are the students in this course graded on their understanding of these topics (e.g., test questions, essays, oral presentations, and so forth)?

None.

Theoretical Content

Please list the types of theoretical material covered, and estimate the time devoted to such coverage.

Basic Physics theory is discussed in this course.

Problem Analysis

Please describe the analysis experiences common to all course sections.

None.
Solution Design

Please describe the design experiences common to all course sections.

None.
V. Laboratories and Computing Facilities

*INTENT:* Laboratories and computing facilities are available, accessible, and adequately supported to enable students to complete their course work and to support faculty teaching needs and scholarly activities.

The *Intent* must be met in order for a program to be deemed accreditable. One way to meet the *Intent* of this criterion is to satisfy each one of the *Standards* listed below. To do this, answer the questions associated with the *Standards*. If one or more *Standards* are not satisfied, it is incumbent upon the institution to demonstrate and document clearly and unequivocally how the *Intent* is met in some alternative fashion.

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

In Section VI we will ask you to describe laboratory equipment planning and acquisition processes. Please do not repeat any of that information here; simply refer ahead to that section if necessary to avoid duplication.

A. Computer facilities available for use in computer science programs. Describe the computer facilities available for use in programs in computer science.

1. Describe the computing facilities used for instruction. Indicate the types of software available in each category. Specify any limitations that impact the quality of the educational experience.

**Institutional facilities:**

Information Technology Services (ITS) provides and maintains five classroom labs located in academic departments or department clusters (Electrical Engineering, Civil/Mechanical Engineering, Mathematics/Computer Science, Mineral Industries, Chemistry/Chemical Engineering). There are 96 machines, all Pentium class, in these five labs. These are equipped for the basic functions of office productivity software and Internet access, but also include additional software that is used in connection with curriculum in one or more academic departments. ITS makes the software as widely available as possible, taking into consideration licensing issues and compatibility with hardware and other software. Additional information is contained in “Labs at SDSMT” at the end of Section V.

**Departmental facilities:**

There are three laboratories in the McLaury building where the Computer Science program is centered. One of these, McLaury 304, contains 21 Pentiums and has
C++, Assembly, Lisp, and the entire Microsoft Developer’s Studio. This lab is included within the institutional facilities, above, but it is used almost exclusively by computer science for scheduled lab classes as well as open lab access. Another laboratory in McLaury 215 contains 20 Pentium-class machines and is used exclusively for computer science classes. Redhat Linux is available there. The third laboratory is housed in McLaury 213. This is a UNIX-based workstation lab containing 12 SunRays connected to a 4-processor Enterprise 450 Sun server. The 1 gigabit fiber-optic network supports a cluster which provides 10 gigaflop performance. Available in this lab are all the GNU utilities, Sun development and cluster tools including Java SDK, and all commonly-used programming language environments. All rooms are wired for network access and all machines are connected to the network.

Other facilities:

Specifically configured machinery is available in McLaury 208 to support a satellite imaging project funded by Raytheon. McLaury 209 houses equipment relating to a collaborative research effort with Sun Microsystems. This equipment is used by student research assistants and their faculty supervisors.

2. Are there any labs, courses, or policies that require two or more students to share a lab station? ___no____ If the answer is yes, please describe the situation(s) involved.

3. Briefly describe the laboratory equipment planning, acquisition, and maintenance processes and their adequacy. Include discussion of these topics for university-wide facilities available to all students (if used by your majors), your own laboratories and equipment (if applicable), and facilities controlled by other departments and/or schools (if used by your majors). Discuss how you assess the adequacy of your laboratory and computing support. Please attach documentation (e.g., inventories, equipment replacement plans, etc.) to this report.

At the departmental level, equipment planning is based, in part, on the needs of current activities within the discipline of Computer Science. Such an awareness is gained from faculty participation in various collaborative industrial research activities, sabbatical experiences, meetings held with our Industrial Advisory Council, attendance at professional meetings, etc. Equipment priorities depend on the perceived greatest shortfall in relation to the current state of the art.

Institutionally, input is funneled from Department Chairs to their College Deans, who in concert with other Deans and directors, coordinated by Vice President Whitehead, formulate long-range planning and make acquisition decisions. Supplementary input is provided by a faculty ad hoc committee. A listing of institutional computer equipment inventories is attached at the end of Section V.
Maintenance needs are coordinated and addressed centrally on the basis of requests to the ITS Help Desk.

The institutional lab machines are being replaced on a 3-year cycle. Microsoft and Sun software is kept up-to-date by generous, ongoing donations from Tech alumni employed at these firms.

**Standard V-1. Each student must have adequate and reasonable access to the systems needed for each course.**

B. Student Access. Each student must have adequate and reasonable access to the systems needed for each course. State the hours the various facilities are open. State whether students have access from residence halls or off campus by direct access, modem, etc., and describe this access quantitatively.

Two of the campus computer laboratories are accessible to students 24 hours a day. Students have Internet access from off campus and from their residence hall rooms (about 75 percent of the entire residence hall population pays the $100 per year charge to be connected to a very high-speed service). The library complex is available until midnight and the student union until 10 p.m. All other labs are accessible throughout regular working hours.

**Standard V-2. Documentation for hardware and software must be readily accessible to faculty and students.**

C. Documentation. Describe documentation for hardware and software systems available to students and faculty in the computer science program. Explain how students and faculty have adequate and timely access to the documentation.

Documentation for all software is available from ITS, and most of it is available on-line.

**Standard V-3. All faculty members must have access to adequate computing facilities for class preparation and for scholarly activities.**

D. Faculty Access. Describe the computing facilities available to faculty for class preparation and for scholarly activities and research. Include specifics regarding resources in faculty members’ offices.

Every faculty member has a fully networked Pentium class computer in his/her office. Most Computer Science faculty also have a SunRay in their office.
<table>
<thead>
<tr>
<th>Location</th>
<th>Hours</th>
<th>Specs</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry Lab</td>
<td>7:30 am - 5 pm and whenever the building is open</td>
<td>9 Machines 120mhz, 64meg RAM, 15in Monitors, CD, Windows 95 HP 5M Laser Printer</td>
<td></td>
</tr>
<tr>
<td>Civil / Mechanical Lab</td>
<td>24 hours / day</td>
<td>41 Machines 200mhz, 64meg RAM, 15in Monitors (23 machines) 17in Monitors (18 machines), CD, Zip (5 machines), Windows NT 4.0 HP LaserJet 5si MX</td>
<td>Can be reserved</td>
</tr>
<tr>
<td>Classroom Lab</td>
<td>24 hours / day</td>
<td>5 Machines 233mhz, 64meg RAM, 17in Monitors, CD, Zip, Windows NT 4.0 HP 4000 Laser Printer</td>
<td>24 hours to all students</td>
</tr>
<tr>
<td>Miners Shack Lab (Cyber Cafe)</td>
<td>Whenever the Miners Shack is open</td>
<td>4 Machines 120mhz, 64meg RAM, 15in Monitors, CD, Zip, Windows NT 4.0</td>
<td></td>
</tr>
<tr>
<td>Electrical Engineering Lab</td>
<td>7:30am - 4:30pm and whenever the building is open</td>
<td>23 Machines 700mhz, 256meg RAM, 17in Monitors, CD, Zip Windows NT 4.0 HP 5M Laser Printer</td>
<td>Can be reserved</td>
</tr>
<tr>
<td>Library Lab East</td>
<td>M-Th - 7am - Midnight F - 7am - 5pm Sat - Noon - 5pm Sun - Noon - Midnight</td>
<td>20 Sun Ray 1 Appliances HP LaserJet 4</td>
<td></td>
</tr>
<tr>
<td>Library Lab West</td>
<td>M-Th - 7am - Midnight F - 7am - 5pm Sat - Noon - 5pm Sun - Noon - Midnight</td>
<td>18 Machines 266mhz, 64meg RAM, 17in Monitors, CD, Zip (1 machine), Windows NT 4.0 HP 5M Laser Printer</td>
<td>Can be reserved</td>
</tr>
<tr>
<td>Lab Name</td>
<td>Days and Time</td>
<td>Machines</td>
<td>Features</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Library Instructional Lab</td>
<td>M-Th 7am - Midnight, F 7am - 5pm, Sat - Noon - 5pm, Sun - Noon - Midnight</td>
<td>8 Machines, 266mhz, 64meg RAM, 17in Monitors, CD, Zip (1 machine), Windows NT 4.0</td>
<td>Large Computer, Desks for group projects, Can be reserved</td>
</tr>
<tr>
<td>McLaury Lab</td>
<td>7:30am - 4:30pm and whenever the building is open</td>
<td>24 Machines, 366mhz, 64meg RAM, 17in Monitors, CD, Zip, Windows NT 4.0 / DOS</td>
<td>Can be reserved</td>
</tr>
<tr>
<td>March / Dake Hall Lab</td>
<td>24 hours /day</td>
<td>6 Machines, 266mhz, 64meg RAM, 17in Monitors, CD, Zip, Windows NT 4.0</td>
<td>Only open for residence hall residents</td>
</tr>
<tr>
<td>Mineral Industries Lab</td>
<td>7:30am - 4:30pm and whenever the building is open</td>
<td>11 Machines, 400mhz, 128meg RAM, 17in Monitors, CD, Zip, Web Cams, Windows NT 4.0</td>
<td>Video Conferencing, Capabilities, Can be reserved</td>
</tr>
<tr>
<td>Palmerton Hall Lab</td>
<td>24 hours /day</td>
<td>10 Machines, 200mhz, 32meg RAM, 15in Monitors, CD</td>
<td>Only open for residence hall residents</td>
</tr>
<tr>
<td>Surbeck Lab</td>
<td>M-F 7:30am - 10pm, Sat &amp; Sun 10am - 10pm</td>
<td>6 Machines, 800mhz, 256meg RAM, 17in Monitors, CD, Windows NT 4.0</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td>Hardware Platform</td>
<td>Operating System</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>Screening router</td>
<td>Dual Pentium</td>
<td>BSD UNIX</td>
<td></td>
</tr>
<tr>
<td>Network monitor</td>
<td>IBM RS/6000</td>
<td>AIX v.4</td>
<td></td>
</tr>
<tr>
<td>SNA server; secondary NT Domain Controller</td>
<td>Pentium</td>
<td>NT v. 4.0</td>
<td></td>
</tr>
<tr>
<td>SNA token-ring gateways (3)</td>
<td>386 PC</td>
<td>MS-DOS</td>
<td></td>
</tr>
<tr>
<td>Primary Domain Name Server (DNS); legacy student e-mail</td>
<td>IBM RS/6000</td>
<td>AIX v.4</td>
<td></td>
</tr>
<tr>
<td>Secondary DNS</td>
<td>IBM RS/6000</td>
<td>AIX v.4</td>
<td></td>
</tr>
<tr>
<td>Tertiary DNS</td>
<td>IBM RS/6000</td>
<td>AIX v.4</td>
<td></td>
</tr>
<tr>
<td>Enterprise backup</td>
<td>IBM RS/6000</td>
<td>AIX v.4</td>
<td></td>
</tr>
<tr>
<td>HPC production</td>
<td>IBM RS/6000</td>
<td>AIX v.4</td>
<td></td>
</tr>
<tr>
<td>HPC Oracle database server; instructional Oracle server; Abaqus engineering modeling package</td>
<td>IBM RS/6000</td>
<td>AIX v.4</td>
<td></td>
</tr>
<tr>
<td>HPC development</td>
<td>IBM RS/6000</td>
<td>AIX v.4</td>
<td></td>
</tr>
<tr>
<td>Exchange server; License Manager Key server</td>
<td>Dual Pentium</td>
<td>NT v. 4.0</td>
<td></td>
</tr>
<tr>
<td>AES Keyfile document imaging</td>
<td>Pentium</td>
<td>NT v. 4.0</td>
<td></td>
</tr>
<tr>
<td>Student e-mail server</td>
<td>Dual Pentium</td>
<td>BSD UNIX</td>
<td></td>
</tr>
<tr>
<td>Active Directory; primary NT Domain Controller; LDAP</td>
<td>Pentium</td>
<td>Windows 2000</td>
<td></td>
</tr>
<tr>
<td>Instructional software (WebCT; Pathware/Authorware); streaming audio/video server</td>
<td>Pentium</td>
<td>NT v. 4.0</td>
<td></td>
</tr>
<tr>
<td>Novell file and print server</td>
<td>Dual Pentium</td>
<td>Novell v. 5.1</td>
<td></td>
</tr>
<tr>
<td>KTEQ student radio station encoding and streaming</td>
<td>Pentium</td>
<td>Windows 2000</td>
<td></td>
</tr>
<tr>
<td>Web server; listservver (Majordomo)</td>
<td>IBM RS/6000</td>
<td>AIX v.4</td>
<td></td>
</tr>
<tr>
<td>Network news feed, reader</td>
<td>Pentium</td>
<td>BSD UNIX</td>
<td></td>
</tr>
</tbody>
</table>
VI. Institutional Support and Financial Resources.

