

 College of Health & Rehabilitation Sciences: Sargent College

Programs in Human Physiology
GRADUATE STUDENT MANUAL

2019-2020

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I. Introduction to Sargent College, Boston University

Sargent College of Health and Rehabilitation Sciences became part of Boston University in 1929. It was originally founded as a School of Physical Training in Cambridge, Massachusetts by Dr. Dudley Allen Sargent in 1881. Dr. Sargent built an international reputation as an innovator in health promotion and physical conditioning. With the expansion of knowledge about health and the increase in complexity of society's health care needs, Sargent College continuously improves our degree programs to meet the needs of future professionals in health fields.

Academic Programs

Undergraduate programs include Athletic Training, Health Science, Health Studies (undergraduate portion of the Doctor in Physical Therapy program), Human Physiology (pre-med), Dietetics, Nutritional Science (pre-med), Rehabilitation and Human Services, Speech, Language and Hearing Sciences, and Therapeutic Studies (undergraduate portion of the Occupational Therapy program). Graduate programs are offered in Human Physiology, Nutrition, Audiology, Occupational Therapy, Physical Therapy, Rehabilitation Counseling, Rehabilitation Sciences and Speech-Language Pathology.

Scope of the Program Manual

Information in this manual is not intended to be fully comprehensive. The student should also refer to policies, data, or listings that are found in

- Sargent College Graduate or Undergraduate Bulletins
- Academic Conduct Code
- The Boston University or Sargent College Websites

While every effort is made to keep all of these sources accurate, up-to-date and in agreement with one another, occasional discrepancies may occur and will be resolved by consultation with your Program Director.

Mission of Sargent College

The mission of Boston University Sargent College is to advance, preserve, disseminate, and apply knowledge in the health and rehabilitation sciences. BU Sargent College strives to create an environment that fosters critical and innovative thinking to best serve the health care needs of society.

II. Introduction To The Department of Health Sciences

Welcome to the Department of Health Sciences in Sargent College of Health and Rehabilitation Sciences. We look forward to having you as a graduate student and welcome the opportunity to work with you.

This manual has been assembled to provide you with information about your program of study as well as policies and responsibilities therein. Please review it thoroughly. If you have any questions about the curriculum or policies outlined, speak with your faculty adviser. Information in this manual is not intended to replace information available from the following resources:

- ◆ Sargent College Graduate Bulletin
- ◆ Boston University Telephone Directory
- ◆ Mugar Library Guidelines for Preparation of Thesis and Dissertations
- ◆ Academic Conduct Code
- ◆ <http://www.bu.edu/sargent>

The Department offers graduate programs leading to the Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees in Human Physiology. Each student, working together with a faculty adviser, designs his or her individual program based on their academic background, professional experience, and career objectives. This planning includes scheduling of required courses, selection of electives, inclusion of directed study, research, professional or teaching experiences, and selection of projects for critical literature reviews, theses, and dissertation research. The adviser will evaluate transcripts for courses to be transferred for credit from other educational institutions and set-up committees and dates for examinations and thesis defense, where applicable. Students are assigned to an academic adviser on the basis of academic and scientific interests but, the student may request reassignment if the expertise of another faculty member is more suitable.

III. Faculty In Human Physiology

Faculty and Areas of Specialization

Helen Barbas, Ph.D. Ph: 617-353-5036, barbas@bu.edu , Office: Sargent - Rm 431	McGill University, Canada; <i>Professor</i> , Neuroscience, organization of prefrontal cortex.
Jason Boland, Ph.D. Ph: 617-353-9168, jbohland@bu.edu Office: Sargent – Rm 403	Boston University, <i>Assistant Professor</i> , Computational neuroscience.
Klaus Hilgetag, Ph.D. Ph: 617-353-2718, claush@bu.edu	University of Newcastle upon Tyne; <i>Adjunct Associate Professor</i> , Computational neuroscience
Susan Kandarian, Ph.D. Ph: 617-353-5169, skandar@bu.edu Office: Sargent – Rm 423	The University of Michigan; <i>Professor</i> , Muscle physiology, molecular mechanisms of gene expression in muscle.
Peter M. Kang, M.D. Ph: 6-7-735-4290, pkang@bidmc.harvard.edu	George Washington University School of Medicine, <i>Adjunct Assistant Professor</i> , Cardiac apoptosis and heart failure
Lisa Leon, Ph.D. Ph: 508-233-4862; lleon@bu.edu	University of Michigan Medical School; <i>Adjunct Associate Professor</i> , Pathophysiology of thermoregulation.
Anna Monahan, MS, CAGS Ph: 617-353-2710, amonahan@bu.edu Office: Sargent – Rm 647B	Northeastern University and Simmons College; <i>Lecturer, Internship Coordinator</i> .
Kathleen G. Morgan, Ph.D. Ph: 617-353-7464 kmorgan@bu.edu Office: Sargent – Rm 429	University of Cincinnati, <i>Professor</i> , Cardiovascular cell biology and cytoskeleton
Judith L. Schotland, Ph.D. Ph: 353-8449, schotlnd@bu.edu Office: Sargent – Rm 427	Northwestern University, Clinical Associate Professor and Director, Programs in Human Physiology; Neuroscience.
Vasileios Zikopoulos, Ph.D. Ph: 353-8375, zikopoul@bu.edu Office: Sargent – Rm 401A	University of Crete, Heraklion, Greece, <i>Assistant Professor</i> ; Neuroscience.

IV. Ethical Standards and Policies of Sargent College of Health and Rehabilitation Sciences; Petitions; Appeals

Sargent College has a commitment to excellence in the education of Health and Rehabilitation Professionals. Individually and collectively, those associated with Sargent are responsible for maintaining and promoting those ethical standards below:

RESPONSIBILITY OF THE COLLEGE TO STUDENTS:

1. In the process of recruiting students, the College and its program should be represented accurately.
2. The admissions procedures should indicate a fair and impartial review of student's credentials.
3. A learning environment should be provided which is safe and conducive to learning.
4. The curriculum should be consistent with the best practices, philosophies, and patterns within the allied health professions.
5. The College and its programs should attempt to respond to changing patterns and concepts in the process of educating allied health professionals.
6. The faculty should be competent educators in their respective field.
7. Procedures used to evaluate students should be fair and clearly presented to the students at the beginning of each course and throughout the program.
8. Grievance and appeals procedures for students should exist and be clearly presented to students.
9. The College should make every effort to ensure that the students will be competent in their professional areas at the completion of program requirements.

RESPONSIBILITY OF THE COLLEGE TO CONSUMERS OF HEALTH CARE SERVICES

1. The College should make every effort to ensure that each graduate of the college should be competent for service in his or her respective profession.
2. The College should emphasize through its instruction that the graduates of the college should respect the dignity and privacy of each individual with whom they come in contact in a professional setting.

PROFESSIONAL BEHAVIOR STATEMENT

The mission of Sargent College is to advance, preserve, disseminate, and apply knowledge in the health and rehabilitation sciences. Sargent College strives to create an environment that fosters critical and innovative thinking to best serve the health care needs of society. This environment is made possible only through full participation of all members of the Sargent College community. A key expectation of this community of scholars, educators, practitioners and students is the adherence to the highest standards of professional and ethical behavior.

Academic performance is only one indicator of success for Sargent College students. Students are expected to demonstrate professional behavior, to accept responsibility for their actions, and to expect the same from their peers. Professional behavior is expected across environments, whether the student is engaged in clinical practice, classroom instruction, peer or faculty interaction, and research or laboratory activities. Students are expected to know and comply with the specified rules for each of their academic and clinical experiences.

Students are evaluated on professional behavior in addition to academic performance. Failure to meet the standards for professional behavior may result in dismissal from the program. The specific responsibilities of students are outlined in the manual for each program of study.

ACADEMIC HONESTY

Sargent College of Health and Rehabilitation Sciences is committed to creating an intellectual community in which both faculty and students participate in the free and uncompromising pursuit of learning. This is possible only in an atmosphere of mutual trust where the discovery and communication of truth are marked by scrupulous, unqualified honesty. The college expects all students to adhere strictly to the accepted norms of intellectual honesty in their academic and clinical work. It is the responsibility of the student to abide by the Sargent College Academic Conduct Code that is distributed annually to each student at the college. Copies are available in the Academic Service Center (Room 207).

ABSENCE FOR RELIGIOUS REASONS

1) According to Chapter 151C of the General Laws, Commonwealth of Massachusetts, any student in an educational or vocational training institution, other than a religious or denominational educational or vocational training institution, who is unable, because of his or her religious beliefs, to attend classes or to participate in any examination, study, or work requirements on a particular day, shall be excused from any such examination or study or work requirement, and shall be provided with an opportunity to make up such examination, study, or work requirement that may have been missed because of such absence on any particular day; provided, however, that such makeup examination or work shall not create an unreasonable burden upon such school. No fees of any kind shall be charged by the institution for making available to the said students such opportunity. No adverse or prejudicial effects shall result to students because of their availing themselves of the provisions of this section.

