### Annual Academic Assessment Report Cover Sheet

**Assessment reports are due the 1st Wednesday after the Fall Term**  
**Email to:** assessment@unlv.edu  
**Program**

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<th>Information:</th>
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<tr>
<td><strong>Program Assessed</strong></td>
<td>Doctor of Philosophy</td>
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<tr>
<td><strong>Department</strong></td>
<td>Computer Science</td>
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<tr>
<td><strong>College</strong></td>
<td>Engineering</td>
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<tr>
<td><strong>Department Chair</strong></td>
<td>Dr. Laxmi Gewali</td>
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<tr>
<td><strong>Assessment Coordinator</strong></td>
<td>Dr. Ajoy Datta</td>
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<tr>
<td><strong>Date Submitted</strong></td>
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<tr>
<th><strong>Contact Person for This Report</strong></th>
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<tbody>
<tr>
<td><strong>Name</strong></td>
<td>Ajoy Datta</td>
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Please attach a narrative (not to exceed 4 pages, excluding appendices) addressing the following:

- What are the student learning outcomes? Please provide a numbered list.
- Which learning outcomes were assessed?
- How were they 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 was learned from the assessment results?
- How did the program respond to what was learned?

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.
For the PhD degree in computer science we have specified the following student outcomes:

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

2. Exhibits a depth of knowledge in at least one specialized area of computer science.

3. Conducts a thorough literature survey on a research topic.

The following learning outcomes were assessed:

- Oral qualifying examination on a chosen research topic
- Written dissertation on research topic
- Oral defense of the dissertation

Students were assessed by:

- The student will present a dissertation proposal containing a background survey on the problem chosen, a discussion of the research objectives and the approach to be used, and a list of references. The proposal will be judged based on its completeness, technical merit, and feasibility.

- A written dissertation is submitted to a CS faculty committee. The results are collected on how well the dissertation is written and on its description of significant research. This must be a complete, well-researched, well-written dissertation describing a significant research contribution to the field of Computer Science. It must be publishable in a refereed journal.

- Students present their dissertation in an oral presentation to the CS faculty and graduate students. Results are collected on how well the student presents his work. This must be a well-organized oral presentation describing and defending the work done by the student on his/her dissertation. The student must also be able to field and answer questions on the presentation from the audience.
Assessing Student Engagement in Research

A student’s research work in dissertation research was assessed by the student's dissertation committee. The initial dissertation proposal and its presentation were assessed by the committee. Their published articles were also evaluated. Finally, the committee assessed the final dissertation report and the presentation.

Assessment results:

The following categories have been defined for detailed assessment. In each category, an achievement of 50% or higher is mapped to Satisfactory, 25% to 50% to Developing, and the rest to Unsatisfactory.

1. Research Questions:
   • Have you identified your broad research area?
   • Have you identified detailed research topics within your broad area?
   • Have you developed a novel theory and methods within the selected topic?
   • Have you summarized your research findings in a technical report or a paper?

2. Literature Review
   • Can you find books and research papers on a given topic from our library?
   • Can you find research papers and articles on a given topic from digital libraries and other online resources? (e.g. IEEE Explorer, ACM Digital Library, or Science Direct)

3. Methods
   • Have you done an algorithm’s complexity analysis?
   • Have you done the empirical analysis through experiments?
   • Are you familiar with approximation techniques and other simulation techniques such as Monte Carlo Technique?
   • Can you describe your algorithm in UML Diagrams?

4. Results
   • Can you interpret the experimental results accurately?
   • Can you identify anomalies and outliers in your results?
   • Can you tabulate the results and visualize it in graphs?

5. Format
   • Can you write a technical paper in LaTex using AMS or in a similar format?
   • Can you use Equation editor in MS word?
   • Can you use reference management tools such as BIBTeX?

6. Verbal Communications
   • Have you presented your research results through seminars and conference presentations?
The categories were evaluated as following.

<table>
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<tr>
<th>Criteria</th>
<th>Satisfactory</th>
<th>Developing</th>
<th>Unsatisfactory</th>
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</thead>
<tbody>
<tr>
<td>Research Questions</td>
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<td></td>
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<tr>
<td>Literature Review</td>
<td>X</td>
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<td>Methods</td>
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<td>Results</td>
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<td>Format</td>
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The outcomes are definitely above what was expected. We have seen a big growth in the number of PhD students. The students are performing extremely well and making exceptional progress.

**Program response:**

Based on the assessment outcomes, no program changes will be taken at this time. The responsibility for changes is shared by the CS Graduate Committee, and any changes are subject to a vote by CS Department tenured faculty.

The CS Department is alerting and encouraging faculty members to attend workshops on assessment processing both outside and inside UNLV.