THE UNIVERSITY OF BRITISH COLUMBIA

MEDICAL GENETICS GRADUATE PROGRAM

GUIDELINES FOR THE PHD COMPREHENSIVE EXAMINATION

I. OVERVIEW:

The student in the Medical Genetics Graduate Program who intends to advance to PhD candidacy is required to pass a comprehensive examination in human genetics. This oral examination is held after completion of all required coursework. It is intended to test the student's grasp of their field of study as a whole, as well as their ability to communicate their understanding of it.

II. PURPOSE OF THE EXAMINATION:

The purpose of the PhD comprehensive examination is to evaluate the candidate's knowledge of the areas of specialization relevant to their research project, and of general human genetics. The ability to reason and to integrate knowledge of the discipline related to the student's thesis project will be emphasized.

The exam is intended to determine whether the student has developed:

- Strong analytical, problem-solving and critical thinking abilities;
- Required breadth and in-depth knowledge of the discipline;
- Required academic background for the specific doctoral research to follow;
- Potential ability to conduct independent and original research; and
- Demonstrated ability to communicate knowledge of the discipline.

The comprehensive examination is intended to test the student's grasp of the chosen field of study as a whole, and the student's ability to communicate his or her understanding of it in English or French.

III. TIMING OF THE EXAMINATION:

MSc Student: who wishes to transfer from a Master's of Science to a doctoral program must have completed one year of study in the Master's program with a minimum 80% average in twelve credits, of which at least nine credits must be at the 500 level or above and at least nine credits must be at 80% or above. The student must show clear evidence of research ability.

The MSc student who has the approval of their Supervisory Committee may apply to the Medical Genetics Graduate Program to transfer from MSc to PhD studies within 20 months of registration in their program. **As a prerequisite for transfer, the student must successfully pass a PhD comprehensive examination.** The exam should be completed by **April 15th** of the following year for the student who enters their program in September; and **August 15th** of the following year for the student who enters their program in January. The MSc student who does not meet the appropriate deadline may be required to remain in their MSc program.

If the student is unsuccessful in the comprehensive exam, they will remain in the MSc program with no effect on eligibility for acceptance into PhD studies after completion of the MSc degree. The comprehensive exam is not required for any student completing their MSc degree.

PhD Student: entering directly into PhD studies should take the comprehensive exam by 20 months and no later than 24 months of initial registration in their program.

Eligibility for the Four Year Doctoral Fellowship (4YF):

The **MSc student** who transfers to the PhD program will be eligible for the departmental Four Year Fellowship (4YF) competition if they:

- Started their graduate program in September and have passed their PhD comprehensive exam no later than **April 15th** (20 months into their program).
- Started their graduate program in January, and have passed their PhD comprehensive exam by **August 15th** (20 months into their program).
- The incoming **PhD student** is considered for the 4YF at the time of admission to their program and therefore before they take the comprehensive exam.

IV. COMPREHENSIVE EXAMINATION REQUIREMENTS AND SCHEDULING:

The Research Supervisor must ensure that their student arranges for a Supervisory Committee meeting prior to scheduling the comprehensive examination; and that their student provides the following materials to the Medical Genetics Graduate Program:

MSc Student:

- A brief letter or email addressed to the Graduate Advisor requesting transfer from MSc to PhD studies. The letter should include the name of the student's Research Supervisor and the student's area of research.

MSc / PhD Student:

- A signed *Student's Supervisory Committee Meeting Form* from the student's Committee indicating its **approval of the thesis proposal**; and additionally for the **MSc student, approval to transfer from MSc to PhD studies.**
- A 3-5 sentence outline/abstract of the research proposal.
- Email above materials to Cheryl, Graduate Program Assistant (medical.genetics@ubc.ca).

It is the supervisor's responsibility to schedule their student's comprehensive examination. The general procedure is:

- Graduate Program Assistant forwards the student's transfer request (if applicable) and abstract to Graduate Advisor who will appoint a departmental Chair/Common Examiner and alternative Chair to the comprehensive exam. The supervisor, student, Chair and alternative Chair will be advised of these appointments by email.
- Supervisor emails Graduate Advisor, Dr. Matthew Lorincz (mlorincz@mail.ubc.ca), a list of proposed external examiners for approval.
- Student writes proposal and meets with their Supervisory Committee to discuss content.
- Supervisor schedules the examination for three hours (to ensure adequate time for questions and discussion); and advises Cheryl of exam details.
- Cheryl forwards examination forms to the Chair/Common Examiner.

