Bodies that Administer the Program

The principal bodies that administer the program are: the Administrative Committee, the Undergraduate Committee, the Assessment Team, and the Faculty.

Administrative Committee: This committee is comprised of the department chair, associate chairs, and the administrative assistant and has responsibility for department administration. Most significant curricular decisions typically receive input from the administrative committee before going to the Undergraduate Committee.

Undergraduate Committee: This committee is typically what others may refer to as the Curriculum Committee. Membership in this committee rotates or refreshes every year and members are appointed by the department chair. The general responsibilities of this committee include dealing with issues involving the undergraduate curriculum, requirements for the baccalaureate degree, and requirements for accreditation. Some of the typical charges of this committee include planning undergraduate requirements for the catalog, reviewing the numbering of courses, reviewing the status of cross-listed courses, and serving as a screening body for new course proposals. The department chair and the academic advisor are non-voting ex-officio members of this committee. The undergraduate committee serves as an advisory committee to the department chair and the faculty.

Assessment Team: This team consists of three faculty members appointed by the department chair. The responsibility of the assessment team is to (a) collect and distill data necessary for assessing program outcomes, (b) evaluate the extent to which program objectives are achieved, and (c) make recommendations to the Undergraduate Committee regarding changes to the course outcomes and curriculum made apparent through the review of collected data.

Members of the External Advisory Board: Dr. George Strawn, Co-chair of the Networking and IT Research and Development (NITRD) of the National Science and Technology Council; Dr. John Gustafson, Chief Technology Officer, Ceranovo; Mr. Tom Miller, Microsoft Research; Mr. John Paule, Retd. Exec. Vice President, FBL Financial Group; Ms. Rebecca Taylor, President, Taylor-Deininger Partners; Mr. Ron Wolf, Technology Executive.

How Assessment Information is Obtained

Tools for assessing program educational objectives and program outcomes use a combination of direct and indirect methods, some of which are quantitative and some of which are qualitative. These methods depend on assessment information from three types of sources: employers, faculty, and students. We use a single tool to evaluate the extent to which program educational objectives are achieved and this tool is a survey of individuals who have graduated from our program within the last 5 years.
How Information Distillation is Transformed into Curricular Correction

The processes used to transform information distillation from measurements into curricular correction are illustrated in Figure 3-2.

**Figure 3-2: The Com S Curricular Correction Process**

The Assessment Team collects and distills data to assess program outcomes from pre-graduation measurements and data to evaluate the extent to which program objectives are achieved from post-graduation measurements. Following distillation of these data, the Assessment Team provides conclusions and recommendations to the Undergraduate Committee. The Undergraduate Committee considers these conclusions and recommendations from the Assessment Team and passes them on to the appropriate course coordinators and faculty for implementation.

We make note of the fact that the ABET criteria – which are Program Outcomes A through K described in Criterion 3-A may be different from the course outcomes for individual courses. However, the individual course outcomes map to a subset of the ABET A through K outcomes. In Section 3-D we provide a mapping table between the outcomes for individual courses and the ABET program outcomes. Our process for revision and establishment of student outcomes focus only on course outcomes and not on the ABET outcomes listed in Criterion 3-A. If changes are made to the course outcomes, these are reflected in the mapping between the course outcomes and the ABET program outcomes.

**Pre-Graduation Measurement**

The program outcomes are the ABET A-K outcomes as listed in Criterion 3-A. These include the ABET (A-I) outcomes and the ABET program specific outcomes (J-K) for computer science programs. Their relationship to the program educational objectives is given in Table 3-1 in Criterion 3-B. Several methods, direct and indirect, and qualitative and quantitative, are used to assess the program outcomes.

- The single-most important process we use to assure that graduates are achieving the program outcomes is the continuous monitoring of student work by the faculty who teach the
respective classes. The faculty members are usually those involved in preparing course objectives and outcomes, so that assessment is a part of their ongoing responsibility. These data are reflected in homework, projects, laboratory work, and examinations that the students take regularly. Faculty tend to recognize that if one or two people in a class do not master a major concept, then there probably is a difficulty that can be attributed to the student. If, however, a substantial fraction of a class fails to master a major concept, then remedial action by the instructor is in order. This assessment is rapid and important in our activity.

- Another assessment tool is the exit survey of graduating students. Prior to graduation, all graduating seniors are required to complete an exit questionnaire and an outcomes assessment survey. This provides students with the opportunity to assess, from their personal learning experiences, the effectiveness of the program in achieving the program outcomes relative to their own expectations.

- A third assessment tool is an online survey that is sent to employers who recruit our students for internships and jobs. It allows employers to reflect on the students they hire and to assess the effectiveness of the undergraduate program in achieving its outcomes.

