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INTRODUCTION

Welcome to the Interdisciplinary Graduate Program in the Physiological Sciences. The purpose of this handbook is to introduce you to the various requirements that must be met before you are granted the Master of Science (M.S.), or Doctor of Philosophy (Ph.D.) degree from the Graduate College of The University of Arizona. The strength of the Physiological Sciences Program derives largely from the flexibility afforded by the interdisciplinary faculty who participate in the Program. This allows each student the freedom to design a unique program of study to meet individual career goals.

However, the flexibility of this Program necessitates careful coordination of your program of study with your mentor, the Program Committee, the Physiological Sciences faculty, and the Graduate College. This handbook should be read upon entering the Program, and used henceforth as a reference regarding the policies and procedures of the Physiological Sciences Program at The University of Arizona.

The Program is intended to provide the foundation for a career in the physiological sciences. To achieve this, the student requires (a) an adequate base knowledge of physiology at the cellular, organ, and systems level, (b) experience and training in research, culminating in a major research project, and c) experience and training in teaching, and in presenting research findings.

The Program is designed for completion of the doctoral degree in about five years, or the master's degree in two years. Obtaining the degree within this time frame depends, in large part, on the motivation and self-discipline of the student. The Program is designed to introduce students to research activities during their first year. By design, the course work requirements are flexible so that the needs of students with diverse areas of specialization can be accommodated. The student, in conjunction with a mentor and the Physiological Sciences Program Committee, designs the individualized program of study.

REVISED: 8/08

Scholar's Statement to Serve Humanity

In the Pursuit of knowledge, I WILL STRIVE TO:

- **MAINTAIN** the integrity of the scholarly process and practice my profession with conscience and dignity;
- **SHARE** my knowledge in an ethical manner for the good of all humanity, and uphold my responsibility for the continued ethical use of this knowledge;
- **RESPECT** the integrity of my colleagues, while fostering that integrity through critical analysis of research findings;
- **ACKNOWLEDGE** the contributions of all those involved in the creation of this knowledge, and only take credit for my own contributions;
- **RECOGNIZE** my moral and ethical obligations to be fair and objective in judging the work of others, and to avoid bias that obstructs valid ideas that differ from my own;
- **RECOGNIZE** my role as a member of society and respect the questions posed by members of the society that sustains my work;
- **KEEP** the well-being of those affected by my work and the benefit to humanity foremost in my practice;
- **GIVE** respect and gratitude to my teachers and to those I teach;
- **NOT PERMIT** considerations of age, disease or disability, creed, ethnic origin, gender, nationality, political affiliation, race, sexual orientation, or social standing to alter my judgment as a professional;
- **MAINTAIN** the utmost respect for life.

(Statement adapted from an oath written by Brendan C. Brinkman)

DOCTORAL PROGRAM

General

At the University of Arizona, the Graduate College sets the overall framework for the completion of the doctoral degree. Within these guidelines, the Physiological Sciences Program establishes specific requirements and monitors student progress. The overall goals of these requirements are to ensure:

- sufficient breadth of knowledge in Physiological Sciences
- sufficient depth of knowledge in the student's area of specialty
- rigorous research training
- training in career skills (writing, speaking, critical evaluation of the literature)
- training in teaching skills

In addition, the guidelines and requirements that are described in this handbook have been established to ensure the protection of student interests and successful completion of the doctoral degree. The student is expected to comply with the regulations of the Graduate College with respect to residence, credit hour requirements, and the qualifying and comprehensive examinations (please refer to the Graduate Catalog). A high level of performance is expected of students who are enrolled in graduate programs at The University of Arizona. Students must maintain a grade point average of 3.00 (letter grade of B) or better to receive financial support and to be awarded a Ph.D. degree.

Required Coursework

The Graduate College mandates that 36 hours of coursework, exclusive of the dissertation, half of which must be graded, be completed in the major subject area by all doctoral students. This refers to courses in which regular grades (A,B,C) can be earned, and that are numbered at the 500 level or above. 18 Dissertation Units and 9 units in a minor area of study are also required.

The courses listed below, totaling 32 units, must be completed by all Physiological Sciences graduate students. In some cases, certain Program requirements may be waived if equivalent coursework has been completed previously. However, if a waiver is desired, the student must submit a written petition to the Program Committee, which will either grant or deny the waiver. Individual faculty are not authorized to waive any of the Program requirements without prior approval of the Program Committee. Transfer credit from other institutions can be applied to an advanced degree if "approved by the head of the Program, the grade earned is "B" or above, and it was awarded graduate credit at the institution where the work was completed." (For additional information see the UA Graduate Catalog, <http://catalog.arizona.edu/2006-07/policies/acceptcr.htm>.) If waivers are granted for coursework taken at other institutions, these courses are referred to as "Transfer Coursework" by the Graduate College, and must be listed as such on the **Doctoral Plan of Study** form http://grad.arizona.edu/Current_Students/Forms/GC_Forms.php This form must be filed during the third semester. The required courses are:

Cellular and Molecular Physiology (PS/PSIO 503); **5** units

Systems Physiology (PSIO 603); **6** units

Laboratory rotations (PS 700, or PSIO 610); 6 units. The purpose of the laboratory rotation will vary with the individual needs and interests of the student. In general, the investigator should not expect the student to complete a major project. Rather, the laboratory rotation should provide an opportunity to become acquainted with the ongoing research of the laboratory and to be exposed to the important technical aspects of the work. Laboratory rotations must be performed under the tutelage of any regular faculty member with an active appointment in the Physiological Sciences Graduate Program. Laboratory rotations with faculty outside of the PS GIDP are not allowed unless petitioned and approved by the Program Committee. However, the laboratory rotations requirement must be completed in a minimum of two different faculty laboratories. As a general rule, the graduate college considers one (1) unit of credit to be equal to three hours of work per week (48 hours/semester/credit). Prior to beginning the rotation both the student and the faculty member must complete the Laboratory Rotation Form, Appendix V.

Physiology Student Forum (PSIO 696C); each semester. This is a 1 credit course which is run by Physiological Sciences Graduate students and meets each semester. It must be taken for credit every semester unless there is a class conflict. Student Forum meets for one hour every other week. Ordinarily two students present during each session (20-30 min each), however at the discretion of the student organizers some sessions are reserved for full hour presentations. The Ph.D. students are expected to present a minimum of two 20-30 min. Student Forum presentations and one full-length seminar. One of the short presentations must be given during the first year. These presentations are in addition to the final defense of the doctoral dissertation, which will not necessarily take place during Student Forum. Student and faculty attendance will be taken at each Student Forum.

Scientific Writing Strategies, Skills and Ethics (PS 595b) (2 units). Provide students with skills to write and communicate effectively for a variety of scientific audiences; including scientific journals, funding institutions, potential employers as well as administration in academia and industry.

Statistics (1 semester of an upper division (i.e. 400 or above) statistics course); 3 units. Suggested courses: EPID 576a Biostatistics, Math 509C, Statistics for Research, PHL 576, Biostatistics for Public Health, PSIO 575, Statistical Analysis. Other syllabi may be considered by the Program Committee for approval.

Physiological Sciences Teaching Workshop (PS 697a,b 1 unit each semester); Fall: Theoretical background on learning/teaching; Handy hints from good teachers; Development of teaching philosophy and techniques Spring: Observations and feedback (peer & faculty); More handy hints; Evolution of own style and skill

Departmental seminar programs, 4 credits. Credit for attending departmental seminars can be obtained in any department participating in the Physiological Sciences Program. A minimum of four units of credit derived from departmental seminar programs is required. The dissertation defense can be presented in one of these seminar series with permission of the seminar coordinators.

The remaining units must be in physiology or in closely related disciplines. The additional courses should be selected by the student in consultation with a mentor. The courses chosen should be based on the student's individual interests and area of specialization. The format of these additional courses could include colloquia, tutorials, or formal courses offered by a variety of other departments (see Appendix III). A program of study should be developed as soon as possible, and a copy of the written plan should be sent to the Program office for review by the Program Committee and for our records. If the student and mentor decide to alter their original goals, an amended plan should be submitted to the Program office.

Minor Requirement

The Graduate College requires all Ph.D. students to complete a "minor" program of study. Successful completion of a minor field of study is determined by the department in which the minor is obtained. Complete the Minor Program of Study Form, Appendix VI and submit to the Program Office. The student who chooses to major and minor in Physiological Sciences has a "Distributed minor in Physiological Sciences". The distributed minor consists of 9 units of formal graded course work in any area of Physiological Sciences (excluding seminars and lab rotations).

Minor in Physiological Sciences

Students majoring in another discipline who desire a minor in Physiological Sciences must complete a minimum of nine units, (typically PSIO 503 and PSIO 580 or PSIO 601). The minor will not be granted if the student fails to maintain a B average (GPA of 3.0) for these courses. Complete the "Minor Program of Study" form (Appendix VI) obtain signatures provide the signed document to the Program office.