2) Students are asked to identify potential schedule conflicts with religious observances (class attendance, exams, assignment due dates) *within the first week of receiving the course syllabus* and to communicate these to the course instructor. This will enable the course instructor to work with the student to set alternative due dates or exam dates and to identify appropriate methods well in advance for the student to obtain information that may be missed from class.

DISABILITY ACCOMMODATIONS (ALSO ON THE BU WEBSITE)

Boston University provides reasonable accommodations to eligible individuals with disabilities in conformance with Section 504 of the Rehabilitation Act of 1973 and with the Americans with Disabilities Act of 1990. Requests for disability accommodations must be made in a timely fashion to the Office of Disability Services, 19 Deerfield Street, Boston, MA 02215; 617-353-3658 (Voice/TTY). Students seeking accommodations must submit appropriate medical documentation and comply with the policies and procedures of the Office of Disability Services.

Please see also, <http://www.bu.edu/disability/policy/policyindex.htm>

GRADUATION

All students must fill out an application for Graduation after they meet with their advisers to certify that all degree requirements are met. The application for Graduation must be signed by your adviser and returned to the ASC Office (Room 207). It is essential that this form be submitted by February 1st of your last year of study to ensure that your name is included in the May graduation list and commencement programs. Doctoral students must check with their adviser as to their eligibility to participate and it is recommended that the dissertation defense be scheduled by mid April if the student is to receive their hood and diploma in the May ceremony.

All students (January, May and September grads) are invited to participate in the May commencement ceremony if they have completed all coursework by that date. Commencement materials will be sent by email and postal mail so please be sure that BU has your updated contact information. Check the Sargent College and Boston University websites for important details about the ceremonies or stop by the Academic Services Center (Room 207) if you have any questions.

V. Master of Science in Human Physiology

1. COURSE, GRADE AND REGISTRATION REQUIREMENTS

All candidates must successfully complete a minimum of 33 (30 for the AT track) semester hours of graduate-level work. At least 16 semester hours must be in courses offered by the Department of Health Sciences. Up to 8 hours of graduate course work may be transferred from other educational institutions with departmental approval. In cases where students attend Boston University as a "special student" only 8 hours of course work can be transferred to the degree program.

An overall grade point average of 3.0 or higher is required for graduation.

No grade less than C is acceptable for inclusion in the 33-semester-hour requirement. In addition, students receiving three grades (or a total of 12 credits) below C+ *will be* terminated from the degree program. In the event of an unacceptable grade, no course required by the Department of Health Sciences for the degree program may be repeated more than one time. An unacceptable grade received when a course is repeated will result in termination from the degree program (See *Appendix B* for curriculum outline of MS requirements).

Some course work, such as Independent/Directed Study or Research (see *Appendix M*), may be graded on a P (pass) or F (fail) basis. P then indicates B- or better work. A grade of I must be completed no later than one calendar year of the date on which the incomplete grade is reported. A grade of F will be assigned automatically and permanently if the coursework remains incomplete on the assigned date or twelve months after the I grade has been awarded, whichever comes first.

All master's degree candidates must maintain continuous registration for academic credits (minimum: 0.5 credit hrs) during the Fall and Spring semesters of each year. Failure to register will result in administrative withdrawal of the candidate and necessitate reapplication to continue the program. Degree candidates must be registered for academic credit or pay the continuing student fee during the final semester in which the thesis defense is conducted, unless the thesis is being completed in the summer. A leave of absence may be requested by petition for specified lengths of time provided an explanation is presented. Such a petition should be formulated with the guidance of the ASC Office and subsequently addressed and presented to the Program Director. Candidates must complete their program within five years from the first semester of matriculation and must submit an Application for Graduation at least three months prior to the expected date of graduation. These can be obtained from the Academic Services Center (Room 207).

2. CURRICULUM

Candidates for the Master of Science degree in Human Physiology can fulfill the degree requirements via one of the following three tracks:

1. **Preclinical Accelerated Track:** 33 credits, critical literature review, can be completed in one year.
2. **Research Track:** 33 credits, research-based thesis, usually completed in two years.
3. **Athletic Training Track:** 30 credits, critical literature review, ½ time study and ½ time athletic training graduate assistantship, usually completed in two years.

At the time of acceptance into the MS program candidates are initially placed into either the Athletic Training Track or the Preclinical Accelerated Track. To be considered for the Research Track a candidate must identify a suitable topic and adviser in the department.

Students in the Preclinical Accelerated Track and Research Track take the same **core curriculum** (17 credits):

SPH BS 704 Intro to Biostatistics (3)

and

SAR HS750 Analysis of Physiological Literature (2 credits fall semester)

plus three of the following:

SAR HS 542 Exercise Physiology (4)

SAR HS 581 Gross Anatomy (4)

SAR HS 582 Neuroanatomy and Neurophysiology (4) (spring semester only)

SAR HS 575 Cardiopulmonary Pathophysiology (4) (spring semester only)

CAS BI 552 Molecular Biology I (4) (fall semester only)

CAS BI 553 Molecular Biology II (4) (spring semester only)

(Numbers in parentheses indicate the number of course credits in semester hours).

3. PRECLINICAL ACCELERATED TRACK

The curriculum for candidates in the Preclinical Accelerated Track must include 17 credits of the **core curriculum** (*see above or Appendix B*)

and

SAR HS493 Critical Literature Review

Students have the option of designing a program emphasizing *physiology or neurosciences*. This is reflected in the selection of 12 additional credits from either a basic or clinical area of specialization and/or electives, which may include departmental, college or university offerings which contribute to their educational objectives and career goals. In addition they will register for 4 credits of Critical Literature Review (SAR HS 793). (*See Appendix A through C for more complete information*).

Thus, the overall semester hour requirements for the Master's degree in Human Physiology for the student choosing the Coursework/Critical Literature Review Option may be summarized as follows:

Core Curriculum (17 credits) + Specialization & Electives (12 credits) + Critical Literature Review (4 credits) = 33 credit hours Total

4. RESEARCH TRACK

The curriculum for candidates in the Research Track must include 17 credits of the **core curriculum** (*see above or Appendix B*)

and

16 credits of SAR HS791 Directed Study and Research

The decision to pursue a thesis should be agreed upon by a faculty member who is willing to serve as the research adviser. A faculty member must agree to become the student's academic adviser and eventually first reader on the thesis. The academic adviser will assist the student in identifying a topic for thesis research. If the nature of the thesis project is such that an affiliation must be established with another laboratory or institution, arrangements between the Department of Health Sciences and the external investigator or facility must be completed prior to initiation of the research. These arrangements include agreement of the external investigator to participate in research supervision and serve as the second reader. Thesis projects based outside of the Department of Health Sciences must, however, be closely

related with the ongoing research program or expertise of at least one Health Sciences faculty member with a full time appointment. When this decision is finalized between the student and the faculty member notification should be given to the department Chair so that the student's records can be updated. A candidate after successfully completing a thesis project must present it orally in a session open to the public.

- The thesis committee will consist of **two** members who are involved in and/or are knowledgeable about the thesis topic area. At least one of the advisers must be a full-time member of the departmental faculty.
- Candidates selecting the thesis option must include 16 credit hours of SAR HS 791 Directed Study and Research in their total of 33 semester hours.
- Required steps for completing a thesis:
 - 1) Plan project with adviser
 - 2) Thesis proposal meeting (with committee members)
 - 3) Data collection
 - 4) Data analysis
 - 5) Oral presentation
 - 6) Submission of written thesis

(See *Appendix D* for the MS Thesis grading rubric.)

- Mugar Library has published a guide for Dissertations and Theses (<http://library.bu.edu/theses>) These instructions should be carefully studied before initiating preparation of the thesis.

The overall semester hour requirements for the Master's degree in Human Physiology for the student choosing the Thesis Option may be summarized as follows:

Core Curriculum (17 credits) + Thesis (16 credits) = 33 credit hours Total

5. ATHLETIC TRAINING TRACK (FOR STUDENTS WITH GRADUATE ASSISTANTSHIPS IN BU'S ATHLETIC TRAINING SERVICES)

An athletic training track (MS-AT Track) within the masters in Human Physiology is available for those students wishing to enhance their credentials in athletic training. Note that applicants for this concentration must be eligible for a Massachusetts state athletic trainer license. In consultation with the advisor for MS-AT track students, Athletic Training Program Director, Sara Brown, students follow this curriculum (30 credits) (see also *Appendix B*):

Fall Year 1 (7 credits)

1. SPH BS704: Introduction to Biostatistics
2. SAR HS581: Gross Human Anatomy

Note: Students who have already completed a gross human anatomy course with cadaver lab will select either Cardipulmonary Pathophysiology (SAR HS575) or Neuroanatomy and Neurophysiology (SAR HS582) during Spring of Year 1 and substitute an **elective** this semester.

Spring Year 1 (7 credits)

1. SAR HP 572: Principles of Evidence-Based Practice (3)
2. Elective (see below)

Fall Year 2 (8 credits)

1. SAR AT672: Patient-Oriented Evidence for Athletic Trainers
2. Elective (see below)

Spring Year 2 (8 credits)

1. SAR HS793: Critical Literature Review
2. Elective (see below)

Note: Students in the MS-AT Track will register for 4 credits of Critical Literature Review (SAR HS 793) in their last semester. The student, in consultation with a mentor from the Athletic Training program, will write an in-depth review, analysis, and synthesis of a research-related topic of scientific and/or professional relevance (See *Appendix C* for complete details).

