

HANDBOOK FOR GRADUATE STUDENTS IN EXERCISE PHYSIOLOGY

Policies and Procedures for the Ph.D. Program in Exercise Physiology West Virginia University School of Medicine



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For Students Admitted Fall 2007 and Later



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A. PROGRAM OVERVIEW

The Division of Exercise Physiology offers a program leading to the Doctor of Philosophy degree (Ph.D.) in the School of Medicine. Admission to our graduate program is through the West Virginia University Health Sciences Biomedical Sciences Ph.D. program. The program in Exercise Physiology is intended to give exceptional students, knowledge in basic medical and scientific areas to prepare them for careers as effective and knowledgeable researchers and teachers in the broad field of Exercise Physiology. These goals are achieved by several means. Formal course work in the major discipline of Exercise Physiology is supplemented with courses from the sub-disciplines of Physiology, Biochemistry, Molecular Biology, Pharmacology and Neuroscience. The student's knowledge base will be further strengthened by participation in additional courses offered by other departments within the School of Medicine and by departments in other colleges of West Virginia University. These formal courses provide the student with the opportunity to develop a solid foundation in sciences that can be applied to interpret and study aspects of exercise and disease.

Research training and experience are provided under the guidance and supervision of the graduate faculty. The aim of this effort is to promote attitudes, habits, skills and abilities that will enable graduate students to develop into independent thinkers. Graduates of this program will demonstrate:

- Focused and comprehensive training in the discipline of exercise physiology with an emphasis in a particular area of research.
- Familiarity with primary Exercise Physiology research literature, including a working background knowledge of pathological diseases associated with lack or inability to perform exercise.
- Skills in modern physiology research through course work and laboratory training.
- Skills in designing experimental procedures/protocols and in conducting independent research using state-of-the-art technologies.
- Development of oral, written, and visual communication skills.
- Preparation for a wide range of careers, including academic research, undergraduate/graduate teaching, science writing, outreach, government policy, basic or applied science in industry, etc.

Graduate work involves a program of study and research individually designed to utilize the abilities and strengths of the faculty and accommodate the needs of the student within an area of specific interest. Although there are common goals, expectations, and courses that will be universal for all graduate students, the exact content of a program of study within Exercise Physiology will differ from one student to another.

The content of this handbook represent the current policies and procedures that have been approved by the graduate faculty of the Division of Exercise Physiology. Nevertheless, this handbook is to be viewed as a “living document” so that after appropriate debate and approval by the graduate faculty, the content of this handbook may be periodically revised.

B. DESIGNATED RESEARCH TRACKS

The Exercise Physiology Doctor of Philosophy graduate program is composed of three distinct research tracks that enable the prospective student to focus their research and graduate education on a specific area of emphasis. The individual areas of emphasis are:

- Cardiovascular and Metabolic Diseases (CMD)
- Muscle Pathophysiology (MPP)
- Rehabilitation Science and Engineering (RSE)

Students participating in the Exercise Physiology Doctor of Philosophy graduate program will be required to participate in the didactic Exercise Physiology core curriculum (EXPH 786 and EXPH 787) as well as didactic electives that are focused on the specific emphasis area and germane to the research focus. The goal is to provide a flexible graduate training that provides the appropriate knowledge related to the area of emphasis.

B. POLICIES AND PROCEDURES FOR ADMISSION

B.1. Admission to the Ph.D. Program

The general application procedures to the Ph.D. Program in Exercise Physiology follows the published guidelines of the Graduate Catalogue of the Biomedical Sciences Graduate Program of West Virginia University. These procedures can be obtained online at:

<http://www.hsc.wvu.edu/resoff/>

The Admissions Committee, comprised of 1 representative from each of the seven graduate programs in the Biomedical Sciences and a senior graduate student, make the decision on acceptance, which are offered on an annual basis.

