1) Overview/introductory Statement

After speaking with faculty, staff, and students in Weber State University’s Computer Science department as well as reviewing their current curriculum, we believe that the department has created a strong and innovative curriculum, has built strong ties with the community and local industry, and has provided an inviting and comfortable atmosphere that students enjoy. This high degree of success is currently being achieved with very limited resources. In this report, we examine what the CS department is doing well, as well as examine areas for possible growth and/or improvement.

Note that unless otherwise noted, all standards in the Program Reviewer Guide are being met. Those that were identified as a weakness by the committee, or those that the committee believes the department is doing an exceptional job on are included in this report.

2) Program strengths (please reference Standard where appropriate)

The committee has identified wide-ranging strengths in the Computer Science department. After examining the curriculum, we found the curriculum as a whole as well as individual course design and delivery mechanisms effective. We found an inviting environment for students as they reported positive relationships with faculty, opportunities for service learning, and vibrant employment opportunities. The number of students in the program has grown tremendously over the last few years, and recruiting activities performed by the department will likely result in continued growth and visibility in the community. Faculty reported a collegial environment with a lot of opportunities for service and development. Even more commendable were the faculty’s participation in these opportunities which resulted in visibility and respect throughout the University and within the larger teaching and research community as well. We examine these areas in more detail below.

Curriculum/Course Design and Delivery

The Computer Science department has developed an innovative curriculum that is well aligned with current growth areas in the field (aligns with standard b, element a). Recent additions to the curriculum, including courses in mobile application development and game development match regional employment needs as well as student interests. Core classes provide appropriate theoretical and practical knowledge that would be accepted of any CS graduate.

For individual courses, the department organizes course committees consisting of multiple faculties teaching the course. As a team, they choose a common book and a common set of student learning outcomes. The committee believes this type of collective ownership of the courses to be positive.

Courses in the curriculum include significant hands on work. To allow for appropriate practical application of course concepts, technology is available in many of the classrooms. This lab environment is an asset to the department.
Faculty Service and Development
Faculty from the department have assumed key roles throughout the University, providing visibility and respect for the department. Individuals seem to be recognized for their leadership at the University level. Though this can be positive from a service perspective as well as helpful in the faculty’s dossier, it does seem to add to the already overburdened faculty load.

Faculty are motivated to continue to develop themselves in their teaching and scholarship. For example, a faculty was presenting at SIGCSE, a well-respect CS conference, during the visit. In addition, faculties work with the department chair annually to set goals and objectives, and some accountability measures are in place (aligns with standard, e, element h).

Community Connections
The industry advisory committee helps the department gain insight into the needs of local businesses. In addition, a few local companies give significant financial contributions to the department.

Service Learning
Opportunities for service learning include the ability for students to travel to Ghana and participate in the development of a medical information system there as part of their software engineering course. This type of service learning is rare in Computer Science, and the committee believes that it is beneficial to the students and may also prove attractive to a wider range of students than are typically attracted to the Computer Science field.

Student-Faculty Relationships
Students reported that faculty members are friendly, maintain an open-door policy for assisting them, and know them by name. This is part of what draws students to Weber State instead of other area Universities.

Recruiting
Recruiting efforts are being done in the upper K-12 grades. The department appears to be making efforts to attract a broad population of students.

Department Collegiality
Within the department, the entire faculty we interviewed reported a high-level of collegiality. Effort was made to maintain close ties with faculty at Davis and Salt Lake campuses as well as among faculty in Ogden. We believe this collegiality contributes to their ability to perform well in all of the previously reported areas.

