Expected Outcome 1: Communications Skills
Our students will demonstrate proficiency in their communication skills through completion of a Doctoral Dissertation on the research topic, an Oral Defense of that Dissertation, and through scholarly publications in the open literature and through presentations to professional audiences.

Assessment Method 1: Communications Skills-Faculty Evaluation
Assessment Method Description
To fulfill degree requirements for the Ph.D. in Computer Science and Software Engineering the candidate must have a written Dissertation of their research work approved by their graduate committee and must successfully defend this Dissertation in an oral defense. After the defense, a standardized form (see Appendix A) will be completed by all members of the committee dealing with various issues including; clarity of the written document, organization and logic of the written document, ability of the student to communicate technical ideas within the written document, clarity of the oral presentation, organization and logic of the oral presentation, and the ability of the student to communicate technical ideas in the oral presentation. The students performance in each of these areas will be ranked on the standardized assessment form as Excellent (3pts), Acceptable (2pts), or Unacceptable (1pt).

Target level:
We anticipate that the average score of our students in each category will be 2.0 or higher.

Findings
2 students completed their Ph.D. degree in computer science and software engineering during this evaluation period. These students’ committee members responded to the following questions regarding the students performance. 5 faculty responses were collected in total from the student defenses. The committee members scored their answers as Excellent (3pts), Acceptable (2pts), or Unacceptable (1pt).
Average Score Question

2.6 Please evaluate the student’s written document in terms of its clarity, organization and logic, and the ability of the student to communicate technical ideas in this written form.

2.8 Please evaluate the student’s oral defense in terms of the clarity of the oral presentation, organization and logic of the presentation and the ability of the student to communicate technical ideas orally.

The average scores on these two evaluation questions were greater than the anticipated score of 2.0

**How did you use findings for improvement?**

The average scores on the above survey questions exceeded the anticipated level of performance. Therefore, no action will be taken at this time and this method of assessment will be continued for all Ph.D. students during the next evaluation period.

**Additional Comments**
None

**Assessment Method 2: Publications and Presentations**

**Assessment Method Description**

Students in the Ph.D. program in Computer Science and Software Engineering are expected to communicate their research work to the scientific community through scholarly publications in the open literature. Data on the number of publications by each graduate of the program will be collected and reviewed.

**Target level:**

We anticipate that the average number of publications per Ph.D. graduate in our program will be 2 or more.

**Findings**

Data was collected on the number of publications by each graduate who completed their Ph.D. during this evaluation period (ten students) as follows.

Average Number of Publications = 2.5
How did you use findings for improvement?
The anticipated goal of the average number of publications of 2 or more was met by the students. We will continue to encourage our Ph.D. students to have a high number of publications so that each graduate will continue to meet and exceed this anticipated goal.

This method of assessment will be continued for all Ph.D. students during the next evaluation period.

Expected Outcome 2: Comprehensive Computer Science Knowledge

Our graduates will demonstrate a thorough understanding of the principles, sciences, and technologies that are broadly associated with the area of computer science and software engineering.

Assessment Method 1: PhD qualifying examination

Assessment Method Description
Every Ph.D. student is required to pass our PhD qualifying examination. The PhD Qualifying Examination is successfully fulfilled by passing the three subjects of the exam: Advanced Algorithms, Advanced Operating Systems, and Advanced Computer Architecture.
Target level:
We expect that our students’ success rate should be 60% or better in the first attempt of the exam.

Findings
9 Ph.D. students were part of the Fall 2012 class. Out of these 7 students (or 78%) passed the qualifying examination in the first attempt during this assessment period.

How did you use findings for improvement?
The Graduate Program Committee has communicated these results to the faculty as well as other stakeholders. We will continue to look for opportunities to improve the program and the learning experience for the students. By requiring that a 70 or higher in the subject exam be obtained by every Ph.D. student that continues in our program, we ensure that every Ph.D. student has demonstrated a thorough understanding of the principles, sciences, and technologies that are
broadly associated with the area of computer science and software engineering.

**Additional Comments**
None

**Assessment Method 2: Computer Science and Software Engineering Knowledge-Student Survey**

**Assessment Method Description**
Upon completion of the degree requirements for the Ph.D. in Computer Science and Software Engineering, each student will be asked to fill out a graduation survey covering several items including the following question:

- To what degree did your Ph.D. computer science and software engineering education provide you with a thorough understanding of the principles, sciences, and technologies that are broadly associated with the area of computer science and software engineering.

**Target level:**
We expect that our students’ responses should average a score of 4 or better out of 7 on this question.

**Findings**
2 students completed their Ph.D. degree in computer science and software engineering during this evaluation period. These students responded to the following question using this response key.

**Response Key**
1 – Very Poor, 2 – Poor, 3 – Fair, 4 – Good, 5 – Very Good, 6 – Excellent, 7 – Exceptional

**Average Score Question**

7.0 To what degree did your Ph.D. computer science and software engineering education provide you with a thorough understanding of the principles, sciences, and technologies that are broadly associated with the area of computer science and software engineering?