B.2. Admission into the Exercise Physiology Program

By the end of the first semester of the graduate program, graduate students will select the graduate program in Exercise Physiology by choosing to do their dissertation research with a faculty member affiliated with the program. The graduate program in Exercise Physiology is able to accommodate students with diverse backgrounds and wide ranges of interests in physiological pathologies and impacts of exercise on these pathologies. Any student admitted to the undifferentiated first year curriculum is eligible to join the graduate program. Students with MS degrees desiring direct entry into the program must apply through the school-wide admissions committee and may need to complete portions of the first year curriculum. If a laboratory is not selected following the first semester, an additional semester can be utilized for making a decision to enter the Exercise Physiology Graduate Program.

C. PROGRAM OF GRADUATE STUDY IN EXERCISE PHYSIOLOGY

C.1 Summary of Time Line for Graduation

- C.1.1** After admission into the Biomedical Sciences Program, the student will begin to prepare an **Individual Development Plan (IDP)** which will require annual review with the Advisor.
- C.1.2.** After admission to the graduate program in Exercise Physiology, the student should work with their Advisor/Dissertation Chair to identify and assemble members of the Dissertation Committee. The committee members should be selected according to his/her abilities to assist the student with critical aspects of his/her doctoral work. The committee will consist of at least five faculty members, the majority of who hold regular graduate faculty status. A minimum of three members of the committee (including the Dissertation Chair) must be members of the Exercise Physiology graduate faculty. At least one member of the Dissertation Committee must come from outside the Exercise Physiology Division and not have extensive knowledge of the research topic. The goal is to have this member provide a broad/external perspective on the committee. The Graduate Director will have final approval of Dissertation Committee Chairs and Dissertation Committee Members. A **Committee Approval Form** must be filled and submitted to the Health Sciences Center Graduate Programs Office (HSC 2272) and to Toni Burbridge in the Exercise Physiology Office (HSC 8701).
- C.1.3** The members of the Dissertation Committee will approve a “plan of study” for the student that will include the remainder of the required course work for the program. The plan of study should be completed and approved by the Dissertation Committee on or before the end of the first semester of year 2. This plan of study serves as a contract between the student and the members of his/her Dissertation Committee. A **Plan of Study Form** must be filled and submitted to the Health Sciences Center Graduate Programs Office (HSC 2272) and to Toni Burbridge in the Exercise Physiology Office (HSC 8701).
- C.1.4** Students should meet with their Dissertation Committee at least once each year and provide evidence of research progress towards graduation during these meetings. Additional Dissertation Committee meetings may be required and will be decided upon at the discretion of the Dissertation Chair and/or the Dissertation Committee. A **Dissertation Committee Evaluation Form** must be filled and submitted to the Health Sciences Center Graduate Programs Office (HSC 2272) and to Toni Burbridge in the Exercise Physiology Office (HSC 8701).
- C.1.5** The student should be positioned to present research data (e.g. pilot data) at one national meeting by the end of the second year of study. All students should strive to present his/her research data at a minimum of one national meeting/year thereafter.
- C.1.6** The student must complete his/her candidacy/qualifying examination, which is an NIH style fellowship or other agency grant (Dissertation Proposal) to the Dissertation Committee as part of the comprehensive examination. The proposal defense will include an oral presentation which includes defense of the Dissertation Proposal through questioning from the Dissertation Committee. The substance of the questions from the Dissertation Committee during the examination may include those related to the research proposal/topic of study, and any other questions related to the area of Exercise Physiology or the content from graduate courses. This examination needs to be completed on or before the last working day of Year 3. Failure to do so will lead to the loss of stipend support and/or dismissal from the IGPBMS. A maximum of three attempts to achieve satisfactory performance on this examination will be allowed. Failure to

achieve satisfactory performance on the examination will be grounds for dismissal from the Exercise Physiology Graduate Program. With successful completion of the dissertation proposal and its oral defense, the student advances to candidacy for the Ph.D. degree and also begins the 5-year clock for completion of the degree. A **Doctoral Candidacy Form** must be filled and submitted to the Health Sciences Center Graduate Programs Office (HSC 2272) and to Toni Burbridge in the Exercise Physiology Office (HSC 8701).

