DEPARTMENT OF PHYSIOLOGY AND BIOPHYSICS GRADUATE DEGREE POLICIES AND PROGRAM

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Section I - Introduction and General Information

1. Faculty of Graduate Studies

Graduate programs at Dalhousie University are controlled by the Faculty of Graduate Studies. Students must obey all regulations and requirements of the Faculty. These are described in: "Faculty of Graduate Studies Manual on Policies, Governance and Procedures". Regulations of the Department of Physiology and Biophysics are in addition to those of the Faculty and apply to all departmental graduate programs.

2. Programs

The Department offers full-time graduate programs leading to M.Sc. and Ph.D. degrees in Physiology and Biophysics. It also offers a part-time M.Sc. program.

The M.Sc. program

The M.Sc. program provides students with a basic training in research in physiology and biophysics. Students graduating with the M.Sc. degree should be able to conduct supervised research or to enter Ph.D. programs in physiology or related disciplines. Graduates of the M.Sc. program will have demonstrated that they can:

- (a) Understand all areas of human physiology at the senior undergraduate level, and have a deeper understanding of specific areas studied in graduate courses and in thesis research
- (b) Present research seminars to scientific audiences
- (c) Perform research in a specialized area of physiology and/or biophysics
- (d) Deliver undergraduate and high school level lectures and tutorials

The Ph.D program

The Ph.D. program trains students to become competent independent researchers and capable teachers at the university level. Graduates of the Ph.D. program will have demonstrated that they can:

- (a) Conduct original research in physiology and/or biophysics
- (b) Publish their results in internationally recognized peer-reviewed journals
- (c) Present their work at national and international scientific meetings
- (d) Deliver undergraduate and graduate level lectures and tutorials

3. General Criteria for Admission

Students entering the graduate program from a B.Sc. degree normally enter the M.Sc. program. Transfer to the Ph.D. program may be made on completion of the M.Sc. degree, or students may opt to transfer directly after approximately one year in the M.Sc. program. In the case that the student wishes to transfer without completing the M.Sc., they must obtain the approval of their Supervisory Committee and the departmental Graduate Education Committee. Students entering with an M.Sc. degree in Physiology or a related discipline may be admitted directly to the Ph.D. program.

The M.Sc. program

Applicants should have a B.Sc. (Honours or equivalent) and a very good academic record. The minimum requirements are:

- (a) an overall average of B⁺
- (b) an average mark of at least A over the last 2 years of studies

Students who do not meet these criteria may be accepted as "special", "probationary" or "qualifying year" students (see Graduate Studies Calendar).

The Ph.D. program

Students will only be admitted who have a M.Sc. or equivalent degree in Physiology or a related discipline, or who have satisfied the Graduate Education Committee that their progress in all aspects of their program is of sufficient quality to merit a direct transfer to the Ph.D. program.

Section II - Admission Procedures

Deadline for Applications:

General Application Deadlines	Canadian Residents	Non-Canadian Residents
For September Admission	June 1 st	Apr 1st
For January Admission	Oct 31 st	Aug 31st
For May Admission	Feb 28 th	Dec 31st

1. Initial Processing

Application and enquiries are initially handled in the department office under the overall guidance of the Graduate Coordinator. A new file is established for each applicant and a copy maintained in the department office. Final admission of students into any graduate program is the responsibility of the Faculty of Graduate Studies. Recommendation to the Faculty of Graduate Studies can only be made by the Graduate Education Committee after reviewing a complete application file. The minimum for a complete file is:

- (a) A completed Faculty of Graduate Studies online application form: https://dalonline.dal.ca/PROD/bwskalog.P DispLoginNon
- (b) 2 original, sealed, transcripts of previous academic work
- (c) A minimum of 2 letters of reference from referees with knowledge of the applicant's academic background.
- (d) Evidence of proficiency in the English language. This may take the form of a degree from an English language university whose degrees are recognized by the Faculty of Graduate Studies. Alternatively, an official TOEFL certificate is also recognized. http://www.dal.ca/admissions/graduate/admission_requirements.html
- (e) 1 page document detailing previous research experience & current research interests.