Composition of the Examination Committee:

The Graduate Advisor must approve the composition of the Examination Committee. The Examination Committee is comprised of at least four faculty members, not including the supervisor, who is a non-voting observer. The majority of the examiners are to be from the Department of Medical Genetics:

- Two examiners are members of the Student's Supervisory Committee.
- The Chair/Common Examiner (the "Chair") is a Medical Genetics faculty member who has previously served as an examiner on eight or more comprehensive exams.
- The External Examiner can be either from the Department of Medical Genetics or from outside of it (but cannot be from the Student's Supervisory Committee).

Scope of the Examination:

The comprehensive examination will include an assessment of:

(i) The student's knowledge of basic scientific and genetic principles, and of the field of human genetics;

(ii) Detailed knowledge of the specific area of proposed research, based on a proposal following the format of a Canadian Institutes of Health Research operating grant.

Research Proposal:

At least three weeks before the examination, the student will deliver to the examiners a written research proposal (**EIGHT pages maximum, excluding references and figures**), including clear hypotheses, objectives, rationale, experimental details and data interpretation) following Canadian Institutes of Health Research (CIHR) operating grant proposal formatting guidelines. The research proposal should stand alone (i.e. it should contain all the information required to support your research plan and should contain a complete description of your project). References (format must include reference titles) and figures should be added as an addendum to the eight-page proposal.

Research Proposal Should Include:

- One-page (single-spaced) summary of the research proposal;
- List of ten keywords with a short (maximum half-page), non-technical abstract suitable for preparation of a press release;
- C/V module including:
  - Training and academic background (degrees, research projects);
  - Awards, scholarships, qualifications or credentials;
  - Publications (including abstracts, presentations).

Students are encouraged to obtain guidance from all examiners as to appropriate reading material to aid in preparation for the exam.

V. FORMAT OF THE EXAMINATION:

Approximately half of the examination will be focused on a general body of knowledge of human genetics including the content of the core Medical Genetics graduate courses. The other half of the examination will deal with topics related to the student's proposed research area. There will be emphasis on the candidate's ability to relate knowledge from the specific research area to more general areas of human genetics.

Core Concepts in Medical Genetics:

- Mendelian Inheritance and Complex Trait Genetics (including sex-linked, mitochondrial and multifactorial inheritance)
- Linkage Analysis (including linkage disequilibrium and polymorphisms)
- Differentiation and Development and Somatic Cell Genetics
- Genotype/Phenotype Correlations in Human Genetic Disease (including mutations and mutation detection, issues of heterogeneity, penetrance, and expressivity)
- Gene Structure/Protein Structure and Function (including gene-regulation and epigenetics)
- Bioinformatic Analysis
- Structure and Composition of the Human Genome
- Comparative Genetics and the use of model organisms
- Ethical issues in Genetics
- Gene Therapy

Examination Procedure:

- Chair asks the student to present a 10-20 minute summary of their research proposal.
- Chair next calls on each examiner to question the student for approximately 20 minutes. Generally, the Chair asks questions at the end of the round to ensure that the questioning is evenly distributed between general knowledge of human genetics and the student's specific research area.
- A second round of questions is usual before the Chair asks the supervisor if they have any questions. (Note: The supervisor acts as an observer and is not a voting examiner.)
- A third round is usually not required.

Examination Outcome:

- Student will be asked to leave the room and the Chair leads a discussion of the proposal and examination.
- Each examiner is to offer a brief opinion on the strengths/weaknesses of the proposal and the student's defence of it; and the supervisor is to give a brief statement about the student.
- Each examiner votes pass/fail (can be a paper or verbal vote).
- If the opinions are not unanimous, the Chair will make a decision in consultation with the Examination Committee and acceptable to the majority of the Committee.
- Chair will advise the candidate regarding the examination results.

- In the event of failure, the candidate will be informed of the reasons and will be asked to withdraw from the Graduate Program[1]. Under exceptional circumstances, a candidate showing deficiency in one specific area may be given a conditional pass, but required to pass an oral re-examination in that area or be required to pass (68%) a course covering that particular field. Subsequent examination or verification to be arranged by the Chair of the Examination Committee in consultation with the Medical Genetics Graduate Advisor.
- If student fails the examination, they can be allowed one retake of the exam if the Examination Committee recommends this at the time of the first examination. The Examination Committee will remain the same. It is also possible that the student will be asked to rewrite their proposal, be re-examined or meet other criteria to satisfy deficiencies in a subset of the exam material. If re-examination on any aspect is required, the Chair should note requirements on a time frame.
- Chair ensures Examination Committee signs appropriate forms; and emails scans of original forms to medical.genetics@ubc.ca.

Updated: December 18, 2019

[1] Except for the MSc student who has taken the comprehensive exam as part of the requirements for transfer to the PhD program and fails the comprehensive exam - they will then continue in their MSc program.