- C.1.7** Before or usually after defense of the proposal, you should be positioned to seek a fellowship from a national funding agency. Your dissertation proposal or elements of it, provides the cornerstone of an application for an individual predoctoral fellowship from agencies, such as the NIH (F31, F31 diversity) and the AHA, etc... Successful defense of the dissertation proposal strengthens the student's ability to obtain a predoctoral fellowship because the research plan has received an internal critique. Examples of deadline dates for a Ruth Kirschstein NRSA F31 application to NIH are the first weeks of April, August, and December; the F31 diversity fellowship deadlines are the first weeks of May, September, and January. Deadlines for an AHA predoctoral fellowship are in January and July. Please be aware that these dates may change depending on the funding agency. Consult with your Graduate Director for other opportunities and deadlines that are pertinent to your discipline.
- C.1.8** Students should submit/publish several manuscripts (e.g., 1-3) to appropriate peer-reviewed journals from work conducted as part of the dissertation program. As per Biomedical Sciences requirements students must publish at least one first author manuscript of original data in a peer-reviewed scientific journal prior to graduation.
- C.1.9** Although the student's primary focus after completing the comprehensive/qualifying examination should be dissertation research, there may be opportunities for involvement in research that is unrelated to/not part of the student's dissertation. The student should first obtain approval from his/her Advisor prior to involvement in any non-dissertation research. Significant contributions to projects in which a student provides significant, direct, creative and research input to non-dissertation research may result in co-authorship on other manuscripts. The best policy is for authorship to be discussed and decided prior to initiating the project. The student may be required to participate in additional research activities as deemed necessary by the Advisor.
- C.1.10** The student must consult with his/her Advisor to decide which presentations to make and manuscripts to write. Advisor approval must be met before the student submits any grant proposals, abstracts or manuscripts for review or presentation. It is the student's responsibility to report his/her progress, presentations and publications to the Dissertation Committee.
- C.1.11** When research has progressed to a point that is considered satisfactory by the Advisor and the Dissertation Committee, the student will write their doctoral dissertation according to Graduate Council guidelines. The dissertation must be presented to the Dissertation Committee two weeks prior to the doctoral defense date. A **Shuttle Sheet Request Form** must be submitted to the Health Sciences Graduate Programs Office (HSC 2722) and Toni Burbridge in the Exercise Physiology Office (HSC 8701), two weeks prior to the defense date. The student is also responsible for filling out a defense announcement using a **Defense Announcement Flyer Template** and submitting to Becky Miller so that she can send out to the Exercise Physiology Division.

Note: A timeline for form submission and links to all necessary forms can be found at the following link:

C.2 Courses and Requirements in Exercise Physiology

The Exercise Physiology faculty has developed a core curriculum for students in the graduate program in Exercise Physiology. The following courses constitute the Exercise Physiology core curriculum and are required for all Exercise Physiology graduate students. ***The required courses are relatively few, and the majority of the training will be obtained by engaging in research.*** Students may be required to take additional specific courses as determined by the student's Dissertation Committee. These courses will address the specific needs and interests of the student and reflect the overall objectives of the graduate program. The student's Dissertation Committee in consultation with the student determines all elective courses. Partial or full tuition waivers will only be considered for graduate level courses that are approved by the student's Dissertation Committee.

YEAR 1 FALL SEMESTER

Students take a common curriculum for the first semester in graduate school. The required courses are (Taken from Handbook for First Year IGPBMS Students):

Course	Code	Credits
Foundations for Contemporary Biomedical Research 1*	BMS 793A	4
Foundations for Contemporary Biomedical Research 2*	BMS 793B	4
Cellular Methods	BMS 706	1
Discussion on Scientific Integrity	BMS 700	1
Short laboratory experiences	BMS 791A	2

**These courses run consecutively.*

Foundations for Contemporary Biomedical Research 1 and 2

The purpose of these courses is to impart a fundamental understanding of the functional components of a cell, and the basis for regulation of cellular processes and organ systems. The knowledge base is developed in an interactive faculty-student environment that requires interpretation and rational speculation to apply general concepts to specific situations and stimulate creative scientific thought.

Objectives

- Impart a fundamental knowledge base
- Integrate molecular, cellular and physiological concepts
- Illustrate relevance through clinical examples
- Illustrate current relevance via the literature
- Stimulate student engagement and critical thinking

Assessable Skills

- Understand important concepts, their significance and illustrate mastery with examples.
- Apply the conceptual principles discussed to novel situations.
- Design and interpret experiments to test molecular, cellular and physiological mechanisms.
- Verbally articulate understanding of concepts during scientific discussion(s).
- Demonstrate teamwork and problem-solving.