2. Assessment

The Graduate Education Committee will meet to consider applicants with complete files. Files of students, who are potentially acceptable, will be circulated to suitable prospective supervisors, as selected by Graduate Education Committee. Students are strongly encouraged to identify /contact prospective supervisors in advance of applying to the program. If a potential supervisor has been identified, that individual should provide a brief letter to support the candidate's application.

3. Departmental Admission

Students will only be admitted when they are approved by the Graduate Education Committee and a faculty member has undertaken, in writing, to provide supervision. Supervisors must be regular, joint-appointed or cross-appointed members of the department who are also members of the Faculty of Graduate Studies. The letter from the supervisor to the Graduate Coordinator must contain an outline of the type of project that the student is likely to be performing and a clear statement of the financial support available to the student, and its minimum duration. Notice of any special conditions, uncertainties, or possible delays connected with this support must also be described.

4. Notification

When a prospective student is approved by the Graduate Education Committee, a letter of recommendation is sent by the Graduate Coordinator to the Faculty of Graduate Studies. Once the recommendation has been approved by the Faculty of Graduate Studies, the following documentation, listed below, is sent to the prospective student. The Graduate Coordinator will ensure that the documentation is sent immediately following admission, and that copies are placed in the student's file and are also sent to the supervisor:

- (a) A letter from the Graduate Coordinator advising that the applicant's admission has been approved by the Department and by the Faculty of Graduate Studies, and that the applicant should receive formal admission from the Registrar. The letter must also describe any further deadlines, conditions of admission, and details of the registration procedures.
- (b) A copy of the letter from the supervisor/co-supervisor to the Graduate Coordinator describing the project that the student is likely to be performing and the financial support available to the student (see 3 above), and that he or she will receive a formal offer of a scholarship from the Faculty of Graduate Studies.
- (c) A letter from the President (or delegate) of the departmental Graduate Student Society, welcoming the prospective student, and offering further assistance in providing information or answering questions about the social and cultural characteristics of the university and the city. A copy of the letter should be sent to the Graduate Coordinator.
- (d) A package from the departmental office giving details of the department's graduate programs (this document), the university graduate handbook, housing office information, and any other pertinent information.
- (e) For students who are not Canadian citizens or permanent residents, additional correspondence may be required for obtaining visas or other official documents. **This is the responsibility of the supervisor**. Copies of letters from the supervisor must be provided to the Graduate Coordinator for the inclusion in the student's file.

Section III - Program Regulations

1. The M.Sc. program

Students must complete formal course work, conduct original research, write a thesis, and defend the thesis.

Course requirements

- (a) Students must obtain at least 3.5 credits. The M.Sc. thesis is worth 2 credits, the remaining 1.5 credits must be earned by completion of appropriate courses.
- (b) Each student **must** register for and participate in **PHYL 5517X/Y** (Physiology & Biophysics Graduate Seminar course) each year that he/she is in the program. However, the half credit is earned only once. **It is only possible to register for this class in September**.
- (c) All students must present at least one departmental seminar during the course of their studies.
- (d) All students must select at least one of the following half credit courses as part of their remaining 1.0 credit requirements:

PHYL 5323.03	Human Physiology: The Mechanisms of Body Functions		
PHYL 5504.03	Advanced Topics in Respiration		
PHYL 5508.03	Directed Readings in Physiology & Biophysics		
5509.03	"	"	
5510.03	"	"	
PHYL 5513.03	Endocrine Physiolog	gy	
PHYL 5517.03	Physiology & Biophysics Graduate Seminar		
PHYL 5519.03	Molecular Physiology of Ion Channels		
PHYL 5608.06	Directed Readings in Physiology & Biophysics		
5609.06	"	"	
5610.06	"	"	
PHYL 5568.03	Cardiovascular Physiology		
PHYL 9000.00	M.Sc. Thesis		
PHYL 9530.00	Ph.D. Thesis		

