3-Year Academic Assessment Plan Cover Sheet

Email to: assessment@unlv.edu

Program Information

<table>
<thead>
<tr>
<th>Program Assessed</th>
<th>Doctor of Philosophy - Computer Science</th>
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<tbody>
<tr>
<td>Department</td>
<td>Computer Science</td>
</tr>
<tr>
<td>College</td>
<td>Howard R. Hughes College of Engineering</td>
</tr>
<tr>
<td>Department Chair</td>
<td>Kazem Taghva</td>
</tr>
<tr>
<td>Assessment Coordinator</td>
<td>Ajoy Datta</td>
</tr>
<tr>
<td>Date Submitted</td>
<td>02/08/2019</td>
</tr>
</tbody>
</table>

Contact Person for This Plan

<table>
<thead>
<tr>
<th>Name</th>
<th>Ajoy Datta</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone</td>
<td>Office: (702) 895 – 0870</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:ajoy.datta@unlv.edu">ajoy.datta@unlv.edu</a></td>
</tr>
</tbody>
</table>

Please address the following items:

- What are the student learning outcomes? Please provide a numbered list.
- **Plans must include a curriculum map showing which courses will address which learning outcomes.** Examples can be found here: [http://provost.unlv.edu/Assessment/map.html](http://provost.unlv.edu/Assessment/map.html)
- Which learning outcomes will be assessed in each cycle year (i.e., assessment timeline)?
- How will the learning outcomes be assessed? (Programs must use at least one direct assessment of student learning.)
- Undergraduate programs should assess at least one University Undergraduate Learning Outcome (UULO) each year, which may or may not overlap with a program learning outcome.
- Graduate programs should assess at least one outcome related to one of the following graduate level requirements each year:
  - student engagement in research, scholarship, creative expression and/or appropriate high-level professional practice.
  - activities requiring originality, critical analysis and expertise.
  - the development of extensive knowledge in the field under study.
- What is your plan for sharing the assessment results and acting on them (i.e., closing the loop)?

Please limit the narrative portion of your report to no more than four pages. You may attach appendices with data, tables, charts, or other materials as needed. Please explain the relevant conclusions from any appendices in your narrative. Please contact the Office of Academic Assessment if you have questions or need assistance.
Computer Science Ph.D. Program
3-Year Academic Assessment Plan (2019 – 2022)

I. Student Learning Outcomes

The program has three student learning outcomes:

SLO 1: Exhibit a breadth of knowledge in the areas of algorithms, programming languages and compilers, theory, operating systems, and computer architecture.

SLO 2: Exhibit a depth of knowledge in at least one specialized area of computer science.

SLO 3: Be proficient in conducting a thorough literature survey on a research topic.

II: Assignment of Program Related Student Learning Outcomes to Specific Courses

SLO 1:

Ph.D. graduate students in Computer Science can take a wide variety of courses. All graduate courses in Computer Science include SLO 1 as an outcome.

SLO 2:

Most graduate courses also include outcome 2. Specifically, the course number CS 789 is reserved for special topics and most Ph.D. students take a number of CS 789 courses. A number of the special topic courses have transitioned to a regularly numbered course, such as

CS 715 - Advanced Analysis of Algorithms
CS 733 - Geographic Data Base Systems
CS 740 - Statistical Pattern Recognition
CS 741 - Structural Pattern Recognition
CS 747 - Cryptography and Information Theory
CS 758 - Computational Geometry
CS 769 - Advanced Data Base Management
CS 772 - Software Architecture
CS 777 – Scheduling (to be approved)
CS 780 - Distributed Computing and Algorithms
CS 781 - Automated Deduction
CS 782 - Expert System Construction
CS 783 - Genetic Algorithms and Neural Networks
CS 788 - Computational Environmetrics.

All of these outcomes are also stressed in the process of writing and defending a thesis or dissertation.

**SLO 3:**

Outcome 3 is present in

CS 795 - Directed Research
CS 798 - Dissertation Proposal

Furthermore, most Ph.D. students co-author peer-reviewed conference and journal papers as a result of their Ph.D. thesis work.

Table 1 summarizes how program-level student learning outcomes are covered in the curriculum.