Cellular Methods

The goal of this course is to familiarize the first year Biomedical Sciences students with the most current technologies found in the literature. Additionally, students will develop the critical thinking skills required

to evaluate data and begin to synthesize an experimental design for a research project directed at a novel research question. This is achieved by presentations on methods and having a journal club session with a paper that uses this method. This course is integrated with the material presented in Foundations for Contemporary Biomedical Research. The paper used for the journal club portion is chosen to compliment the lecture material in the Foundations course.

Objectives

The students will be able to:

- Recognize, evaluate, and interpret data generated through various techniques
- Compare and contrast available techniques that are best suited for addressing a particular research inquiry
- Be cognizant of the limitations of those techniques
- Construct a set of experiments sufficient to examine a particular biological phenomenon

Discussions on Scientific Integrity

As a graduate student at West Virginia University, you are required to meet particular federal and University-wide standards regarding the responsible conduct of research (RCR). To meet these standards, all graduate students take this course their first semester at WVU. This course together with the lecture on laboratory notebooks, cover the required subjects specified by the National Institutes of Health (NIH). In addition, you must complete an online RCR course offered by the Collaborative Institutional Training Initiative (CITI). You can take the course any time after receipt of your acceptance but it must be completed within 30 days of the beginning of your initial semester- the passing grade is 80%. Failure to do so may affect your status within the College and the University in general.

The Office of Research Integrity and Compliance (ORIC) will publish a training list derived from the CITI website database of those who have taken the training. This list will be published daily on the ORIC website (<http://oric.research.wvu.edu>) in the "Training Lists" section. To remain in compliance with NIH standards, you will need to retake the CITI training every 3 years that you are active in research at WVU.

Short laboratory rotations

There are four main objectives for the short lab experience:

1. To aid in choosing a laboratory for your dissertation research
2. To learn the research area of other laboratories in the Health Sciences Center so that you can interact scientifically with the members of that laboratory
3. To aid you in selecting faculty members for your dissertation committee.
4. To learn techniques involved in research.

Research Profile of Available Mentors: Before Graduate Student Orientation, you will receive a booklet of one-page research profiles of the available faculty. Arrive at Graduate Student Orientation prepared to identify at least three faculty with whom you would like to conduct a short lab experience. During Graduate Student Orientation, you will have the opportunity to meet with the faculty and learn about their research. Please discuss rotation projects and dissertation possibilities with available faculty if you are interested in rotating in their laboratory.

Selecting a Rotation Mentor: On the last day of Graduate Student Orientation, you will submit to the VP for Graduate Education, the names of three faculty members with whom you would like to rotate during the first rotation. Approximately 2 weeks before each of the next 2 short lab experiences in the fall semester, we will ask you to again submit three names of faculty (rank order) with whom you would like to rotate. While you will most likely receive your first choice, we reserve the option to match you

with your second or third choice based on competition with other first-year students for the same faculty mentor and research interests.

Schedule: During the 1st semester of Year 1, you will do three short lab experiences of 4 weeks each.

If you have not matched with a dissertation mentor by December/January of Year 1, you will conduct rotations during the spring semester until a match is finalized. Please discuss with your rotation mentor about conducting research during University spring break.

At the start of each lab experience, you should meet with the faculty member and set up a daily work schedule. At this time, you may also receive additional materials to read in preparation for your experiments.

NOTE: Usually only one student will rotate in any given laboratory during each rotation. There may be an exception or two. Some faculty may host two students at a time.

NOTE: Due to time constraints with obtaining security clearance for rotations at NIOSH, please indicate your desire to do a short lab experience before or shortly after arriving at WVU. You must submit a security clearance form before conducting a rotation or dissertation research at NIOSH. It takes time to obtain a security clearance at NIOSH. Please be aware that a dozen or more people at NIOSH and CDC are involved in the submission and approval processes. Therefore, NIOSH staff request that only those students who are really interested in the research faculty at NIOSH submit this form. If you are seriously considering doing research at NIOSH, you will need to talk to NIOSH faculty for the proper form.

