Graduate Assessment by Degree/Certificate Program

1. List in detail your Student Learning Outcomes (SLOs) for each graduate degree/certificate offered.

A. Master of Science in Biomedical Sciences (Physiology)

1. Sufficient breadth and depth of knowledge to assume responsibility for teaching classes in Anatomy and Physiology at least at the undergraduate level, and teaching experience in Physiology;

2. Knowledge of the process of research, including: familiarity with techniques for searching the literature; principles of measurement; and practical experience in the design and conduct of scientific experiments, collection of data, and interpretation of data sufficient to enable them to interpret current literature, and to embark upon the next (doctoral) level of development as researchers;

3. Familiarity with the mechanics of scientific reporting sufficient to enable them to prepare a publication for a scholarly journal;

4. Experience with oral presentation of material sufficient to enable them to prepare and deliver reports on their work at seminars or meetings of scientific societies;

5. A degree of understanding and scientific maturity sufficient to enable them to assess the work of others;

6. An understanding of the administrative procedures common to academic departments.

B. PhD in Biomedical Sciences (Physiology)

1. Sufficient breadth and depth of knowledge to assume responsibility for teaching classes in Anatomy and Physiology at the undergraduate level, and sufficient sophistication in one specialty area of Physiology to teach medical and graduate level course material in that area;

2. Specialized knowledge in an area of research, including familiarity with the literature and techniques common to their area of specialization; and practical experience in the design and conduct of scientific experiments, collection of data, and interpretation of data sufficient to enable them to initiate and continue research successfully as independent investigators and to supervise student work in that area;

3. Familiarity with the mechanics of scientific reporting sufficient to enable them to publish their work in scholarly journals;
4. Experience with oral presentation of material sufficient to enable them to prepare and deliver reports on their work at seminars or meetings of scientific societies;

5. A degree of understanding and scientific maturity sufficient to enable them to assess and criticize constructively the work of others;

6. An understanding of the administrative procedures common to academic departments.

2. Where are these SLOs published (e.g., departmental web page)?

These SLOs are all listed in the Physiology Program’s Policies and Procedures Handbook, a copy of which is given to each incoming student, and portions of which may be distributed to prospective applicants by e-mail.

3. Explain how your SLOs map onto your curriculum, i.e., how does your program of graduate studies produce the specific SLOs in your students?

A. SLO 1, Knowledge: Courses:

Except for required courses, the program of study will be tailored to the needs and future career plans of each individual graduate student. A minimum of 30 credits is required for the MS degree. There is not a specific credit requirement for the PhD. Once admitted to PhD candidacy, the student’s advisory committee determines what further coursework, if any, the student shall take.

Required courses for incoming MS students include:
Phyl 603 Medical Physiology
Phyl 606 Human Neurophysiology
Anat 603/604

Most students will do some directed reading or directed research, especially Plan B MS students and PhD students who, for whatever reason, have not begun a research program under a faculty mentor who will chair their Advisory Committee. Students will enroll in Phyl 699 in order to receive credit for this work, with the number of credits being agreed upon by the faculty conducting the 699, the Chair of the Graduate Program Committee, and the student. Incoming PhD students may petition the Graduate Program Committee to be exempted from these required courses when the student has already satisfactorily completed equivalent courses at another institution, but in general, students should expect that they will take these courses.

B. SLO 1, Teaching

Graduate students are strongly encouraged to participate in teaching by demonstrating in laboratory sessions, particularly within their intended area of specialty. Their participation as Graduate Teaching Trainees should bring them into direct contact with students and afford them an appreciation of the problems associated with the administration of courses. To this end, Graduate Teaching
Trainees should participate in meetings of course committees and they should also attend the lectures. Whenever possible, students will be permitted to select the courses in which they will instruct; however, instances may arise where it will be necessary to assign individuals to specific courses within the general area of their competence.

A maximum of 10 hours/week may be spent in teaching, except when students receive their major financial support in the form of a teaching stipend (Graduate Teaching Assistantship). Students holding Graduate Teaching Assistantships will be assigned duties in accordance with Graduate Division guidelines.

C. SLO 2, Research:

The first year graduate student will consult with the mentor to choose a research project early in the graduate program. Following passage of the Qualifying Exam, the graduate student and the advisor are encouraged to informally discuss the possible projects with potential members of the Advisory Committee and/or other faculty members in order to determine the scientific feasibility of the research scheme and suitability with respect to departmental facilities and personnel. Based on these discussions, the graduate student and mentor should complete Appendix 1 (Initial Research Summary) as soon as feasible and submit it to the Graduate Program Committee for approval.