Electives (12 cr) 4 credits per semester

Electives should be selected from the following courses (12 credits total; all courses are 4 cr unless noted otherwise):

- SAR AT 630: Pharmacology (2 cr)
- SAR AT 631: Health Promotion and Wellness (2 cr)
- SAR AT 632: Health Care Management and Quality Improvement (2 cr)
- SAR HP532: Clinical Medicine II
- SAR HP565: Biomechanics of Human Movement
- SAR HS547: Exercise Physiology for Varied Populations
- SAR HS575: Cardiopulmonary Pathophysiology
- SAR HS582: Neuroanatomy and Neurophysiology
- SAR PT520: Functional Anatomy
- SAR PT634: Diagnostic Procedures for Rehabilitation Professionals
- SAR RS790: Teaching Skills

Total credit hours: 30 (Core Curriculum, including critical literature review: 18 credits + Electives: 12 credits)

FINANCIAL SUPPORT

Graduate assistantships which include a stipend and tuition waiver are available on a competitive basis. These positions have a separate application process, and applicants must have or be eligible for a Massachusetts athletic trainer license. For more information, please email athrn@bu.edu or call 617-353-2746.

VI. Doctor of Philosophy (Ph.D.) in Human Physiology

1. CURRICULUM, GRADE AND REGISTRATION REQUIREMENTS

Students admitted with a **bachelor's degree** must complete the equivalent of 63 credits; 19 credits of a core curriculum, 16 credits of specialization courses defined in consultation with the academic advisor, and at least 28 credits of research.

Those admitted with a **master's degree** must complete 33 credits; 17 credits from the core and specialization curriculum defined in consultation with the academic advisor and 16 credits of research (*These requirements are consistent with the Graduate School of Arts and Sciences at Boston University*). In both cases a minimum grade point average of 3.0 must be maintained. No more than 8 credits of any C+ grade will be acceptable for inclusion in the requirement.

A doctoral student must take a comprehensive examination at the end of formal coursework after which he/she is admitted to candidate status. A candidate must complete the dissertation and defend it orally before the department, college, and university faculty. A candidate must be a full time (full-time: 12-18 credit hours per semester or, for a teaching or research fellow, 8-12 semester hours per semester) student for a minimum of two consecutive semesters and complete the degree in 5 years (post master's) and 7 years (post-bachelor's).

All doctoral degree candidates must register continuously for academic credit (minimum: 0.5 credit hrs.) during the Fall and Spring semesters of each year. After registering each semester, contact Janet Turner (SAR Graduate Financial Aid: jmt98.bu.edu) to let her know that you have registered. She will then update your records. Failure to register will result in administrative withdrawal of the candidate and necessitate reapplication to the program. Degree candidates must be registered for academic credit or pay the continuing student fee during the final semester in which the dissertation defense is conducted. Leave of absence may be requested by petition for specified lengths of time provided an appropriate justification is presented. Such a petition should be formulated with the guidance of the advisor and the Academic Services Center (ASC) and subsequently addressed and presented to the Chair of the Department. Candidates must submit an Application for Graduation at least three months prior to the expected date of graduation. These can be obtained from the Academic Service Center (Room 207).

2. ACADEMIC ADVISOR

The PhD program in Human Physiology has been designed around a mentorship model to prepare individuals for careers as independent scientists – whether in academia or industry. You will begin your academic experience by assisting your faculty mentor with a specific inquiry. Over time as you gain experience you will identify your own related line of investigation to pursue for your dissertation. Students must commit to a full-time, consistent involvement in their mentor's research program. Your mentor serves as a professional role model throughout the program and will guide you in developing and achieving your professional and academic goals.

The primary advisor will either:

1. Have a full-time appointment as a member of the Department of Health Sciences *OR*
2. Have an adjunct or secondary appointment as a member of the Department of Health Sciences, in which case, a full-time department faculty member will serve as co-director of the dissertation and must serve on the committee.

3. PREPARATION BY THE CANDIDATE OF PROPOSED COURSE OF STUDY

By the end of the second semester of study each doctoral student, in consultation with his/her advisor, will develop a **proposed course of study** including learning goals and performance expectations (e.g., work schedule, responsibilities, supervision format, and required tasks), along with an agreed-upon timeline for the remainder of the formal coursework and dissertation research. Courses and dissertation credits should be indicated for each semester of the candidate's program. This will serve as an initial contract which will be reviewed and **updated annually** at the end of the Annual Dissertation Committee meeting based on committee input. The proposed course of study as well as the other requirements for the doctoral degree will be monitored by use of the Doctoral Checklist (*Appendix E*). Beginning in the 2nd year, it is recommended that the annual progress report be submitted **within one week** of the Annual Dissertation Committee meeting (see below), or no later than **November 30** of the year in which the meeting is held (*Appendix F: Ph.D. Annual Report*).

4. COMPREHENSIVE EXAMINATION REQUIREMENTS

The comprehensive examination is taken after coursework is completed, usually at the end of the second year of study. Any delays beyond this date must be agreed upon by the primary research advisor. The purpose of this exam is to test your ability to think independently and with depth and breadth about the major questions that you intend to pursue in the future. The steps for the comprehensive exam include:

- a. Selection of the examining committee
- b. Written exam
- c. Oral exam

a. Examining Committee

Four to six months before the comprehensive exam, the examination committee is selected. The advisor will suggest examiners with inputs from the candidate about the composition of the committee, which should consist of at least 3 faculty members and may include departmental faculty (at least 2, including the mentor or co-director), other University faculty, and individuals from other institutions, as appropriate. Each member should have expertise in at least one aspect of the proposed research and at least one member (often the committee Chair) who is not directly involved in the student's research. The committee Chair cannot be the primary mentor. Once decided upon, the committee membership should be submitted to the Program Director (schotlnd@bu.edu) for approval and inclusion in the student's record.

b. Written Exam

The written exam consists of a proposal in support of the student's proposed research in the form of an individual National Research Service Award (NRSA F31) training fellowship application. (n.b., while generally the exam is written to align with the proposed thesis work, as the research progresses, at the discretion of the thesis committee and mentor, the aims may change.)

The student completes the following sections of the NRSA fellowship application:

1. Project summary/Abstract
2. Specific Aims
3. Research Plan (including Significance, Innovation, and Approach)
4. Vertebrate Animal Welfare/Protection for Human Subjects (as appropriate)
5. Bibliography and References Cited

Information about the NRSA program *and* instructions for writing the grant can be found at:

<https://researchtraining.nih.gov/programs/fellowships/F31>

Guide for Grant Applications:
<http://deainfo.nci.nih.gov/extra/extdocs/gntapp.pdf#>

Abridged instructions for these sections from the SF424 (R&R) instruction set are provided in Appendix G: Comprehensive Exam Format for your convenience.

The written exam should be the student's own work. Mentors can give advice regarding research direction and help the student to think through their experiments, but mentors are not to edit the written document, as it is an exam. The written exam must be approved by the student's thesis mentor and distributed to all committee members at least **two weeks** prior to the oral exam. **Once the student passes the written exam, the oral defense takes place.**

c. Oral Exam

The oral exam is essentially a defense of the student's proposal. The student will be expected to present their hypotheses and demonstrate their ability to anticipate potential problems and probable methods of overcoming those obstacles. The student will also be expected to demonstrate competence developed from core coursework. The student is encouraged to ask their mentor for specific advice on how to prepare for the exam and the level of expertise they are expected to demonstrate. The exam will last approximately **1.5 hours**. Students make a **20-25 minute** PowerPoint presentation based on the written proposal that gives the context for the hypotheses, explains the experimental approach, and presents results of any pilot studies. A question and answer period with the examining committee follows the presentation. At the conclusion of the question and answer period, the committee will consider in private session the acceptability of the oral exam and, upon reaching a decision, meet with the candidate to present the decision of the committee. After the oral exam, the committee may require edits to improve the proposal, increasing its readiness for submission to NIH/NSF. If the oral exam is unsatisfactory, it may be repeated only once and only following approval of a written petition to the members of the Human Physiology Program. Disapproval by a **majority** of members will result in the candidate's termination from the program.

Upon successful completion of the oral exam, the committee must complete and sign the **Comprehensive Exam Approval Form** (see *Appendix H*). **Two weeks** prior to the oral exam, students must inform the HP Program Director (schotlnd@bu.edu) of the scheduling of the exam and identify the Qualifying Committee Chairperson. The Program Director will forward the **Comprehensive Examination Form** to the Chairperson, who will be instructed to return the completed form to the Program Director for processing.

Although the written comprehensive exam is not expected to be ready for submission to a funding agency at the time it is presented to the Qualifying Examination Committee, after receiving feedback from the committee as part of successfully passing the written and oral components of the examination, the student should be able to revise their proposal to apply for an NRSA (if deemed appropriate by both the student and their advisor).

To download application materials and read the most current information on the NRSA application, see <http://grants.nih.gov/grants/forms.htm>.