**INTENT:** The institution’s support for the program and the financial resources available to the program are sufficient to provide an environment in which the program can achieve its objectives. Support and resources are sufficient to provide assurance that an accredited program will retain its strength throughout the period of accreditation.

The **Intent** must be met in order for a program to be deemed accreditable. One way to meet the **Intent** of this criterion is to satisfy each one of the **Standards** listed below. To do this, answer the questions associated with the **Standards**. If one or more **Standards** are not satisfied, it is incumbent upon the institution to demonstrate and document clearly and unequivocally how the **Intent** is met in some alternative fashion.

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

**Standard VI-1.** Support for faculty must be sufficient to enable the program to attract and retain high-quality faculty capable of supporting the program’s objectives.

**Standard VI-2.** There must be sufficient support and financial resources to allow all faculty members to attend national technical meetings with sufficient frequency to maintain competence as teachers and scholars.

**Standard VI-3.** There must be support and recognition of scholarly activities.

A. One evidence of the long-term stability of a program is its ability to both attract and retain high quality faculty. Describe how your program does this. Some topics the description might address are sabbatical and other leave programs, salaries, benefits, teaching loads, support for and recognition of scholarly activity (including financial support for attendance at professional meetings), departmental and institutional ambiance, etc. Give counts of the total number of faculty and the number of resignations, retirements, and new hires for each of the last five years. Indicate whether there are significant problems attracting and retaining faculty, and if so, the causes.

In 1997, a faculty member resigned. This position was filled by an instructor with a Master’s degree until 2000 when we were able to fill the position with a Ph.D. in Computer Science. The difficulty in hiring was based partly on the low number of Ph.D.’s in Computer Science looking for faculty positions and the fact that our salaries are below average. However, we were able to hire a Ph.D. in Computer Science and also a Ph.D. in Mathematics with significant computer science
experience. As of fall 2001, the instructor’s position has been permanently allocated to the department, resulting in a net gain of 1.5 FTE faculty since 1998.

Teaching loads have been set to acknowledge the difficulty of teaching courses in the field and the need for Computer Science faculty to stay current. Most full-time Computer Science faculty have a teaching load of either two courses or three courses with two preparations. This has been funded partly by externally funded release time and partly by internal allocation of resources.

Sabbaticals and leaves have been available for Computer Science faculty. In the past year, one faculty member has been on sabbatical. In the spring of 1998, one faculty member was on externally-funded leave and one on sabbatical.

Salaries have been improved significantly over the past three years due to a state-wide program designed to bring salaries closer to regional averages. Budgets have been reorganized and tuition and fees raised. While salaries are still below average, the situation has greatly improved in the past five years.

The ambiance of the department is one reason that we have very little turnover. Faculty feel they are part of something special and are not willing to risk that to go elsewhere, even for an increase in salary.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Faculty</th>
<th>Resignations</th>
<th>Retirements</th>
<th>New Hires</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001-2002</td>
<td>7.5</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2000-2001</td>
<td>6.5</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1999-2000</td>
<td>6.5</td>
<td></td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td>1998-1999</td>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997-1998</td>
<td>6.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1996-1997</td>
<td>6.0</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes on table:

From 1997-1998 to 1999-2000 the open faculty position was filled by an instructor. The open position was filled in 2000, but the instructor remained to compensate for the absence of a faculty member on sabbatical. The instructor’s position has been filled by a newly-graduated Master’s student. The department has been fortunate to keep some of its best M.S. graduates in that position. Since this has been a one-year position, it is not included in resignations and new hires. However, it is included in total faculty. Thus, neither the resignation in 1996-1997 nor the new hire in 2000-2001 changed the total number of the faculty. Starting in 2001-2002, this will be a continuing position and has been counted both in new hires and in total faculty.
There are five full-time Computer Science faculty. Three faculty members are shared between Mathematics and Computer Science. One of these three was hired in 1998. This is the 0.5 new hire in 1998-1999.

Currently, one of the full-time Computer Science faculty is on sabbatical, but his position has been covered by a full-time Computer Science instructor. That position has been made permanent, bringing the number of Computer Science faculty to 7.5 for next year.

B. Summarize the professional activities of your faculty, attendance at meetings, university and professional honors won by individuals, etc. Just summarize here; details should appear in individual faculty vitas.

In the past two years, the primary research focus of the department has shifted from traditional research and governmental support to applied research with corporate support. As a result of this, the number of papers published has declined somewhat, but the number of undergraduate students involved in projects has risen dramatically, as have research funding and equipment donations. We believe this new focus has strengthened our program.

A summary of activities from the past 5 years is presented below.

40 papers published in refereed journals
$697,000 in research funding (including Sun Microsystems $524,000, Raytheon $141,000)
20 talks/presentations given by faculty members
21 conferences attended
4 faculty served as reviewers for journals or textbooks

In addition to the activities above, two faculty associated with the Computer Science program have won the campus Presidential Award for Outstanding Professor.

**Standard VI-4. There must be office support consistent with the type of program, level of scholarly activity, and needs of the faculty members.**

C. Briefly describe the level and adequacy of office support. The description should address secretarial support, office equipment, and the total group supported by this equipment and staff.

The department has one secretary. This is a reduction of one-half from six years ago. However, workstudy students and secretaries from other departments are available to assist the department, making the reduction workable. We have been able to keep office equipment current, including a new copier, a new FAX machine, and upgrades
to the computers in the office. Office supplies are readily available and special requests are promptly handled by the secretary.

Standard VI-5. Adequate time must be assigned for the administration of the program.

D. Describe the adequacy of the time assigned for the administration of the program.

The department chair gets one course release time. This would be inadequate were it not for the fact that the chair is also assigned courses that are less time-consuming to teach. With the release time and the course assignment, the chair’s job is manageable. Also, the chair’s job is a three-year rotation, so no one is required to perform these duties long term. Other faculty members assist the chair by performing various administrative duties.

Standard VI-6. Upper levels of administration must provide the program with the resources and atmosphere to function effectively with the rest of the institution.

E. Describe the adequacy of the resources and the atmosphere provided by the upper administration for the program to function effectively with the rest of the institution.

It would be difficult to imagine a more supportive atmosphere from the upper administration. The Vice President for Academic Affairs is a former head of our department and the President is a former president of IEEE. Both have a firm understanding of the resources necessary for a good Computer Science program. Also, Computer Science has been included in the programs listed for our campus incentive funds. These incentive funds allocate money to institutions based on how well they meet certain goals. In this case, the goal is increased enrollment in disciplines with an impact on economic development in the state. This gives us additional priority for resources.

F. Positive and constructive leadership at the college/school level and within the program’s department are especially important to the program’s quality. Evaluate this leadership and the interaction between these levels of administration.

Our college dean supports our department. The rotation of chairs has not caused any problems to date. The previous and current department chairs have supported the Computer Science program.
Standard VI-7. Resources must be provided to acquire and maintain laboratory facilities that meet the needs of the program.

G. Laboratory and Computing Resources. Briefly describe the resources available for the program to acquire and maintain laboratory facilities. Include information on how the institution determines the adequacy of the resources.

Resources for laboratory and computing resources come from several sources. These include money allocated to the department for general expenditures, lab fee money generated by departmental courses, equipment supplied by Instructional Technology Services (ITS), and grants. Our departmental general fund and lab fee monies typically provide $15,000 – $20,000 annually for equipment. ITS has provided computers for the PC lab housed in our department and other campus labs. A grant from Sun Microsystems furnished our UNIX lab with extra equipment provided jointly by the department and ITS. Alumni at Microsoft donate all of the Microsoft software that we need.

The budget is determined by the Vice President for Academic Affairs. She allocates monies based on estimates provided to her from the Dean and the Chair of the department. However, if an estimate is flawed or unexpected circumstances arise, both the Vice President and the Dean have discretionary funds in reserve to address the situation. Budgets are reviewed annually to assess changing needs.

Standard VI-8. Resources must be provided to support library and related information retrieval facilities that meet the needs of the program.

H. Library Resources. Briefly describe the resources available for the support of the library and related information retrieval facilities. Include information on how the institution determines the adequacy of the resources.

The library budget for the Computer Science program is determined as part of the overall formula for the campus. This formula takes into account the number of students taking the classes and the level of the classes being taught. More weight is assigned for Junior/Senior classes than for Freshman/Sophomore, and more for Graduate classes than for Junior/Senior. A base amount is given to each department across the board to ensure an adequate amount of funding. Over the past few years, the average annual amount allocated to the department was $3,000.

Subscriptions are handled differently. Each department may request new subscription materials, but most will be asked to substitute journals rather than simply add the new journal.

Any faculty or staff member may request library materials at any time. Every semester, each department assigns a liaison who works with library staff to order materials based on the amount allocated by the library for that department. The library also retains some money to fill gaps or deal with special requests.
Standard VI-9. There must be evidence that the institutional support and financial resources will remain in place throughout the period of accreditation.

I. Discuss and show evidence of continuity of institutional support for the program in the past, and problems that have existed or are anticipated in this area, if any.

The support for the program has been consistent. In fact, the support has increased over the past few years. We have acquired additional funding and, more importantly, have added an additional faculty position in Computer Science starting next year.
VII. Institutional Facilities

**INTENT:** Institutional facilities, including the library, other electronic information retrieval systems, computer networks, classrooms, and offices, are adequate to support the objectives of the program.

The *Intent* must be met in order for a program to be deemed accreditable. One way to meet the *Intent* of this criterion is to satisfy each one of the *Standards* listed below. To do this, answer the questions associated with the *Standards*. If one or more *Standards* are not satisfied, it is incumbent upon the institution to demonstrate and document clearly and unequivocally how the *Intent* is met in some alternative fashion.

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

A. Library

**Standard VII-1.** The library that serves the computer science program must be adequately staffed with professional librarians and support personnel.

1. Assess the staffing of the library (or libraries) that serve the computer science program. Are there adequate professional librarians and support personnel? Supply documentation if possible.

   The Devereaux Library currently has nine full-time staff members and an additional open position. There are three librarians, one exempt employee, and five support staff members. In addition, 10-15 student workers are hired during the academic year to supplement the staffing of the library. Although small, it is a dynamic staff and more than adequate to serve the needs of the campus.

**Standard VII-2.** The library's technical collection must include up-to-date textbooks, reference works, and publications of professional and research organizations such as the ACM and the IEEE Computer Society.