Program Time Line: Following is the general time frame in which most students progress through the Ph.D. Program in Physiological Sciences. A Checklist is provided in Appendix VI to help you keep track.

YEAR 1

Prepare and submit to the Physiological Sciences Program Office a **Proposed Program of Study**. You and your mentor (or preceptor) should work on this together. This form should be revised as changes occur throughout your graduate studies.

Complete the **Qualifying Exam** by satisfactorily passing PSIO 503 and 603 (grade of "B" or better)
Complete **Scientific Writing Strategies, Skills and Ethics** PSIO595b, (grade of "B" or better)
Complete at least **two rotations** in the laboratories of your choice. Submit completed lab rotation forms (Appendix II) at the beginning and end of each rotation.

Enroll in Student Forum and give at least one 20-30 min presentation.

YEAR 2

By the **beginning of your third** semester you are expected to have chosen a mentor from the Physiological Sciences regular faculty. You **must** select a mentor by the end of your third semester. To formalize your selection, you must submit the "Mentor Selection Form" (Appendix VII) with the appropriate signatures. See additional information under "Mentor Selection".

Register for and attend Student Forum

By the end of the third semester, you should form a Comprehensive Examination Committee (see below) and meet with them for the first time. You must submit the **Comprehensive Examination Committee Form** (Appendix V) to the Program Office prior to scheduling your written comprehensive exam. A **"Doctoral Plan of Study"** form must also be submitted to the Graduate College by the end of the third semester.

The written and oral comprehensive exam should be completed by the end of the second year (see below). You should also, by the end of your second year, have completed the coursework required for a major in Physiological Sciences. You should be in the process of formulating a research project, conducting preliminary experiments, and considering members to serve on your dissertation committee.

Additional information on the comprehensive exam is available at:

<http://grad.arizona.edu/current-students/program-requirements/doctor-of-philosophy/comprehensive-examination>

The various required Graduate College forms are available at:

<http://grad.arizona.edu/current-students/forms>

Complete the form "**Application for Comprehensive Oral Examination**". Submit the original and three copies of your to the Graduate College Degree Certification Office, Administration Bldg, Room 316, **AT LEAST** 1 week prior to the Oral exam date. This form requires the signatures of all your committee members as well as the Major/Minor Department Heads

Note that to remain eligible for Program funding, you must complete the Comprehensive Examination by the end of the fifth semester. In exceptional circumstances students may petition the Program Committee for an extension of the deadline.

YEAR 3

During the third year, you should form the Dissertation Committee (which need not be the same as your comprehensive exam committee) and complete the required dissertation proposal. Submit the "Dissertation Proposal Approval Form" to the Program Office.

Register for and attend Student Forum

Complete Minor Coursework, if necessary

YEAR 4

Student should have enrolled in Student Forum each semester and by the end of the fourth year should have completed two 20-30 minute presentations and one full length seminar.

PENULTIMATE SEMESTER

During the **first week** of this semester, you must submit the original plus three copies of the "**Doctoral Application to Candidacy**" to the Graduate College Degree Certification office.

FINAL SEMESTER

Obtain the "Manual for Theses and Dissertations at:

http://grad.arizona.edu/system/files/002_ETD_Diss_Manual.pdf

This manual contains the directions for formatting your dissertation; however, the overall organization of the dissertation should be determined by you and your mentor. It is the responsibility of your Mentor to proof your dissertation.

The original plus three copies of the "Announcement of Final Examination" must be distributed to Degree Certification at least three weeks before the date of your final exam.

Penultimate copies of your completed dissertation manuscript must be distributed to your committee members three weeks before your final exam.

After passing your final exam, submit two final copies of your dissertation manuscript to Degree Certification at least three weeks before your graduation date.

Questions regarding submitting forms, Graduate Representatives, and/or deadlines should be directed to the Program Office.

It is the intent of the Physiological Sciences Graduate Program to provide financial support utilizing a combination of Program funds and mentor contributions with the stipulation that adequate progress is being made towards the degree. (See below)

Note that students are required to schedule at least one meeting per year with the dissertation committee during years 2-5. More frequent meetings are recommended. The Program Committee will evaluate student progress each year using input from both the student and mentor.

The Qualifying Examination

The "Qualifying Examination", involves obtaining a grade of B or better in both PSIO 503 and PSIO 603. If a student fails this examination (i.e., receives a grade of C or lower in either course), the Program Committee and course faculty will decide whether or not the student will be allowed to re-take the course. If the student is allowed to re-take the course and fails to receive a grade of B or better the student will be dismissed from the Program.

Selection of Mentor

Each student must select a mentor **from the PS GIDP faculty with regular member status** by the completion of their third semester in the program. A mentor is a faculty member who will serve as an advisor, supporter, tutor, master, sponsor and role model. A mentor is expected to interact with the student on a regular basis (**i.e. weekly**) providing guidance, advice, and the intellectual challenge necessary for the student to complete the degree program. The following suggestions may be of assistance to graduate students in choosing a mentor. There are two broad areas that come into play when choosing a mentor. The first area has a professional basis and the second a personal basis. The choice of a mentor may be the single most important decision during graduate training.

When considering the professional aspects of your selection of a mentor, the following questions may prove helpful: (1) What is this individual's reputation OUTSIDE the University. Remember, when you have completed your dissertation and you are looking for a position, your mentor's reputation will initially be your reputation. (2) Does your prospective mentor have the funding available to support your research for at least three years? This area is probably the most problematic for graduate students. The money needed to fund your research project will most likely come from your mentor's laboratory. Also, although your stipend money is relatively stable, the mentor is expected to contribute an amount equal to one-half of your stipend to the Physiological Sciences Program. Therefore, you will need to know not only the amount of money available for your research but also the stability of funding. (3) How does your prospective mentor's lab operate? You should critically evaluate the day-to-day operations of the lab and understand the goals of the lab and where you will "fit in". You should also understand the role of your mentor in those operations. Some principal investigators have lab managers or research assistants who run the laboratory. You should know almost as much about these individuals as about your prospective mentor. (4) What are the professional requirements of the prospective mentor on such issues as work habits, ethics, sharing of ideas, lab meetings, journal clubs, and authorship on papers.

On the personal side, the answers to the following questions may be extremely helpful: (1) Is the personality of my prospective mentor compatible with my own? (2) Is this individual going to be responsive to my needs and, just as important, am I going to be responsive to his or her needs? When you join a lab, your mentor will have certain expectations of you and these should be identified when evaluating a prospective mentor. By the same token, what are your expectations of a mentor? (3) What do other students and faculty think about your prospective mentor? The collegial relationship of your prospective mentor with others will influence your interaction with other laboratories.

Do not forget the importance of the choice of a mentor and do not make that choice without a great deal of thought. Talk to other people about your prospective mentor and ask probing, but not inflammatory, questions. And provide yourself with HONEST answers to both the professional and personal aspects of your decision. Once you have identified a mentor, the Program Office must be informed of this selection in writing by you and your mentor.

Selection of Comprehensive (and Dissertation) Committees

(The composition of the Comprehensive Exam Committee and the Dissertation Research Committee is most often the same. However, in certain cases, the compositions may be different. For example, a student's dissertation project may deal with a topic that is unrelated to the minor. In this unusual case, it is recommended that faculty representing the minor serve on the Comprehensive Committee but not on the Dissertation Committee.)

The student, in consultation with the mentor, should select the Comprehensive Examination Committee. The Comprehensive Examination committee is composed of five faculty members, three with expertise in the major area of study, and two representing the minor area. At least two members of the committee must be faculty members of the Physiological Sciences Program, and one from the faculty of the minor department or program. (Note that some PS faculty members are in multiple graduate programs, and therefore can serve multiple roles on your committee.) Students must submit the signed "Comprehensive Examination Committee Form"(appendix V) to the Program Office prior to scheduling the written comprehensive exam.

Outstanding scholars from within or outside the University whose participation on the Comprehensive (and Dissertation) committee(s) will strengthen the academic quality of the student's program, and who are not faculty in Physiological Sciences, may be appointed, by exception, with the approval of the Graduate College. A request for "special committee member" can be made by the Program. This person is then a voting member of the student's committee. For tenure-track faculty in other programs, there is no special approval needed. For non-tenure track faculty, or for faculty from other universities, a "Request to Approve a Special Committee Member" form (available from the Program Office) and an updated curriculum vitae are required.

External Reviewer. Occasionally an external reviewer may participate on the dissertation committee. Most often this person is from outside the University of Arizona. It is expected that the mentor cover any and all costs incurred in the participation by the External Reviewer. This external reviewer is not a voting member of the student's committee (unless the student petitions the graduate college for an exception as noted above).

The Student is strongly encouraged to meet with the dissertation committee twice a year, but is required to meet at least once per year to allow an evaluation of progress and to receive feedback.