YEAR 1 SPRING SEMESTER

In the Spring semester of Year 1, students who have chosen Exercise Physiology as their graduate program will take classes as required by their program (see below). Additional classes are often recommended by their Advisor and/or their Dissertation Committee (if they have met) and should be selected to address weaknesses in a particular discipline or to solidify knowledge in a particular area. Consult with your Graduate Program Director and Advisor for information on these courses.

You need to register for a total of 9 credits to be a full-time student. A potential example of a class schedule for the Year 1 Spring semester is indicated below.

Course	Code	Credits
Journal Club	EXPH 799	1
Elective (i.e. Molecular Genetics, etc...)*	BMS 715	3
Research	BMS 797	5

**To be determined in conjunction with Mentor and/or Dissertation Committee.*

Journal Club

An in-depth examination and discussion of recent publications, research ideas and research projects/data-encompassing topics and research relevant to Exercise Physiology or pathologies resulting from lack of exercise.

Learning objectives

- Identify recent peer-reviewed research studies
- Develop presentation skills
- Develop critical thinking skills
- Identify strengths and weaknesses in recent peer-reviewed research studies
- Develop on the spot critical thinking skills
- Gain experience in public speaking skills in front of peers
- Gain experience questioning public speakers as an audience member

YEAR 1 SUMMER SEMESTER

In the Summer semester of Year 1, students will register only for research credits in the Exercise Physiology program.

Course	Code	Credits
Research	EXPH 797	3

YEAR 2 FALL SEMESTER

In the Fall semester of Year 2, students who have chosen Exercise Physiology as their graduate program will take classes as required by their program (see below). As above, additional classes are often recommended by their Advisor and/or their Dissertation Committee (if they have met) and should be selected to address weaknesses in a particular discipline or to solidify knowledge in a particular area. Consult with your Graduate Program Director Advisor for information on these courses.

You need to register for a total of 9 credits to be a full-time student. A potential example of a class schedule for the Year 2 Fall semester is indicated below.

Course	Code	Credits
Cardiopulmonary Physiology	EXPH 787	3
Journal Club	EXPH 799	1
Research	EXPH 797	5

Cardiopulmonary Physiology

An advanced survey of important concepts involved in cardiovascular/pulmonary physiology and pathophysiology. The main focus will be on understanding the changes to the cardiovascular/pulmonary system brought about by physiological stimuli such as exercise, aging, and disease states.

Learning objectives

- Describe important concepts in advanced cardiovascular and pulmonary physiology/pathophysiology
- Evaluate scientific literature in the area of cardiovascular and pulmonary research
- Define excitation-contraction coupling in the heart and its importance in pathological settings
- Describe the pathological consequences of the diabetic heart and its implications on cardiac function
- Analyze important concepts in arterial-ventricular interactions.
- Describe arterial stiffness and the concepts of diet and exercise altering arterial-ventricular stiffness

- Describe characteristics and mechanisms surrounding cardiac failure and the contractile ramifications
- Describe hypoxic pulmonary vasoconstriction at rest and in exercise
- Describe the pulmonary response to exercise and pathology
- Describe the characteristics of lung tissue under physiological and pathological stress
- Explain the effects of hypoxia leading to respiratory failure
- Gain experience in teaching in a didactic and active learning environment

YEAR 2 SPRING SEMESTER

In the Spring semester of Year 2, students who have chosen Exercise Physiology as their graduate program will take classes as required by their program (see below). As above, additional classes are often recommended by their Advisor and/or their Dissertation Committee (if they have met) and should be selected to address weaknesses in a particular discipline or to solidify knowledge in a particular area. Consult with your Graduate Program Director and Advisor for information on these courses.

You need to register for a total of 9 credits to be a full-time student. A potential example of a class schedule for the Year 2 Spring semester is indicated below.