5. DOCTORAL DISSERTATION REQUIREMENTS

Candidates are strongly encouraged to begin preparation for their dissertation research as soon as possible after entering the PhD program. This preparation should include selecting a primary advisor, initiating laboratory work under the supervision of the advisor and reviewing the literature of original research in the subject area of the dissertation. For an overview of Sargent College Policies for Ph.D. Dissertations,

see *Appendix L* (n.b. in the case of conflicting information, the content of the Human Physiology Program Graduate Manual supersedes that of Sargent College Policies.)

Careful attention to planning each candidate's program, including formal coursework, independent study and dissertation research, will enable the candidate to meet the objective of having at least one original research paper **submitted** for publication in a peer-reviewed scientific journal prior to receiving the doctoral degree. The original research paper must be closely related in content area and be part of the series of dissertation research experiments designed by the candidate under the guidance of the advisor(s). In meeting the requirement for having at least one original research paper submitted for publication, it must be clear that the candidate was the primary person responsible for the research effort leading to the publications, i.e., they should be first author. Presentation at a regional or national professional meeting is encouraged.

The steps for completing your doctoral dissertation are as follow:

- a. Dissertation committee formed
- b. Annual dissertation committee meeting
- c. Final progress report
- d. Graduation application
- e. Abstract and oral defense scheduling
- f. Oral defense
- g. Timeline
- h. Steps in submission of dissertation

a. Dissertation Committee

After successfully completing the comprehensive exam, the student and his/her advisor form the dissertation committee. The dissertation committee may be composed of the same or different members as the comprehensive exam committee and may have either 4 or 5 members. The advisor is the first reader, and a second member serves as second reader. At least one committee member must be from outside the College (this member may or may not be a reader). The Chair of the dissertation committee cannot be involved in the student's research and cannot be the primary mentor or a reader.

b. Annual dissertation committee meeting

Every year the student schedules an annual meeting with their committee (3 members minimum). The student makes a short PowerPoint presentation demonstrating the prior year's accomplishments and the committee provides feedback. This meeting should last no more than an hour. It is recommended that the student submit their Annual Report (*Appendix F*) within **one week** of this meeting. In no case may it be turned in later than **November 30th** of the current year's annual dissertation committee meeting.

c. Final progress report

The last annual dissertation committee meeting takes the form of a formal Progress Report and serves as the equivalent to the proposal defense. Students schedule the final Progress Report once they have enough preliminary data to indicate that their Aims are sound and there is sufficient progress in their research direction for presentation and discussion. This is commonly during the fourth year in the program and at least one year before the final defense date. The student prepares a written outline of their dissertation indicating what each section is expected to contain in the end product. Findings in support of each section are summarized along with any publications or meeting abstracts that resulted from this work. The written document is given to the committee members **one week** before the student gives an oral presentation **to the committee**. This is followed by a formal committee meeting to discuss the student's progress and whether he/she is on target to finish.

Upon successful completion of the final Progress Report, the committee must complete and sign the **Final Progress Report Approval Form** (see *Appendix I*). **Two weeks** prior to the oral presentation, students must inform the HP Program Director (schotlnd@bu.edu) of the scheduling of the presentation. The Program Director will forward the **Final Progress Report Approval Form** to the major advisor, who will be instructed to return the completed form to the Program Director for inclusion in the student's file.

d. Graduation application

Students must submit their Sargent College Graduation Application by **the end of the semester prior to the planned graduation**. Students may not submit their dissertation unless a diploma application has been submitted to the Registrar by this deadline. The diploma application can be found here: <http://www.bu.edu/sargent/graduation-application/>

e. Abstract and oral exam scheduling

The abstract must be included with the dissertation manuscript that is circulated to all dissertation committee members **five weeks** before the scheduled oral dissertation defense. **At least two weeks prior to the oral defense** students must schedule their oral exam, submitting *Appendix J: Schedule of the Final Oral Defense*, to the HP Program Director (schotlnd@bu.edu).

f. Oral defense

On completion of the dissertation research and the preparation of the completed dissertation manuscript, the candidate must defend the dissertation orally in a session open to other faculty, students, the academic community and the public. The dissertation defense consists of a 45-50 minute summary presentation of the thesis project, including a statement of the problem and discussion of the conclusions. After the presentation 10-15 minutes will be allowed for open discussion and questions. This will be followed by a closed session for further discussion between the committee and candidate. It is in this private session that the student's ability to defend his/her dissertation research will be evaluated by challenges to aspects of their research. If the candidate's dissertation defense is unsatisfactory, it may be repeated only once and only following approval of a written petition to the members of the Human Physiology Program. Disapproval by a majority of members will result in the candidate's termination from the program. Successful defense of the dissertation will be recorded on the *Approval of Dissertation (Appendix K)*. The major advisor will turn in the completed form to the Program Director for inclusion in the student's file.

g. Timeline

To ensure adequate time for reading and revision, the following timeline **MUST** be followed. **After review and approval by the first reader**, the completed dissertation must be presented to the second reader **five weeks prior** to the scheduled oral defense. Within **two weeks** the document will be returned to the student for any requested revisions. The student has **one week** to incorporate these edits before returning the document to the entire committee **two weeks** prior to the scheduled oral defense. At this time the remaining committee members complete their review of the dissertation in preparation for the oral defense and subsequent committee meeting.

-5 weeks	-4 weeks	-3 weeks	-2 weeks	-1 week	Oral defense
Manuscript to 2 nd reader		Manuscript returned to student	Manuscript to committee		
		Abstract to committee and to Program Director			

h. **Steps for submission of dissertation:**

1. A candidate must be registered for the semester in which the degree requirements are completed and during the preceding semester. While conducting research on the dissertation project, the student should register for an appropriate number of credits for HS 905 - Dissertation Research. If satisfactory progress is made, the student receives a "J" grade for each semester or summer term so registered until the final presentation/defense is held and the dissertation is accepted by the candidate's committee. At this time, the academic advisor determines a letter grade commensurate with the quality of the project and this grade takes the place of all J-grades appearing on the student's record.
2. Mugar Library has published a guide for the writers of Dissertations and Theses. Proper formatting and other useful information concerning writing your dissertation is available at this link: <http://library.bu.edu/theses> which includes the *Guide for Writers of Theses and Dissertations*. These instructions should be carefully studied before initiating preparation of the dissertation. For the purposes of the BU Library and all other archival opportunities, the **name of the college** is *Sargent College of Health and Rehabilitation Sciences*.
3. Students may not submit their dissertation unless a diploma application has been submitted to the Registrar by this deadline. The diploma application can be found here: <http://www.bu.edu/sargent/graduation-application/>
4. To be eligible for the May commencement hooding ceremony:
 - a. The dissertation defense and public hearing must be scheduled at least **30 days prior to the Commencement date**.
 - b. After a successful defense, doctoral candidates are expected to complete their edits and submit a final document to the BU Library at least **one week** in advance of the Sargent Convocation date.
 - c. Only students who have successfully deposited their dissertation in the library will be permitted to participate in the hooding ceremony.
 - d. At the same time that the dissertation is submitted to the BU Library, the *Approval of Dissertation (Appendix K)*, which has been approved and signed by the dissertation committee, is submitted to Sharon Sankey, who registers the degree.

VII. Appendices

- A. GRADUATE COURSES FOR HUMAN PHYSIOLOGY PROGRAM
- B. M.S. CHECKLIST & DEGREE REQUIREMENTS
- C. M.S. CRITICAL LITERATURE REVIEW GUIDELINES & GRADING RUBRIC
- D. GRADING RUBRIC FOR MS THESIS OPTION
- E. PH.D. CHECKLIST & DEGREE REQUIREMENTS
- F. PH.D ANNUAL REPORT
- G. COMPREHENSIVE EXAM FORMAT
- H. COMPREHENSIVE EXAM APPROVAL FORM
- I. FINAL PROGRESS REPORT APPROVAL FORM
- J. SCHEDULING OF FINAL ORAL EXAM WITH ABSTRACT APPROVAL
- K. APPROVAL OF DISSERTATION
- L. SARGENT COLLEGE POLICIES FOR PH.D. DISSERTATIONS
- M. GUIDELINES FOR INDEPENDENT/DIRECTED STUDY OR RESEARCH
- N. CHILDBIRTH AND ADOPTION ACCOMMODATION FOR FULL-TIME PHD STUDENTS

APPENDIX A: GRADUATE COURSES IN HUMAN PHYSIOLOGY

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

HS542 – Exercise Physiology (4)	HS745 – Advanced Regional Anatomy (var. cr)
HS550 – Neural Systems (4) - <i>Spring</i>	HS755 – Readings in Neuroscience (4) - <i>Spring</i>
HS575 – Cardiopulmonary Pathophys (4) <i>Spring</i>	HS776 – Nutritional Epidemiology (4)
HS581 – Gross Anatomy (4)	HS791 – Ind/Dir Study/Thesis (4)
HS582 – Neuroanatomy/Neurophys (4) <i>Spring</i>	HS792 – Research Design (2)
HS710 – Graduate Affiliation (var. cr.)	HS793 – Critical Literature Review (0-4)
HS742 – Nutrition for Disease Prevention (4)	HS901 – Directed Study & Research (4)
HS547 – Ex. Phys. Varied Populations (4) <i>Spring</i>	HS905 – Dissertation Research

Note: For additional elective/specialization courses see other departments in Sargent College as well as other colleges within Boston University, e.g. the Graduate School of Arts and Sciences, Graduate School of Engineering, Medical School and School of Public Health. A copy of their catalogs is in the Health Sciences office (Room 443). A selection of offerings from these departments follows.