Comprehensive Examination

1. Overview of the Comprehensive Examination and the Dissertation Proposal

Overview of the Comprehensive Examination and the Dissertation Proposal

The Comprehensive Examination consists of written and oral components as required by the Graduate College of the University of Arizona. As discussed in detail below, students in Physiological Sciences will ordinarily complete the written and oral components of the Comprehensive Examination by the end of the 5th semester in the Program. A separate requirement of the Physiological Sciences Program, the Dissertation Proposal, will be completed during the following year

2. Objectives of the Comprehensive Examination

The objectives of the Comprehensive Examination are:

- a) to determine if the student has attained adequate breadth of knowledge in physiological sciences, An adequate breadth of knowledge reflects to the material covered in the required courses (503 and 603), as well as in the courses that satisfy the minor degree

- b) to determine whether the student has attained a sufficient depth of knowledge in selected sub-disciplines of physiological sciences, including knowledge of the literature, concepts and experimental approaches in the area of specialization
- c) to assess the student's ability to think clearly and independently about topics in the physiological sciences and to express these thoughts orally and in writing
- d) to satisfy Graduate College requirements

3. Timing of the Comprehensive Examination

The Comprehensive Examination will ordinarily take place during the student's fourth semester or early fifth semester in the Program. To remain eligible for funding from the Program, students must complete the written and oral portions of the Comprehensive Examination by the end of the 5th semester. In exceptional circumstances, such as illness or a family crisis, students may petition the Program Committee for extension of the deadline.

4. The Comprehensive Examination Committee

During the 3rd semester in the program (Fall of year 2) students will select a Comprehensive Examination Committee. As described above, this committee will consist of 5 members (including the advisor), selected to reflect the student's minor and area of interest in Physiological Sciences (see Graduate College rules in the Handbook), as well as the anticipated make-up of the Comprehensive Examination (see below). A member of the committee other than the major advisor will serve as chair. This committee may or may not be identical to the student's Dissertation Committee (see below). The Program will provide each member of the Committee with the "Comprehensive Examination Guidelines" (Appendix VI) which outlines the goals and format of the Comprehensive Examination. The Program will provide the committee chair with the "Comprehensive Exam Committee Chair Checklist." The student will arrange a meeting of the Comprehensive Examination Committee at least 6 weeks prior to the anticipated date of the Written Comprehensive Examination. At this meeting the general research interests and background (rotations, courses) of the student will be discussed. The student and committee will discuss a time-table for the Comprehensive Examination. The Committee will inform the student of its general expectations and help the student to prepare for the Examination by suggesting review articles or other readings.

The examination must evaluate the student's breadth of knowledge in Physiological Sciences, but should also reflect the specialized interests that each student has developed by this stage. To ensure that all levels of understanding in Physiological Sciences are addressed, the field has been divided into I. Systems Physiology, and II. Cell/Molecular Physiology. There is no substitute for helpful communication between the student and Comprehensive Examination Committee as the questions are being planned and the student is preparing for them.

The Written Comprehensive Examination will be in a take-home, essay format. The members of the student's Comprehensive Examination Committee discuss the areas to be covered by the exam and the Committee Chair will assign members to write three questions in systems physiology and three questions in cell/molecular physiology. The questions should not focus specifically on the student's prospective dissertation topic, but may include related areas that form the essential background for it. These essay questions should be designed for the students to answer over a two-week period using information from textbooks, journals and class notes. The questions will be submitted to the Program Committee at least 2 weeks in advance of the Examination. The Program Committee will review the questions to ensure that there is a reasonable degree of uniformity among the Examinations given to all students. Questions from former Examinations will be kept on file for the use of students and faculty. If the student's minor area of study is in a department outside of Physiological Sciences, the graduate college gives the Minor Department the option of waiving participation in the written portion of the comprehensive examination. However, the Minor Department must participate in the oral portion of the comprehensive examination.

5. The Written Comprehensive Examination

Students will be provided with three cell/molecular and three systems physiology questions. The student must select two questions from each category and will have two weeks to complete the four answers. The answer to each question should be no more than 10 single-spaced pages using 12 point font (including graphs and figures). Students are expected to use textbooks, journal articles, class notes and similar sources of information to prepare essays in answer to the questions. The essays should include graphs or other figures as necessary to illustrate answers. All direct quotes or figures drawn from other sources must include proper citations. Students may not consult other people in preparing their answers. All figures and legends must be legible. Page limits and font size requirements will be strictly enforced.

The answers will be graded by the Committee members who wrote the questions. Students will receive a grade (S/P/F) and written comments and are encouraged to discuss comments with the grader. A passing grade (S or P) for each of the answers is necessary for successful completion of the Examination. Failure to achieve this will constitute failure of the Written Comprehensive Examination. The entire Examination may be retaken once, after mentoring by Committee members (ordinarily within one month). If both questions in one category are passed, the retake exam may focus only on the failed category, if agreed upon by the entire committee. Failure in the second attempt will constitute failure of the Written Comprehensive Examination. Failure of the Comprehensive Examination will result in dismissal from the Program.

After the written portion of the comprehensive Examination has been completed successfully, the student may file an "Application for Comprehensive Oral Examination for Doctoral Candidacy" form with the Graduate College. This form represents and instructions for its completion can be found on the Graduate Degree Certification Website at: <http://grad.arizona.edu/current-students/forms>

This form (the original plus three copies) must be submitted at least three weeks prior to the date of the Oral Comprehensive Examination. Before you submit this form you must: a) Schedule your examination with the members of your committee; b) Provide your committee with your study program, including all of the courses that will be used to fulfill your degree requirements; and c) Obtain signatures from all of the Comprehensive committee members. Students must be registered during the semester the written and oral examinations are taken, and these examinations must take place within six months of one another.

6. The Oral Comprehensive Examination

The Graduate College describes the oral comprehensive exam as follows:

“Upon successful completion of the written examinations in the major and minor(s), the Oral Comprehensive Examination is conducted before the examining committee of the faculty. This is the occasion when faculty committee members have both the opportunity and obligation to require the student to display a broad knowledge of the chosen field of study and sufficient depth of understanding in areas of specialization. Although a discussion of proposed dissertation research may be of importance, such a discussion can not be used to satisfy the requirements of the Oral Comprehensive Examination. The examining committee must attest that the student has demonstrated the professional level of knowledge expected of a junior academic colleague.” **Students should be aware that during the oral examination committee members often pursue answers from the written examination in more depth or ask the questions that the student chose not to answer.**

Upon successful completion of the Written Comprehensive Examination, the student and committee may schedule the oral portion. The Oral Comprehensive Examination must be completed not less than 3 weeks and not more than 6 months after the written portion. The exam will last between 2 and 3 hours. The Examination will consist 50-70 % of questions in physiological sciences with emphasis on the student's area of specialization, and 30-50 % of questions in the minor (which may overlap). The student

should be prepared to answer questions not only related to topics previously discussed with the committee, but also related to material covered in the required core courses. Students have found that an excellent way to prepare for the oral exam is to hold mock exams in their laboratory. The students' mentor can organize these mock exams and other students can serve as questioners. The questions will not be the same as the student will get in the oral, but will help the student prepare for thinking on his or her feet. Students may not bring notes into the examination. Students may be permitted to retake the Oral Comprehensive Examination once should they fail in the first attempt. The Graduate College stipulates a 4 month waiting period in this situation.

There is no longer a Graduate College Representative. The student's committee chair (not the mentor) now serves as the graduate college reporter and representative for the written and oral exams.

The Dissertation Committee

Students must select a Dissertation Committee by the end of the 5th semester. The Dissertation Committee must meet with the student at least once each year, with a member other than the major advisor serving as chair. There is no obligation for the student to convene the same faculty members on their Comprehensive Examination and Dissertation Committees.

The Dissertation Proposal

No later than the start of the 7th semester students MUST complete and present to the Dissertation Committee a proposal that provides a compelling rationale and research plan for the dissertation topic. The Dissertation Proposal is not part of the Comprehensive Examination, but is a key requirement of the Physiological Sciences training program providing a valuable opportunity for students to develop grant-writing skills and to receive feedback from their committees at a relatively early stage of the experiments. The goal is to develop a rigorous and feasible experimental plan that will serve as a guide for the dissertation research, although the experiments may be modified if necessary as the work proceeds. The proposal should be written in the NIH format but with the following page limitations (single-spaced): Specific Aims (1), Background and literature review (10), Experimental Design (10), Literature Cited (as necessary). Many students will already have initiated the dissertation project. Preliminary data are not required, but may be included in the background section of the proposal.

The completed draft of the proposal should be provided to the Dissertation Committee members for comment and a meeting of the student and the committee should take place at which the student will field questions about the rationale, design, and interpretation of the proposed experiments. Once the Dissertation Proposal has been revised to the satisfaction of all members of the Dissertation Committee, the members of this committee will sign the "Dissertation Proposal Approval" form (Appendix VI). A copy of this form is then submitted to the Program Office to be included in the student's annual performance review.