Course	Code	Credits
Human Performance and Rehabilitation Engineering	EXPH 793	3
Journal Club	EXPH 799	1
Elective (if necessary)	*	1-3
Graduate Colloquium	EXPH 796	1
Research	EXPH 797	1-4

**To be determined in conjunction with Mentor and/or Dissertation Committee.*

Human Performance and Rehabilitation Engineering

This course provides an in-depth and hands-on experience with important concepts related to muscle structure, function, and metabolism as well as injury and repair. Topics of examination also include neuromotor control, tissue engineering and exercise performance. The class structure includes didactic lectures and hands-on applications/experiences.

Learning objectives

- Understand similarities and differences in excitation-contraction coupling between muscle types.
- Describe thick filaments and their roles in myosin heavy chains and regulation of velocity of shortening in loading and unloading.
- Consider adult muscle stem cells, satellite cells, and gene expression in muscle remodeling to atrophy and aging.
- Describe process and signaling involved in muscle wasting
- Discuss the importance of satellite cells in muscle repair and regeneration
- Discuss adaptations of skeletal muscle to increased use, disuse and aging
- Describe what controls reaching movement
- Understanding the underlying mechanisms responsible for locomotor function
- Understanding of the use of wearable technologies for assessing human performance

Graduate Colloquium

This course is to be taken once a year in the Spring semester beginning in Year 2. The course is designed to be a platform for the student to discuss their research progress and to provide an

opportunity to develop presentation skills.

Learning objectives

- Enhance presentation abilities in a number of different settings
- Disseminate research progress to faculty and peers.
- Develop communication skills

YEAR 2 SUMMER SEMESTER

In the Summer semester of Year 2, students will register for the scientific writing course and research credits in the Exercise Physiology program.

Course	Code	Credits
Scientific Writing	BMS 720	1
Research	EXPH 797	2

Scientific Writing

This course is divided into 2 parts. The purpose of the first part of the Scientific Writing course is to introduce students to scientific writing using a standard journal format and a simple set of data. Students may use their own data or a sample data set that will be provided to write a paper based on the format used in the Journal of Neuroscience. Although, not all students will submit manuscripts to this journal, it provides a relatively straightforward structure and format that can be generalized to other journals. The background, details, methods, and data analysis in the paper will come from the student's own research area and will be evaluated by their mentor.

The purpose of the second part of the Scientific Writing course is to introduce students to the grant writing process using a standard NIH predoctoral grant application format and a simple set of preliminary data. Students may use a sample data set, unless you have your own data, and write the scientific portion of a grant proposal based on the format used by the NIH for a Ruth L. Kirschstein National Research Service Award (NRSA) Predoctoral Fellowship (F31). The scientific details in the grant application will come from the student's own research area and will be evaluated by their mentor.

YEAR 3-5+

In Year 3-5+, students will register for the Exercise Physiology Journal Club and research credits in the Exercise Physiology program. In the Spring semester they will take EXPH 796.

FALL

Course	Code	Credits
Journal Club	EXPH 799	1
Research	EXPH 798	8

SPRING

Course	Code	Credits
Journal Club	EXPH 799	1
Graduate Colloquium	EXPH 796	1
Research	EXPH 798	7

SUMMER

Course	Code	Credits
Research	EXPH 798	3

C.3 Directed Research

Once the Advisor is identified and even before the Dissertation Committee is in place (year 1), the student can begin preliminary research projects and pilot studies in the area of the dissertation topic. All preliminary research must be collected under the supervision and approval of the Dissertation Chair (Advisor in most cases).

Therefore, the student is expected to engage in directed research under the supervision of the Dissertation Chair to learn techniques and collect pilot data that will be the basis of a future dissertation project. The student does not require approval of his/her dissertation topic and research questions by his/her Dissertation Committee prior to beginning pilot data collection; but approval of the Dissertation Chair is required.

Studies to obtain pilot data should be presented to the Dissertation Committee to demonstrate the student's competency in research skills, and, that his/her research ideas and hypotheses are appropriate and justified. This process facilitates progression through the program in a timely and efficient manner. Nevertheless, the Dissertation Committee may require the student to obtain additional pilot data or research skills prior to approving the research proposal as a dissertation topic.

The student's directed research efforts should be progressing towards approval of a dissertation topic from the members of the Dissertation Committee, once they have been identified (before the end of semester 1, year 2).