2. Assess the adequacy of the library's technical collection and of the budget for subscriptions as well as new acquisitions. The library must contain up-to-date textbooks, reference works, and publications of professional and research organizations such as the ACM and the IEEE Computer Society. It should also contain representative trade journals. Supply documentation, if possible. Assess the process by which faculty may request the library to order books or subscriptions.
The Devereaux Library has a strong collection in the areas of Computer Science and Computer Engineering. There are 138 journal titles with some variation of the word "computer" in the title or description. Eight of those titles are from the IEEE Computer Society: Computer; Computing in Science and Engineering; IEEE Computer Graphics and Applications; IEEE Computer Applications in Power Magazine; IEEE Design and Test of Computers; IEEE Transactions on Computers; IEEE Transactions on Computer Aided Design of Integrated Circuits & Systems; and IEEE Transactions on Visualization and Computer Graphics. In addition, there are 150 electronic journal titles available through the South Dakota Library Network. Until last year, the Devereaux Library subscribed to the electronic (CD-ROM) version of the IEEE/IEE. Escalating costs forced the library to drop the subscription.

The book collection is equally strong. There are approximately 6100 books in the Devereaux Library with the word "computer" or some variation of the word in the title or description. There are 65 of those located in the reference collection of the library. Most books in this area are current. The library tries to keep its computer related holdings current because of the rapid evolution of computer technology.

The budget for the Computer Science program is determined as part of the overall formula for the campus. This formula takes into account the number of students taking the classes and the level of the classes being taught. More weight is assigned for Junior/Senior classes than for Freshman/Sophomore, and more for Graduate classes than for Junior/Senior. A base amount is given to each department across the board to ensure an adequate amount of funding. Over the past few years, the average annual amount allocated to the department was $3,000.

Subscriptions are handled differently. Each department may request new subscription materials, but most will be asked to substitute journals rather than simply add the new journal.

Any faculty or staff member may request library materials at any time. Every semester, each department assigns a liaison who works with library staff to order materials based on the amount allocated by the library for that department. The library also retains some money to fill gaps or deal with special requests.

Library materials may also be obtained through Interlibrary Loan. Devereaux Library belongs to MINITEX, a network based at the University of Minnesota. MINITEX provides access to materials throughout South Dakota Minnesota, North Dakota, Wisconsin, and the University of Illinois. Devereaux Library also has reciprocal agreements with various libraries throughout the U.S. In addition, Devereaux Library has contracts with UMI Article Clearinghouse and the British Library Document Supply Centre for the delivery of articles. Anyone with a valid SDSM&T ID may submit an electronic Interlibrary Loan request.

**Standard VII-3. Systems for locating and obtaining electronic information must be available.**

3. Assess the library’s systems for locating and obtaining electronic information.

The Devereaux Library has developed methods that allow students to access information without physically being in the library building. The South Dakota Library Network (SDLN) is available to all residents of the State of South Dakota. The Devereaux Library participates in the network, maintaining our online catalog on SDLN. Through SDLN, our patrons have access to books throughout the state and to search engines for specialized book searches. GaleGroup’s InfoTrac has also increased the usefulness of many of the indexes by making hundreds of articles available in full-text format. SDLN has added access to the World Wide Web via WebPals. SDSM&T allows all students who have signed a Computer Usage Agreement access to the Internet.

**Dial Access**
South Dakota Library Network: 394-5374
Campus Internet: 394-2466

**Internet (Telnet) Access**
South Dakota Library Network: telnet library.sdln.net
Campus Internet: telnet silver.sdsmt.edu

**World Wide Web Access**
South Dakota Library Network: http://www.sdsmt.edu/services/library
SDLN - WebPals: http://webpals.sdln.net/webpals
Campus Internet: http://www.sdsmt.edu/

Email access is available at: libref@msmailgw.sdsmt.edu
Standard VII-4. Classrooms must be adequately equipped for the courses taught.

B. Classroom Equipment. Describe the equipment typically available in classrooms where you teach your courses. Assess its adequacy for the purpose.

Most computer science courses are taught in the McLaury building. There are five classrooms in that building, and each is equipped with an overhead projector and a screen. In addition, one classroom is equipped with a ceiling-mounted computer projection system. A second computer projection system is available on a movable cart and serves the remaining classrooms. It is the goal of the department to have ceiling-mounted systems in the three classrooms on the third floor and a mobile system shared between the two classrooms on the second floor. We expect to reach this goal by the end of the 2001-2002 academic year if not sooner. This equipment is adequate to meet the needs of the department. Also, there are network connections in each classroom in the McLaury building.

Standard VII-5. Faculty offices must be adequate to enable faculty members to meet their responsibilities to students and for their professional needs.

C. Discuss and assess the adequacy of faculty offices to enable faculty to meet their responsibilities to students and for their professional needs.

Each faculty member has, at a minimum, a private office, a computer connected to the campus network, a private phone, and appropriate office furniture and equipment. Many faculty have more than one computer. Offices are small but are adequate for meeting students and performing other professional duties.
Appendix I. Information Relative to the Entire Institution

A. General Information:

Name of Institution: South Dakota School of Mines & Technology Date: June 4, 2001

Address: 501 East Saint Joseph Street Rapid City SD 57701

(Street) (City) (State) (Zip)

URL: http://www.sdsmt.edu

Name and Title of Chief Executive Officer of Campus (President, Chancellor, etc.)

Dr. Richard J. Gowen President

(Name) (Position)

B. Type of Control (Check more than one, if necessary)

_____ Private, non-profit
_____ Private, other
______ Federal

Municipal

_____ State

Affiliation, if private: ________________________________

If above classifications do not properly apply to the institution, please describe its type of control.

C. Regional or Institutional Accreditation. Name the organizations by which the institution is now accredited, give dates of most recent accreditation. Attach a copy of the most recent accreditation action by any organization accrediting the institution or any of its computer-related programs.

The South Dakota School of Mines and Technology is accredited by the North Central Association of Colleges and Universities, the most recent accreditation visit having taken place in 1996. The next NCA visit is scheduled for 2006. The computer science program is currently accredited by the Computing Sciences Accreditation Board (CSAB). All engineering programs at the South Dakota School of Mines and Technology are accredited by the Accreditation Board for Engineering and Technology (ABET) with the exception of a new program in Environmental Engineering. We anticipate putting this program forward for initial accreditation during the next general ABET review in 2004. The chemistry program is accredited by the American Chemical Society. Copies of the most recent accreditation actions follow this page.
November 18, 1996

President Richard J. Gowen
South Dakota School of Mines and Technology
501 E. St. Joseph Street
Rapid City, SD 57701

Dear President Gowen:

This letter is formal notification of the action taken concerning South Dakota School of Mines and Technology by the Commission on Institutions of Higher Education. At its meeting on November 13-15, 1996, the Commission voted

...to continue the accreditation of South Dakota School of Mines and Technology, and to adopt the other items entered on the attached Statement of Affiliation Status.

Changes in your institution that would require further Commission action prior to their initiation are found in Chapter 12 of Handbook of Accreditation. Please review them with care.

Information about informing the public of this action is found in Chapter 15 of the Commission’s Handbook.

On behalf of the Commission I thank you and your associates for your cooperation. If you have questions about this action or about Commission policies and procedures please write or call Dr. Stephen D. Spangehl, who is the member of our staff responsible for providing continuing assistance to South Dakota School of Mines and Technology.

Sincerely,

Patricia A. Thrash
Executive Director

Enclosures: Statement of Affiliation Status
Record of Status and Scope

cc: Evaluation Team Members
STATEMENT OF AFFILIATION STATUS

SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY
501 E. St. Joseph Street
Rapid City, SD 57701

(Effective November 15, 1996)

Status: Accredited (1925-)

Highest degree awarded: Doctor's.

Most recent action: November 15, 1996.

Stipulations on affiliation status: The School is to inform the Commission prior to implementing programs at locations other than its campus at Rapid City and Ellsworth Air Force Base.

New degree sites: None.

Progress reports required: None.

Monitoring reports required: None.

Contingency reports required: None.

Other visits required: None.

Last comprehensive evaluation: 1995-96.

Next comprehensive evaluation: 2005-06.
July 26, 1996

Dr. Richard J. Gowen
President
South Dakota School of Mines & Technology
501 East St. Joseph Street
Rapid City, SD 57701

Dear Dr. Gowen:

The Computer Science Accreditation Commission (CSAC) of the Computing Sciences Accreditation Board (CSAB) met on June 28-30, 1996, to act on the accreditation reviews conducted during the 1995-96 academic year. The accreditation of the program that you submitted to CSAC for evaluation is being continued for a period of 6 years (6Y). Details concerning the applicable CSAC/CSAB policies, and a confidential Final Statement are enclosed.

The CSAC action on your program takes into account the information that was submitted in your response to the Preliminary Statement for Review and Comment. The chairperson of your evaluation team presented an analysis of this response to the entire Commission, and after thorough discussion, CSAC reached the decision that we are pleased to report to you in this letter.

The policy of CSAB is that CSAC grant accreditation for a limited number of years. The length of the accreditation term is not to be publicly disclosed, because it is not an indication of program quality and may be misunderstood. Your program is awarded the maximum period of accreditation under current policy. Continuation of accreditation beyond the term provided requires a re-evaluation of the program at the request of the institution.

The enclosed Final Statement discusses the findings that are the basis for the action of the Commission. It was developed from the Preliminary Statement that you previously reviewed, with the addition of specific sections that (1) address your earlier response and pertinent changes since the visit, and (2) summarize the conclusions of the Commission.
Letter to Dr. Gowen
July 26, 1996
Page 2

Your institution's program will be listed among the 144 computer science programs currently accredited by CSAC. These programs will be listed in the forthcoming CSAB Annual Report, and in two public announcements of all CSAC-accredited programs. These news releases are sent to The Chronicle of Higher Education, computing professional journals, the education editors of various popular publications, major newspapers, to other accrediting bodies, the Association of Specialized and Professional Accreditors (ASPA), colleges and universities, selected secondary schools, and to corporate recruitment personnel.

Speaking for our offices, team chairpersons and program evaluators, I appreciate your interest in computer science education, and the efforts of your faculty and staff to secure the continued accreditation of your computer science program. Please accept our best wishes and congratulations.

Sincerely,

[Signature]

Doris K. Litke
President

Enclosure: Public Release Policy
CSAC Criteria
CSAC Accreditation Provisions
Final Statement
Official Statement

cc: Dr. Karen Whitehead, Dean  
Dr. Edward Corwin, Chairperson  
Dr. Keith Barker, 1995-96 CSAC Chairperson  
Mr. Patrick M. LaMalva, Executive Director  
Dr. Marino J. Nicolai, CSAC Team Chairperson
SEP 27 1999

Karen Whitehead
Vice President for Academic Affairs
South Dakota School of Mines & Technology
501 East St. Joseph Street
Rapid City SD 57701-3995

Dear Dr. Whitehead:

The Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET) recently held its 1999 Summer Meeting to act on the program evaluations conducted during the 1998-99 academic year. Each evaluation was summarized in a report to the Commission and was considered by the full Commission before a vote was taken on the accreditation action. The results of the evaluation for South Dakota School of Mines and Technology follow:

Accredit to September 30, 2005. A request to ABET by January 31, 2004 will be required to initiate a reaccreditation evaluation visit. The reaccreditation evaluation will be a comprehensive general review.

- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Geological Engineering
- Industrial Engineering
- Mechanical Engineering
- Metallurgical Engineering

Accredit to September 30, 2002. A request to ABET by January 31, 2001 will be required to initiate a reaccreditation evaluation visit during Fall, 2001. In preparation for the visit, a report describing the actions taken to correct shortcomings identified in the final statement shall be submitted to ABET by July 1, 2001. The reaccreditation evaluation will focus on these shortcomings.

- Mining Engineering
Accreditation Board for Engineering and Technology, Inc.

Accredit to September 30, 2002. A report describing the actions taken to correct shortcomings identified in the final statement shall be submitted to ABET by January 31, 2002. If accepted, this report may serve as the basis for extension of accreditation to September 30, 2005.