Advancement to Candidacy

After successful completion of the comprehensive written and oral examinations, you are automatically advanced to candidacy. The Graduate College requires you to submit the "Committee Appointment Form" for your Dissertation Committee 6 months prior to scheduling your final Defense (This form replaces the old "Advancement to Candidacy Form"). Along with the Committee Appointment form, **you must submit a copy of the Human/Animal Subjects Committee Review if your dissertation project was subject to such a review. For human subjects, your name must be listed on the protocol.**

Penultimate Draft of Dissertation

Submit copies of the draft of your dissertation document to your committee. Make sure you allow adequate time for your committee to review and for you to prepare the final version. For information regarding the preparation of the dissertation, see the booklet entitled "**Manual for Theses and Dissertations**," which is available at http://grad.arizona.edu/documents/PDF/ETD_Diss_Manual.pdf

Announcement of Final Examination

The final examination is your dissertation defense. The Announcement of final examination form (original plus three copies) is submitted at least three weeks prior to the date of your examination. The form must be signed by your Committee.

Final Copies of Dissertation Document

Online submission of the dissertation is now available. The final dissertation must be submitted via the electronic submission site at <http://dissertations.umi.com/arizona/> and must meet all specifications of the manual. You can order your bound copies from this site. The dissertation is submitted by about April 20 for May graduation, November 26 for December graduation and August 11 for August graduation. Check with the PS Program Office for exact dates. The last requirement is to clear all fees with the Bursar's office, failure to clear your account will postpone the posting of your degree.

YOU MUST BE REGISTERED TO DEFEND! YOU MUST ALSO BE REGISTERED DURING THE SEMESTER YOU SUBMIT YOUR DISSERTATION!

To defend and/or submit the final copies of the dissertation in the Fall or Spring semester you must register for a minimum of three graduate units; during the summer, you must register for one unit either summer session.

Terminal Master's Degree Option/ Master's Degree for Ph.D. Students

Whether seeking an MS degree "along the way" while proceeding in the doctoral program, or as a "terminal" MS degree, students enrolled in the doctoral program who wish to obtain the MS degree in Physiological Sciences are expected to complete the following five requirements:

- 1) Contact Program Committee (copy Program Chair and Program Coordinator) in writing of intention/circumstances to obtain a MS
- 2) Pass Ph.D. coursework with B grade or above
- 3) Form a MS committee comprised of three members, two faculty of which are from Physiological Sciences; and alert the Program Committee of your intentions, and the makeup of your committee by submitting the "Master's Committee Form" Appendix VI
- 4) Pass qualifying comprehensive exams (written and oral)
- 5) Demonstrate scientific insight/integrative thinking (three options)
 - a. Write a critical literature review
 - b. Write a dissertation proposal
 - c. Write a first author manuscript

If qualifying comprehensive exams are not yet passed, student must orally defend one of options in # 5.

Specific content of written portion of MS requirement for students enrolled in PhD program are established on a case-by-case basis by the student's MS committee.

Financial Structure of the Doctoral Program

The funds utilized by the Program to support the doctoral student stipends are derived from NIH Training Grants, Graduate College Fellowships, Teaching Assistantships, and faculty contributions. In general, these funds dictate the number of students supported by the Program. The graduate students in the Program are supported by training grants (including Systems and Integrative Physiology, or Cardiovascular Physiology and others) and by teaching and research assistantships.

The Physiological Sciences program has since its inception followed an innovative method of consolidating financial resources in order to create a stable source of funding for predoctoral students throughout a standard five year Ph.D. program. This financial approach contrasts markedly with those of many other institutions and programs which support the first year students only, and is recognized as a strength of the Physiological Sciences program for recruiting exceptional candidates and in allowing students to complete their programs of study.

It is the intention of the Physiological Sciences program to provide at least partial support for full-time predoctoral students who are in good standing in the program for five consecutive years. However, because of uncertainties in funding sources, this support cannot be construed as a guarantee of continuous support to any student. The five year period begins with the year of admission into the program, and barring exceptional circumstances is limited to five years regardless of the actual source of support for the student during that period. Support ends at the time of graduation (with congratulations!) if the student finishes in less than five years.

Support from the Program includes stipend, health insurance, registration fees and out of state tuition if applicable. Once a mentor is selected, the Program covers half of the student's salary, with the other half provided by the student's major adviser. Students will not be allowed to join a laboratory that does not have ongoing support.

Stipends

The level of graduate-student stipends is set by the NIH guidelines. Upon successful completion of the Comprehensive Exam the stipend is increased by \$1500 for the remainder of the student's program.

Competitive Predoctoral Fellowships

The Program encourages individual students to seek supplementary funding. The advantages of seeking predoctoral fellowships are that it provides you with an opportunity to develop grant-writing skills, it brings prestige to you and the Program, it enables us to recruit more students into the Program, and it enables you to supplement (increase) your stipend. The Resources Committee can provide guidance in this endeavor by identifying potential funding agencies. The proposal, however, should be written in consultation with your mentor or with the advice of the Resources Committee.

If an application for a fellowship is successful and an award received, the student will receive a bonus of not more than \$3000 in addition to the regular stipend for a maximum possible stipend of \$25,272. This does not include stipends from training grants or predoctoral fellowships awarded on the basis of an application made by the Program on your behalf, and therefore not from your own initiative.

Scientific Conferences

Depending upon the availability of funds, the Program attempts to defray the costs for students who are attending and presenting a "first author" poster or talk at one national meeting per year. Specifically, the Program will pay for costs associated with travel, lodging, meals and registration fees. Students who wish to attend a meeting, but are not presenting a poster or talk, may petition the program for support should funds be available. Travel Request Forms are available in the Program Office.

Teaching Activities

The Physiological Sciences Graduate Program participates in a broad selection of teaching activities. The faculty members believe that teaching, and the communication skills it develops, is a central part of graduate training. Indeed, all students in the Ph.D. program are required to participate in teaching activities as an integral element of the training program. Students are not required to teach in the first year of the program (first year students may, however, petition the Teaching Committee to become involved in various teaching venues if their interest, experience and schedule permit it). In addition, the fifth year is typically sheltered from teaching responsibilities, to allow senior students to focus on research and writing activities. Teaching responsibilities include, but are not limited to, leading discussions sections, organizing and conducting laboratory exercises, preparing and grading exams and quizzes. The extent of each of these activities varies with different courses in which our students participate. In order to provide feedback and to recognize teaching excellence, teaching performance is evaluated each semester based on input from faculty and students.

PHYSIOLOGICAL SCIENCES MASTERS PROGRAM

The mission of the Masters Program is to provide an avenue for the student to gain more experience in and exposure to the diverse areas of the physiological sciences and to offer a mechanism for the student to obtain in-depth knowledge in a specific area of physiology. To this end, opportunities can be provided for students to gain experience in teaching appropriate undergraduate courses in the physiological sciences and/or to participate in a specific research project in the laboratory of a Physiological Sciences faculty member.

Prospective students should consider carefully the possible advantages and disadvantages of the Masters program as compared with the Ph.D. program in Physiological Sciences. Information and guidance in this decision are available from the Program office.

Faculty participation

All faculty members of the Physiological Sciences GIDP are eligible to participate fully in the M.S. Program as committee members and as major advisors/research project directors (i.e., mentors).

Curriculum

(a) All Masters students in the Physiological Sciences Program must pass both (PSIO 503, Cellular and Molecular Physiology) **and** (PSIO 603, Systems Physiology). Masters students must enroll in Physiological Sciences Student Forum (PS 696C; see course description above) each semester unless there is a class conflict. Students must give at least one 20-30 minute presentation during Student Forum, in addition to the Masters final presentation (if applicable). Masters students must complete at least one laboratory rotation (PSIO 610 or PS700). Additionally, all Master's students awarded a teaching assistantship must also enroll in Physiological Sciences Teaching Workshop (PS 697a,b) during the fall and spring semester of the first year.

(b) An individual curriculum plan specifying the other coursework to satisfy Graduate College requirements will be developed by the student and his/her advisor and approved by his/her M.S. Committees, usually the second year is spent on research (PS 900)

Financial Support

There are three primary avenues of financial support for the Masters students: graduate teaching assistantships, research assistantships, and self-support. In some cases, combinations of partial teaching assistantships and partial research assistantships may be arranged. Regardless of the avenue of support, all Masters applicants are held to the same minimum academic requirements for admission into the program. Applicants will be informed about support options early in the recruiting process.

The Physiological Sciences program has no financial commitment for the support of Masters students accepted into the program, and students must indicate that they are aware of this restriction at the time of application. However, some students may qualify for and receive support from TA-ships administered through the Dept. of Physiology. The student's option for support will not be taken into account in the ranking of applicants by the Recruitment and Admissions Committee.

(i) Teaching assistantship.