- (e) All other courses must be approved by the supervisor/co-supervisor and the Supervisory Committee. Depending on the student's background and projected needs, he or she may be required by the Supervisory Committee to take more courses than the minimum 3.5 credits. Courses in excess of the minimum may be designated by the committee as "required" "ancillary" or "audit" (see Graduate Studies Calendar for further details on these categories and the minimum grades required)
- (f) As stated in section 6.6.5 of the Graduate Studies Calendar, students may not register for more than two Independent Study, Directed Readings or Special Topics classes in any graduate program. The Graduate Coordinator must approve registration to such courses.

In order to complete the class satisfactorily, a student must fulfill all the requirements as set down in the class outline provided by the instructor. By the end of the first week of class, the Independent Study / Directed Reading / Special Topics form (available in Word and PDF format at http://www.dal.ca/faculty/gradstudies/currentstudents/forms.html) must be Submitted to the Faculty of Graduate Studies in order to be placed in the student's file. Changes to the outline which affect assessment components, the weight of individual assessment components, or examination requirements with a value of ten percent or more must have the approval of the enrolled student(s) in order to be valid and must also be sent to the Faculty of Graduate Studies for the student file no later than four weeks after the beginning of the term in which the class is conducted.

When collaboration is included as part of class expectations as in group projects or group assignments, the instructor will provide in the class outline a statement of the degree of collaboration permitted in the preparation and submission of assignments.

(g) Once a final decision on courses has been made a Program Form should be filled out, by the student, detailing the selected courses. When the form has been completed and signed by the student and Supervisor, it is then submitted to the Graduate Coordinator for approval. Once approved, the Graduate Coordinator will then forward the form onto Graduate Studies. If there are any changes to courses throughout the program, a Program Update Form will need to be submitted to Graduate Studies detailing the changes. Both forms can be found by visiting: http://www.dal.ca/faculty/gradstudies/currentstudents/forms.html

2. The Ph.D. program

Students complete formal course work if deemed necessary by their supervisory committee, pass a Comprehensive Examination within 2 years of entering the PhD Programme, conduct original research, write a thesis, and defend the thesis.

Course requirements

There is no minimum number of credits. However, students must satisfy the following departmental requirements:

- (a) All students must take **5517X/Y** (Physiology and Biophysics Graduate Seminar). Each student must register for and participate in **PHYL 5517X/Y** each year. Students will be required to present a department seminar during the course of their studies.
- (b) Other course work may be required by the supervisory committee.

3. Mandatory Seminar Attendance

All Physiology & Biophysics graduate students are required to attend Department of Physiology & Biophysics seminars and special seminars over the course of the academic year. Attendance at these seminars allows students to develop breadth of knowledge in areas of physiology and / or biophysics research that may be outside their own area of interest.

4. Academic Standing

Students are required to obtain a minimum grade of B- in all courses. Failure to do so constitutes a failure and the automatic dismissal of the student from the program. However, under exceptional circumstances the department, with approval of the Supervisory Committee and the Graduate Education Committee, may consider an application to re-enter the program to re-take the failed course. Any student who subsequently fails a second course will be dismissed from the program with no possibility of re-entry.

5. Teaching Requirements

Teaching undergraduate physiology, in laboratories, tutorials, or reviews is considered an integral part of graduate training. All students will be expected to perform at least a minimum amount of undergraduate teaching, regardless of the source of their financial support. Teaching of undergraduates in tutorials and laboratories is paid by the department at rates established each academic year.

6. Recommended Program Sequences

PhD Program Outline: See Appendix I (pgs.16&17)

MSc Program Outline: See Appendix II (p.18)

7. Program Durations

Full-time programs

The Faculty of Graduate Studies sets maximum limits of 4 years and 6 years for M.Sc. and Ph.D. degrees respectively. These should be regarded as absolute program limits. The Department of Physiology and Biophysics will only request extensions beyond these times in exceptional circumstances

The part-time M.Sc. program

The Faculty of Graduate studies sets a maximum limit of seven years for a part-time M.Sc. Degree. However, the Department of Physiology and Biophysics requires that a part-time M.Sc. Degree program be completed in 5 years or less. Part-time students must complete at least one credit in each year until all required course work has been completed.