Computer Engineering b

This is a newly accredited program. Please note that the graduating class of the spring of 1998 is the first group of students to graduate from this accredited program.

The final statement to your institution that discusses the findings on which the action was based is enclosed.

The policy of ABET is to grant accreditation for a limited number of years, not to exceed six, in all cases. The period of accreditation is not an indication of program quality. Any restriction of the period of accreditation is based upon observed or reported conditions indicating that compliance with the applicable accreditation criteria must be strengthened. Continuation of accreditation beyond the time specified requires a reevaluation of the program at the request of the institution as noted in the accreditation action cited above. ABET policy prohibits disclosure of the period for which a program is accredited. For further guidance, please refer to the enclosed copy of ABET’s Public Release Policy.

A list of accredited programs is published annually by ABET. In compliance with the regulations of the U.S. Department of Education, it is ABET policy to provide the Secretary of Education with the list of accredited programs and final accreditation actions. Information about ABET accredited programs at your institution will also be listed in the forthcoming ABET Accreditation Yearbook and on the ABET website (www.abet.org).

It is the obligation of the officer responsible for ABET accredited programs at your institution to notify ABET of any significant changes in program title, personnel, curriculum, or other factors which could affect the accreditation status of a program during the period of accreditation.
Please note that appeals are allowed only in the case of not to accredit actions. Also, appeals may be based only on the conditions stated in the first paragraph of the enclosed Appeals Policy.

Sincerely,

Ira D. Jacobson, Chair
Engineering Accreditation Commission

Enclosures:  Final Statement
Public Release Policy
Appeal Policy
Appeal Procedure
Instructions to Institutions for Programs Requiring Interim Visits
Instructions to Institutions for Programs Requiring Interim Reports

cc: Richard J. Gowan, President
Daniel J. Bradley, Visit Team Chair

* The following codes identify the type of program accredited:

a - associate degree program   d - day program
b - baccalaureate degree program e - evening program
m - master's degree program, basic level w - weekend program
M - master's degree program, advanced level C - co-op
Dr. James M. Munro, Chair  
Department of Chemistry and Chemical Engineering  
South Dakota School of Mines and Technology  
Rapid City, SD 57701  

Dear Dr. Munro:  

The Committee reviewed your department’s five-year reevaluation report, and I am pleased to inform you that the Committee concluded that your department continues to meet the guidelines that have been established for ACS-approved chemistry programs.

After reviewing the course materials that were submitted for Environmental Chemistry (CHEM 332), the Committee members agreed that this course, while valuable as an elective, does not qualify as advanced for ACS certification purposes. The Committee would be pleased to reconsider the advanced status of CHEM 332 and to examine any additional or revised course materials that you care to send.

The Committee expressed concern with the content of one of the research reports that was submitted, which was substantial in size but did not have a discussion section. The Committee encourages you to ensure that journal format is followed for all student research reports and emphasize the importance of the discussion of research results with the students. The student research reports that were submitted are being returned under separate cover.

I apologize for the delay in communicating the final results of your review. The Committee appreciates your cooperation and patience. If you have any questions or comments, please feel free to contact me.

Sincerely,

Cathy A. Nelson  
Secretary  
Committee on Professional Training

c: Dr. Richard J. Gowen, President
D. Enrollment

Total enrollment for the entire institution (FTE) 1947
Total faculty for the entire institution (FTE) 111

E. Funding Process. Describe the process for allocating institutional funds to the computer science program.

Budgets are built by the central administration of SDSM&T with the help of the deans and department chairs. This budget is presented and defended to the Board of Regents of Higher Education for South Dakota and eventually to the Appropriations Committee of the State Legislature. Each campus has an opportunity to charge approved fees to cover critical areas. Capital assets follow a similar process of presentation.

When the Legislature has passed the Appropriations Bill, it is the responsibility of the Board of Regents to allocate budgets to the separate schools according to the legislative intent.

The instructional program budget is distributed on the SDSM&T campus by the Vice President for Academic Affairs with the approval of the President of SDSM&T. Each college dean is invited each year to present a budget request on behalf of the college, using the previous year’s budget as a baseline. In the event that one-time funds are anticipated, the deans prepare prioritized requests for their allocation. Funds are then distributed on a college basis by the Vice President for Academic Affairs to the deans. The dean then allocates college resources to the departments within the college. As with all tax-assisted institutions, a good deal of accountability is prescribed. About one-third of the budget of state higher education in general comes from state taxes, with the remainder coming from student tuition and fees, gifts, and research activity.

F. Promotion and Faculty Tenure. Summarize the promotion and tenure system and the system for merit salary adjustments. (Give an overview of actual practice; do not reproduce an entire section from the faculty handbook.)

To be eligible for promotion, the faculty member must meet the minimum rank qualifications set forth in the Agreement between the South Dakota Board of Regents and the Council of Higher Education, an affiliate of the South Dakota Education Association. These specify educational experience and years of experience required for each rank. In addition to the minimum promotion criteria, faculty must meet institutional and departmental standards for promotion and tenure. In practice, this means that to be considered for promotion a faculty member must excel in at least one of the areas of (1) teaching, (2) research, scholarship and/or creative endeavor, and (3) service. Normally, strength is also expected in one or two secondary areas.

Faculty members who wish to be considered for promotion must notify their department chair in writing no later than October 5. It is the responsibility of the
faculty member to prepare and submit all favorable documentation that he or she wants considered in the decision and to submit this with the request for consideration. This documentation, together with the recommendation of the department chair and the dean, is then forwarded to the Office of the Vice President for Academic Affairs by November 5.

Faculty members are considered for tenure in their sixth year of tenure-track service, and must have achieved the rank of Associate Professor to be granted tenure. The procedures for tenure application are the same as those for promotion described above. Faculty who do not apply for or who are not granted tenure must be given notice of non-renewal of their tenure-track contract. The contract between the Board of Regents and the Council on Higher Education requires that unsuccessful applicants for tenure be granted one additional term contract following the decision not to award tenure.

The Office of the Vice President for Academic Affairs then makes these materials available to the institutional Promotion and Tenure Committee. The Promotion and Tenure Committee consists of eight members, of which four are elected for three-year terms by the faculty, the remainder being appointed by the President. The current practice is to appoint the four college deans to this committee.

The Promotion and Tenure Committee reviews all materials and has access to the faculty member's personnel file. The committee consults with the faculty member and other appropriate individuals as it sees fit. By January 15, the Committee forwards all information, together with its recommendation, to the President who then forwards his recommendation for or against promotion to the Board of Regents.

Distribution of salary monies appropriated by the Legislature is negotiated by the Board of Regents and the Council on Higher Education. The allocation of salary increases for the past four years has been based on market (25% of funds), performance (60% of funds), and institutional discretion (15%), with specific formulas for this allocation specified in the negotiated agreement. During the annual performance evaluation, department chairs must indicate whether, in their estimation, the faculty member has met, fallen short of, or exceeded expectations in teaching, in scholarship, and in service. Each college dean uses this information to determine a merit category for college faculty members in each of the three areas. This categorization is then used in the allocation formula for performance. Institutional discretionary funds have been used to provide additional recognition for performance in teaching.

In 1997, the South Dakota System of Higher Education changed from formula-based funding to a five-year base budget funding approach. This was at a time when decreases in enrollments would have resulted in a funding decrease under the formula. The South Dakota Legislature allowed the Board of Regents to retain the funds to be lost under the formula with the provision that they be directed toward improving salaries under a salary competitiveness program. This three-year program, funded through these funds together with a special student fee and additional internal redirections, provided an average salary package of 6.1% for the academic years 1998-99 through 2000-01. The Board of Regents
continued this program at a reduced level of 4.5% for the academic year 2001-2002. As a result of this program, computer science faculty salaries for 2001-2002 are on average 43.86% greater than they were in 1997-1998.

G. Retirement and Benefits. Summarize the retirement program and other faculty benefits.

SDSM&T participates in the State of South Dakota retirement and benefit programs. All eligible employees make a five percent contribution to the retirement system which is matched by the State and credited to the employees’ accounts. Eligible employees are also covered by the South Dakota Public Employee Benefit Program. This includes life, group medical, and major medical insurance.
Appendix II. General Information on the Unit Responsible for the Computer Science Program

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

A. Type of unit

1. Name of computer science program unit: Department of Mathematics and Computer Science

   URL http://www.mcs.sdsmt.edu

2. If the computer science administrative program unit is not a department reporting to an administrative officer (e.g., Dean of College of Arts and Sciences) who in turn reports to president, provost, or equivalent executive officer, describe the unit.

   Not applicable

B. Administrative Head of Computer Science Program Unit

   Dr. Antonette Logar (Name)  Department Chair (Title)
C. Organization Chart: Attach an organization chart showing how the unit fits into the administrative structure of the institution.

June 2001
D. Research Organizations. Describe any research organizations, institutes or other related facilities that are part of the unit responsible for the computer science program or that closely affect its operation.

Although it is not an official institute, the Collaborative Research program between SDSM&T and Sun Microsystems is an ongoing research program which provides many of the benefits of a research institute to the department. Sun provides equipment and funding for faculty and students to work with a team from Broomfield, Colorado on cutting-edge research projects. For the past two years these projects have been concentrated in the area of high performance computing and enhancement of automatic parallelization tools. Seven faculty members and approximately fifteen students have worked on these projects.

A similar collaboration exists between Raytheon and SDSM&T. Funding and equipment are provided to the department for research and development of satellite imagery tools. The MODIS reprojection tool is currently the largest effort, but many other projects have been completed under this agreement. Three faculty and seven students have been involved in these projects.

Opportunities for research are also available through the Institute of Atmospheric Sciences (IAS). This institute was founded in 1959 and is an internationally known research group currently employing 15 researchers. Its activities include research in such areas as remote sensing, hailstorm modeling, and lightning data analysis. In the past five years, five computer science faculty members have participated in IAS research for NASA and NSF, primarily in the area of satellite image enhancement techniques and pattern recognition. Newer initiatives in biocomplexity, which combines remote sensing, modeling, and pattern recognition, are expected to result in increased collaboration between the computer science faculty and the researchers in IAS.

E. Computer-Related Undergraduate Degree Programs. List all undergraduate computer-related degree programs offered by the institution, beginning with the program(s) being evaluated.

<table>
<thead>
<tr>
<th>Program Title</th>
<th>Years Reqd</th>
<th>Degree Awarded</th>
<th>Admin. Unit</th>
<th>If accred., by whom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Science</td>
<td>4</td>
<td>B.S. in Computer Science</td>
<td>Dept. of Mathematics &amp; Computer Science</td>
<td>CSAB (ABET-CAC)</td>
</tr>
<tr>
<td>Computer Engineering</td>
<td>4</td>
<td>B.S. in Computer Engineering</td>
<td>Dept. of Electrical &amp; Computer Engineering</td>
<td>ABET</td>
</tr>
</tbody>
</table>
Are these programs adequately differentiated in all university information? Explain how.