This option will require a commitment to teaching, and may also include research experience as a Research Assistant or as an Independent Studies student during the course of the Masters program. The research experience will be available by prior arrangement with a Physiological Sciences faculty member who agrees to serve as a research sponsor for at least one semester, and with the approval of the Teaching Assistant administrative coordinator in the Dept. of Physiology. The research experience may provide salary or units or a combination, based on arrangements made between the student and the faculty

sponsor. Teaching assistantships are administered through the Department of Physiology, and thus the number of students recruited and admitted for these positions will be specified by the Department. Some prior coursework in physiology may be required as a prerequisite for students applying for support under this option, and will be stated explicitly in the application for admission.

The assignment of teaching loads for the M.S. students will be made by the Teaching Assistant administrative coordinator in the Dept. of Physiology and will be reported to the Physiological Sciences Teaching Committee. At least one member of the Teaching Committee will be the individual who coordinates the laboratory sections for the PSIO 201/202 course. Ideally, an additional member of the Teaching Committee should be the coordinator(s) of the undergraduate major in Physiological Sciences. Every effort should be made to assure that the teaching assignments for the Master students are commensurate with their level of TA support.

(ii) Research assistantship.

This option is available to students that have identified a faculty sponsor who can guarantee two years of financial support for the student as a Research Assistant (at 50% time) at the time of the student's application to the program. The faculty sponsor must sign the student's application form indicating that this support will be provided if the student is accepted. Guaranteed support will not ensure that the student is accepted into the program, since all applicants will be considered on a competitive basis. Teaching will not be required.

(iii) Other support.

Students must state in this circumstance that they can reasonably expect to have an independent means of support for 2 years, such as a 2 year fellowship, personal income from a job, or other options. The Physiological Sciences Program and the Dept. of Physiology have no responsibility for financial support for these Masters students. Teaching will not be required.

Time line: Exams and requirements for completion of the MS degree program

Each student is expected to complete the program in two years, barring exceptional circumstances. A faculty preceptor will be assigned to each M.S. student at the beginning of the first semester. Each M.S. student will select a formal Masters committee consisting of the major advisor/research project director and two committee members from the faculty of the Physiological Sciences program, by the beginning of the student's second semester in the program. If the Masters student has not chosen a faculty mentor by the end of the first semester of study, the Program Committee will assign a faculty mentor to the student in order to facilitate the selection of appropriate coursework and the identification of a laboratory (when appropriate) in which to complete the Masters research project. The M.S. student's committee should meet in the second semester to review the curriculum plan, and at least once per semester thereafter to evaluate student progress and advise the student on appropriate options for meeting the requirements for final completion. With approval from the student's committee, the student will choose one of 3 options described below as the final requirement for the M.S.

1. Masters Thesis, and oral examination;

A traditional Thesis is written following the guidelines at http://grad.arizona.edu/documents/PDF/Diss_Manual.pdf. A public oral presentation is required, followed by a defense of the document to the committee.

2. Research Manuscript (written document) and oral examination;

A summary of the research project in the form of a "first author" manuscript that may be submitted for publication. A public oral presentation is required, followed by a defense of the document to the committee.

3. Written scientific document (review) and oral examination;

Demonstrate scientific insight/integrative thinking by writing a critical literature review. Defense of the review and oral examination by the committee.

Additional information is available on the Graduate College Website at:

<http://grad.admin.arizona.edu/degrecert/ppmaster.htm>

PHYSIOLOGICAL SCIENCES PROGRAM ADMINISTRATION

The Physiological Sciences Program is administered by an **Executive Committee** that consists of 8 members who represent the major areas of Physiological Sciences. These members include the Chair of the Program, the Chairs of the standing committees, one at-large member and one student representative. Current members of the Executive Committee are Ron Lynch, (Chair), Parker Antin, Sean Limesand, Alan Marmorstein, Tim Secomb, Steve Wright and Jenn Fang. Additional information on the administration of the Program is provided in the bylaws, in Appendix I. The PS standing committees, their responsibilities and members are:

1. Recruiting Committee -- Responsible for publicizing the Program, recruiting, evaluating applicants, and recommending admission of qualified candidates to the Executive Committee.

Steve Wright (Chair)	Fall 2008 - Spring 2011	Faculty Member	Fall 2008 - Spring 2011
Kirsten Limesand	Fall 2007- Spring 2010	Faculty Member	Fall 2008 - Spring 2011
Hilary Wakefield	Fall 2008- Spring 2009	Laura Wright	Fall 2008- Spring 2009
Tarann Henderson	Fall 2008- Spring 2009	Leslie Zuniga	Fall 2008- Spring 2009

2. Program Committee -- Responsible for curriculum and course development, evaluation of graduate student progress, maintenance of the Graduate Handbook (which states the policies and procedures for graduate education), and mediation of the concerns and grievances of graduate students. Graduate students are encouraged to consult with any member of the Program Committee to resolve any issue related to their graduate education that is of concern.

Alan Marmorstien (Chair)	Fall 2008 - Spring 2011	Nicholas Delamere	Fall 2007 – Spring 2010
Heddwen Brooks	Fall 2006 - Spring 2009	Andy Fuglevand	Fall 2006 - Spring 2009
Henk Granzier	Fall 2008 – Spring 2011	Faculty Member	Fall 2008- Spring 2011
Kate Lindborg	Fall 2008- Spring 2009	Amber Rice	Fall 2008- Spring 2009

3. Resources Committee -- Developing and implementing the financial plan for the Program, including offering graduate students assistance in obtaining extramural pre-doctoral awards.

Tim Secomb (Chair)	Fall 2007 - Spring 2010	Jan Burt, HLB Training Grant	
Patricia Hoyer, Systems Training Grant		Carol Beltran, Ad-Hoc	
Holly Lopez	Ad-Hoc	Ann Revill	Fall 2008 - Spring 2009
Stewart Dandorf	Fall 2008 – Spring 2009		

4. Activities Committee -- Has the charge of promoting social and professional interdisciplinary activities among the participants (graduate students, postdocs, and faculty) of the Physiological Sciences Program.

Sean Limesand (Chair)	Fall 2006 - Spring 2009		
Tony Macko	Fall 2007 - Spring 2008	Ann Revill	Fall 2007 - Spring 2008

5. Teaching Committee -- is responsible for assigning teaching responsibilities to all students who have completed their first year and for insuring that all students receive an evaluation of their teaching abilities both from the students they teach and from a faculty member.

Cindy Rankin (Chair)	Fall 2006 - Spring 2009	Claudia Stanescu (Ad-Hoc), Physiology TA Coordinator	
Gene Settle, Lab Teaching Assoc.			
Jen Schaefer	Fall 2007 - Spring 2008	Lora Pittman	Fall 2007 - Spring 2008

6. Student Forum – Administered by and for students in the PS GIDP, along with the faculty Liaison's fosters a interactive environment and maintains the dissemination of information among Program participants.

Chris Laine	Fall 2008 – 2009	James Phillips	Fall 2008 – Spring 2009
Rick Levine	Fall 2007 – Fall 2009	Doug Stuart	Fall 2008 – Spring 2010
Scott Boitano	(Substitute)		

Physiological Sciences Program

By-Laws (Rev. 1/04)

The interdisciplinary Physiological Sciences Program is composed of research and graduate educational activities in a broad range of Physiological areas. The program involves faculty members from the Colleges of Medicine, Agriculture, Arts and Sciences, and Engineering and Mines who form the "Committee on Physiological Sciences." The Executive Committee (appointed by and responsible to the Director of Graduate Interdisciplinary Programs.) serves as the executive, policy and administrative agency for the Program. The structure and organization of the Committee on Physiological Sciences shall conform to the Guidelines for Interdisciplinary Programs established by the Director of Graduate Interdisciplinary Programs.

It is the responsibility of the Physiological Sciences Program to provide a graduate educational program in the various areas of physiology, to publicize the program, and to maintain graduate and postdoctoral participants of the highest quality. It is also the responsibility of the program to maintain vigorous, productive research activities, to maintain an interacting community of physiological scientists by providing seminars and promoting campus-wide interdisciplinary activities, and to identify promising areas of physiological research and the faculty expertise and facilities needed to explore these areas.

Creative planning and leadership are essential to maintain and foster excellence in physiological research. These and related functions are served by the Committee on Physiological Sciences and its Executive Committee. In the following sections the By-laws that govern policies and operating procedures are outlined.

Article I. Chairperson of the Executive Committee and of the Physiological Sciences Graduate Interdisciplinary Committee.

Activities of the Physiological Sciences Program are administered by the Executive Committee whose Chairperson shall also serve as Chairperson of the Committee on Physiological Sciences. The Executive Committee will report to the Director of Graduate Interdisciplinary Programs.

A. Chairperson of the Committee on Physiological Sciences

1. The Chairperson of the Committee will be appointed to a five year term by Director of Graduate Interdisciplinary Programs from a nominee submitted by the Executive Committee. It is the policy of the Physiological Sciences GIDP that the Chairperson may serve no more than one consecutive term. If the nominee is currently a member of the Executive Committee, the allowable tenure as a member of this committee (ordinarily three years; see below) will be extended to a maximum of eight years.