A Selection of Elective/Specialization Courses in Other Departments at Boston University

SAR HP565 Biomechanics	SAR PT520 Functional Anatomy
SAR HP771 Foundations of Motor Control	SAR HP782 Advanced Human Movement
CAS BB522 Molecular Biology Laboratory	CAS CN500 Computational Methods in Cognitive and Neural Systems
CAS BI525 Biology of Neurodegenerative Diseases	CAS BI556 Membrane Biochemistry and Cell Signaling
CAS BI560 Systems Biology	
GMS AN707 Neurobiology of Aging	GMS AN709 Neural Development and Plasticity
GMS AN716 Developmental Cognitive Neuroscience	GMS AN718 Methods in Neuroscience
GMS AN777 Fundamentals of Cellular and Molecular Neuroscience	GMS AN811 Cognitive Neuroscience
GRS CH621 - Biochemistry I	GRS CH622 - Biochemistry II
GRS BI655 Developmental Neurobiology	GMS AN702 Neurobiology of Learning & Memory
GRS BI755 Cellular and Systems Neuroscience	GRS BI756 Systems & Behavioral Neuroscience

APPENDIX B: M.S. CHECKLIST & DEGREE REQUIREMENTS

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

Name: _____ I.D.# _____ Adviser: _____
 Address (local): _____ Telephone: _____
 Address (permanent): _____ Telephone: _____

Thesis and Critical Literature Review Track Options:

Core Courses	Credit	Grade	Date	Substitute
SPH BS 704 Biostatistics	3			
SAR HS 750 Analysis of Physiological Literature (2 credits)	2			
plus three (3) of the following:				
SAR HS 542 Exercise Physiology	4			
SAR HS 581 Gross Human Anatomy	4			
SAR HS 582 Neuroanatomy/Neurophysiology	4			
SAR HS 575 Cardiopulmonary Pathophysiology	4			
CAS BI 552 Molecular Biology I	4			
CAS BI 553 Molecular Biology II	4			

Core courses 17 hrs

Thesis Option

	Credit	Grade	Date	Substitute
SAR HS 791:16 credits				

Total 33 hrs

Critical Literature Review Option

	Credit	Grade	Date	Substitute
SAR HS 793:4 credits				
Specialization & electives: 12 credits				

Total 33 hrs

- 1) Maximum 8 credits transfer from another educational institution
 - 2) No grade less than C will be counted toward the MS degree
 - 3) Students receiving 12 credits (3 grades) below C+ will be terminated from program
 - 4) Minimum GPA: 3.0 (B) for graduation
 - 5) Thesis track: 16 credits SAR HS 791 Directed Study/Research
 - 6) Critical Literature Review track: 4 credits SAR HS793 Critical Literature Review
 - 7) At least 16 of the 33 credits must be in courses offered by the program in Human Physiology
- Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

Name: _____ I.D.# _____ Adviser: _____

M.S. CHECKLIST & DEGREE REQUIREMENTS

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

Name: _____ I.D.# _____ Adviser: _____
 Address (local): _____ Telephone: _____
 Address (permanent): _____ Telephone: _____

MS Athletic Training Track Option:

Curriculum	Cr.	Grade	Date	Course #
Year 1 – Fall (7 credits)				
SPH BS704 Biostatistics	3			
SAR HS581 Gross Human Anatomy ¹	4			
Year 1 Spring (7 credits)				
SAR HP572 Principles of Evidence-Based Practice	3			
<i>Elective (select from list below)</i>	4			
Year 2 – Fall (8 credits)				
SAR AT672 Patient-Oriented Evidence for Athletic Trainers	4			
<i>Elective (select from list below)</i>	4			
Year 2 – Spring (8 credits)				
SAR HS793 Critical Literature Review; Spring ²	4			
<i>Elective (select from list below)</i>	4			
Total	30			

¹ Students who have already completed a gross human anatomy course with cadaver lab will select either Cardipulmonary Pathophysiology (SAR HS575) or Neuroanatomy and Neurophysiology (SAR HS582) during Spring of Year 1 and substitute an **elective** this semester.

² Students in the MS-AT Track will register for 4 credits of Critical Literature Review (SAR HS 793) in their last semester. The student, in consultation with a mentor from the Athletic Training program, will write an in-depth review, analysis, and synthesis of a research-related topic of scientific and/or professional relevance (See Appendix C for complete details).

Electives (12 cr) 4 credits per semester

Electives should be selected from the following courses (12 credits total; all courses are 4 cr unless noted otherwise):

- SAR AT 630: Pharmacology (2 cr)
- SAR AT 631: Health Promotion and Wellness (2 cr)
- SAR AT 632: Health Care Management and Quality Improvement (2 cr)
- SAR HP532: Clinical Medicine II
- SAR HP565: Biomechanics of Human Movement
- SAR HS547: Exercise Physiology for Varied Populations
- SAR HS575: Cardiopulmonary Pathophysiology
- SAR HS582: Neuroanatomy and Neurophysiology
- SAR PT520: Functional Anatomy
- SAR PT634: Diagnostic Procedures for Rehabilitation Professionals
- SAR RS790: Teaching Skills

Total credit hours: 30 (Core Curriculum, including critical literature review: 18 credits + Electives: 12 credits)

APPENDIX C: M.S. CRITICAL LITERATURE REVIEW GUIDELINES

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

SAR HS 793 Critical Literature Review in Human Physiology (4 credits), Sem I, II

I. Objective

Production of a critical literature review following the in-depth review, analysis, and synthesis of a research-related topic of scientific and / or professional relevance. The student, in consultation with the faculty member supervising his/her work, is responsible for development and completion of the paper.

II. Choosing your topic:

Make an appointment with the faculty member you will be working with on your review. Come prepared with ideas for your topic. Be prepared to discuss these with your professor, who can provide guidance on changing the scope and/or direction of your review, as necessary.

III. Conduct an initial literature search:

- A. Please see the following webpage for assistance in researching and writing your literature review <http://library.bu.edu/systematic-reviews-support>
- B. Prepare an outline or table of contents
- C. Make an appointment with your professor to review your initial outline or table of contents. He/she will make suggestions for areas that may need further background information (i.e., additional sources) or topics that are more tangential and need less attention.
- D. It is recommended that this appointment take place within the third week of the semester.

IV. Write your review:

- A. Based on your literature search, by the time you begin to write your review you should have a fairly good idea of how it is going to be organized and where you will end, i.e., your conclusions and recommendations for future research.
- B. Set up appointment dates to meet with your professor to review initial and 2nd drafts of your manuscript.
- C. The recommended date to turn in your completed manuscript (subject to negotiation with the faculty member supervising your work) is:
 - For Spring graduation: April 15
 - For Winter graduation: November 15

V. Organization of review:

A. Cover sheet: with paper title, your name & email

B. Abstract:

- Max 250 words
- Starting your paper by writing an initial draft of your abstract can be a good way to organize your manuscript, as it forces you to think through the organization of your paper. It is much easier to write when you know where you are headed!

C. Introduction:

- Introduce review topic.
- Establish context and significance.
- Preview organization of document.

D. Extensive Literature Review:

Your literature review must be comprehensive and up-to-date. Guide your reader through the review with appropriate headings and sub-headings. Feel free to use figures (properly cited) to clarify your review. Keeping your conclusions in mind should help guide your writing.

E. Summary and Conclusions:

Thoroughly but succinctly summarize your findings. As science is an ongoing process, your review will likely have revealed implications for suggested future research directions. Your conclusions should include your suggestions for future research.

F. References: Provide a bibliography of all references cited. References should be in a numbered list in which publications are in alphabetical order with respect to the first author's last name and should include all of the authors' last names and first and middle initials, the full title of the article or book cited, the standard abbreviation of the scientific journal, the volume number, first and last page numbers, and year of publication. Citations that are publicly available in a free, online format may include URLs or PMID numbers along with the full reference.

- a. To cite previous work, use numbers in parentheses in the text which correspond to those in the reference list.
- b. Use APA or another widely used reference format.

VI. Additional Information:

D. In addition to comprehensively addressing the specific requirements (as described previously), grading of the paper will include *evaluation of correct English grammar, spelling and syntax*.

E. One soft-bound, final copy must be submitted to the department and an electronic copy is also required for the adviser.

F. Successful completion of the Critical Literature Review requires the approval of the adviser, and/or other reviewers, if appropriate.

G. The Critical Literature Review will be graded as Pass or Fail.

H. You are expected to conduct yourself responsibly and professionally, communicating clearly with your professor, arranging meetings, completing tasks in the agreed upon time frame, etc.

