Assessment Plan for the Biomedical Physics program at CSU Fresno:

Overview:

Schedule: We will assess student work during the fall and spring terms as appropriate for courses offered. Lab instructions will be reviewed on an ongoing basis, as needed. Improvements to courses will take place before the course is next offered, and generally during the summer break. Alumni surveys will be performed as an adjunct to the Physics Department's periodic surveys of alumni.

Population studied: We will track success of program graduates and survey them for their opinions about how useful the program was to them. We will examine the work of students within the program. Students in Physics 135, Physics, 156 and Physics 157 will generally be seniors, while those in Physics 136 will generally be Juniors.

For embedded final exam questions, student work will be reviewed at the end of each semester. Lab reports and lab instructions will be reviewed during the semester that a course is given, or shortly thereafter.

Program Mission:

The Mission of the Undergraduate Biomedical Physics Program at Fresno State is to provide students with a rigorous undergraduate-level introduction to the field of Medical Physics, including radiation physics, anatomy, physiology, medical imaging, and, at their option, radiation therapy. This will include a solid background in physics, biology, chemistry, and mathematics. The program will provide students with preparation for graduate instruction in Medical Physics and other areas of quantitative medicine (computational neuroscience, molecular imaging, etc.), as well as for other careers for which a broad-based, interdisciplinary scientific background is an asset.

Program Goals:

Goal 1: The students will be well prepared for graduate work in Medical Physics and other areas of quantitative medical science.
Goal 2. Students will gain an in-depth understanding of the physical and mathematical principles underlying medical imaging and radiation therapy.
Goal 3. Students will develop a practical understanding of the subject matter through laboratory exercises using actual radiation measurement equipment, medical imaging equipment, or radiation therapy equipment, as appropriate to each course.

Goal 1: The students will be prepared for graduate work in Medical Physics and other areas of quantitative medical science.

Objective 1: Students who successfully complete the program will be well prepared to apply to graduate school in Medical Physics and other areas of quantitative medicine.

Assessments:

A. Track GRE scores of graduating students.

B. Track graduate admissions for students and alumni in Medical Physics programs and other graduate programs in Quantitative Medicine.

C. For students electing other options for further study, (Medical School, Allied Health, or areas unrelated to their major) similarly track graduate admissions tests and admissions rates.

Objective 2: Graduates will be well prepared to succeed in graduate programs in Medical Physics and other areas of quantitative medical science.

Assessments:

A. Track graduation rates from graduate and professional schools for graduates, with rates broken down by type of study (Medical Physics M.S., Medical Physics Ph.D., Neuroscience Ph.D., etc.)

B. Survey graduates who are enrolled in, or who have completed graduate school and solicit their opinions of the extent to which the program prepared them for graduate work.

Objective 3: Graduates who elect to pursue other careers will be well prepared for a variety of graduate programs and entry-level jobs requiring a diverse scientific background.

Assessment: Survey graduates who have pursued other career paths and solicit their opinions of the extent to which the program prepared them for their further education or employment.

Goal 2. Students will gain an in-depth understanding of the physical and mathematical principles underlying medical imaging and radiation therapy.

Objective 1. Students will understand basic physics and mathematics pertaining to medical physics.

Assessment: Embedded questions in final exams for Physics 136, Radiation Physics, will be used to assess the initial understanding of students of basic math and physics of radiation. Embedded questions in final exams for Physics 156, Diagnostic X-Ray Imaging Physics, and Physics 157, Nuclear Medicine Physics, will be used to assess both the retention of these concepts, and the application of these concepts by students to particular areas of medical imaging technology.

Objective 2. Students will understand the mechanisms and limitations of each medical imaging modality studied.

Assessment: Embedded questions in Physics 135, MRI/MRS of the Brain, Physics 156, Diagnostic X-Ray Imaging Physics, and Physics 157, Nuclear Medicine Physics, will be used to assess student understanding of: the physical principles underlying each imaging modality, the physical properties that are visualized in each type image, the general types of medical and biological information that these properties can reveal, and the limitations of each imaging modality in acquiring clinical information.

Goal 3. Students will develop a practical understanding of the subject matter through laboratory exercises using actual radiation measurement equipment, medical imaging equipment, or radiation therapy equipment, as appropriate to each course.

Objective 1: Students will experience lab exercises using radiation detection equipment and medical imaging/therapy equipment.

Assessment: Faculty will review, on a yearly basis, the types of equipment and laboratory environments available for students in lab courses. New opportunities for lab settings (e.g., nearby hospitals) will be sought out as needed, and the success of these efforts will be summarized on a yearly basis.

Objective 2: Students will perform laboratory exercises that will deepen their understanding of the principles and operation of medical imaging devices, while demonstrating the practical issues involved in working with these devices.

Assessment: The program director will review lab instructions on a yearly basis (with an exception allowed for those labs which have already been judged to be adequate). Selected student lab reports will also be reviewed as needed. Visits to lab exercises by a faculty colleague of the instructor may be employed as needed.

Reporting and Use of Assessment Results:

Use of Assessment Results for Program Improvement: The final exam answers, critiques of labs, and, when applicable, survey responses will be assembled and analyzed after the end of the spring semester. Results will be distributed to the program faculty so that they will have the opportunity to devise and implement course improvements over the summer break. The results will also be summarized in a brief assessment report.

Assessment Reports: A summary report of each yearly assessment will be distributed to all program faculty. The report will also be forwarded to the chair of the physics department. These reports will be available for inclusion (either intact or as excerpts) in the Physics Department's periodic program review.