The Chairperson nominee will be selected by the Executive Committee in a closed session, with advisory votes to be provided to the Executive Committee by the program faculty and the students before the decision process. In cases where there is a potential conflict of interest on the part of an Executive Committee member, including being the spouse of a candidate or a graduate student in the laboratory of a candidate, that member will be excused from the decision process. Any member of the Executive Committee who is excused from participating in the selection due to potential conflicts of interest will be replaced by another representative. The replacement is temporary, and sustained only for the immediate process of discussion and selection of the next Chairperson nominee. The absent member will be replaced by another member of the Physiological Sciences Program, according to the following hierarchical order. If the person qualified to be appointed as a substitute has a conflict of interest, or is currently appointed to the Executive Committee, then the replacement will be determined by the next option in the series.

For faculty substitutes:

- a). The former Chair of the same Committee in the Physiological Sciences program.
- b). The senior faculty member of the same current Committee, with seniority determined from combined years of service in that position and in other Committees of the Physiological Sciences program.

Appendix I Physiological Sciences Program By-laws

For student representative substitutes:

- a). The former student representative to the Executive Committee.
- b). The senior student representative from all the current Committees, with seniority determined from combined years of service in that position and in other Committees of the Physiological Sciences program.

2. The duties of the Chairperson of the Committee are: a) call and preside at meetings of the Executive Committee as needed but not less than once per quarter; b) call and preside at meetings of the Committee on Physiological Sciences at least once per year and as needed; c) appoint and supervise the Standing Committees on Recruiting and Admissions, Program, Resources and Activities as detailed in Article II; d) administer the budget of the Committee on Physiological Sciences; e) manage administrative matters (such as qualifying and thesis committees) with the Graduate College and Deans of the Colleges of Agriculture and Medicine and of the Faculty of Science at meetings to be held no less than twice a year; and f) direct course change and approval forms and monitor catalogue copy.

B. Executive Committee

1. The Executive Committee will consist of seven faculty members representing the major areas of Physiological Sciences and one graduate student. Five of the faculty members will represent the standing committees (ordinarily the Chair of the standing committee; see below) and a seventh will serve as the "member at large". Faculty members of the Executive Committee will be appointed only from the members of the Committee on Physiological Sciences. Each Executive Committee member will serve a three-year term, and the terms will be staggered so that at least two members of the Executive Committee are replaced each year. New members of the Executive Committee will be appointed each year by the Dean of the Graduate College from nominations submitted by the Executive Committee. The graduate student member will be elected annually by the students in good academic standing in the Program. Outgoing members of the Executive Committee are not eligible for reappointment to the Executive Committee until one year after the termination of the previous appointment.
2. The Executive Committee is responsible for administering the graduate program in Physiological Sciences, including admission of graduate students, evaluation of continuing graduate students, publicizing the Physiological Sciences program intra- and extramurally, planning the development of the Physiological Sciences Program, formulating the annual budget of the Committee on Physiological Sciences, securing and allocating necessary funding, and advising the Dean of the Graduate College and Vice-President for Research on issues pertinent to Physiological Sciences.

Article II. Standing Committees

- A. The **Committee on Recruiting and Admissions** shall be appointed annually by the Executive Committee on Physiological Sciences and shall consist of at least three faculty members and one graduate student who represent the various disciplines within the Committee. At least one member of the Recruiting and Admissions Committee shall be from the Executive Committee. The graduate student member will be elected annually by the students in good academic standing in the Program. The Recruiting and Admissions Committee shall be responsible for publicizing the program, developing an active minority recruitment plan, evaluating applicants, and recommending admission of qualified candidates to the Executive Committee. At its discretion, the Recruiting and Admissions Committee may ask a postdoctoral trainee to assist in its work.

Appendix I Physiological Sciences Program By-laws

- B. The **Program Committee** shall be appointed annually by the Executive Committee on Physiological Sciences and shall consist of at least three faculty members and one graduate student who represent the various disciplines within the group. The graduate student member will be elected annually by the students in good academic standing in the Program. At least one member of the Program Committee shall be from the Executive Committee. The Program Committee shall be responsible for curriculum and course development, maintaining the Student Handbook, suggesting potential advisors to students, evaluation of graduate student progress including an annual evaluation of the yearly progress reports from the students and their mentors, mediation of the concerns and grievances of the graduate student. The Program Committee shall prepare a report on graduate student progress and submit the report by June 1 of each year to the Executive Committee.
- C. The **Resources Committee** shall be appointed annually by the Executive Committee on Physiological Sciences and shall consist of at least three faculty members and one graduate student who represent the various disciplines within the group. The graduate student member will be elected annually by the students in good academic standing in the Program. At least one member of the Resources Committee shall be from the Executive Committee. The Resources Committee shall be responsible for developing and implementing the overall financial plan for Physiological Sciences including extramural fund raising for Program activities, identifying funding opportunities and advising students on predoctoral awards and applying for fellowships and scholarships from the Graduate College.
- D. The **Activities Committee** shall be appointed annually by the Executive Committee on Physiological Sciences and shall consist of at least three faculty members, one graduate student, and one postdoctoral fellow who represent the various disciplines within the group. The graduate student member will be elected annually by the students in good academic standing in the Program. At least one member of the Activities Committee shall be from the Executive Committee. The Activities Committee shall be responsible for organizing educational and social events that promote interactions among the members of the Physiological Sciences Program. These activities shall include at least one picnic at the beginning of each academic year, supervision of Student Forum, at least one annual poster session, and a Program Newsletter.
- E. The **Teaching Committee** shall be appointed annually by the Executive Committee on Physiological Sciences and shall consist of at least two faculty members, the Laboratory Teaching Associate and one graduate student, who represent the various disciplines within the Committee on Physiological Sciences. The graduate student member will be elected annually by the students and must be in good academic standing in the Program. At least one member of the Teaching Committee shall be from the Executive Committee. The Teaching Committee shall be responsible for assigning teaching responsibilities to all students who have completed their first year, taking into account preferences of course coordinators and students. Assignments shall be distributed among students in as equitable manner as possible, individual teaching loads being averaged over the year. A description of the responsibilities for several of the courses in which Physiological Sciences graduate students gain teaching experience follows. The Teaching Committee shall also be responsible for ensuring that all students receive an evaluation of their teaching abilities both from the students that they teach and from a faculty member

Article III. Membership in the Committee on Physiological Sciences

The Committee on Physiological Sciences consists of tenured (or tenure-eligible) faculty members at the University of Arizona who participate in graduate education and research in Physiological Sciences. An affiliate membership is available to non-tenure-eligible faculty.

Appendix I Physiological Sciences Program By-laws

A. Regular Membership

1. Criteria

- a. Faculty (tenure-eligible only) shall be nominated for membership in the Committee on Physiological Sciences by submitting a request for membership and a recent curriculum vitae to the Executive Committee. a two-thirds majority of positive votes of the Executive Committee shall be required for nomination to membership to the Director of Graduate Interdisciplinary Programs, who shall confer membership. Criteria for membership shall include demonstrated research activity, interest in graduate education, and resources for graduate training.
- b. a member of the Committee on Physiological Sciences shall be dropped from membership for failure to participate in the activities of the Committee. Participation includes service as a thesis/dissertation director for graduate students in Physiological Sciences, service on a committee of the Committee on Physiological Sciences, teaching a graduate course in Physiological Sciences, giving a seminar in the Physiological Sciences seminar, continued scholarly and research productivity in Physiological Sciences. Membership shall be subject to periodic review and failure to satisfy those criteria as decided by a two-thirds majority of the Executive Committee shall result in loss of membership.
- c. Members dropped from membership may reapply for membership as specified in Article.

2. Responsibilities

- a. Members of the Committee on Physiological Sciences may serve as academic and research advisors of graduate students in the program and as members of graduate and other committees.
- b. Members of the Committee on Physiological Sciences shall meet annually and as needed. Meetings shall be conducted in accordance with Robert's Rules of Order.
- c. Each member of the Committee on Physiological Sciences shall have one vote on matters brought to the Committee by the Executive Committee. a quorum shall constitute one-third of membership. Failing a quorum, a mail note shall be required.
- d. Members shall be listed as Faculty of the Committee on Physiological Sciences in the Graduate Catalog.
- e. Members shall be expected to share in the financial support of graduate students at a level determined by the Executive Committee.

B. Affiliate Membership

1. Non-tenure-eligible faculty who otherwise meet the criteria for membership (Art. III, 1.a.), may apply for affiliate membership in the Committee on Physiological Sciences by submitting a request for membership and a recent curriculum vitae to the Executive Committee. a two-thirds majority of positive votes of the Executive Committee shall be required for election to affiliate membership.
2. Affiliate members shall have all the privileges and responsibilities of regular members (Art. III, 1.b.) except that they shall only serve as co-directors of graduate dissertation committees in conjunction with a regular member.