I. Formatting Guideline:

- TIMES NEW ROMAN 12
- DOUBLE SPACED
- 1" MARGINS ON ALL SIDES
- PAGES NUMBERED ON BOTTOM
- COVER SHEET WITH PAPER # AND TITLE, DATE DUE, YOUR NAME & EMAIL
- 10-25 PAGES EXCLUSIVE OF COVER SHEET AND REFERENCES

Literature Review Grading Rubric

	EXCELLENT	GOOD	FAIR
ABSTRACT	4.5 – 5%	3.5 – 4.4%	0 – 3.4%
	<ul style="list-style-type: none"> • INCLUDES CONCISE REVIEW OF TOPIC. • CONCISELY SUMMARIZES CONCLUSIONS AND IMPLICATIONS. 	<ul style="list-style-type: none"> • INCLUDES CONCISE REVIEW OF TOPIC. • CONCLUSIONS & IMPLICATIONS WEAK OR LACKING CONTEXT. 	<ul style="list-style-type: none"> • MISSING ELEMENTS AND POORLY ORGANIZED. • CONCLUSIONS & IMPLICATIONS EITHER NOT INCLUDED OR WEAK.
INTRODUCTION	4.5 – 5%	3.5 – 4.4%	0 – 3.4%
	<ul style="list-style-type: none"> • STRONG INTRODUCTION TO REVIEW TOPIC. • CLEARLY ESTABLISHES CONTEXT AND SIGNIFICANCE. • CLEAR PREVIEW OF ORGANIZATION OF DOCUMENT. 	<ul style="list-style-type: none"> • INTRODUCES REVIEW TOPIC. • WEAK FORMULATION OF CONTEXT AND SIGNIFICANCE. • WEAK PREVIEW OF DOCUMENT ORGANIZATION. 	<ul style="list-style-type: none"> • WEAK INTRODUCTION TO REVIEW TOPIC. • LACKS CONTEXT AND/OR SIGNIFICANCE. • LACKS PREVIEW OF DOCUMENT ORGANIZATION.
LIT. REVIEW	49.5 – 55%	38.5 – 49.4%	0 – 38.4%
	<ul style="list-style-type: none"> • COMPREHENSIVE & ACCURATE REVIEW. • STRONG SYNTHESIS OF EXISTING KNOWLEDGE. CRITICALLY ANALYZES AND EVALUATES OTHERS' FINDINGS. 	<ul style="list-style-type: none"> • REVIEW STRONG, THOUGH MAY BE MISSING IMPORTANT ELEMENTS OR EMPHASIS MISPLACED. • ANALYSIS & EVALUATION OF EXISTING RESEARCH DEMONSTRATES LESS COMPETENCE WITH MATERIAL. 	<ul style="list-style-type: none"> • WEAK REVIEW THAT IS MISSING IMPORTANT ELEMENTS. • DEMONSTRATES POOR COMPREHENSION OF EXISTING RESEARCH.
SUMMARY	4.5 – 5%	3.5 – 4.4%	0 – 3.4%
	<ul style="list-style-type: none"> • SUMMARY IS COMPREHENSIVE AND SUCCINCT. • CONCLUSIONS AND IMPLICATIONS FOLLOW LOGICALLY FROM REVIEW. 	<ul style="list-style-type: none"> • SUMMARY IS COMPREHENSIVE AND SUCCINCT. • CONCLUSIONS AND IMPLICATIONS LESS OBVIOUSLY LOGICAL EXTENSIONS FROM REVIEW. 	<ul style="list-style-type: none"> • SUMMARY MISSING ELEMENTS AND POORLY ORGANIZED. • WEAK OR MISSING CONCLUSIONS AND ILLOGICAL OR MISSING IMPLICATIONS.
REFERENCES	4.5 – 5%	3.5 – 4.4%	0 – 3.4%
	<ul style="list-style-type: none"> • COMPREHENSIVE AND APPROPRIATE REFERENCES. • CORRECT CITATION METHOD IN MANUSCRIPT BODY. • CORRECTLY FORMATTED REFERENCE LIST. 	<ul style="list-style-type: none"> • MISSED SOME SIGNIFICANT REFERENCES; SOME INAPPROPRIATE REFERENCES INCLUDED. • CORRECT CITATION METHOD IN MANUSCRIPT BODY WITH SOME ERRORS. • CORRECTLY FORMATTED REFERENCE LIST WITH SOME ERRORS. 	<ul style="list-style-type: none"> • MISSING MANY SIGNIFICANT REFERENCES; MOST REFERENCES INAPPROPRIATE. • INCORRECT CITATION METHOD IN MANUSCRIPT BODY. • INCORRECTLY FORMATTED REFERENCE LIST.
FORMATTING	4.5 – 5%	3.5 – 4.4%	0 – 3.4%
	<ul style="list-style-type: none"> • CORRECTLY FOLLOWED ALL FORMATTING GUIDELINES. • TURNED IN AT AGREED UPON DEADLINES 	<ul style="list-style-type: none"> • DID NOT FOLLOW ALL FORMATTING GUIDELINES. • TURNED IN AT AGREED UPON DEADLINES 	<ul style="list-style-type: none"> • DID NOT FOLLOW ALL FORMATTING GUIDELINES. • TURNED IN LATE

PROFESSIONALISM	9 – 10%	7 – 9%	0 – 6.9%
	<ul style="list-style-type: none"> • TOOK INITIATIVE • MAINTAINED CLEAR LINES OF COMMUNICATION • TOOK RESPONSIBILITY FOR ACTIONS 	<ul style="list-style-type: none"> • USUALLY TOOK INITIATIVE • USUALLY MAINTAINED CLEAR LINES OF COMMUNICATION • TOOK RESPONSIBILITY FOR ACTIONS 	<ul style="list-style-type: none"> • RARELY TOOK INITIATIVE • RARELY MAINTAINED CLEAR LINES OF COMMUNICATION • RARELY TOOK RESPONSIBILITY FOR ACTIONS
WRITING	9 – 10%	7 – 9%	0 – 6.9%
	<ul style="list-style-type: none"> • ORGANIZATION IS EXCEPTIONALLY CLEAR. WRITING COHESIVE. 	<ul style="list-style-type: none"> • ORGANIZATION AND WRITING GOOD, THOUGH NOT EXCEPTIONAL. 	<ul style="list-style-type: none"> • POORLY ORGANIZED AND NOT WELL WRITTEN.
	90 – 100%	70 – 89%	0 – 69%

TOTAL SCORE MUST BE $\geq 70\%$ FOR PASS

APPENDIX D: GRADING RUBRIC FOR MS THESIS

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

Your thesis will be graded according to the following rubric:

Human Physiology MS Thesis Grading Rubric

	EXCELLENT	GOOD	FAIR
ABSTRACT	7.1 – 8%	6 – 7%	0 – 5.9%
	<ul style="list-style-type: none"> • STATES PURPOSE OF STUDY. • CONCISELY SUMMARIZES RESULTS, CONCLUSIONS AND INTERPRETATION. 	<ul style="list-style-type: none"> • STATES PURPOSE OF STUDY • SUMMARY IS WEAK OR LACKING CONTEXT. 	<ul style="list-style-type: none"> • MISSING OR UNCLEAR PURPOSE OF STUDY • SUMMARY IS WEAK AND LACKS CONTEXT.
BACKGROUND & SIGNIFICANCE	16.1 – 18%	12 – 16%	0 – 11.9%
	<ul style="list-style-type: none"> • CLEARLY ESTABLISHES RESEARCH QUESTION, CONTEXT AND SIGNIFICANCE. 	<ul style="list-style-type: none"> • RESEARCH QUESTION NOT CLEARLY STATED; WEAK CONTEXT AND SIGNIFICANCE. 	<ul style="list-style-type: none"> • RESEARCH QUESTION, CONTEXT AND/OR SIGNIFICANCE IS/ARE MISSING.
RESEARCH DESIGN & METHODS	16.1 – 18%	12 – 16%	0 – 11.9%
	<ul style="list-style-type: none"> • COMPREHENSIVE & ACCURATE DESCRIPTION OF RD & M. • REASONING BEHIND CHOICE OF METHODS & ANALYSIS CLEARLY EXPLAINED. 	<ul style="list-style-type: none"> • ADEQUATE DESCRIPTION OF RD & M • CHOICE OF METHODS & ANALYSIS NOT ALWAYS CLEARLY EXPLAINED. 	<ul style="list-style-type: none"> • WEAK DESCRIPTION OF RD & M • REASONING BEHIND CHOICE OF METHODS & ANALYSIS WEAK OR MISSING.
RESULTS & DISCUSSION	16.1 – 18%	12 – 16%	0 – 11.9%
	<ul style="list-style-type: none"> • CLEAR & LOGICAL PRESENTATION OF DATA. • CRITICALLY ANALYZES AND EVALUATES FINDINGS IN THE CONTEXT OF EXISTING LITERATURE. • DRAWS APPROPRIATE CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH. 	<ul style="list-style-type: none"> • DATA PRESENTATION ADEQUATE THOUGH SOMEWHAT LACKING IN CLARITY. • ANALYSIS AND EVALUATION OF FINDINGS LESS STRONGLY BASED IN EXISTING LITERATURE. • CONCLUSIONS & DIRECTIONS FOR FUTURE RESEARCH LESS OBVIOUSLY DERIVED FROM THESIS RESEARCH. 	<ul style="list-style-type: none"> • POOR PRESENTATION OF DATA. • WEAK ANALYSIS OF FINDINGS IN CONTEXT OF EXISTING LITERATURE. • INAPPROPRIATE OR MISSING CONCLUSIONS; ILLOGICAL OR MISSING IMPLICATIONS.

