3-Year Academic Assessment Plan Cover Sheet
Assessment plans are due February 16, 2015
Email to: assessment@unlv.edu

Program Information:

<table>
<thead>
<tr>
<th>Program Assessed</th>
<th>M.Sc. in Astronomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department</td>
<td>Physics and Astronomy</td>
</tr>
<tr>
<td>College</td>
<td>Sciences</td>
</tr>
<tr>
<td>Department Chair</td>
<td>Prof. Stephen Lepp</td>
</tr>
<tr>
<td>Assessment Coordinator</td>
<td>Prof. Michael Pravica</td>
</tr>
<tr>
<td>Date Submitted</td>
<td>02/17/15</td>
</tr>
</tbody>
</table>

Contact Person for This Plan

<table>
<thead>
<tr>
<th>Name</th>
<th>Prof. Michael Pravica</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone</td>
<td>5x1723</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:pravica@physics.unlv.edu">pravica@physics.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.
Assessment Plan for the Physics B.Sc. degree

Learning outcomes for our graduate masters of astronomy (M.Sc) degree:

1. Graduates of the program are expected to be successful in pursuing careers in the direct practice of physics or further education in more advanced programs (e.g. attainment of the Ph.D.) in physics, astronomy or other related fields.

2. Graduates of the program are ready to be team contributors or leaders, capable of successful collaboration and independent thought.

3. Graduates of the program are prepared through coursework and involvement in cutting-edge research to be problem solvers and professional researchers. They will also possess fundamental experimental skills associated with operating electrical devices/measuring instruments such as oscilloscopes, power supplies, volt-ohm-ammeters. They will also have satisfactory computational skills to properly process data associated with measurements.

4. Graduates of the program have a satisfactory core knowledge and understanding of physics, mathematics, and other related sciences to function adequately as physicists. This includes students who pursue other degrees and careers that are not directly related to physics after receiving their M.Sc. from the UNLV physics program. They will also have a satisfactory understanding of how physics critically relates to society at large.

5. Graduates of the program are trained to be effective communicators professionally and socially. This includes the ability to compose satisfactory scientific reports and deliver scientific presentations to all levels of audiences (e.g. public, professional).

We have the following curriculum map which illustrates how selected courses address the program learning objectives:

<table>
<thead>
<tr>
<th>Course</th>
<th>SLO 1</th>
<th>SLO 2</th>
<th>SLO 3</th>
<th>SLO 4</th>
<th>SLO 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 credits of graduate level courses (600 level or higher)</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>15 credits of graduate level courses (700 level or higher)</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>6 credits of Phys 797 (Thesis)</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
</tbody>
</table>

Key: **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

Yearly assessment of learning outcomes and how they will be assessed:
- (Learning outcomes 1-4): We are giving all of our graduates an exit interview to determine their satisfaction with the program. The responses are recorded by the assessment coordinator and...
will be discussed at a future department meeting with the objective of receiving and distributing student feedback, assessing any need for quality control, and improvement of the program.

- **(Learning outcomes 1-4):** Passing the introductory-level (600-level) and more advanced (700-level) courses with a grade of B or better will give the students mastery of physics. The physics and astronomy department routinely assesses the lecture/course-based learning experiences of our masters students in meetings/discussions that are held several times a year in the spirit of improving their performance.

- **(Learning outcomes 3, 4):** The physics department requires all Ph.D. students to pass a written qualifying examination each Spring. Masters candidates are also strongly encouraged to take this exam. The exam is written by faculty members: each faculty member typically supplies a question which they individually grade. A committee meets every year to tally the total exam score for each student and decide whether or not he/she passes. Faculty advisors are informed of the status of their students pertaining to the passing of this exam. The final results are also shared at a department meeting.

- **(Learning outcomes 1-5):** Many of the physics graduate students traditionally write scientific papers which are peer-reviewed and ultimately published in renown scientific journals with their advisors based on their research projects. This is arguably the best means to ensure satisfactory writing skills and satisfactory knowledge of physics when they graduate coupled with their completion of the masters dissertation.

- **(Learning outcomes 1-5):** All masters students are required to complete and submit a research-based thesis which is examined and graded by the student’s committee. The graduate degree candidate also presents a talk on his/her research which is open to the UNLV community and the public. There is a question/answer session (moderated by the student’s thesis advisor) held immediately afterward where anyone present for the talk can ask questions. After this, the student’s committee meets privately with the student and asks questions on the thesis work. The aim here is to assess what the student has learned, how much of the work accomplished was their own, and how well did he/she present their work and field questions from the audience. The student’s thesis committee members consider both the research paper and talk performance when assigning a grade.

**Plans for sharing assessment results/closing the loop:**

We plan on discussing assessment results at our department meeting at least once a year. There is a general consensus that the quality of graduate teaching UNLV astronomy graduate students is excellent based on the track record of placing our graduate students in excellent professional positions and their enrollment in further graduate school programs (e.g. Ph.D. or other Masters programs) and that they generally succeed long after their UNLV graduate physics educational experience. That said, the department has agreed to require exit interviews for students who complete the masters program. Our goal is to further improve our program.