- A fourth assessment tool is an informal assessment through student interviews conducted by the External Advisory Board members when they visit us annually. Typically a small group of 3 to 4 students is interviewed by the EAB during each visit for an informal assessment of the program outcomes and the program educational objectives.

- Student Forums: Students are encouraged in an open, friendly manner to comment on strengths and to express concerns. Faculty and administration also attend. While the format is anecdotal, the intent of the forum is to find out where problems exist in a way that we simply could not do otherwise. Meeting notes from these forums are given to the department chair for further action if needed.

- Faculty members compare ideas regularly, and our undergraduate committee facilitates this comparison. Members of the undergraduate committee carry forward ideas to the larger group of faculty when appropriate. Problems are generally not allowed to continue. A similar facilitation also happens with our equipment committee for continuous improvement of instructional laboratories.

- Recommendations from the Computing Accreditation Commission are used to periodically guide changes to our curriculum and program. The Bachelor of Science program is nationally accredited by the Computing Accreditation Commission of ABET. The process of accreditation requires periodic external reviews of the undergraduate program by computer science educators and professionals. The content and quality of subject matter in each course required of majors is ascertained through an examination of course descriptions, textbooks, and sample homework and examinations. From personal vitae, university data, classroom and laboratory visits, and interviews with students, faculty, advisors, and administrators, the quality of the supporting infrastructure is examined – including required supporting coursework in other disciplines, faculty resources, and laboratory space and equipment.
objectives and outcomes are also periodically evaluated by the External Advisory Board. The quality of the program is contrasted with nationally established standards for accreditation. In addition, Iowa State University is periodically accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools.

- In addition to these methods, the Iowa Legislature passed a bill in 2012 (HF 2284) that requires the implementation of “a continuous improvement plan in every undergraduate program offered by an institution of higher education governed by the board.” The implementation of this plan was started by the university in Fall 2013. In AY 2014-15 the department’s Assessment team required every course to file an assessment plan and submit their results for evaluation by the Assessment team. Any action, if necessary, will be considered by the Undergraduate Committee for continuous improvement of the curriculum.

- The department chair speaks regularly with graduating seniors each semester and takes their comments to the various departmental committees. One outcome of this process has been an upgrade of both the computing equipment and the policies for using it.

<table>
<thead>
<tr>
<th>Assessment Processes</th>
<th>Direct</th>
<th>Indirect</th>
<th>Informal</th>
<th>Quantitative</th>
<th>Qualitative</th>
<th>Source</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior exit survey</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>Students</td>
<td>Each semester</td>
</tr>
<tr>
<td>Course Assessment by students</td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>Students</td>
<td>Each semester</td>
</tr>
<tr>
<td>Course Evaluation by Instructor</td>
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<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>Faculty</td>
<td>Each semester</td>
</tr>
<tr>
<td>External Advisory Board</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td>EAB</td>
<td></td>
<td>Annual</td>
</tr>
<tr>
<td>Student Forums</td>
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<td>X</td>
<td>X</td>
<td></td>
<td>Students</td>
<td>Annual</td>
</tr>
<tr>
<td>Faculty input</td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td>Faculty</td>
<td>Annual</td>
</tr>
<tr>
<td>Competency Assessment by Employers</td>
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<td></td>
<td>X</td>
<td></td>
<td>Employers</td>
<td>Once in 2 years</td>
</tr>
<tr>
<td>Assessment mandated by Iowa Legislature</td>
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<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>Faculty</td>
<td>Periodic, as needed by the university</td>
</tr>
</tbody>
</table>

Table 4-1: Assessment Processes for Student Outcomes
Table 4-1 above describes most of the above assessment processes and the frequency with which they are carried out. Direct measurements indicate that the assessment data source is faculty member, EAB member, or employer. Indirect and informal measurements include senior exit surveys, student forums, and course assessment by students.

Expected Level of Attainment of Outcomes from Senior Exit surveys

In analyzing the outcomes assessment data from senior surveys, the responses were converted to numerical values according to the scale: Very Well = 3, Well = 2, Adequately = 1, Not at All = 0. Let \( \text{response}(i, q) \) denote the numerical value of student \( i \)’s response to question \( q \). Let \( N(q) \) denote the number of respondents responding to question \( q \).

For each semester, an average score, \( \text{score}(q) \), was computed for each survey question, by summing up the numerical responses of all respondents divided by the number of respondents:

\[
\text{score}(q) = \frac{\sum \text{response}(i, q)}{N(q)}
\]

The expected level of attainment of an outcome is at least 1 (Adequate). It is an on-going goal of the department, as a result of continuous improvement to strive to achieve a level for each outcome between Adequate and Well (that is, 1.5).