This research training will provide the student background data /information from which to base grant proposal and dissertation topic as part of the requirements for completing the dissertation proposal defense.

C.4 Comprehensive Candidacy/Qualifying Examination

Admission to candidacy occurs following successful completion of the candidacy/qualifying examination. Consistent with West Virginia University requirements, the candidacy/qualifying exam has both an oral general knowledge and written dissertation component.

C.4.1 General Knowledge and Dissertation Proposal Defense Examination

The first and second components of the candidacy/qualifying examination will take place during the dissertation proposal defense examination. The purpose of the dissertation proposal defense examination is to evaluate whether the student is prepared to undertake doctoral research. It consists of a written proposal of the dissertation research project and the oral presentation and defense of the project to the student's Dissertation Committee, the Exercise Physiology Division, and any other interested parties. In preparing the proposal, the student should include a review of the literature pertinent to the project, a rationale for the proposed experiments, and preliminary data supporting the hypothesis. Students commonly revise their proposals during the course of their dissertation research. Thus, it is not necessary for students to have a complete set of preliminary data supporting the aims of the proposal. Every effort should be made to defend the dissertation proposal in the fall semester or the early spring semester of the third year in graduate school. As indicated in C.1.5, both of these examinations need to be completed on or before the last working day of Year 3. Failure to do so will lead to the loss of stipend support and/or dismissal from the IGPBMS.

The format for the dissertation proposal may be similar to that of an NIH predoctoral fellowship, AHA predoctoral fellowship, or other predoctoral fellowship as agreed upon by the Dissertation Chair and Dissertation Committee. Format and requisite forms for the dissertation proposal should be consistent with the agency sponsoring the fellowship's recommended format. As an example, a typical fellowship application will include the following documents:

1. Abstract
2. Table of Contents
3. Biographical Sketch
4. Specific Aims
5. Research Strategy
6. Literature Cited

Note: *The page limits are for single spaced type. The allowed fonts are Arial, Helvetica, Palatine Linotype or Georgia and a font size of 11 or 12 points. The type density should be no more than 15 characters per inch and six lines per inch. One-half inch margins should be used on all sides but not greater than 1 inch. If the student chooses to convert this proposal to an actual fellowship application, they will need to consult the directions for the additional sections required by the NIH or other granting agency.*

Page limitations for the proposal will be strictly enforced. Page limitations will vary depending upon the guidelines for the particular fellowship that the student will apply for and should be consistent with the agency requirements. The student should obtain approval from their Dissertation Committee regarding the fellowship that will be applied for. The student should consult with their Advisor in determining the aims of the project. The student should also consult with their Advisor on writing style and grantsmanship issues. The proposal must not be a copy and paste effort from the Advisor's grants. The written proposal should be given to the Dissertation Committee at least two weeks before the oral defense to afford the Dissertation Committee sufficient time to evaluate the project.

The dissertation proposal defense will be presented as a public seminar to the Exercise Physiology Division. It is the student's responsibility to notify Becky Miller (rgmiller@hsc.wvu.edu) of the date, time and location of the dissertation proposal defense and provide a document flyer for her to send out to the Exercise Physiology Division. Following the seminar, the student will meet with the Dissertation Committee to evaluate the proposal in depth. During this meeting, the Dissertation Committee will be charged with examining the student in broad areas of Exercise Physiology as well as specifics regarding the dissertation proposal itself. The questions from the Dissertation Committee can include but are not limited to an understanding of the techniques used in the proposal and the student's ability to use deductive reasoning. During the proposal defense examination as well as during all subsequent Dissertation Committee meetings, and the dissertation defense, the student's Advisor must not speak for the student or answer questions directed at the student.

As indicated in C.1.6, the examination must be completed on or before the last working day of Year 3. Failure to do so will lead to the potential loss of stipend support and/or dismissal from the IGPBMS. A maximum of three attempts to achieve satisfactory performance on this examination will be allowed. Failure to achieve satisfactory performance on either component of the examination can be grounds for dismissal from the Exercise Physiology Graduate Program.

