A. **Student Learning Outcomes for the program.** List the Student Learning Outcomes for the program (*Number for later reference*).

1. Provide civil engineering graduates with technical capabilities. The objective outcomes are:
   - 1.a. An advanced knowledge of state-of-the-art and evolving areas associated with civil and environmental engineering
   - 1.b. The ability to work creatively and independently on research topics
   - 1.c. The ability to solve open-ended problems

2. Prepare civil engineering graduates to have effective workplace skills. The objective outcomes are:
   - 2.a. Oral and written presentation of technical and management information
   - 2.b. Motivation to pursue life-long learning
B. **Curriculum Map.** Where is the information covered in the courses required in the program? At what developmental stage is it covered (Beginning, Middle, or End)? **Courses are determined by the Advisory Committee of the student based on the student’s area of concentration.**

B = Beginning, M = Middle, E = End

- B = outcome introduced in beginning of development, such as in introductory course
- M = outcome covered in middle stages of development
- E = outcome fully developed at the end of career, such as in a capstone course

<table>
<thead>
<tr>
<th>Courses in program (Required &amp; Electives)</th>
<th>Student Learning Outcomes (SLO)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
<td>SLO - 1.a  SLO - 1.b  SLO - 1.c  SLO - 2.a  SLO - 2.b</td>
</tr>
<tr>
<td>CEE 700 - Research Methods in Civil and Environmental Engineering</td>
<td>BME</td>
</tr>
</tbody>
</table>

Note: Courses are determined by the advisory committee of the student based on the student’s area of concentration.
C. **Methods, Instruments and Analysis.** What instruments will be used over the three years? Which learning outcomes will be assessed by the instruments? Who is responsible for instrument development/validation and data collection? When and where will data be collected over the three years? How will results be reported (e.g. percentages, ranks, state or national comparisons) and what are the expected measures (results that would indicate success)?

<table>
<thead>
<tr>
<th>Assessment Instrument</th>
<th>Student Learning Outcomes (SLO)</th>
<th>Person responsible for instrument and 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>GPA of Graduating Students</td>
<td>SLO – 1.a.</td>
<td>CEEC-GAC *</td>
<td>Annually</td>
<td>Average GPA of 3.0 or above.</td>
</tr>
<tr>
<td>Graduate Exit Survey and Interview</td>
<td>SLO – 1.a.</td>
<td>CEEC-GAC</td>
<td>Every semester</td>
<td>At least 80% positive responses towards the outcome</td>
</tr>
<tr>
<td>Number of Publications</td>
<td>SLO – 1.b.</td>
<td>CEEC-GAC</td>
<td>Every three years</td>
<td>Average of one journal paper for thesis option graduating student and one conference paper for project option graduating student.</td>
</tr>
<tr>
<td>Alumni Survey</td>
<td>SLO – 2.b.</td>
<td>CEEC-GAC</td>
<td>Every three years</td>
<td>Average of 4.0 on a scale of 0.0 to 5.0 of the assessment instrument.</td>
</tr>
</tbody>
</table>

* CEEC-GAC: CEEC Department Graduate Affairs Committee
Table listing annual average GPA and publication data.

<table>
<thead>
<tr>
<th>YEAR</th>
<th># of Ph.D. Graduates</th>
<th>Average GPA of Ph.D. Graduates</th>
<th># of Journal Articles</th>
<th># of Conference Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>6</td>
<td>3.804</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>2015</td>
<td>7</td>
<td>3.701</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>2016</td>
<td>8</td>
<td>3.869</td>
<td>19</td>
<td>3</td>
</tr>
</tbody>
</table>

The outcome 1.a is measured using. The average GPA during the three assessment years is higher than 3.0 which indicates success.

The outcomes 1.b, 1.c, and 2.a are measured using number of publications data collected by the department annually. The expected measure of number of publication (1 journal article or 1 conference paper per graduate student) has been met rather mostly exceeded beyond the requirement.

The outcome 2.b. is measured using exit survey. There is no alumni survey data available at this point which is a part of the assessment plan. The exit survey question related to satisfaction with various aspects of CEEC department is shown in the bar graph below. It is conjectured that a positive experience while at UNLV could be a motivating factor towards life-long learning. Less than 10 percent of the students are not feeling positive about various aspects of the CEEC program. Therefore, this outcome has been achieved successfully.
How satisfied were students with each of the following aspects of the CEEC Department:

- Quality of graduate curriculum
- Quality of graduate level teaching by faculty
- Intellectual quality of faculty
- Diversity of faculty
- Relationship between faculty and graduate students
- Level of support provided by your academic research
- Level of support provided by your academic committee
- Level of support provided by graduate coordinator
- Level of collegial and supportive environment provided by CEEC...
- Overall academic experience

D. **Analysis & Reporting.** List the position(s) responsible for data analysis and report below.

CEE Department Graduate Affairs Committee

E. **Process for Program Improvement.** What is your plan for reviewing and acting on your findings?

This three-year assessment indicates that the outcomes 1.a, 1.b, 1.c, and 2.a need improvement. It is not clear whether this improvement is needed due to program deficiency or a limitation of the assessment instruments used. The average GPA of the graduated students shows success. Moreover, the established criteria of number of publications are also satisfied beyond minimum requirement. In order to improve the process, following changes are to be undertaken:

1) For the outcome 1.a, the advanced knowledge is topic specific and is most likely achieved through all courses in a degree program. In Section B “Curriculum Map”, more courses should be included for assessment. For example, one course from each specialization area in civil engineering. Furthermore, specific assessment tools should be identified in each course and used in Section C “Methods, Instruments and Analysis”.

2) For outcome 1.b, work creatively and independently is achieved through thesis writing. The thesis credit hours of CEE 797 should be used for this outcome in Section B. A questionnaire has been previously developed to collect data from the graduate advisory committee during the thesis defense. This could be used as a tool to assess outcome 1.b.

3) This particular assessment has a disconnect between Sections B and C. The course identified for curriculum is not used as an instrument. The assessment needs to be improved by adding more courses in section B and linking the performance in the courses to the Section C.

4) It is recommended that all graduate students be required to complete the graduate program survey before graduation.