Article IV. Amendments

The By-laws shall be amended or revised by movement of the Executive Committee and a two-thirds positive vote of the Committee on Physiological Sciences.

Use of 400-Level Course Work in Minor Programs

At the October 20, 1989 meeting of the Graduate Council, the motion was passed to allow students to use six units of 400-level coursework in the minor area. The 400-level courses in the minor program are accepted toward fulfilling the total number of units required on the program of study.

1. If a student has a GPA below 3.0 in the 500-level course work on the study program, he/she must add course work at the 500 level to bring the GPA up to 3.0 since 400 level course work will not be calculated in the graduate GPA.
2. a minor consisting of 3 units of 500-level course work and 6 units of 400-level course work is adequate if the minor department approves.
3. The Graduate College will NOT consider petitions to use more than six units of 400-level course work in the minor portion of the program.
4. a student enrolled in a 500-level course may change to a 400-level course with a drop-add form within the prescribed deadlines. If the 500-level course is on an approved study program, the student may file the form, Changes in Student Records or Programs of Study, to correct the program.
5. a student may NOT petition to change a 500-level course to 400-level after a grade is submitted.
6. a Student who has completed a course at the 400-level and has received a grade may take the course at the 500-level. The 400-level enrollment may not then be used on the study program.
7. Only 500-level and above courses count toward the minimum enrollment for assistantships, taking oral examination, etc.
8. Doctoral students who have split minors may NOT use six 400-level units in each part of the minor.
9. The official graduate transcript will not reflect the 400-level courses completed unless the student submits a request to the transcript department to carry over the 400-level courses to the graduate transcript.
10. The 400-level courses will not be reflected in the cumulative GPA or in the total earned hours.

**THE COMPREHENSIVE EXAMINATION
PHYSIOLOGICAL SCIENCES
Guidelines**

The following is a summary of the Comprehensive Examination format, as described in the Program Handbook. The written and oral portions should be completed during the 4th semester in the Program (ordinarily Spring of year 2). For further important details, please refer to the Physiological Sciences Program Handbook. Questions may be directed to the Program Coordinator or the Program Chair.

1. Doctoral students must select a Comprehensive Examination Committee during their 3rd semester in the Program (ordinarily Fall of year 2). The student will select one member (not the advisor) to chair the committee. The chair will collate questions for the written portion of the Examination and chair meetings of the Committee.
2. Students must arrange a meeting of the Committee, at least 6 weeks prior to the desired time of the written Examination (ordinarily during the 3rd semester), to allow introductions and to discuss the timing, format and content of the written and oral portions of the Examination.
3. The Committee will prepare 3 questions in systems and 3 questions in cell/molecular physiology. The questions must be submitted to the Program Coordinator, for review by the Program Committee.
4. The Written Comprehensive Examination will be in a take-home, essay format. The members of the student's Comprehensive Examination Committee discuss the areas to be covered by the exam and the Committee Chair will assign members to write three questions in systems physiology and three questions in cell/molecular physiology. The questions should not focus specifically on the student's prospective dissertation topic, but may include related areas that form the essential background for it. The student must select two questions from each category and will have two weeks to complete the four answers. Students are expected to use textbooks, journal articles, class notes and similar sources of information to prepare essays in answer to the questions. The essays should include graphs or other figures as necessary to illustrate answers. All direct quotes or figures drawn from other sources must include proper citations. Students may not consult other people in preparing their answers. The answer to each of the four questions chosen by the student should be not more than 10 single-spaced pages using 12 point font (including graphs and figures). All figures and legends must be legible. Page limits and font size requirements will be strictly enforced.
5. The answers should be graded (S/P/F) in a timely fashion and the outcome communicated to the student, advisor and Program Coordinator by the chair of the Committee. (See "Guidelines for Comprehensive Exam Committee Chairs"). In order to pass the written portion of the Examination, the student must receive a passing grade (S or P) on each of the 2 systems and the 2 cell/molecular questions that are answered.
6. In the case of failure, the student may retake the examination once, following the identical format (student receives 3 questions in each area and answers 2). Students who fail one or both of the questions within one area, but pass both questions in the other area, do not need to retake the passed area. The failed area may be retaken once. Again, the format should be identical.

7. After the Written Comprehensive Examination is completed, the student will complete arrangements for the Oral Comprehensive Examination as described in the Program Handbook and the rules of the Graduate College:

http://grad.arizona.edu/Current_Students/Program_Requirements/Comprehensive_Examination.php

8. The Oral Comprehensive Examination will consist 50-70% of questions in Physiological Sciences, with an emphasis on the student's area of specialization, and 30-50% of questions in the minor (which may overlap). The student should be prepared to answer questions not only related to topics previously discussed with the committee, but also related to material covered in the required core courses.
9. Students have found that an excellent way to prepare for the oral exam is to hold mock exams in their laboratory. The students' mentor can organize these mock exams and other students can serve as questioners. The questions will not be the same as the student will get in the oral, but will help the student prepare for thinking on his or her feet.

The Physiological Sciences Comprehensive Examination Committee Chair Checklist

The following is a checklist for the Chair of the Comprehensive Examination Committee (NOT the mentor). For further details, refer to the Physiological Sciences Program Handbook. Questions may be directed to the Program Coordinator or the Program Chair.

Doctoral students must select a Comprehensive Examination Committee during their 3rd semester in the Program (ordinarily Fall of year 2). The student will select one member (not the advisor) to chair the committee. **The chair is responsible for chairing meetings of the Exam Committee and for managing the development and execution of the exam.**

At the initial meeting of the Exam Committee:

- ___ Determine the date for the written exam, and if possible, potential dates for the oral exam (if the written is successfully passed).
- ___ Determine the areas on which the student will be examined, and which committee member is responsible for composing each question (3 systems, 3 cell/molecular).
- ___ Set a date by which the questions will be submitted to the chair (see below).

The questions must be submitted to the Program office at least 1 week prior to the exam, so that the PS Program Committee can evaluate it for consistency with program goals, and suggest changes when warranted.

- ___ Once the questions are approved, the exam should be submitted to the Program Coordinator (Holly Lopez), at least 1 week prior to the exam date.

The Program Coordinator will administer the exam (unless instructed otherwise). The Program Coordinator will then distribute the questions to the appropriate committee members for grading, and the graded questions are returned to the Committee Chair.

The Chair of the Committee must insure that exams are graded in a timely manner (5 days).

- ___ Once the exams are graded the Chair of the Committee collects the original exams, notifies the committee, the Program Coordinator, and the student of the results.
- ___ The Chair of the Committee provides a copy of the graded exams to the Program Office to be filed and returns the original, graded exam to the student.

If the result is “pass”, the student proceeds with the Oral Exam.

If the result is “fail”, the Chair of the Committee follows the guidelines for repeating the written exam – by calling another Committee Meeting to determine procedure.

PSIO 610/PS 700 - Laboratory Rotation

Student Name: _____ Date: _____

Faculty Name: _____

Does the faculty member belong to the PS GIDP? Yes ___ NO ___
(If the answer is NO, then a petition must be made to the PS GIDP Program Committee)

Before starting the rotation the student and faculty must submit to the Program Committee a brief outline of the anticipated time course of the rotation, and the work to be performed. Upon completion of the rotation the student and mentor should submit a one paragraph summary of the work and training accomplished.

The student and mentor each must also submit, on separate forms, a confidential evaluation of the rotation.

Outline or Evaluation: _____

Signatures:

_____ Student
_____ Faculty
_____ (Chair, PS GIDP Program Committee, if required)

Mentor Selection Form

I, _____ hereby agree to accept _____ into my laboratory and serve as mentor effective ___/___/____. By accepting this student I understand that each year I am financially responsible for 50% (or the current amount set by the PS GIDP) of the current stipend amount to the program on behalf of this student. I further understand that this student may be supported via a training grant, thus my portion will be paid to the program not necessarily directly to the student. I will make my contribution in one of the following ways:

- _____ Pay 50% directly towards a graduate assistantship (Student is NOT appointed to a training grant);
- _____ Transfer state salary dollars to Physiological Sciences State line by transferring my salary to grant dollars;
- _____ Provide indirect cost dollars for program use;
- _____ Another method to be agreed upon by me and the Program, outlined below (i.e. Training support 100% this year, I will pay 100% next year)
- _____ Should my funding become unavailable, my department head agrees to cover my portion of the above named student salary at the Physiological Sciences stipend rate for the duration of training, or until extramural funding is obtained

(Mentor Signature) (Date)

(Student Signature) (Date)

(Home Department Head Signature) (Date)

(Home Department Business Manager) (Date)

Appendix V – Program Forms

Physiological Sciences Graduate Program
Minor Program of Study

Student Name: _____

Program of Study for Minor Department: _____

Courses (list):

1. _____

2. _____

3. _____

4. _____

5. _____

Faculty (Minor representatives for Comprehensive Exam)

1. _____

2. _____

Approval from Minor Department: The program described above meets the requirements of our department for a “Minor in _____.”