Separate catalog descriptions are provided for the two programs. Each program has its own fact sheet that is used by the Admissions Office when discussing programs with prospective students at College Fairs and on campus visits.
# Appendix III. Finances

A. Finances Related to the Computer Science Program(s).

1. For the computer science program, indicate below the funds expended during the fiscal year immediately preceding the visit.¹

<table>
<thead>
<tr>
<th></th>
<th>Institutional Funds*</th>
<th>Non-recurring or Outside Funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Salaries</td>
<td>$23,210</td>
<td></td>
</tr>
<tr>
<td>Faculty Salaries</td>
<td>$990,651</td>
<td>$144,914</td>
</tr>
<tr>
<td>Non-teaching Professionals' Salaries ²</td>
<td>$37,836</td>
<td></td>
</tr>
<tr>
<td>Support Personnel Salaries &amp; Wages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secretarial</td>
<td>$19,471</td>
<td></td>
</tr>
<tr>
<td>Technician</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Other - student labor</td>
<td>$4,125</td>
<td></td>
</tr>
<tr>
<td>Graduate Students</td>
<td>$67,917</td>
<td>$24,832</td>
</tr>
<tr>
<td>Operating Expenditures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(excluding research operations and travel)</td>
<td>$41,956</td>
<td>$8,925</td>
</tr>
<tr>
<td>Capital Equipment Expenditure: (including value of allocated time for teaching and research):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td>$5,176</td>
<td>$2,482</td>
</tr>
<tr>
<td>Computer Expenditures: (total, including value of allocated computer time for teaching and research)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardware</td>
<td>$13,085</td>
<td>$26,300</td>
</tr>
<tr>
<td>Software</td>
<td>$600</td>
<td>$163</td>
</tr>
<tr>
<td>Allocated time</td>
<td>**</td>
<td></td>
</tr>
<tr>
<td>Travel Expenditures (non-research funds)</td>
<td>$5,301</td>
<td></td>
</tr>
<tr>
<td>Scholarship Awards (if administered by the Computer Science Program Unit)</td>
<td></td>
<td>$5,500***</td>
</tr>
<tr>
<td>Library (if administered by Computer Science Program Unit)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Research (if separately budgeted)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Other – Undergraduate research assistants</td>
<td>$59,433</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$1,209,328</td>
<td>$272,549</td>
</tr>
</tbody>
</table>

*Since the computer science program is part of an integrated department, it is difficult to separate out expenditures for it alone. Salary and benefit dollars for the 7.5 FTE devoted to computer science were $559,804. We estimate that approximately 65% of general O&M expenditures are devoted to the computer science program. Graduate students come entirely from the computer science M.S. program. **Campus computing resources are networked and supported by Information Technology Services (ITS). ITS provides technical support for faculty equipment and computer labs. Networked resources, including internet access and Internet2 access, are available to all students and faculty. The ITS budget for 2000-2001 was $1,922,905 of which $1,139,090 was supported with state funds. ***In the spring of 2001, the department awarded $14,000 in scholarships for the 2001-2002 academic year.

¹ It is understood that some of the data may have to be estimated to cover the entire fiscal year. In such case, unless the differences are insignificant, an updated report should be provided for the evaluation team at the time of the visit.
2 Non-teaching professionals would include research professors, faculty members on
paid sabbatical leave, post-doctoral research associates, and other degreed
professionals.

2. Report funds for the fiscal year immediately preceding year of visit, broken down
according to source.

<table>
<thead>
<tr>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional funds (recurring)</td>
</tr>
<tr>
<td>Gifts and non-research grants</td>
</tr>
<tr>
<td>Research contracts and grants</td>
</tr>
<tr>
<td>Other (explain)</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

B. Operating and Computing Expenditures for the Five Fiscal Years Immediately
Preceding that Reported in III A.

1. Operating expenses for the computer science program unit.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional Funds</td>
<td>$33,490</td>
<td>$23,096</td>
<td>$44,840</td>
<td>$27,301</td>
<td>$36,537</td>
</tr>
<tr>
<td>Outside Funds</td>
<td>$0</td>
<td>$0</td>
<td>$2,964</td>
<td>$7,893</td>
<td>$19,191</td>
</tr>
</tbody>
</table>

2. Computer hardware/software capital expenditures (excluding equipment used
primarily for research) for the computer science program unit.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Institutional Funds</td>
<td>$54,041</td>
<td>$43,337</td>
<td>$14,044</td>
<td>$85,335</td>
<td>$51,149</td>
</tr>
<tr>
<td>Outside Funds</td>
<td>$0</td>
<td>$8,224</td>
<td>$380</td>
<td>$550</td>
<td>$205,063</td>
</tr>
</tbody>
</table>

C. Additional Funding. If additional funds, other than those listed in Table A.1 above,
are available to faculty to support scholarly activities such as travel to technical meetings,
e.g., consulting support, give the number of faculty for whom this type of support is
appropriate and an estimate of the amount of support available.

Approximately $90,000 annually is available to support requested faculty
development activities. These monies are allocated by an institutional Faculty
Development Committee that considers individual faculty proposals on an ongoing
basis. Activities supported range from travel support to attend professional
meetings to bringing presenters to campus.

A. Term of appointment of administrative head.

9 month __X__ 12 Month _______ Other (specify) ________

B. Number of personnel associated with program.

<table>
<thead>
<tr>
<th></th>
<th>Full-time Number</th>
<th>Part Time</th>
<th>Total FTE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>FTE</td>
<td></td>
</tr>
<tr>
<td>Faculty</td>
<td>5</td>
<td>4* 2.25</td>
<td>7.25</td>
</tr>
<tr>
<td>Non-teaching Professionals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administrative</td>
<td>1</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>Computer Lab Personnel: **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professionals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technicians</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secretarial, Accounting, etc.</td>
<td>1</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Graduate Teaching Assistants</td>
<td>16</td>
<td>9.06</td>
<td>9.06</td>
</tr>
<tr>
<td>Graduate Research Assistants</td>
<td>1</td>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>Graduate Students</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate Students</td>
<td>162</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The four individuals listed here are all full-time faculty with part-time responsibility in Computer Science. Three faculty are 50% Computer Science and 50% Mathematics, while the chair is 75% Computer Science and 25% administration.
** Computer lab support is provided by Information Technology Services (ITS). ITS has a full time professional staff of 10 and a part time student staff of 15-20.

C. Policies. Provide a brief description to give an overview.

1. Describe policy toward private consulting work, sponsored research projects, and extra compensation.

Private Consulting Work
Policy on private consulting work is defined in the collective bargaining agreement, Section IX, Article 9.5. This policy deals with private consulting which requires the faculty member's absence from duties and limits such time to a maximum of four (4) days per month with an accumulated maximum of six (6) days during the contract period. Such work must be related to the faculty member's duties.

The faculty member who receives release time for private consulting work must receive prior written approval from the President and must file a report with the President after the work is completed.
**Sponsored Research Projects.**

Sponsored research participation is strongly encouraged. Faculty participating in sponsored research do not receive extra compensation during the academic year, but those who continue such research on a full-time basis during the summer may receive compensation equal to one-ninth of the academic year salary for each month worked during the summer. Faculty members who have funding for sponsored research during the academic year are relieved of a proportionate part of their teaching load.

**Extra Compensation**

Faculty members who voluntarily teach overloads receive overload pay as do faculty who teach summer courses. The established rate for such efforts is 8% of the nine-month base salary per three-credit course. It is rare that computer science faculty offer to teach overloads, and there has not been the need to ask them to do so.

2. State the standard teaching, administrative, research, and other loads on the faculty, in general terms.

The nominal teaching load for faculty is 12 credit hours per semester. However, practice within the department is to keep teaching assignments to two or three courses per semester with a maximum of two preparations whenever possible.

Tenure-track and tenured faculty are expected to serve on departmental and campus committees. Committee assignments for AY 2000-2001 are detailed in the faculty resumes in the self-study. The department has committees for both the undergraduate and the graduate computer science programs, and each computer science faculty member is assigned to one of these. These committees are given responsibility for curriculum, make recommendations on the allocation of departmental resources, and advise the department chair on any other matters concerning the program.

Faculty are expected to pursue research and scholarly activity appropriate to their interests.

Each semester, the department chair meets individually with faculty members to discuss their professional objectives in teaching, research, and service. The proportion of effort in each area varies with the individual, with teaching typically accounting for 60%-75% of effort for computer science faculty members.

3. Describe policies and procedures for recruiting faculty for the computer science program. Describe any barriers to hiring the appropriate faculty.

When faculty positions become vacant, a search committee is constituted to conduct a national search. Advertisements are placed in appropriate professional journals, and position announcements are sent to other colleges and universities as well as to the South Dakota Job Service. The personnel department maintains a manual detailing specific search procedures and this will be available to the team if they wish to review it.
Since the last accreditation visit, one tenure-track faculty member, Dr. Gregg Stubbendieck, has been added to the computer science faculty as the result of a national search, filling a position created by a resignation. While every effort is made to bring in new faculty at salary levels close to the average for rank and discipline as indicated by the Faculty Salary Survey by Discipline conducted annually by Oklahoma State University, the national shortage of computer science Ph.D.s coupled with the geographic isolation of SDSM&T present challenges in filling positions. In this most recent case, it took three years to fill the position. The program has been allocated an instructor position to assist with the increased freshmen level load, and it is anticipated that this position will be filled shortly.
Appendix V. Computer Science Program Enrollment and Degree Data

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

Give below enrollment figures for the first term of the current and five previous academic years and the number of undergraduate and graduate degrees conferred. (The current year is the year in which this report is being prepared.) List data beginning with the most recent year first. If part-time students are involved, give the number as FTE/actual number, e.g., 10/40.

Institution as a Whole

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Enroll Year</th>
<th>Total Undergrad</th>
<th>Total Grad</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2001</td>
<td>1st 2nd 3rd 4th 5th</td>
<td>1995 312</td>
<td>234 105*</td>
<td>4*</td>
</tr>
<tr>
<td>1999-2000</td>
<td>657 401 315 453</td>
<td>2023 252</td>
<td>297 56</td>
<td>4</td>
</tr>
<tr>
<td>1998-1999</td>
<td>710 357 321 418</td>
<td>1972 239</td>
<td>256 49</td>
<td>3</td>
</tr>
<tr>
<td>1997-1998</td>
<td>666 386 338 403</td>
<td>2008 202</td>
<td>265 72</td>
<td>2</td>
</tr>
<tr>
<td>1996-1997</td>
<td>656 359 350 376</td>
<td>1994 224</td>
<td>278 56</td>
<td>4</td>
</tr>
<tr>
<td>1995-1996</td>
<td>687 457 343 378</td>
<td>2099 257</td>
<td>271 94</td>
<td>1</td>
</tr>
</tbody>
</table>

*estimate

Unit offering Computer Science Program(s)—give total enrollment even if not all students are in the program for which accreditation is requested.

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Enroll Year</th>
<th>Total Undergrad</th>
<th>Total Grad</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-2001</td>
<td>84 32 23 23</td>
<td>162 22</td>
<td>8 12*</td>
<td></td>
</tr>
<tr>
<td>1999-2000</td>
<td>60 27 22 30</td>
<td>139 15</td>
<td>19 6</td>
<td></td>
</tr>
<tr>
<td>1998-1999</td>
<td>53 29 27 28</td>
<td>137 16</td>
<td>20 2</td>
<td></td>
</tr>
<tr>
<td>1997-1998</td>
<td>63 30 21 28</td>
<td>142 16</td>
<td>22 4</td>
<td></td>
</tr>
<tr>
<td>1996-1997</td>
<td>49 25 25 20</td>
<td>119 21</td>
<td>17 10</td>
<td></td>
</tr>
<tr>
<td>1995-1996</td>
<td>44 34 20 24</td>
<td>122 22</td>
<td>16 11</td>
<td></td>
</tr>
</tbody>
</table>

*estimate
Appendix VI. Admission Requirements

If you are having more than one program evaluated, particularly if the programs are on separate campuses, the answers to these questions may vary from one program to another. If this is the case, please use separate copies of this section for each program, and clearly delineate which program is being described.