3) Program challenges (please reference Standard where appropriate)

The department is currently facing two major challenges. The first is the limited resources available and the second being the significant and possibly insurmountable obstacles the department will face in their quest for ABET accreditation.
Insufficient Resources

The model currently being used within the department is unsustainable. Faculty loads are being pushed beyond reasonable boundaries for prolonged periods of time. Currently, faculty still pursue training, committee work and other opportunities within the University, however it is clear this level of productivity is taking its toll on faculty. This also results in limited time for faculty to engage in scholarship, and much less course assessment is being performed than would be desirable. The faculty would benefit from having more time for reflection of development of their courses and curriculum, performing peer reviews, and similar activities (align with standard e, element g). Finally, salaries are low relative to similar Universities, as well as relative to professions in the field, and this affects morale.

Technology resources are also limited. While the department provides a significant number of labs equipped with computers for students, the hardware being used is significantly out of date. It seems the department often accepts hardware that is cast off from other departments. It seems this model should be reversed, as Computer Science requires the use of up-to-date technology to best prepare students.

ABET Accreditation Obstacles

The Computer Science department is currently pursuing ABET accreditation. While the committee believes that this is a worthwhile goal, we have identified multiple factors that will be in direct conflict with achieving ABET accreditation. These factors include the amount of overload being taught by faculty in the department, the number of adjuncts employed and more specifically the ratio of adjuncts to full-time/tenure-track faculty, as well as the credentials of faculty in the department.

ABET requires that the department employs some faculty with PhDs, and the PhDs be in Computer Science or a closely related field. It does not appear this number is currently sufficient. This last factor may be an obstacle the department is not able to or may not find a desirable solution to overcome. ABET Accreditation also requires assessment to be performed. As mentioned previously, with the limited resources available it is not feasible to ask faculty to take additional time for assessment. The lack of assessment could also be considered an issue in and of itself, outside of the requirements for ABET accreditation.

Difficulty with Support Courses

Both the faculty and students we interviewed mentioned that the students had a difficult time successfully completing the required math courses at WSU which hampers the CS student from moving through the program in an efficient manner. It was noted that students frequently go to SLCC to complete their math coursework. This should be investigated further.

4) Areas where the program did not meet the Standards and why

We have outlined key challenges in the prior section. Areas where the program did not meet the standards are related to the challenges identified. The student faculty ratio is increasing, yet students said the low ratio was critical for their success. Even though the enrollment in the program is increasing, the number of faculty is not. This violates standard b, element c and is
related to the insufficient resources available to the department. Additionally, more timely replacement of key technologies i.e. servers is necessary. Current practices violate standard f, element c.

5) Recommendations for change – suggested changes for meeting Standards

**Increase Faculty or Otherwise Reduce Faculty Loads**

The review committee recommends that the department increase the number of faculty, with a preference towards those that will help them meet ABET accreditation. If the number of faculty cannot be increased to bring faculty loads to a reasonable level, the committee recommends that the department consider other options such as collaborations with other universities in the area, open course options, limiting the number of students admitted to the program or admitted for the upper division coursework. A strong preference would be given to increasing the number of faculty to support the current and growing needs of the department.

**Increase Assessment**

In order to increase assessment with minimal resource requirements, we suggest the department implements administration of the Major Field Test (MFT) in Computer Science for all students at one or two points in their education. This exam allows you to compare the success of students among the different tracks, to compare with other universities, and if given multiple times during a students education to track their progress. Other normative exams could also be considered.

In addition, we believe other mechanisms for assessment of faculty teaching should be put in place besides the CIEQ measurement. Possible solutions include peer reviews, putting in place specific mechanisms for measurement of the achievement of student learning outcomes in individual courses, as well as self-assessment. (See Standard c, element d).

6) Additional recommendations and comments from the review team

On many fronts, we would like to recommend the department continue on the path they have paved. The department has adapted to the needs of the field and we advise them to continue to monitor and adjust to trends such as parallel and cloud-based computing. They have a strong curriculum that they look to continue to strengthen by working toward ABET accreditation. Faculty should continue to focus on and value collegiality with each other, and continue to focus on maintaining a positive and inviting environment for students. All of these are challenging and resource consuming goals, so we reiterate our concerns in this area and hope that additional resources can be added to allow the program to continue to grow and thrive.