The average score on this survey question was greater than the anticipated score of 4.0

**How did you use findings for improvement?**

4
The average scores on the above survey question exceeded the anticipated level of performance. Therefore, no action will be taken at this time and this method of assessment will be continued for all Ph.D. students during the next evaluation period.

Additional Comments
None

Expected Outcome 3: Creative and Independent Research
Our graduates will demonstrate an ability to undertake focused study and advanced creative and independent research of a significant unsolved problem, such as the development of new theoretical methodologies, experimental techniques, or significant advances in knowledge and understanding of the discipline of computer science and software engineering.

Assessment Method 1: Research Expertise-Faculty Evaluation
Assessment Method Description
To fulfill degree requirements for the Ph.D. in Computer Science and Software Engineering a Ph.D. candidate must have a Dissertation of their research work approved by their graduate committee (typically made up of three faculty within Computer Science and Software Engineering, an outside committee member and an outside reader appointed by the Graduate School) and must successfully defend this Dissertation in an oral defense. During the oral defense of the students research work, a standardized form (see Appendix A) will be completed by all members of the committee dealing with various issues including; ability of the student to undertake focused study, creativity of the students research, independence of the students research, significance of the problem addressed. The student’s performance in each of these areas will be ranked on the standardized assessment form as Excellent (3pts), Acceptable (2pts), or Unacceptable (1pt).

Target level:
We anticipate that the average score of our students in each category will be 2.0 or higher.

Findings
2 students completed their Ph.D. degree in computer science and software engineering during this evaluation period. These students’ committee members responded to the following questions regarding the students
performance. 5 faculty responses were collected in total from the student defenses. The committee members scored their answers as Excellent (3pts), Acceptable (2pts), or Unacceptable (1pt).

Average Score Question

2.8 Please evaluate the student’s ability to undertake focused study.

2.8 Please evaluate the creativity of the student’s research.

3 Please evaluate the independence of the student’s research.

3 Please evaluate the significance of the problem addressed in the student’s research.

The average scores on these four survey questions were greater than the anticipated score of 2.0

How did you use findings for improvement?
The average scores on the above survey questions exceeded the anticipated level of performance. More data will be collected to evaluate this outcome. Therefore, no action will be taken at this time and this method of assessment will be continued for all Ph.D. students during the next evaluation period.

Additional Comments
None

Assessment Method 2: Research Expertise-Student Survey

Assessment Method Description

Upon completion of the degree requirements for the Ph.D. in Computer Science and Software Engineering, each student will be asked to fill out a graduation survey covering several items including the following question:

- To what degree did your Ph.D. computer science and software engineering education enhance your ability to undertake focused study?
- To what degree did your Ph.D. computer science and software engineering education enhance your ability to undertake creative research?
- To what degree did your Ph.D. computer science and software engineering education enhance your ability to perform independent research?

Target level:
We expect that our student’s responses should average a score of 4 or better out of 7 on this question.
Findings
8 students completed their Ph.D. degree in computer science and software engineering during this evaluation period. These students responded to the following questions using this response key.

Response Key
1 – Very Poor, 2 – Poor, 3 – Fair, 4 – Good, 5 – Very Good, 6 – Excellent, 7 – Exceptional

Average Score Question

6.5 To what degree did your Ph.D. computer science and software engineering education enhance your ability to undertake focused study?

6.5 To what degree did your Ph.D. computer science and software engineering education enhance your ability to undertake creative research?

7 To what degree did your Ph.D. computer science and software engineering education enhance your ability to perform independent research?

The average scores on these survey questions were greater than the anticipated score of 4.0

How did you use findings for improvement?
The average scores on the above survey question exceeded the anticipated level of performance. Therefore, no action will be taken at this time and this method of assessment will be continued for all Ph.D. students during the next evaluation period.

Additional Comments
None
Appendix A

Ph.D. Program Assessment Form for Committee Members

Committee Member Name: ______________________

Student Name: ______________________

Student Degree Sought: Ph.D. Graduation month/year __________ / ________

Please mark the following questions with a score of Excellent (3 pts), Acceptable (2 pts), or Unacceptable (1 pts). Circle only one below.

<table>
<thead>
<tr>
<th>Score (Circle One)</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>3, 2, or 1</td>
<td>Please evaluate the student’s ability to undertake focused study.</td>
</tr>
<tr>
<td>3, 2, or 1</td>
<td>Please evaluate the creativity of the student’s research.</td>
</tr>
<tr>
<td>3, 2, or 1</td>
<td>Please evaluate the independence of the student’s research.</td>
</tr>
<tr>
<td>3, 2, or 1</td>
<td>Please evaluate the significance of the problem addressed in the student’s research.</td>
</tr>
<tr>
<td>3, 2, or 1</td>
<td>Please evaluate the student’s written document in terms of its clarity, organization and logic, and the ability of the student to communicate technical ideas in this written form.</td>
</tr>
<tr>
<td>3, 2, or 1</td>
<td>Please evaluate the student’s oral defense in terms of the clarity of the oral presentation, organization and logic of the presentation and the ability of the student to communicate technical ideas orally.</td>
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</table>