C.4.3 Admission to Candidacy

Based upon the Dissertation Committee's recommendation, with satisfactory performance on the qualifying examination/proposal defense, the Exercise Physiology Graduate Program Director will recommend that the student be elevated to candidacy for the Ph.D. degree. The Dissertation Chair (Advisor) will submit a completed **Doctoral Candidacy Examination Form** to the Health Sciences Center Graduate Programs Office (HSC 2272) and to Toni Burbridge in the Exercise Physiology Office (HSC 8701). **The Plan of Study Form** should also be completed and submitted to the Health Sciences Graduate Programs Office (HSC 2272) and to Toni Burbridge in the Exercise Physiology Office (HSC 8701).

C.5 Annual Evaluation of Student Progress

Students are required to meet with their Dissertation Committee at least once each year and provide evidence of research progress towards graduation. Additional Dissertation Committee meetings may be required and will be decided upon at the discretion of the Dissertation Chair and/or the Dissertation Committee. Note that the dissertation proposal defense and dissertation defense may serve as the annual meeting with the Dissertation Committee. The Dissertation Chair (Advisor) will submit a completed **Dissertation Committee Evaluation Form** detailing the student's progress. Forms should be submitted to the Health Sciences Graduate Programs Office (HSC 2722) and to Toni Burbridge in the Exercise Physiology Office (HSC 8701).

C.6 Dissertation Examination and Defense

When research has progressed to a point that is considered satisfactory by the Advisor and the Dissertation Committee, the student will write their doctoral dissertation according to Graduate Council guidelines. A copy of these guidelines can be obtained from the Health Sciences Graduate Programs Office. A draft of the dissertation will be approved by the Dissertation Chair (Advisor) and the Dissertation Committee before the final oral defense. This draft must be given to the Dissertation Committee two weeks prior to the defense. Exceptions to this time schedule are strongly discouraged and will require the approval of every member of the Dissertation Committee.

Students should submit/publish several manuscripts (e.g., 1-3) to appropriate peer-reviewed journals from work conducted as part of the dissertation program. The student will not be allowed to defend their dissertation without a minimum of one paper in press in a peer-reviewed journal, in which the student is the first author. Submission of the paper must be approved by the Dissertation Chair (Advisor). In some cases, students share first authorship with another member of the laboratory. The use of such papers to fulfill this requirement will be at the discretion of the student's Dissertation Committee. The same first author manuscript cannot be used by two different doctoral students to fulfill the single publication requirement for the IGPBMS.

The final examination for the Ph.D. degree will consist of presenting a dissertation seminar before the Dissertation Committee, the Exercise Physiology Division, and any other interested parties, after which the student will continue with their dissertation defense in a separate session with their Dissertation Committee. It is the student's responsibility to notify Becky Miller of the date, time and location of the dissertation defense and provide a document flyer for her to send out to the Exercise Physiology Division. A **Shuttle Sheet Request Form** must be submitted to the Health Sciences Graduate Programs Office (HSC 2722) and Toni Burbridge in the Exercise Physiology Office (HSC 8701), two weeks prior to the defense date. If performance in the oral defense is judged satisfactory by the Dissertation Committee, the granting of the Ph.D. degree will be recommended. Following the satisfactory defense of the dissertation, the student must prepare the dissertation for electronic submission to West Virginia University. Approval of the written dissertation and the electronic submission, which includes signatures from all committee members, must be completed before the Ph.D. can be conferred. Students should not make firm commitments for start dates in postdoctoral positions or other employment prior to completion of these requirements.

C.7 Deadline for Degree Completion

West Virginia University has two deadlines by which the degree must be completed or the student will need to retake introductory coursework. Once a student has been admitted to candidacy, they have five years to complete the degree. Overall, the student must complete the degree by the end of the eighth year in graduate school. The expectation is that the student will finish well before this time. To ensure timely progress, the Office of Research and Graduate Studies will send letters to students at the beginning of their sixth year to inquire as to their progress towards completion.

C.8 Student Agreement

After reading through this handbook, the student is required to sign the **Signature Page** (request the form from the Graduate Director) indicating that they understand and agree to the policies outlined herein. The signed form must be submitted to the Health Sciences Graduate Programs Office (HSC 2722) and Toni Burbridge in the Exercise Physiology Office (HSC 8701).