Following approval of this initial research proposal, the graduate student will be required to meet with his/her Advisory Committee and present a final research proposal. This presentation should establish a comprehensive background for the project and preliminary results, if available, should be discussed. This proposal should include details of the research program with the experimental particulars. The proposal will be subject to approval by the Advisory Committee and forwarded to the Departmental Graduate Committee for final approval. If significant problems are identified at this time, the student will present a revised program approximately two months later.

The Graduate Program Committee will review each graduate student’s work at the end of the academic year. The graduate student and his/her advisor will meet with the Committee to review the student’s progress for the past academic year. As well, a tentative schedule for the Comprehensive Examination will be provided. The graduate student is required to complete the form “Annual Review of Graduate Student’s Progress” (Appendix 2, page 11) and present the information to the Departmental Graduate Committee during his/her annual review.

D. SLO 3, 4, 5, Scientific Maturity:

A graduate student’s academic maturity is nurtured largely through his/her exposure to the scientific acumen of departmental colleagues. The active participation of graduate students in seminars, discussions and study groups accelerates this process. In order to stimulate the development of scientific maturity:
1. A graduate student in the M.Sc. program will give one seminar near the completion of the program, typically in the second year. A PhD student will give one seminar in the second year of his/her program and a second seminar near completion of the degree. In the case of a MS student who transfers to the PhD program, the seminar typically given in the second year near completion of the MS will serve as a portion of the Qualifying Examination;

2. Graduate students should participate in study groups related to the area of their specialization where appropriate. These study groups provide a situation in which students can present and evaluate their own work as well as that of others in an informal atmosphere;

3. Graduate students are ordinarily expected to attend special seminars arranged by the Department of Anatomy, Biochemistry, Biophysics, Physiology, and Reproductive Biology or seminars in other departments when appropriate;

4. Graduate students will present a written report of their research once annually to the Graduate Program Committee. Additional written reports may be requested by the Chairperson of the Advisory Committee. This gives the student an opportunity to formulate his/her progress in writing. Parts of this report may be useful in the preparation of the thesis;

5. Graduate students will participate in scientific meetings to the extent that funds for travel allow.

E. SLO 6, Administrative Procedures:

Graduate students will be exposed whenever practicable to the processes of decision making and administration of the Department. This exposure will be achieved in part by assigning graduate students to sit on committees of the Department, and they may serve as assistants to faculty members having specific responsibilities within the Departmental structure.

All graduate students will be permitted to attend open faculty meetings of the Department as observers. Each autumn the graduate students of the Department will elect a graduate student representative who will have full voting privileges at these meetings, and with whom the Department can consult on any matters concerning graduate student affairs. Students will also elect a representative to the campus-wide Graduate Student Organization (GSO).

4. What population(s) is covered by your assessment(s)?

All students admitted to the MS and PhD programs in Physiology are covered by the assessments described herein.

5. Please list/describe all the assessment events and devices used to monitor graduate student progress through the program. Consider the following
questions:

– How are written exams used to assess graduate students?

A. Written exams, usually *multiple choice*, are the main basis for grades in our courses. These are constructed, as much as possible, using questions with which we have prior experience. They are intended to define a minimal competence in the subject matter of each course. Together with other behaviors defined by the instructor (class participation, reviewing a classic or recent paper, literature review paper, etc.) they form the basis for the course grade.

B. *Literature review papers* are part of the evaluation scheme in some courses. They are intended to exercise literature search techniques, critical thinking, and expository writing skills. They are evaluated for these attributes by the faculty who teach the subject matter of the paper.

C. Some integrative courses, such as Physiology of Exercise, use *essay exams and/or take-home essay exams* to test students’ ability to explain interrelationships between organ systems in the context of a global stressor (exercise), or to explain why certain phenomena are important to homeostasis in this context.

D. The Qualifying and Comprehensive Exams are *multi-day essay exams*, in which time limitations on the amount of knowledge one can demonstrate are minimal. These are intended to test depth of knowledge in several areas of Physiology and supporting physical and biological sciences. They are evaluated by the faculty who delivered the corresponding content and wrote the questions.

– How are independent and/or culminating projects (theses, dissertations, performances, capstone courses, etc.) used to assess graduate students?