WRITING	9.1 – 10%	8 – 9%	0 – 7.9%
	<ul style="list-style-type: none"> • ORGANIZATION IS EXCEPTIONALLY CLEAR. WRITING COHESIVE. 	<ul style="list-style-type: none"> • ORGANIZATION AND WRITING GOOD, THOUGH NOT EXCEPTIONAL. 	<ul style="list-style-type: none"> • POORLY ORGANIZED AND NOT WELL WRITTEN.
PROFESSIONALISM	9.1 – 10%	8 – 9%	0 – 7.9%
	<ul style="list-style-type: none"> • TOOK INITIATIVE • MAINTAINED CLEAR LINES OF COMMUNICATION • TOOK RESPONSIBILITY FOR ACTIONS 	<ul style="list-style-type: none"> • USUALLY TOOK INITIATIVE • USUALLY MAINTAINED CLEAR LINES OF COMMUNICATION • TOOK RESPONSIBILITY FOR ACTIONS 	<ul style="list-style-type: none"> • RARELY TOOK INITIATIVE • RARELY MAINTAINED CLEAR LINES OF COMMUNICATION • RARELY TOOK RESPONSIBILITY FOR ACTIONS
ORAL PRESENTATION	16.1 – 18%	12 – 16%	0 – 11.9%
	<ul style="list-style-type: none"> • PREPARED, POISED AND CONFIDENT • TALK WELL-STRUCTURED TO ENHANCE AUDIENCE COMPREHENSION • RESPONDS PROMPTLY AND APPROPRIATELY TO QUESTIONS 	<ul style="list-style-type: none"> • SOMEWHAT LACKING PREPARATION OR CONFIDENCE • TALK FAIRLY-WELL ORGANIZED • DIFFICULTY RESPONDING TO SOME QUESTIONS. 	<ul style="list-style-type: none"> • CLEARLY LACKED PREPARATION & CONFIDENCE/POISE • POORLY ORGANIZED TALK THAT CONFUSES AUDIENCE • CAN'T ANSWER MOST QUESTIONS
TOTAL	90 – 100%	70 – 89%	0 – 69%

* See: <http://library.bu.edu/theses> for correct formatting

Total score must be >70% for pass

APPENDIX E: PH.D. CHECKLIST AND DEGREE REQUIREMENTS

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

Checklist & Degree Requirements

Name: _____ I.D.# _____ Advisor: _____

Address (local): _____ Telephone: _____

Master's Degree _____

Hrs Transferred _____

Core Courses	Post BA/BS		Post MA/MS		Transfer/ Substitute
	Credits	Date Taken	Credits	Date Taken	
SPH BS 704 Biostatistics	3		3*		
SAR HS 750 Analysis of Physiological Literature	4		2		
plus three (3) of the following:					
SAR HS 542 Exercise Physiology	4		4		
SAR HS 581 Gross Human Anatomy	4		4		
SAR HS 582 Neuroanatomy/Neurophysiology	4		4		
SAR HS 575 Cardiopulmonary Pathophysiology	4		4		
CAS BI 552 Molecular Biology I	4		4		
CAS BI 553 Molecular Biology II	4		4		
Core (credits)	19		17		
Specialization (credits)	16				
Research (credits)	28		16		
TOTAL	63		33		

*or evidence of prior accomplishment

Electives / Specialization

Course	When Taken	Grade	Credits	Comments

Research (SAR HS 905)

Course	When Taken	Grade	Credits	Comments

Planned Comprehensive Exam Date: _____

Pass _____ Fail _____ Date _____

Planned Proposal Defense Date: _____

Pass _____ Fail _____ Date _____

Planned Dissertation Defense Date: _____

Pass _____ Fail _____ Date _____

Goals & Expectations

Year 1:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

Year 2:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

Year 3:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

Year 4:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

Year 5:

Learning goals:

Performance expectations/required tasks (work schedule, responsibilities, supervision format):

APPENDIX F: ANNUAL REPORT

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

Period covered: academic year '16/17

Name	E:mail
ID	Major Professor
Date of Dept. Entry:	Committee Members*
Qualifying Exam Date:	
Last OR Next Scheduled Committee Meeting Date:	

*Please indicate department if other than Health Sciences;
Leave blank if committee not yet formed.

Course Work '16/17

Attach a copy of your transcript from the Student Link

Total Number of Credits to Date:
 Course credits completed + _____
 Research credits completed + _____
 Current + _____
 Total = _____
 GPA _____

Teaching Activities '16/17

Year/Semester	Course Title	Instructor	# Students	Duties (be specific)

Support (TF's, Grants, Research, etc.) '16/17

Year/Semester	Type of Support, e.g., Full- or Half-TF, RA (grant support)

Grants/Fellowships applied for this period
 Indicate whether funded or not and type of support received

Funded (Y/N)	Title/Agency	Type

Publications '16/17

Please give COMPLETE information

Papers Presented at Meetings or Seminars '16/17

Include date, meeting and reference information if published.

*Also list meetings even if no paper was presented.

Research Activity - Abstract of Thesis Research Project
Include objectives, general methods and significance

Summary of Research Completed to Date
(Indicate specific progress during the past year)

Recommendations from last committee meeting and research goals for the next calendar year:

Major Professor's Assessment of Progress

Please include comments relevant to overall progress toward thesis project, specific progress over the last year, significant achievements and results of the last thesis committee meeting. Any other comments are helpful and are appreciated.

Major Professor's Signature and Date _____

Reviewed by the Graduate Committee on _____

Initials: _____

Initials: _____

Initials: _____

Initials: _____

Student acknowledgment of major professor's assessment:

_____ Name
Date

APPENDIX G: COMPREHENSIVE EXAM FORMAT

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

Instructions. The proposal should follow the format of a formal NRSA (F31) research grant proposal. For more complete instructions see:

Quick Guide for Grant Applications:

<http://deainfo.nci.nih.gov/extra/extdocs/gntapp.pdf#>

The full application can be found at:

<https://researchtraining.nih.gov/programs/fellowships/F31>

1. <i>Title of Investigation</i>	Title should be descriptive of research investigation and developed in consultation with the advisor
2. <i>Project Summary/Abstract</i>	This section concisely describes every major aspect of the project, including: 1) brief background; 2) specific aims, objectives, or hypotheses; 3) significance and relevance to public health; 4) unique features and innovation; 5) methodology; 6) expected results; and 6) description of how your results will affect other research areas. No longer than 30 lines of text.
3. <i>Specific Aims</i>	Generally, the Specific Aims section should begin with a brief narrative describing the long-term goals or objectives of the research project and the hypothesis to be tested. This is followed by a numbered list of the Aims. State concisely the goals of the proposed research and summarize the expected outcome(s), including potential impact on the field of research. List specific objectives of the proposed research, for example, to test a stated hypothesis, create a novel design, solve a specific problem, challenge an existing paradigm or clinical practice, address a critical barrier to progress in the field, or develop new technology. One page is recommended.
<i>Research Plan</i> The Research Strategy/Plan is organized into three sections: Significance, Innovation, and Approach. For an application with multiple Specific Aims, the applicant may address Significance, Innovation and Approach for each Specific Aim individually, or address Significance, Innovation and Approach for all of the Specific Aims collectively.	
4. <i>Significance</i>	This is the rationale for your project. Critically evaluate existing knowledge, and specifically identify the gaps that the project is intended to fill. Does the project address an important problem or a critical barrier to progress in the field? If the aims of the project are achieved, how will scientific knowledge, technical capability, and/or clinical practice be improved? How will successful completion of the aims change the concepts,

	<p>methods, technologies, treatments, services, or preventative interventions that drive this field?</p> <p>One to two pages.</p>
5. <i>Innovation</i>	<p>Explain how the application challenges and seeks to shift current research or clinical practice paradigms. Describe novel theoretical concepts, approaches or methodologies, instrumentation, or interventions and any advantages they have over current paradigms. Explain any refinements, improvements, or new applications of theoretical concepts, approaches or methodologies, instrumentation, or interventions.</p> <p>One half to one page.</p>
6. <i>Approach</i>	<p>The purpose of the approach section is to describe how the research will be carried out. Number the sections to correspond with the Specific Aims. Describe the research design conceptual or clinical framework, procedures, and analyses to be used to accomplish the specific aims of the project. Include PI's preliminary studies, data, and experience relevant to the application and experimental design. Describe how the data will be collected, analyzed, and interpreted; any new methodology and its advantage over existing methodologies; any novel concepts, approaches, tools, or technologies for the proposed studies. Discuss the potential difficulties and limitations of the proposed procedures and alternative approaches to achieve the aims. As part of this section, provide a tentative sequence or timetable for the project.</p> <p>Nine to ten pages.</p>
7. <i>Vertebrate animals</i>	<p>This purpose of this section describing the use of vertebrate animals is to ensure the humane treatment of live animals involved in the proposed research. It should be a concise, complete description of the animals and proposed procedures that addresses the following five points:</p> <ol style="list-style-type: none"> 1. Provide a detailed description of the proposed use of animals in the work outlined in the Research Strategy section. Identify species, strains, ages, sex, and numbers of animals to be used in the proposed work. 2. Justify the use of animals, choice of species, and numbers to be used. If animals are in short supply, costly, or to be used in large numbers, provide an additional rationale for their selection and numbers. 3. Provide information on the veterinary care of the animals. 4. Describe procedures for ensuring that discomfort, distress, pain, and injury will be limited to that which is unavoidable in the conduct of scientifically sound research. Describe the use of analgesic, anesthetic, and tranquilizing