8. Annual Progress Report:

Every graduate student in the second year and beyond (M.Sc. and Ph.D.) is required to submit an Annual Progress Report to the Faculty of Graduate Studies. This report is due one month prior to the anniversary of the student's admission date, every year.

Students who have external funding administered by the university are required to submit annual progress reports one month in advance of the one year anniversary of the start date of their award. http://www.dal.ca/faculty/gradstudies/currentstudents/gsis.html

Section IV – Supervision

1. The Supervisor

- (a) Supervisors must be full-, joint-, or cross-appointed faculty members in the Department of Physiology and Biophysics. Their supervisory status must be approved by the Graduate Education Committee for each student supervised.
- (b) Supervisors are responsible for arranging financial support for the graduate students that they supervise. Graduate Students will each receive a stipend that will adhere to departmental guidelines. The stipend should be guaranteed in writing at the time of admission.

- (c) Supervisors must have active, funded research programs.
- (d) Supervisors must provide adequate research facilities for the student to perform their thesis research. This includes laboratory space, study space, equipment and supplies.
- (e) Supervisors must have a complete and thorough knowledge of their responsibilities to the Faculty of Graduate Studies, the Department, and to the student. The supervisor must be familiar with the requirements for graduate degrees offered in the Department, and be able to provide the direction and assistance required by the student to achieve these goals.
- (f) Supervisors must guide their students in the selection of research projects, establish a realistic timetable for the completion of each phase of the research, and allocate enough time to the student to provide suitable guidance.
- (g) Supervisors are responsible for ensuring that a suitable Supervisory Committee is set up, that it meets regularly, and that the appropriate examinations are scheduled. In making these arrangements, the student should always be fully informed.

2. The Supervisory Committee

- (a) A Supervisory Committee must be established for every graduate student. The committee should be set up as soon as the student is in the program. Thereafter, the committee must meet at least every **6 months**. Brief reports of each meeting must be provided to the student and placed in the student's file. These meetings must be held prior to **June 30th** of each year so that the student's Progress Report to Graduate Studies can be properly completed. Additional committee meetings may be requested by the student, the supervisor or the supervisory committee as required.
- (b) The Supervisory Committee consists of the supervisor/ co-supervisor plus at least 2 other faculty members. Either the supervisor or a co-supervisor must be a full or joint member of the Department of Physiology and Biophysics. At least 1 member of the committee, other than the supervisor or co-supervisor, must be a member of the Department of Physiology and Biophysics.
- (c) The composition of the Supervisory Committee must be approved by the Graduate Coordinator and by the Head of the Department.
- (d) Meetings of Supervisory Committees are chaired by the Graduate Coordinator or delegate.

2. Academic Integrity:

Students must be aware of policies, procedures and penalties for academic dishonesty and offenses. Infringement of these policies can result in dismissal from the program. Visit the Academic Integrity Website: http://academicintegrity.dal.ca/

University Regulations can be found in the Faculty of Graduate Studies, Calendar 2014/2015 website: http://gr.cal.dal.ca/UREG.htm

Tutorials are available on Dalhousie Libraries website: http://academicintegrity.dal.ca/

Section V – Funding Opportunities

Competitive stipends commensurate with the CIHR scale are available for outstanding applicants at the Masters, Doctoral and Post-doctoral levels.