A. Admission of students

1. Describe the criteria and procedures used for admitting students to the computer science program(s).

   The admission requirements for the computer science program are the same as those for the institution as a whole. Students under twenty-one (21) years of age must meet the following requirements.

   i. Completion of the following high school courses with a “C” average or better:
      - Four years of English
      - Two years of mathematics excluding arithmetic, business mathematics, general mathematics, and other similar courses
      - Two years of laboratory science
      - A third year of laboratory science or a third year of mathematics
      - Three years of social studies
      - One-half year of fine arts

   ii. Students who have completed the minimum course requirements but who have not obtained a “C” average must meet the one of the following conditions:
       South Dakota or Minnesota resident: Student ranks in the top half of the student’s high school graduating class, or has an ACT composite score of 21 or above, or is selected in an exception group limited in size to 3% of the previous year’s freshman class.
       Non-resident: Student ranks in the top half of the student’s high school graduating class, or has an ACT composite score of 23 or above.
       Students twenty-one (21) years of age or older or who are transferring in more than 24 credit hours are admitted at the discretion of the institution.

2. Describe procedures, including the evaluation of transfer credits, for students admitted to the program as transfer students

   a. from within the institution

   A student who changes majors within the institution is assigned an advisor within the department who determines which courses already taken apply toward the computer science major. Since there is little duplication of courses within the
institution, the student typically will be required to take all courses explicitly required by the computer science program. In the case of students who have previously begun an electrical engineering major, there is occasionally a determination that digital hardware courses taken in that department may be substituted for required computer science courses. Such decisions are documented by memoranda to the Registrar.

b. from another institution

Preceding matriculation of the transfer student at SDSM&T, the Registrar reviews the transcripts of new transfer students and indicates courses outside the major which appear to be eligible for transfer. The annotated transcripts, together with transfer credit transmittal forms, are then sent to the department. The department has designated faculty members who review transcripts, course descriptions, and any other material the student may wish to present to determine whether courses taken elsewhere correspond with required courses in our curriculum. In the case of out-of-department courses such as English, physics and chemistry, the student may be asked to obtain an evaluation from the relevant department. Following this review, a recommendation is made to the registrar regarding transfer of credits. In cases where there is substantive, but not total, correspondence of courses, the student is required to register for a special topics course and, under the guidance of a faculty member, cover the missing components of the course.

3. Explain the policy of the institution in admitting students with conditions and state how the conditions must be made up.

A student who meets the ACT composite score or high school rank condition for admission but fails to meet high school course requirements in one area may be admitted provisionally. The student will then be required to meet the admission requirements by satisfactorily completing appropriate college courses of an equivalent type in that area for credit. These credits will not be included toward graduation from SDSM&T unless the credits are earned during the student’s first semester in college with a grade of C or better.

4. Describe the general policy and methods of the unit offering computer science program(s) in regard to admission with advanced standing.

We accept the CLEP and AP exams. These are most commonly requested in areas of English, humanities and social sciences, and, less frequently, in calculus. Students are admitted with advanced standing typically through the transfer of credit from other institutions as described in the response to question 3.
5. Describe any special admission requirements for entry into the “upper division” in the computer science program(s).

There is no formal “upper division” designation. Students are classified as juniors upon completion of 64 credit hours and as seniors upon completion of 96 credit hours. Students are free to enroll in upper-level courses, i.e., courses numbered above 300, upon completion of the published prerequisites for those courses.
Appendix 7
Assessment Documentation

1. University Mission Statement
2. Major Field Achievement Test Summary
3. Major Field Achievement Test Description
4. Alumni Survey Summaries
5. CAAP Examination Description
6. IAC Presentations
7. Student Opinion Survey
8. SGID Description
9. Faculty Evaluation
1. Mission Statement

The mission of the South Dakota School of Mines and Technology is:

- To prepare men and women for an enhanced quality of life by providing a broad educational environment which fosters a quality educational experience leading to baccalaureate and post-baccalaureate degrees emphasizing science and engineering.

- To contribute to the expansion of knowledge through programs of basic and applied research, scholarship, and other creative endeavors.

- To utilize the special capabilities and expertise on the campus to address regional, national, and international needs.

The principal objectives in support of this mission are:

- To make the South Dakota School of Mines and Technology an outstanding undergraduate educational institution, enhanced by quality graduate education.

- To enhance our national recognition as an educational institution with emphasis in science and engineering.

- To continue to develop centers of excellence in research and graduate education using faculty expertise, and to further develop interdisciplinary research that involves faculty from several departments.

- To create and continually ensure an environment which nurtures growth of the intellect, character, and spirit of students, faculty, and staff.

- To build mutually beneficial partnerships with the broader community.

- To increase significantly the resources available to the institution.

This statement of mission and objectives serves as a framework for the continued growth of excellence at the South Dakota School of Mines and Technology.
2. Major Field Achievement Test Summary

The table below gives the national percentile ranks for SDSM&T students taking the Major Field Achievement Test since 1995. Note that the 1997 results are missing but should be available in time for the visit in October 2001. Also, the test changed in 1996, and it is not clear that the percentile rankings in 1996 are correct since the interpretation guide sent with the 1996 tests was dated 1995.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Score</td>
<td>83</td>
<td>81</td>
<td>83</td>
<td>n.a.</td>
<td>77</td>
<td>96</td>
</tr>
<tr>
<td>Programming Methodology</td>
<td>85</td>
<td>85</td>
<td>69</td>
<td>n.a.</td>
<td>56</td>
<td>88</td>
</tr>
<tr>
<td>Software Systems</td>
<td>89</td>
<td>83</td>
<td>87</td>
<td>n.a.</td>
<td>81</td>
<td>98</td>
</tr>
<tr>
<td>Computer Organization and Design</td>
<td>84</td>
<td>79</td>
<td>87</td>
<td>n.a.</td>
<td>55</td>
<td>93</td>
</tr>
<tr>
<td>Theory and Mathematics</td>
<td>84</td>
<td>65</td>
<td>82</td>
<td>n.a.</td>
<td>68</td>
<td>98</td>
</tr>
</tbody>
</table>

The mean score is the percentile rank of the institutional mean score, that is the average score for all students taking the test at this institution. It is not the average of the four categories.
3. Major Field Achievement Test Information
http://www.ets.org/hea/mft/about.html

ETS helps promote institutional effectiveness by providing the tools colleges and universities need to implement assessment plans. Through its Higher Education Assessment program, ETS offers an array of tests and surveys used widely in outcomes assessment and institutional evaluation. We offer a full range—from those that measure individual skills and content mastery to those that measure overall institutional effectiveness.

The Major Field Test program is an innovative battery of undergraduate outcomes tests that is used by schools and departments at more than 600 colleges and universities globally to measure student academic achievement and growth. Academic departments benefit from the use of the tests as the scores allow for detailed curriculum review and evaluation. Students benefit from the tests by having an effective metric to determine their own level of achievement, comparing their scores with those of other students in the program and with national comparative data.

The content of the Major Field Tests reflects the basic knowledge and understanding gained in the core undergraduate curriculum. The tests are two-hour, multiple-choice examinations designed to assess mastery of concepts and principles as well as knowledge expected of students at the conclusion of a major in specific subject areas. They go beyond measurement of factual knowledge, however, because they also evaluate students’ ability to analyze and solve problems, understand relationships, and interpret material.

Each test delivers an individual student score report, plus the mean scale score and standard deviation for the group of students tested. Several of the tests deliver individually reliable subscores that denote achievement in broad areas within the field. These can be used to highlight students’ strengths or weaknesses in these areas. Most of the tests also deliver assessment indicators, or scores relating to the performance of the group of students within subareas of the major field of study.

Major Field Test scores are reported on a scale of 120-200, with subscores (which many of the tests include) reported on a scale of 20-100. Many of the tests also report scores based on group-level achievement in sub-fields of the discipline. These “assessment indicators” report the average percent of test questions answered correctly, in a particular subject area, by all students tested. Major Field Tests only score correct answers, thereby not penalizing students for any omissions or guesses.

Confidentiality of Information
All Major Field Test data are considered confidential and are reported only to the institutions involved. Data aggregated across institutions are provided as comparative data only. Individually identifiable information is also available but only to the involved institutions. Any information about an institution that is gathered through the testing program will not be released in any form unless ETS has received prior written
authorization to do so. Answer sheets are kept for a period of twelve months and then destroyed, while score report data are kept on file at ETS for five years and then destroyed.

The confidentiality of all student information and scores should be recognized and maintained at all times. We therefore recommend that the institutions obtain written authorization from each student, allowing certain faculty members and others directly concerned with the students’ education to have access to their scores.
4. Alumni Survey Summaries

Question 5

If you are currently employed in the computer field, check off the items that most closely describe the primary focus of the company/entity you work for:

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accounting</td>
<td>3.8</td>
</tr>
<tr>
<td>Aerospace</td>
<td>10.2</td>
</tr>
<tr>
<td>Banking and Insurance</td>
<td>4.5</td>
</tr>
<tr>
<td>Computer Hardware Manufacturing</td>
<td>3.8</td>
</tr>
<tr>
<td>Computer Service (installation and maintenance of hardware and/or software)</td>
<td>8.3</td>
</tr>
<tr>
<td>Computer Sales and Marketing</td>
<td>1.3</td>
</tr>
<tr>
<td>Education</td>
<td>5.1</td>
</tr>
<tr>
<td>Engineering (other than Aerospace)</td>
<td>9.6</td>
</tr>
<tr>
<td>Entertainment</td>
<td>1.3</td>
</tr>
<tr>
<td>Government</td>
<td>7.6</td>
</tr>
<tr>
<td>Military</td>
<td>5.1</td>
</tr>
<tr>
<td>Publishing</td>
<td>0.6</td>
</tr>
<tr>
<td>Retail (other than computer related products)</td>
<td>1.3</td>
</tr>
<tr>
<td>Software Engineering</td>
<td>20.4</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>7.0</td>
</tr>
<tr>
<td>Other</td>
<td>10.2</td>
</tr>
</tbody>
</table>

Others specified:

2001:

Consulting Architect
Shell Oil Infrastructure
Consulting
Internet Ad Serving
Financial Services
Non-primary Debt Credit Cards
Medical
Medical Manufacturing
Marketing
Semiconductor - Embedded Firmware
Health Care
Customize/Integrate Customer Relationship Management (CRM) SW
Financial Software
Technology Leasing
Legal

226
Consulting with Medical Industry on Electronic Insurance Claims &
Office Automation
Agriculture
Medical Devices

Question 6

If you are working in a computer related field, check off the items that most closely
describe the primary activities of your current job:

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration/Management</td>
<td>5.2</td>
</tr>
<tr>
<td>Computer Hardware</td>
<td>-</td>
</tr>
<tr>
<td>Computer Hardware Testing</td>
<td>2.1</td>
</tr>
<tr>
<td>Customer Support</td>
<td>6.6</td>
</tr>
<tr>
<td>Computer Programming</td>
<td>15.0</td>
</tr>
<tr>
<td>Consulting</td>
<td>6.3</td>
</tr>
<tr>
<td>Information Systems</td>
<td>4.5</td>
</tr>
<tr>
<td>Project Management</td>
<td>-</td>
</tr>
<tr>
<td>Sales and Marketing</td>
<td>0.7</td>
</tr>
<tr>
<td>Software Design</td>
<td>17.4</td>
</tr>
<tr>
<td>Software Engineering</td>
<td>-</td>
</tr>
<tr>
<td>Software Maintenance</td>
<td>12.5</td>
</tr>
<tr>
<td>Software Testing</td>
<td>10.8</td>
</tr>
<tr>
<td>Systems Administration</td>
<td>5.9</td>
</tr>
<tr>
<td>System Analysis</td>
<td>8.0</td>
</tr>
<tr>
<td>Teaching</td>
<td>3.1</td>
</tr>
<tr>
<td>Technical Leader</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>2.1</td>
</tr>
</tbody>
</table>

2001:

Software Testing
Systems & Network Security Consultant / Architect
Software Engineering Department Director
Software Manager
Enterprise Technical Architecture (Chief Technologist)
Systems Engineering (writing requirements)
Authoring Help Documents
Software Architect