All of our programs have a “culminating experience”. These are: For Plan A MS students, the masters degree thesis; for Plan B MS students, the plan B paper (which is either an in-depth literature review, or the literature review, problem definition and experimental design for a research project); for PhD students, the doctoral dissertation.

These culminating experiences are the basis for judging the attainment of research expertise (SLO 2, above), and the acquisition of scientific maturity (which are the attributes listed in SLOs 3, 4, and 5). Each paper/thesis/dissertation is reviewed by a faculty committee chosen for background in the relevant subject matter. To the extent that deficiencies are identified in the student’s product, remediation of those deficiencies becomes an opportunity for further, focused, development of the student.

– How are oral presentations/reports/performances used to assess graduate students?

Oral presentations are required in some of our courses, in journal clubs, and in the culminating experience. This is in addition to the teaching experience most of our students get. Oral presentations are used to provide feedback, and remedial
assistance if needed, on organizing the flow of a presentation, on how to prepare materials for presentation, and on articulate delivery. Both faculty observation and student evaluations of instructor performance and are used to provide feedback to graduate students on their ability to communicate Physiology and Anatomy subject matter effectively.

6. **Please list/describe how your graduate students contribute to your discipline/academic area? Consider the following questions:**

   – To what extent do your graduate students present their work at professional conferences?

      Our PhD students present an average of 1.5 papers or posters at national meetings in the course of their UH career. Approximately half of our MS students are authors or coauthors on papers/posters at national meetings.

   – To what extent do your graduate students publish their work?

      Only a small minority do not. Most have more than one publication at the time of graduation from the program.

     Our graduates also contribute in the teaching of Physiology. For example, most of the Biological Science faculty at KCC are our graduates, as is one of the faculty at HPU. Beyond Hawai‘i, many of our graduates have had distinguished careers both in the US and abroad, becoming department chairs, prominent professional society members, and very active members of the community of scientists.

7. **What attempts are made to monitor student post-graduate professional activities?**

   We do not have a formal program of surveying our graduates, although we plan to implement one. We hear about them from their publications, from attendance at meetings, and from occasional phone calls and e-mails.

   ▪ In which industries/professions do your graduates find employment?

     We conferred 16 PhD degrees in the last 10 years. The attached spreadsheet shows where our graduates went, so far as we know. Among these PhD graduates: 63 percent went into post-docs or faculty positions, and are still in academic or research positions; 12 percent into other professions; 12 percent are business proprietors; 12 percent are still seeking professional opportunities.

     We have conferred 43 MS degrees in the past 10 years. Among theses MS graduates: 28 percent have gone on to medical school; 25 percent went on to PhD programs; 5 percent have gone into physical therapy or athletic training; 5 percent into the fitness industry; 14 percent into other professions (e.g., dentistry, osteopathy, community college or HPU faculty, etc); the balance are unknown.

   ▪ How successful are your graduates in their chosen professions and careers?
We don’t know how to measure success, since each person’s definition of that reflects their own personal values. We can only point out that our graduates have become department chairs, active professional society members, and have published (some of them quite extensively).

8. **How were the assessment data/results used to inform decisions concerning the curriculum and administration of the program?**

   – Was pedagogy changed?

   Yes. We have attempted to keep up with the changing demands made on Physiology faculty. We teach preparation of PowerPoint presentations, use of WebCT, productive web searching, and other modern techniques to our students.

   – Did you make administrative changes?

   Yes. In order to facilitate a more integrated presentation of Anatomy, Biochemistry, and Physiology, we have administratively united these three departments, with faculty in all three areas being involved in our graduate program decisions, participating on graduate student committees, providing mentoring, and reviewing applicants.

   – Were there changes in interactions with students? Advising, counseling, etc.

   Yes. Compared to the more flexible, but sometimes inconsistent, approach we have had in the past, we have recently more clearly delineated lines of responsibility for various aspects of our graduate program, more rigorously defined the program’s expectations, and established a mechanism for providing this guidance to students in a timely fashion.

   – Were degree requirements changed?

   Yes. For example, in recognition of the fact that most under-graduate physiology teaching today is in courses on Human Anatomy and Physiology, we now include Anatomy in our core curriculum. At the same time, another course was changed from required to optional in order to preserve opportunities to tailor our program to the student’s career goals.

   – Were courses changed?

   With respect to course content, there is some change every year, as dictated by new knowledge. As noted above, changes in core curriculum have been made to reflect the changing teaching demands made on our graduates. Some courses are no longer offered, and new ones have been added to reflect changing student demand.