- President's Awards
 - ❖ Students **entering** the PhD program with a full doctoral scholarship from NSERC, CIHR, or Killam are eligible to apply for the Dalhousie University President's Award. The Award will cover tuition fees (but not differential fees or other student fees) for up to the first two years of a students program.
- FGS Scholarships and Fellowships
- Bursaries
- Student Research and Conference Travel Grants
- External Funding

Section VI - Progression and Examinations

1. The M.Sc. Thesis Proposal

By the beginning of the second year, the student will present a thesis proposal to the Supervisory Committee. The proposal should outline the background to the research area, the work to be performed, possible outcomes, hypotheses to be tested and contingency plans. The student should provide an outline of the proposal to the committee members at least 2 weeks before the meeting, to allow them to read it thoroughly before they meet. The student should make a brief oral presentation to the committee and be prepared to discuss all aspects of the proposal with the committee. The purpose of the proposal is not to examine the student, but to ensure that a reasonable project is proposed and to offer advice and assistance to the student. At this time, the possibility of transferring directly to the Ph.D. program will be discussed. The committee will also advise the student of the criteria to be met and the probable timetable for entering and completing a Ph.D. program, if it were to be requested.

2. The M.Sc. Thesis Examination

- (a) The Examining Committee will contain at least 3 members of the Department of Physiology and Biophysics, of whom at least 1 must hold a full or joint appointment. This number may include the supervisor if he or she holds a full or joint appointment in the department.
- (b) The Examining Committee will contain at least 1 person whose primary appointment is with another department at Dalhousie University.
- (c) At least 1 member of the Examining Committee must be a person who is not on the student's supervisory committee.
- (d) The Chair of the committee will be the Graduate Coordinator, or delegate. The Chair must hold an appointment in the Department of Physiology and Biophysics and must be in a neutral position relative to the student, that is, not a member of the Supervisory Committee, and not having collaborated in any work that the student has performed.
- (e) The examination will commence with a public presentation of the research work, followed by questions from the Examining Committee and the audience. Finally, the Examining Committee will meet in camera to decide the examination result. A detailed description of examination procedures and possible outcomes is given in the Faculty of Graduate Studies manual.

Students who have received an offer to attend medical school must complete their MSc program requirements prior to commencing their medical studies in the fall. All students must have defended their thesis and submitted the final, corrected, electronic version of their thesis, to FGS by August 21st for October convocation. Failure to comply will result in forfeiture of placement in the medical programme. Please keep in mind that all deadlines are subject to change. It is the responsibility of students to verify deadlines on a yearly basis.

More information on degree requirements:

http://www.dal.ca/academics/academic calendars.html

Details on Theses and Defences:

http://www.dal.ca/faculty/gradstudies/currentstudents/thesesanddefences.html

3. Direct Transfer from the M.Sc. to the Ph.D. Program

Approval for a transfer to the Ph.D. program without completion of an M.Sc. requires separate approval by the M.Sc. supervisor, the Ph.D. supervisor (if different), the M.Sc. Supervisory Committee and the Graduate Education Committee. This will normally be considered at the start of the second year, but must be complete within 18 months of entering the M.Sc. Program. As a minimum the Graduate Education Committee will require evidence that satisfactory grades have been obtained in all course work, that any uncompleted required courses are in progress, that research work has been carried out that is suitable for publication in internationally recognized peer-reviewed journals, and that a suitable proposal for the Ph.D. thesis research has been made. The meeting to consider the transfer will normally hear the Ph.D. thesis proposal as well.

4. The Ph.D. Thesis Proposal

The structure of the Ph.D. thesis proposal meeting is the same as for the M.Sc. thesis proposal (see section VI 1). However, a significantly higher standard of investigation and quantity of research is expected for a Ph.D. degree. The Examining Committee should take this into account in reviewing the proposal.

5. The Comprehensive Examination

- (a) All Ph.D. students are required to pass a comprehensive examination in a subject relevant to their general field of research.
- (b) The rules for membership of the Examining Committee are identical to those for M.Sc. thesis examination.
- (c) The comprehensive examination must be held within 2 years of entering a Ph.D. program.