227
In which of the following computer application areas have you had significant work experience?

<table>
<thead>
<tr>
<th>Computer Application Areas</th>
<th>Percentage 1996</th>
<th>Percentage 2001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Data Processing</td>
<td>2.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Artificial Intelligence</td>
<td>1.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Client-Server Processing</td>
<td>9.5</td>
<td>9.6</td>
</tr>
<tr>
<td>Compilers</td>
<td>3.4</td>
<td>2.1</td>
</tr>
<tr>
<td>Computer Aided Engineering</td>
<td>2.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Computer Graphics</td>
<td>3.1</td>
<td>1.8</td>
</tr>
<tr>
<td>Computer System Implementation</td>
<td>7.1</td>
<td>3.9</td>
</tr>
<tr>
<td>Database Systems</td>
<td>10.5</td>
<td>10.2</td>
</tr>
<tr>
<td>Design of Digital Computers</td>
<td>2.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Distributed Processing</td>
<td>-</td>
<td>3.1</td>
</tr>
<tr>
<td>GUI Programming</td>
<td>-</td>
<td>8.6</td>
</tr>
<tr>
<td>Image Processing</td>
<td>2.7</td>
<td>1.3</td>
</tr>
<tr>
<td>Multimedia</td>
<td>2.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Networks</td>
<td>7.8</td>
<td>-</td>
</tr>
<tr>
<td>Networking and Communications</td>
<td>-</td>
<td>8.3</td>
</tr>
<tr>
<td>Numerical Computation</td>
<td>1.7</td>
<td>1.6</td>
</tr>
<tr>
<td>Operating Systems</td>
<td>5.8</td>
<td>4.2</td>
</tr>
<tr>
<td>Parallel and/or Distributed Processing</td>
<td>6.1</td>
<td>-</td>
</tr>
<tr>
<td>Parallel Processing</td>
<td>-</td>
<td>1.6</td>
</tr>
<tr>
<td>Real Time Programming</td>
<td>11.2</td>
<td>7.6</td>
</tr>
<tr>
<td>Simulation and Modeling</td>
<td>3.7</td>
<td>4.7</td>
</tr>
<tr>
<td>Software Engineering</td>
<td>14.3</td>
<td>13.8</td>
</tr>
<tr>
<td>Web Applications</td>
<td>-</td>
<td>4.9</td>
</tr>
<tr>
<td>Other</td>
<td>2.0</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Others specified:

2001:

- Geographic Information Systems
- Systems Administration
- Embedded Control (flight guidance, navigation, and control)
- System Architecture
- Indexing Technology
- Applications Programming
- ERP Systems (SAP)
- System Installation and Support EDI
- Security
- Computer Sales, Computer Leasing
Question 12

The Computer Science program at SDSM&T prepared me well for my current job.

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1996</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0.0</td>
</tr>
<tr>
<td>Disagree</td>
<td>10.3</td>
</tr>
<tr>
<td>No Opinion</td>
<td>5.7</td>
</tr>
<tr>
<td>Agree</td>
<td>64.4</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>19.5</td>
</tr>
</tbody>
</table>

Question 13

The required courses in the Computer Science program at SDSM&T provide a comprehensive and useful education in the computer field.

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1996</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0.0</td>
</tr>
<tr>
<td>Disagree</td>
<td>5.7</td>
</tr>
<tr>
<td>No Opinion</td>
<td>8.0</td>
</tr>
<tr>
<td>Agree</td>
<td>67.8</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>18.4</td>
</tr>
</tbody>
</table>

Question 14

My job requires that I continue to learn new computing techniques, beyond those I studied in my SDSM&T Computer Science program.

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1996</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>1.1</td>
</tr>
<tr>
<td>Disagree</td>
<td>2.3</td>
</tr>
<tr>
<td>No Opinion</td>
<td>2.3</td>
</tr>
<tr>
<td>Agree</td>
<td>32.2</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>62.1</td>
</tr>
</tbody>
</table>
Question 15

My SDSM&T Computer Science program gave me the background that allows me to learn the new computing techniques I need for my job.

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1996</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
</tr>
<tr>
<td>Disagree</td>
<td>0</td>
</tr>
<tr>
<td>No Opinion</td>
<td>8.0</td>
</tr>
<tr>
<td>Agree</td>
<td>52.9</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>39.1</td>
</tr>
</tbody>
</table>

Question 16

The computing facilities at SDSM&T were adequate to meet the needs of the Computer Science program.

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1996</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>5.7</td>
</tr>
<tr>
<td>Disagree</td>
<td>39.1</td>
</tr>
<tr>
<td>No Opinion</td>
<td>9.2</td>
</tr>
<tr>
<td>Agree</td>
<td>37.9</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>8.0</td>
</tr>
</tbody>
</table>

Question 17

The mathematics and theoretical computer science courses at SDSM&T have proven to be important and useful in my computing work.

<table>
<thead>
<tr>
<th>Opinion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1996</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>5.7</td>
</tr>
<tr>
<td>Disagree</td>
<td>13.8</td>
</tr>
<tr>
<td>No Opinion</td>
<td>16.1</td>
</tr>
<tr>
<td>Agree</td>
<td>50.6</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>13.8</td>
</tr>
</tbody>
</table>
Improvement Suggestions by Alumni:

1996:
- Networking
- GUI
- Parallel and distributed systems
- Real-Time applications
- Cross platform software (*e.g.*, X-Windows)
- More personal PC experience (as opposed to a mainframe)
- More UNIX experience
- Object-oriented programming in C++

2001:
- Better understanding of business
- More team projects
- Increase database coverage
- More networking
- Real-time applications
5. CAAP Examination Description

CAAP Instruments
CAAP has been designed to assess academic skills in the areas of:
- Writing (Objective /Essay)
- Reading
- Mathematics
- Science Reasoning
- Critical Thinking

CAAP items are drawn from general education college materials in humanities, sciences (social and natural), and mathematics.

Uses of CAAP
1. Documenting Levels of Proficiency. In conjunction with other indicators, such as course performance and courses taken, CAAP scores yield evidence of acceptable levels of academic skills established by the faculty for the areas covered.
2. Indicating Change (from one educational point to another). CAAP can be used as a pretest to establish a baseline of performance at entry and then as a post-test at the completion of relevant core general education courses. The differences between the two scores may be viewed as the change that occurs during the course of the program. This is for group change only. This use may have limitations due to sampling methods, sampling size, and student motivation.
3. Comparing Local Performance with that of Other Populations. CAAP user norms may be helpful to institutions in determining how their students as a group compare with students at the same levels attending similar types of institutions across the nation.
4. Establishing Eligibility Requirements. CAAP may be useful in establishing readiness to take specific advanced courses or to graduate. ACT urges institutions considering this use to include at least one or two other readiness indicators (e.g., course grades, GPA).
6. IAC Presentations

Industrial Advisory Council
1999
Report on the State of the Computer Science Department.
Agenda

- Introduction
- Where the industry is going.
- How is Tech poised for the future?
- Overview of our discussion:
  - Curriculum, Mentoring, Alumni Contact, Industrial relations
- Our observation on the state of the Computer Science Department
  - Looking ahead and questions

Introduction
June Alexander L-3 Communications
Diane Boucher Sun Microsystems
Mike Boucher Sun Microsystems
Sonny/Ben Andrick Martin and Associates
Terri Engels Rockwell
Gail Schmidt Raytheon / EROS
Brett Humphrey Microsoft

Where the Industry is Going

- Networking on all levels
  - Information systems
- Scientific Computing
  - Numerical modeling
- Database systems
  - Size and acceptance
- Multimedia
- Distributed systems
How is Tech Poised for the Future?

- Networking on all levels
  - Digital systems to network classes
- Scientific Computing
  - Strong math background
- Database systems
  - Required class, ongoing research
- Multimedia
  - TMG, Graphics classes
  - OS and hardware infrastructure
- Distributed systems
  - In need of resources

Overview - Curriculum

- Technical Communication class is inadequate
  - Writing fundamentals
    » Resumes
  - Presentation skills are weak
- Internships
  - Needs to be actively promoted
  - Program support
- Strong math background
  - Problem solving
- Strong fundamentals in Computer Science
  - Hardware, software, theory, core fundamentals

Overview - Mentoring

- Virtual Mentoring
  - Open source project such as Netscape
  - High profile project
- Direct Mentoring
  - Industry partnership
  - Current real world experience
  - Visibility
    - Internships and future employment
- Software Engineering
Overview - Alumni

■ High Priority Connection (HPC)
■ Electronic News Letter
  ■ Alumni Office

Overview – Industrial Relationships

■ How we can help
  – Students – Internships, Hiring, Reputation
  – Grants – Software, Hardware, and Data
  – Faculty – Summer research experience
  – Sabbatical - L-3 Communications
  – Distance learning for faculty – Microsoft
  – Recruiting of high school students – encouraging women

Quality Risks for the CS Department

■ Lab space does not meet demand
■ Current hardware is out of date and unreliable
■ Faculty skills must be kept current
■ Student to professor ratio is high in some key courses
  – Expanding CSC 150 requirement
  – Increased class sizes due to CENG program

Quality Risks – Supporting Data

■ Decrease in faculty
  – 1994 – 17
  – 1998 – 15
  – 1999 – 14 with one open position
  – Difficult to attract CS professors

Quality Risks – Supporting Data

■ CS Students
  – 1994 – 156
  – 1998 – 164 CS + 180 CENG @ 25% = 209 students taking CS classes
  – 1999 – predicted to be 218
Quality Risks – Supporting Data

- Operating Systems class
  - 1996 – 25
  - 1998 – 47
  - 1999 – 52

Quality Risks – Data Analysis

- Decreasing faculty along with increasing students, coupled with inadequate lab facilities, puts the quality of our students' core computer science education at risk.

Areas of Excellence

- A strong, committed faculty
- Supportive educational environment
- Excellent curriculum
- Forward thinking institution
- Superb reputation throughout industry

Looking Ahead...

- We want all the CS students you can produce!
  - You need to produce more.
Computer Science Department
Industrial Advisory Council 2000

Agenda

- Introduction
- Industry Trends – 1999
- Industry Trends - 2000
- Tech’s Position for the Future
- Quality Risks
- Summary

Introduction

- June Alexander  L-3 Communications
- Diane Boucher  Sun Microsystems
- Mike Boucher  Sun Microsystems
- Sonny Andrick  Martin and Associates
- Terri Engels  Rockwell
- Gail Schmidt  Raytheon/EROS
- Todd Vollmer  Earthwatch

Progress

- Labs
  - Sun Tech Lab
  - New PC Lab with Microsoft gifts
- Mentoring
  - Rockwell Project – Past and Future
- New Industrial Partnerships
  - Sun
  - Rockwell
  - Microsoft
  - EROS
Industry Trends - 1999

- Networking on all Levels
  - Information systems
- Scientific Computing
  - Numerical modeling
- Database Systems
  - Size and Acceptance
- Multimedia
- Distributed Systems

Industry Trends - 2000

- Connectivity
  - Web
  - Networking
  - Wireless
  - Your Data Anywhere, Anytime
- Winner Takes All
- ISO/SEI
- Scientific/Engineering

Industry Trends 2000 (cont.)

- Financial Engineering
- Modeling
- Data Mining

Tech Position for the Future

- Distributed Systems
  - Component Level – CORBA/DCOM
  - Networking Level
  - Data Level – Distributed Database
  - Client/Server Applications
- Keep doing what you’re doing
Quality Risks

- High School Counselors
- Computer Science fact sheet
  - Recruiting Materials not geared to High School Students
  - Inaccurate and not well organized
    - Computer Engineering curriculum on the back of CS sheet
    - Font size makes text unreadable

Quality Risks (continued)

- Web Page
  - Cool Jobs – Co-Op positions
  - Readiness Test
- Enrollment decisions removed from Advisors (Technical Communications)
- Need traditional Algebra and Trigonometry classes
- Need for Business perspective

Quality Risks

- Student Teacher Ratio
  - Growth in CSC 150
- Difficulty in attracting new faculty
  - Forced to drop Compilers
Areas of Excellence

- Lab equipment
  - Updated hardware
  - Updated software
- New Industrial relationships
- Core Curriculum
  - Core CS classes stress basics
  - Math emphasis sets SDSM&T apart
  - Hardware emphasis
  - Excellent Professors
  - Updating curriculum
- Tech students are the highest quality engineers in the market.