	<p>drugs, and or comfortable restraining devices, where appropriate, to minimize discomfort, distress, pain, and injury.</p> <p>5. Describe method of euthanasia and the reasons for its selection. State whether this method is consistent with the recommendations of the American Veterinary Medical Association Guidelines on Euthanasia. If not, include a scientific justification for not following the recommendations.</p>
<p>8. <i>Bibliography and References Cited</i></p>	<p>Provide a bibliography of any references cited in the Research Plan. Each reference must include the names of all authors (in the same sequence in which they appear in the publication), the article and journal title, book title, volume number, page numbers, and year of publication. Make sure that only bibliographic citations are included. Be especially careful to follow scholarly practices in providing citations for source materials relied upon when preparing any section of the application.</p>

Formatting

Font

- Arial, Helvetica, Palatino Linotype, or Georgia typeface, black font color, and font size of 11 points or larger. (A Symbol font may be used to insert Greek letters of special characters; font size requirement applies.)
- Type density must be no more than 15 characters per inch.
- Type may be no more than six lines per inch.

Paper size and page margins

- Use standard paper (8 ½ x 11)
- Use at least ½” margins (top, bottom, left, and right) for all pages. No information should appear in the margins, including the PI’s name and page numbers.

Page formatting

- For ease of reviewing, use only standard, single-column format for the text.
- Figures, graphs, diagrams, charts, tables, figure legends, and footnotes
- You may use a smaller type size but it must be in a black font color, readily legible, and follow the font typeface requirement. Color can be used in figures. However, all text must be in a black font color, clear, and legible.

Grantsmanship

Use English and avoid jargon. If terms are not universally known, spell out the term the first time it is used and note the appropriate abbreviation in parentheses. The abbreviation may be used thereafter

References Cited

References should be in a numbered list in which publications are in alphabetical order with respect to the first author's last name and should include all of the authors’ last names and first and middle initials, the full title of the article or book cited, the standard abbreviation of the scientific journal, the volume number, first and last page numbers, and year of publication. When citing articles that fall under the Public Access Policy, provide the NIH Manuscript Submission reference number (e.g.,

NIHMS97531) or the PubMed Central (PMC) reference number (e.g., PMCID234567) for each article. Citations that are not covered by the Public Access Policy, but are publicly available in a free, online format may include URLs or PMCID numbers along with the full reference.

To cite previous work, use numbers in parentheses in the text which correspond to those in the reference list.

APPENDIX J: SCHEDULING OF THE FINAL ORAL DEFENSE

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

Candidate: _____ Advisor: _____

Title of Dissertation: _____

Committee Member Information:

1st reader: _____

Name Title Email

2nd Reader: _____

Name Title Email

Committee Chair: _____

Name Title Email

Additional Members:

Name Title Email

Name Title Email

Name Title Email

Required signatures	Scheduling information
Advisor: _____	Date of Defense: _____
Program Director: _____	Time: _____
	Location: _____

This form should be placed in candidate's file.

APPENDIX K: APPROVAL OF DISSERTATION

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

The final copy of the dissertation must adhere to the formatting requirements of Mugar Library.

Submission to Mugar Library is required prior to graduation.

Date of dissertation hearing: _____

Name of PhD Candidate _____

Title of Dissertation _____

Dissertation is Approved with no changes required
 Approved with corrections (attach a list of needed corrections)
 Not Approved

Readers: Please sign if Dissertation is acceptable (minimum 3 signatures required).

1. _____ 3. _____

2. _____ 4. _____

5. _____

Note: Separate signatures are required for the approval page for the library copies.

Date _____
Dissertation Committee Chair's Signature

Date _____
PhD Candidate's Signature

Approval form submitted to PhD Program Director on _____ *date*

PhD in HP Program Director's Signature: _____

APPENDIX L: SARGENT COLLEGE POLICIES FOR PH.D. DISSERTATIONS

General guidelines for the dissertation defense:

- All students who plan to receive a research doctoral degree (Ph.D.) must complete a dissertation and present a public seminar about their work.
- It is expected that the committee will require the student to submit a final draft for their review at least 2 weeks ahead of time to ensure that a complete and high-quality document is available for the faculty to review prior to the defense.
- Preparation of the dissertation must follow all applicable guidelines in the Sargent College Academic Conduct Code as well as the scholarly standards of the student's specific research interest.
- A doctoral dissertation defense can be held during the summer months if all members of the committee agree to attend. A public seminar must still be scheduled and announced to the Sargent community.
- Please see <http://library.bu.edu/theses> for further details about the Boston University Library procedures for dissertations. For the purposes of the BU Library and all other archival opportunities, the **name of the college** is Sargent College of Health and Rehabilitation Sciences.

Participation in the May Hooding Ceremony:

- To be eligible for the May commencement ceremony, the dissertation defense and public hearing must be scheduled at least 30 days prior to the Commencement date. At an absolute minimum, if the student is planning to receive a doctoral hood in the May ceremony, the dissertation draft must be completed by 3/30.
- After a successful defense, doctoral candidates are expected to complete their edits and submit a final document to the BU Library at least one week in advance of the Sargent Convocation date.
- Only students who have successfully deposited their dissertation in the library will be permitted to participate in the hooding ceremony.

Registration and graduation form requirements:

- Students must maintain continuous registration during their doctoral studies. Specific requirements for credits can vary by department but the minimum expectation is for the student to be registered for 0.5 credits with his/her dissertation advisor.
- Doctoral students must complete the Sargent College Graduation Application by February 1st to be included in the Boston University Commencement Program and by April 1st to be listed in the Sargent College Convocation program.

APPENDIX M: GUIDELINES FOR INDEPENDENT/DIRECTED STUDY OR RESEARCH

Programs in Human Physiology, Sargent College of Health and Rehabilitation Sciences

Introduction:

The primary goal of a directed study/research course or contract is to provide the student with an opportunity of working more closely with an experienced faculty member(s) or clinician(s). The experience to be gained through this arrangement is unlikely to be attained in the typical lecture/laboratory course offering. In order for this experience to be worthwhile to the student, faculty member, or the site supervisor they must come to agreement regarding the scope of the work to be completed. This is true whether it involves laboratory research, clinical experience, or pilot work leading to the master's thesis, or doctoral dissertation.

Independent Study/Research Policies and Procedures:

The following course numbers qualify as independent/directed study courses for graduate students:

HS 791 Directed Study and Research (MS)

HS 901 Directed Study and Research (PhD)

HS 905 Dissertation Research

- A. Prior to initiation of directed study/research in HS 791 or 901 the student must:
1. complete a **Declaration of Intent (Form DSR)** obtainable from the departmental secretary or adviser;
 2. discuss the project or directed study completely with the faculty member who is responsible for overseeing the project
 3. if a third party is involved, e.g. a clinician or researcher at another site, the project must be discussed with them and approved
 4. sign and obtain signatures from all parties involved
 5. return complete DSR form to adviser and one to departmental secretary for student's record
- B. If the research (HS 791, HS 905) is partial fulfillment of the requirements for the master's or doctoral degree the procedures for committee membership, proposals, progress reports, defense, etc., is found in another section of this Graduate manual. The above mentioned form (DSR) *is not* to be used in the case of direct thesis or dissertation research.

APPENDIX N: ADDITIONAL RESOURCES FOR GRADUATE STUDENTS

General resources: <https://www.bu.edu/grad/>

Cross-registration/ consortium: <https://www.bu.edu/reg/registration/consortia/>

Responsible conduct of research (RCR), CITI and IRB procedures:

<http://www.bu.edu/researchsupport/training-how-to/responsible-conduct-of-research-training/>

BU and Sargent research administration: <http://www.bu.edu/sargent/research/research-funding-administration/>

BU Sexual misconduct policy/Title IX: <http://www.bu.edu/safety/sexual-misconduct/reporting/>

Personal Counseling: <https://www.bu.edu/shs/behavioral-medicine/>

For PhD students only:

Scholarships, assistantships, loans and summer funding: <https://www.bu.edu/grad/funding/phd-funding/>

Childbirth/adoption accommodation: <http://www.bu.edu/academics/policies/childbirth-and-adoption-accommodation/>

Vacation policy: <https://www.bu.edu/academics/policies/vacation-policy-for-phd-students/>
<https://www.bu.edu/disability/accommodations/>