- (d) The purpose of the comprehensive examination is to test the student's knowledge of the discipline in which they are conducting research, including related areas of physiology and biophysics that the committee feels are relevant to the research. It is not an examination of knowledge in the entire fields of physiology and biophysics, but students must satisfy the committee that they have the ability to pursue and complete original research, and to understand the significance of their research within the broader context of physiological systems.
- (e) The comprehensive examination consists of (i) the preparation of a written paper, (ii) oral synopsis of the paper, and (iii) oral examination of the student on matters related to the topic of the paper. Students must satisfy the committee in all 3 areas in order to pass the examination.
- (f) The Supervisory Committee decides on the subject matter of the paper, in consultation with the student. The student must submit at least 3 topics related to, but not directly associated with, the thesis topic to their Supervisory Committee for consideration. The topic will be chosen by the student's Supervisory Committee, and must then be approved by the Graduate Education Committee. The topic cannot be changed without full agreement of both committees. The Supervisory Committee gives the student precise, written guidelines of the subject matter, length and format of the written paper, length and format of the oral presentation, and the expected length of the oral examination. The student will have 3 months to complete the comprehensive examination once the topic has been approved.
- (g) All members of the Examining Committee, including the Chair, may question the student. Examinations will typically last 2-3 hours. When all questions have been asked, the student will leave the room to allow the committee to reach a decision.
- (h) The examinations result may be a clear pass, a pass with supplemental reading and/or writing required, or a fail. The decision will be made by a simple majority vote. The Chair may not vote except to break a tie. Note that the Faculty of Graduate Studies regulations allow only 1 reexamination in the event of a fail, which occurs within 1 year of the initial examination.

6. Publication of Thesis Research

The Supervisory Committee will expect the majority of the thesis work to have been published, or submitted for publication, in reputable scientific journals, with the candidate appearing as the first author on at least 1 of the papers. As a guideline, Ph.D. students will normally be expected to publish at least 3 full-length papers from their thesis work.

7. The Ph.D. Thesis Examination

- (a) The Examining Committee will contain at least 3 members of the Department of Physiology and Biophysics, of whom at least 1 must hold a full or joint appointment. This number may include the supervisor.
- (b) The Examining Committee will contain at least 1 person whose primary appointment is with another department at Dalhousie.
- (c) The Examining Committee will obtain an External Examiner from outside Dalhousie University who must be approved by the Faculty of Graduate Studies.
- (d) Before the thesis is sent to the External Examiner, it must be examined by all Dalhousie University members of the Examining Committee, who must all notify the Graduate Coordinator in writing that, in their opinion, the thesis is acceptable for examination at a Ph.D. defence.
- (e) The examination will follow the rules and regulations of the Faculty of Graduate Studies and will follow a. similar overall format to M.Sc. thesis exam.

Details on Theses and Defences:

http://www.dal.ca/faculty/gradstudies/currentstudents/thesesanddefences.html

Section VII – Administration

1. The Graduate Coordinator

The Graduate Coordinator is elected by the Committee of the Whole for a three-year term. He or she is responsible for the overall operation of the graduate program and serves as Chair of the Graduate Education Committee. The role of the Graduate Coordinator is to oversee the day to day running of the graduate program. The Graduate Coordinator is the students' advocate providing fair and impartial advice with regard to their academic development. It is expected that the Graduate Coordinator will be available for consultation when needed. In the event that the Graduate Coordinator has graduate student(s) in the program, those student(s) will be assigned a member of the Graduate Education Committee to act as their advocate

2. The Graduate Education Committee

The Graduate Education Committee will consist of the Graduate Coordinator and at least 2 other full or joint appointed members of the Department of Physiology and Biophysics, plus 2 graduate students elected by the Graduate Student Society. Faculty members of the committee are elected by the committee of the whole for a three year term.

3. Physiology & Biophysics Graduate Students Society

The Graduate Student Society is comprised of all graduate students from the Department of Physiology & Biophysics. The main objectives of the association are to enhance the experience of students in the Physiology & Biophysics graduate program, and to encourage interactions between graduate students through social events or academic activities such as the annual Meet and Greet for new students and the annual Physiology & Biophysics Graduate Student Research Day. Two executive members of the Graduate Student Society sit on the Graduate Education Committee and participate in general department meetings.