**Table 1: Curriculum Map**

<table>
<thead>
<tr>
<th>Ph.D. in Computer Science</th>
<th>SLO 1</th>
<th>SLO 2</th>
<th>SLO 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 656</td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 677</td>
<td>xx</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 795</td>
<td></td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>CS 798</td>
<td></td>
<td></td>
<td>xx</td>
</tr>
<tr>
<td>CS 715, 733, 740, 741, 747, 772, 777, 780, 781, 782, 783, 788 and CS 789</td>
<td>x</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Comprehensive Examination</td>
<td>xx</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Qualifying Examination</td>
<td></td>
<td>x</td>
<td>xx</td>
</tr>
<tr>
<td>Peer-reviewed publication</td>
<td>x</td>
<td>xx</td>
<td></td>
</tr>
<tr>
<td>Ph.D. Thesis</td>
<td>x</td>
<td>xx</td>
<td></td>
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**Key**

x = moderate emphasis
xx = primary emphasis
III: Definition of Methods, Instruments, and Analysis of Student Learning Outcomes Assessment

Data is collected through the following instruments as detailed in Table 2.

- Tally of number of Ph.D. graduates. This data point is used a benchmark.
- Tracking of Ph.D. students’ GPA currently in the program. The GPA is reflective of SLO 1 and SLO 2.
- Tracking of comprehensive exam average. The comprehensive exam can be used to measure SLO 1 and SLO 2
- Pass/Fail Grades: CS 795 and CS 798. Successful completion of CS 795 and CS 798 relates to achieving SLO 3.
- Publications pertain mainly to SRO 3.
- Qualifying Exam Questionnaire
  (The questionnaire is given to the student shortly before taking the qualifying examination)
  - The questionnaire assesses the aptitude of students to conduct independent research and can assess SLO 3.
- Graduate Exit Questionnaire: This questionnaire is given to the student shortly before the Ph.D. defense
  - The questionnaire consists of two parts:
    - A subject test to measure SLO 1, i.e. students’ breadth of knowledge in the areas of algorithms, programming languages and compilers, theory, operating systems, and computer architecture.
    - A survey to gain insight into the students’ perception of our program and to obtain suggestions for improvement from the students’ perspective.
- Alumni Survey: The survey addresses the following:
  1. Relevance of the Learning Outcomes in the Alumni’s career.
  2. Perceived quality of the program in achieving SLOs 1 – 3.
  3. Suggestions regarding improvements from a perspective gained in the work place.
Table 2: Assessment Measures and Schedule  
Ph.D. in Computer Science

<table>
<thead>
<tr>
<th>Assessment Instrument</th>
<th>Learning outcomes assessed</th>
<th>Person responsible for instrument &amp; data collection</th>
<th>When and where will data be collected</th>
<th>Expected Measures (results that would indicate success)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student GPA</td>
<td>1 2</td>
<td>A. Datta and/or W. Bein</td>
<td>Time of graduation</td>
<td>Expected result is an average of 3.5.</td>
</tr>
<tr>
<td>Comprehensive Examination</td>
<td>1 2</td>
<td>A. Datta and/or W. Bein</td>
<td>Semesterly</td>
<td>70% success rate</td>
</tr>
<tr>
<td>Qualifying Examination</td>
<td>3</td>
<td>Advisor</td>
<td>Semesterly</td>
<td>90% success rate</td>
</tr>
<tr>
<td>CS 795/CS 798</td>
<td>3</td>
<td>Instructor</td>
<td>Semesterly</td>
<td>90% success rate</td>
</tr>
<tr>
<td>Graduate Exit Questionnaire</td>
<td>1</td>
<td>A. Datta and/or W. Bein</td>
<td>Time of graduation</td>
<td>70% success rate</td>
</tr>
<tr>
<td>Number of Publications</td>
<td>2 3</td>
<td>A. Datta and/or W. Bein</td>
<td>Time of graduation</td>
<td>Expected result is an average of two technical publication per graduating student.</td>
</tr>
<tr>
<td>Alumni Survey</td>
<td>1 2</td>
<td>A. Datta and/or W. Bein</td>
<td>Every three years</td>
<td>80% positive response</td>
</tr>
</tbody>
</table>

VI: Action Plan for Continuous Program Improvement

The graduate coordinator provides a summary report each year. The report consists of two parts: (a) results and findings, and (b) suggestions for improvements. This report is reviewed in a meeting of graduate faculty members, and changes agreed to in this meeting will be implemented in the following academic year. The alumni survey will be used to receive feedback from students and act on it as warranted.

This plan will be reviewed every three years.