Annual Academic Assessment Report Cover Sheet

Assessment reports are due the 1st Wednesday after the Fall Term

Email to: assessment@unlv.edu

Program Information:

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<th>Program Assessed</th>
<th>Health Physics M.S. Program</th>
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<td>Department</td>
<td>Health Physics &amp; Diagnostic Sciences</td>
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<td>College</td>
<td>Allied Health Sciences</td>
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<td>Department Chair</td>
<td>Steen Madsen</td>
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<td>Assessment Coordinator</td>
<td>Steen Madsen, Interim Graduate Program Coordinator</td>
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<td>Date Submitted</td>
<td>Dec. 11, 2017</td>
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Contact Person for This Report

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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.
The goal of the Master of Science in Health Physics Program is to provide a high-quality graduate education experience for students in the fields of medical and health physics. The program consists of two sub-plans targeting the primary paths to employment: Environmental Health Physics (EHP) and Medical Physics (MP). The EHP sub-plan is accredited by the Accreditation Board of Engineering and Technology (ABET, 2015) and the MP sub-plan is accredited by the Commission on Accreditation of Medical Physics Education Programs (CAMPEP, 2014).

The academic program consists of a common core coursework shared by both sub-plans, augmented by discipline-specific coursework and thesis research. The student learning objectives are developed at the program level, and are addressed primarily through the common core courses. Sub-plan specific courses supplement the core courses on the SLO’s and serve to deliver additional content to ensure students meet the requirements of the accrediting bodies.

**Student Learning Objectives (SLO)**

1. Graduates able to demonstrate knowledge of theoretical fundamentals of health physics
2. Graduates competent in advanced disciplines related to health physics
3. Graduates capable of assessing and solving problems related to health physics
4. Graduates will have had “hands-on” experience with experimental equipment and techniques and abilities to analyze data and develop reports
5. Graduates able to gain practical experience with state-of-the-art equipment and software
6. Graduates able to write technical documents
7. Graduates able to communicate with technical & non-technical audiences
8. Graduates able to function within a team
9. Graduates able to participate in the research process and disseminate results
10. Graduates cognizant of the need for life-long learning and professional responsibility
11. Graduates exposed to professional practice
12. Graduates able to interact with professionals in a less formal setting
13. Graduates exposed to health physics and medical ethics
14. Graduates cognizant of the need to understand socio-cultural, political, and environmental issues related to health physics

**Assessment Activities – 2018**

Our accrediting bodies require an annual self-evaluation of the program, program objectives, student learning objectives and performance. This self-evaluation is performed as part of the end of the academic year program faculty meeting. The annual self-evaluation is focused on the performance of the students and feedback on courses from the previous year (FA and SP terms), performance on the oral examinations, and thesis defenses with the intent of addressing any immediate concerns or issues with the program content and direction. As part of the self-assessment process, the faculty will also review the alumni and employer feedback on alumni performance and capabilities to identify any concerns or deficiencies. The program faculty will also meet with our external review committees (for Environmental Health Physics - EHP and Medical Physics - MP) to discuss and evaluate the program outcomes, student learning outcomes, and the feedback gathered over the course of the academic year. This year’s assessment process was performed with additional emphasis regarding SLO’s 1-5 (students understanding theory and
Performance of the academic program with regards to the SLO’s was evaluated directly by the faculty involved in teaching the courses by comparing student performance on assignments, quizzes, exams, reports, presentations, labs and clinical practicums against the course and program expectations as well as against previous year’s student performance. Student evaluations of the courses provided feedback to the instructor as well as the department chair on the content relative to program objectives. The performance of students in the comprehensive oral examination also provided feedback on areas that need improvement in the program.

In addition to the data and observations from classroom performance, the program was also assessed through exit interviews with graduating students (all 5 students completed exit interviews this cycle). The preparation of students for the workforce was assessed by surveying alumni’s employers (0 responses this cycle). In addition, two medical physics students sat for part 2 of their national board exams during the past year.

During this review cycle, The Medical Physics External Advisory Board met on two occasions: Dec. 14, 2017 and May 24, 2018. As part of these meetings the department faculty and external advisors reviewed the program SLO’s and accreditation program goals, curriculum, student performance, and program performance.

Assessment Results / Lessons Learned

Based on student performance in the coursework (exams, quizzes, reports, labs, clinical practicums), it appears that they have a solid understanding of the theory and fundamentals of health and medical physics. Students also appear to have mastered the fundamentals of both the practical aspects of health physics (as evaluated from their performance in the lab course – HPS 603) and the clinical aspects of medical physics (based on their performance in HPS 742L: Clinical Lab Rotation). Not surprisingly, we have noted a strong correlation between the level of physics experience of incoming students and their performance in the MS program: students with strong physics backgrounds perform better as they are more capable of performing the type of problem solving and analyses required to successfully progress through the program.

One of the two students taking the department comprehensive oral exam passed on his first attempt while the other failed. The oral exam is an excellent method for assessing SLO’s 1-5 as the students are examined on their knowledge of the core fundamentals of health and medical physics. In that respect, the failure was rather surprising as the student had performed well in all core courses. It was subsequently learned that he has difficulties with oral exam formats. After practicing with his peers for a couple of months, he subsequently passed the make-up exam. Two students took the American Board of Radiology (ABR) part 2 exam. Both students passed on their first attempt. Based on results from the oral comprehensive exam and the national certification exam, our program is successful in preparing students for careers in both environmental health physics and medical physics.

All five graduating students (2 EHP and 3 MP) completed exit interviews for the Fall 17 – Spring 18 review cycle. Overall there was a higher degree of satisfaction noted by students in the Medical Physics sub-option. MP students were very satisfied with the curriculum (coursework and clinical practicums). The students were very pleased with access to clinical training at local...
radiation oncology centers (Comprehensive Cancer Centers of Nevada) and at a leading radiation oncology vendor (Varian Medical Systems) which operates a clinical educational facility in Las Vegas. Based on students’ comments, one weakness of the MP sub-option is the lack of in-depth exposure to basic computational principles associated with medical physics applications. Although EHP students were satisfied with the program (especially the knowledge of the professors), they expressed concern with the lack of EHP faculty.

Program Responses (“Closing the Loop”)

To ensure student success in the program, we will endeavor to admit only students with strong physics backgrounds. The lack of qualified EHP faculty is a valid concern. Two EHP faculty resigned in 2016 and it has taken longer than anticipated to replace them. One faculty line was filled with the hiring of a radiation biologist in August 2017 while the other faculty line remains open. A search is ongoing and it is anticipated that a new hire will be made by August 2019.

In the previous assessment report, time to degree completion (2.5 – 3 years) was expressed as a concern. Three of the five students graduating in this cycle completed their degree in less than 2 years. One student was selected for a 1.5 year internship at the International Atomic Energy Agency in Vienna and therefore required an extra year to complete his thesis. Reasons for the timely graduations are likely two-fold: (1) students are heeding our advice to select their thesis supervisors during their first semester in the program, and (2) the graduate admissions committee is screening students with an emphasis on physics majors who are better able to cope with the demands of the curriculum thus enhancing the likelihood of timely program completion. Access to summer graduate assistantships for MS students would likely also help with student progression through the program. To that end, Health Physics faculty are attempting to resolve the summer funding gap with funds from external grants.