(Authorized Signature)

(Date)

Appendix V – Program Forms

Physiological Sciences
Comprehensive Examination Committee Form

Student Name: _____

Date: _____

Tentative Written Exam Date: _____

Tentative Oral Exam Date: _____

Name of Comprehensive Exam Committee Chairman (cannot be your mentor):

Committee Member Signatures (Please print name after signature):

Mentor: _____

Faculty (Major) _____

Faculty (Major) _____

Faculty (Minor) _____

Faculty (Minor) _____

Additional Committee Member(s) if applicable:

Physiological Sciences
Master's Committee Form

Student Name: _____

Date: _____

Graduation Option (check one):

- Masters Thesis, and oral exam
- Research Manuscript (written document) and oral exam
- Written scientific review and oral examination

Committee Make up:

At least 2 Members from Physiological Sciences

(Outside members must be approved by Program Committee)

At least 2 Members must be tenure-track

(Check with Program Office if questions)

Committee Member Signatures (Please print name after signature):

Mentor: _____

Faculty _____

Faculty _____

Additional Committee Member if applicable:

Physiological Sciences
Dissertation Proposal Approval Form

Student Name: _____ Presentation Date: _____

Proposal Title: _____

Date Approved by Dissertation Committee: _____

Required Signatures (Please print name after signature)

Dissertation Director: _____

Faculty (Major) _____

Faculty (Major) _____

Faculty (Minor) _____

Faculty (Minor) _____

Additional Committee Member/Outside Reviewer if applicable
(Provide title and location if outside UA)

PHYSIOLOGICAL SCIENCES DOCTORAL STUDENT CHECKLIST

Name: _____ First Enrollment: _____ Mentor: _____

Faculty Preceptor: _____ Student Preceptor: _____

Program Forms

Lab Rotation Forms (Faculty/Term) _____

Mentor Selection Form ____/____/____ Minor Approval Form: ____/____/____

Comprehensive Exam Committee Form: ____/____/____ Dissertation Proposal Form: ____/____/____

Teaching Fulfilled _____ Transfer Units Approved (if applicable)? _____

Student Forum (Term): Full Length Seminar: _____ 20 Minute Presentations: _____

Required Coursework (Term/Grade)

PSIO 503 _____ PSIO 603 _____ PS 595B _____ Stats (course #) _____

Graduate College Forms:

Doctoral Plan of Study: ____/____/____ Application for Oral Comprehensive Exam: ____/____/____

Application to Candidacy: ____/____/____ Announcement of Final Exam: ____/____/____

Comprehensive or Dissertation Committee Meetings: ____/____/____, ____/____/____,
____/____/____, ____/____/____, ____/____/____, ____/____/____, ____/____/____

Comprehensive Exam Committee:

Faculty Representing Major (Name & Dept)

Faculty Representing Minor (Name & Dept)

Written Completion Date: ____/____/____ Oral Completion Date: ____/____/____

Dissertation Committee:

Faculty Representing Major (Name & Dept)

Faculty Representing Minor (Name & Dept)

Dissertation Title:

Honors/Awards: _____

PHYSIOLOGICAL SCIENCES MASTERS STUDENT CHECKLIST

Name: _____ First Enrollment: _____ Mentor: _____

Faculty Preceptor: _____ Student Preceptor: _____

Program Forms

Lab Rotation Forms (Faculty/Term) _____

Master's Committee Form ____/____/____

Student Forum (Term): 20 Minute Presentation: _____

Required Coursework (Term/Grade)

PSIO 503 _____ PSIO 603 _____

Graduate College Forms:

Master's Plan of Study: ____/____/____ Master's Completion of Degree Requirements: ____/____/____

Committee Meetings: ____/____/____, ____/____/____, ____/____/____,

Graduation Option (check one):

- Masters Thesis, and oral presentation
- Research Project Summary (written document) and oral presentation
- Written scientific document (review) and oral examination

Committee:

Project or Thesis Title

Honors/Awards:

Physiological Sciences Faculty and their Home Departments

Ronald Allen, Ph.D., Animal Science
Parker Antin, Ph.D., Cell Bio & Anatomy
Betty Atwater, Ph.D., Physiology (Emeritus)
E. Fiona Bailey, Physiology*
Ann Baldwin, Ph.D., Physiology
Lance Baumgard, Ph.D., Animal Science
Scott Boitano, Ph.D., Physiology, Respiratory
Eldon Braun, Ph.D., Physiology
Heddwen Brooks, Ph.D. Physiology
Janis Burt, Ph.D. , Physiology
Zoe Cohen, Ph.D., Physiology*
Robert Collier, Ph.D. Animal Sciences
William Dantzler, M.D., Ph.D., Physiology
Thomas Davis, Ph.D., Pharm/Tox
Nicholas Delamere, Ph.D., Physiology
Bohuslav Dvorak, Ph.D., Pediatrics
Torsten Falk, Ph.D., Neurology*
Jean-Marc Fellous, Ph.D., Psychology*
Ralph Fregosi, Ph.D., Physiology
Andrew Fuglevand, Ph.D., Physiology
Janet Funk, Ph.D., Medicine
Fayez Ghishan, M.D., Pediatrics
Robert Gillies, Ph.D., Biochemistry
Scott Going, Ph.D., Nutrition
Robert Gore, Ph.D., Physiology
Katalin Gothard, Ph.D., Physiology
Hendrikus Granzier, Ph.D. Mol/Cell Biology*
Raphael Gruener , Ph.D., Physiology
Thomas Hamm, Ph.D., Barrow Neuro Inst.
Ronald Heimark, Ph.D., Surgery
Erik Henriksen, Ph.D., Physiology
Patricia Hoyer, Ph.D., Physiology
James Hoying, Ph.D., Biomedical Engineering
Karl Kern, M.D., Medicine
Gail Koshland, Ph.D. Physiology
Douglas Larson, Ph.D. Pharm/Tox
Richard Levine, Ph.D., Neurobiology
Howard Lien, M.D., Internal Medicine
Kirsten Limesand, Ph.D., Nutritional Sciences*
Sean Limesand, Ph.D., Animal Sciences
Stan Lindstedt, Ph.D., Biology (NAU)
Timothy Lohman, Ph.D., Physiology
Ronald Lynch, Ph.D., Physiology
Alan Marmorstein, Ph.D., Ophthalmology
Robert McCuskey, Ph.D., Cell Bio & Anatomy
Paul McDonagh, Ph.D., Surgery
Bruce McNaughton, Ph.D., Psychology
Eugene Morkin, M.D. Internal Medicine
Naomi Rance, M.D., Ph.D., Pathology
Lucinda Rankin, Ph.D., MCB/Physiology
John Regan, Ph.D., Pharm/Tox
Robert Rhoads, Ph.D., Animal Sciences*
Leslie Ritter, Ph.D., Nursing
William Roeske, M.D., Internal Medicine
Raymond Runyan, Ph.D., Cell Bio & Anatomy
Timothy Secomb, Ph.D., Physiology
Scott Sherman, M.D., Neurology
Alexander Simon, Ph.D., Physiology
Daniel Stamer, Ph.D., Ophthalmology/Pharm
Nicholas Strausfeld, Ph.D., Neurobiology
Douglas Stuart, Ph.D., Physiology
John Szivek, Ph.D., Orthopedics*
Stuart Williams, Ph.D., Surgery
Stephen Wright, Ph.D., Physiology
Hua Xu, Ph.D., Pediatrics*
Konrad Zinsmaier, Ph.D. Neurobiology

* affiliate members

Appendix VII Program Membership

Physiological Sciences Graduate Students 2007-2008 (New students names in **bold**)

Masters Students

Clair Anthony	Andrew Maynard
Anna Brauner	Methajit Methawasin
Gabrielle Brown	Guadalupe Ortiz
Stewart Dandorf	Amber Rice
Meghan Dickerson	Alisa Ryan
Julia Fiello	Deanna Shutt-Wood
Nathaniel Hart	Allison Spera
Tarann Henderson	Amy Stejskal
Laura Hook	Jonathan Tse
Kimberly Hostetter	Patrick Wagner
Karl Huebner	Kristen Westrick
John Kanady	Hemalini Williams
	Leslie Zuniga

Doctoral Students

Stoyan Angelov	Erin McKiernan
Bethzaida Astorga	Edward Parkin
Ji-eun Choi	James Phillips
Yodying Dongprapai	Greg Powell
Jennifer Fang	Ann Revill
Joshua Farr	Zelieann Rivera
Kyle Flann	Jennifer Schaefer
Don Gates	Subhashini Srinivasan
Chris Geffre (MD/PHD)	Grant Sumida
Marco Herrera	Gary Sutherland
Laura Krebs	Weiqun Tong
Christopher Laine	Hilary Wakefield
Kate Lindborg	Jason Worrell
Tony Macko	Laura Wright