Looking ahead

- Alumni Distance Learning
- Tech brand awareness
  - Linux Open Source
  - Sun Tech Project
- Planning for growth
  - Recruiting
  - Placement

Thank You
Questions and Comments
Computer Science
Industrial Advisory Council Summary

April 27, 2001

Introductions

Terri Engels – Rockwell
Gail Schmidt – Raytheon
Sonny Andrick – Martin Group
Bill Cullen – SGI
June Alexander – L-3 Communications
Brett Humphrey – Microsoft
Mike Boucher – Sun Microsystems
Bennett Clark / Chris Konvalin – Comuniq

Introductions cont.

Additional input provided by:
Todd Vollmer – EarthWatch
Rob Uttech – Microsoft
Earl Coffman – Disney
Toran Kopren – Hewlett Packard
Diane Boucher – Sun Microsystems

Agenda

Progress assessment
Industry directions
Tech’s position
Technical Communication
The Ph.D. in CS
Summary
Progress assessment

- Additional space
- Newer hardware
- Additional faculty
- New and continued industry relationships
- Classes size issues
  - OS class was split to reduce ratio
  - CS 150 still remains an issue

Progress assessment

- Made improvements to the CS facts sheet
- Recruiting Materials
  - Inaccurate information was corrected
  - Font size still makes text difficult to read
  - Wordy and dry
- Returned to traditional algebra and trig
- CSAB preparations are going well

Industry Trends 2000

- Connectivity
  - Your Data Anywhere, Anytime
    - Web, Networking, Wireless
- Winner Takes All
- Data Mining
- Modeling
- Scientific/Engineering
- Financial Engineering
- ISO/SEI
Industry Trends 2001

- Disassociation of data
  - Virtualization of storage
  - Virtualization of processing
  - Context filtering
- Integration into your life
- Real time, fully connected
- Open source revolution
- Value added services over hardware and operating system

Tech's Position

- Fundamentals are still strong
  - "Outstanding!"
  - "Two thumbs up!"
- Pay more attention to open source
  - Add to class work via Senior Design and Software Engineering
- Strengthen networking application
- Strengthen GUI classes
- Strengthen interviewing skills

Technical Communications

- Resumes
  - Communication between Tech Comm. and Career Planning
  - Lead from strengths
  - Know your target audience
  - Email resumes
  - Cover letter / introduction
  - Assume all resumes will be scanned
  - On-line resumes with hyperlinks
Technical Communications

- Email
  - Conciseness of email
  - Organize thoughts before writing
  - Don’t vent and send it
  - Etiquette
  - Email is forever
- Everything is different but everything is still the same
  - Fundamentals still apply

Technical Communication

- Some ideas:
  - Bulletin boards for group discussions
  - Positive reinforcement that technical communications are important from major area professors
  - Tie technical communication to discipline coursework

Computer Science Ph.D. Pros

- Provide Ph.D.s to the region
  - University and Industry
- Increase Prestige
  - Undergrad attraction
- Support for Homestake
- Support for high-tech startups
- Support from local industry
- Retain talent

Computer Science Ph.D. Risks

- Budget commitment
- Shift in reward system
  - Disparity in pay and perks
- Shift in focus away from the teaching
  - May result in lower quality undergrad program
- Finding faculty to start
- Impact of failure
Ph.D. Summary

- Benefits are significant
- Some risks are outside our control
  - Budget is always an issue
  - Shift in reward
- Other risks can be overcome
- We recommend that you proceed with faculty support
- We will support you in any way we can

Summary

- Department has made significant progress
- Fundamentals are still strong but we need to be aware that changes are on the horizon for which we may not be prepared
- Technical Communication needs work
- The Ph.D. in CS has difficult issues but on balance, go for it!

Comments
and
Questions
Thank you
7. Student Opinion Survey

Student Opinion Survey

The Student Opinion Survey Forms are to be completed in full by each student. Please read the form carefully and take special note that comments helpful to the professor are invited at the end of the form. There is no requirement for you to sign the form.

A summary of these forms will be prepared by the department head/supervisor and presented to the faculty member. The faculty member will not have access to the individual survey forms until all final grades have been submitted to the Registrar.

Although student opinion surveys will not be used as the controlling criterion for personnel actions, the students opinion survey process will provide information for personnel decision such as promotion, tenure, contact renewal, or augmentation monies.

Any problem with the survey process should be reported to the Office of the Vice President.

While filling in the course reference number, please use the number listed on the packet. Place the numbers, in the boxes below, from top to bottom. For example 1234 would be listed as.

1 2 3 4 5

Student Descriptive Data

Please darken the appropriate response

Class: 1 Freshman 2 Sophomore 3 Junior 4 Senior 5 Graduate 6 Special

Course was: 1 Required 2 Elective 3 Uncertain

Which one of the following was your most important reason for selecting this section?:

1 Friend’s recommendation
2 Faculty advisor’s recommendation
3 Teacher’s excellent reputation
4 Was only section available
5 Thought I could get a good grade
6 Other __________________________

Was class size satisfactory?

1 Yes 2 No, class was too large 3 No, too small 4 Didn’t matter
Diagnostic Comments

[Choice of Strongly Agree, Agree, Disagree, Strongly Disagree, Not applicable]

The Professor

1. Provided a clear statement of course objectives
2. Presented material related to course objectives
3. Presented material in an organized, understandable manner
4. Appropriately enhanced the textbook with lecture
5. Often used relevant examples to clarify course content
6. Often presented practical applications of subject matter
7. Gave clear directions for assignments
8. Communicated subject matter on student's level
9. Seemed to know when students didn’t understand the material
10. Raised challenging questions or problems for discussion
11. Encouraged students to think for themselves
12. Spoke distinctly
13. Was available for individual assistance
14. Adequately answered questions related to course material
15. Selected and used an understandable text
16. Seemed to enjoy teaching the course

Assignments / Laboratories / Exams

1. Were closely related to course materials
2. Were promptly graded and returned
3. Contained useful comments
4. Facilitated understanding of course material

Grading and Evaluation

1. The policies were clearly communicated
2. Grading was based on test, labs, presentations and/or assignments
3. Grading was impartial
4. The frequency of tests was:
   1 Too few  2 Too many  3 About right  4 No tests given

General

1. For me, the pace at which the professor covered the material was:
   1 Too slow  2 Too fast  3 About right  4 Self-paced

2. I would rate the general quality of lecture as:
   1 Excellent  2 Good  3 Satisfactory  4 Poor  5 Not Applicable

3. I would rate the overall instructional performance of the faculty member as:
   1 Excellent  2 Good  3 Satisfactory  4 Marginal  4 Poor

Comments I would like to comment on this class  ___Yes  ___No

[Space for Comments]
8. SGID Description

This hypertext document has been created by the Center for Teaching Excellence. It is intended to provide only a very brief introduction to an important subject.

I. OVERVIEW

Small Group Instructional Diagnosis (SGID) is a constructive, course-specific way of securing student feedback by conducting small discussion groups within the class. Currently used on college campuses throughout the country, SGID is a process through which instructors can receive feedback from students at any time during a course, and it only requires a few minutes of class time. Often conducted at midterm, SGID information can be used to make adjustments that may facilitate student learning during the course. Because students see that their input is taken seriously, this process has also been found significantly to increase student motivation.

II. THE GENERAL PROCESS

Students are typically clustered in groups of 3-7 and asked as many as four questions. The students are often required to agree on a single answer to each question.

For example, one might ask these three questions:

1. When this class/program/workshop is offered again, what one element should remain essentially the same because it worked so well?

2. What one element should be dropped or altered?

3. What one element should be added?

III. THE ADVANTAGES OF THE SGID TECHNIQUE

1. Feedback occurs at two levels: within groups and between groups.

2. The process is accomplished quickly.

3. The answers generated are almost always noteworthy since several persons must agree.

4. Because an SGID provides more reflective feedback, the information is qualitatively different than that secured in end-of-the-semester ratings.

5. Students feel that their voices have been heard. Faculty developers have noted that students often feel “powerless,” and are more willing to work with a professor if they believe their needs are of concern to the professor. Thus, the SGID process by itself seems to have beneficial effects, even before the instructor makes changes based on the feedback from the SGID.
9. Faculty Evaluation

PROFESSIONAL STAFF EVALUATION FORM

1. Evaluation for:
   a. Annual Review
   b. Promotion
   c. Tenure
   d. Promotion and Tenure

2. Covering the calendar year:

   PART A
   TO BE COMPLETED BY FACULTY UNIT MEMBER

3. Background information:
   Name:
   Department:
   Date:
   Academic rank: and date granted:

   Degrees in reverse chronological order:

   Additional academic or professional education:

   Professional experience:

4. Expectations, consistent with institutional policies and subject to the concurrence of the dean and vice president, for faculty unit member performance with respect to teaching and academic advising, research, scholarship and creative activity, and service during the evaluation period as per comment of department head pursuant to Section 11.1(2).

5. Describe your major assigned responsibilities during the evaluation period.

6. Describe your major performance objectives during the current evaluation period.

7.
   a. List your significant contributions to teaching or cooperative extension activities. (Appendix G of the BOR-COHE agreement contains a sample list.)
b. List your significant contributions to academic advisement.

8. List your significant contributions in research, scholarship or creative activity. 
(Appendix G of the BOR-COHE agreement contains a sample list.)

9. 
   a. List your significant contributions to the university. (Appendix G of the BOR-COHE agreement contains a sample list.)
   
   b. List your significant contributions to your discipline or profession. 
   (Appendix G of the BOR-COHE agreement contains a sample list.)
   
   c. List your significant contributions to the community-at-large. (Appendix G of the BOR-COHE agreement contains a sample list.)


PART B

TO BE COMPLETED BY IMMEDIATE ADMINISTRATIVE SUPERVISOR

11. Professional performance:

   a. Indicate your assessment of the faculty unit member’s performance by explaining whether, consistent with contemporary standards of the institution, the faculty unit member exceeded, achieved or fell short of the level of performance reasonably expected in a(n) ____________________________ (indicate rank) with like tenure status and comparable professional responsibilities and resources. The explanation must indicate the consideration given to rank, experience and tenure status, professional responsibilities and resources. Separate ratings must be given for teaching, including separate mention of academic advisement, research and service responsibilities. **In each instance, based on the information supplied by the faculty unit member, the supervisor must identify the specific activities, or lack thereof, that warrant the rating.**

   b. For all faculty unit members who serve on tenure track contracts or who hold rank below that of professor, comment about progress towards achieving the levels of performance that, in keeping with institutional standards, justify a recommendation for promotion to a more senior rank

250
or award of tenure. Comments must address each area of professional responsibility.

c. Where appropriate, include recommendations for augmentation monies and contract renewal.

d. Response to the faculty unit member’s major performance objectives for the next evaluation period?

Signature of Supervisor: ____________________________

Date: ____________________________

12. I have received these comments and ratings from my immediate supervisor. I understand that I have the right to respond to these comments and ratings in writing or to call upon a peer group to review the evaluation, provided that notice of such intent is given to the department head within five (5) working days after receipt of this document.

Signature of Faculty Unit Member: ____________________________

Date: ____________________________

13. I should like to add:

Signature of Faculty Unit Member: ____________________________

Date: ____________________________

14. I have reviewed these comments and ratings. I should like to add:

______________________________

Signature of Dean or Vice President for Academic Affairs

Date: ____________________________