Medical Biophysics Graduate Program Regulations & Guidelines for the PhD Mid Level Comprehensive Examination

MIDDLE LEVEL KNOWLEDGE

This concerns a subject area complimentary to the examinee's research topic but not part of his/her doctoral research or written thesis. It denotes a broader scope of knowledge than needed for the thesis, and at the same time carries the message that the required grasp is comparable to what is expected of a good student at the end of a graduate or fourth year half course in that subject. PhD students need to demonstrate the ability to learn material on their own outside of the classroom environment. The subject area in which middle level knowledge is to be demonstrated must not be centered on the thesis area, but rather, usefully tangential to it. Because of their career goals, some students with the agreement of the advisory committee may choose subjects quite unrelated to the thesis area.
Examples would be:

(a) pulse pressure wave reflection in the aorta for a student whose research is on the tissue biomechanics of heart valves

(b) angiogenesis for a student whose research involves the stages of tumor metastasis prior to growth of a vascular supply

(c) the role of heat shock proteins in tolerance to cardiac ischemia for a student developing a new medical imaging techniques to evaluate the extent of tissue that can be rescued following a cardiac infarct

The student, supervisor, and the advisory committee will agree upon the subject for each particular student. The topic should broaden the student's background and better prepare him/her for their thesis defense.

EXAMINING MID LEVEL KNOWLEDGE

Examination of a student's middle level knowledge occurs by oral examination on one formal occasion. The student must demonstrate sufficient knowledge in a selected field to be able to understand and critique research articles in the selected field and ask insightful questions following a scientific presentation. The student, together with the advisory committee, will select the field that will be examined.

SCHEDULING THE MID LEVEL KNOWLEDGE EXAMINATION

In 2015, the Graduate Executive Committee made it mandatory to complete the mid-level examination before the end of the 8th term for candidates with a previous MSc and prior to the end of the 9th term of graduate enrollment (from beginning of enrollment in our graduate program) for all other PhD candidates. The mid-level examination must be successfully completed during these mandatory timeframes or the candidate will be declassified to MSc status. Declassification will trigger the loss of departmental stipend support and may trigger the loss of scholarship or funding from other sources.

THE PAPERS

The student, with the aid and approval of the advisory committee, must identify two key papers from the selected field and copies must be sent (electronically if possible) to the examination committee at least 2 weeks before the examination. Selected papers must also be approved by the Graduate Executive Committee representative participating in the examination (see **The Examiners** below). The selected field should complement or supplement the thesis research, but should not be a topic covered by the student's project. For example, one may choose a competing imaging technique that is not being used in his/her research but could be equally applicable as the field to be examined.

The selected papers will be either seminal papers in the field, or recent review articles that summarize the state-of-the-art. If there is a potential concern about the depth of background knowledge the student is required to demonstrate for the selected papers, this must be decided by the committee in discussion with the student when the topic is selected -- not during the mid-level examination. For example, if a paper is selected because of the technical developments described, but has a large clinical component, it should be decided ahead of time how much of the clinical material must be covered.

THE EXAMINERS

The examination panel for the mid-level examination will consist of:

- the student's advisory committee
- an expert in the selected field
- a representative of the Graduate Executive Committee who is not a member of the student's advisory committee and is not serving as the expert in the selected field.

The Graduate Executive Committee representative may, but is not expected to, ask questions and will participate as Chair for the meeting. The Graduate Executive Committee representative must not serve in any other role during the mid-level examination. That is, the Graduate Executive Committee member cannot be part of the student's advisory committee and cannot serve as the examiner who is the expert in the selected field. If one of the advisory committee members is an expert in the selected field, no external examiner need be invited. The members of the examining committee are responsible for reading the papers prior to the examination and attending with prepared questions on the selected papers.

EXAMINATION FORMAT

For the mid-level examination, the student must prepare a 20-minute talk that provides a forum for discussion of the papers. The examination committee along with the student will decide before the talk if questions can be asked during the talk or if they should be held until afterwards. The 20-minute duration is the approximate length of the talk if no questions were to be asked.

The presentation should include the following:

- the reasons for selecting the particular papers
- what are the important issues presented
- what are the limitations of the techniques or level of current knowledge
- what are the key take-home messages

The presentation should NOT be a simple summary of the selected papers. It is not acceptable to present a list of facts from the papers without interpretation of their significance and without placing them in context of the field of study. The student must be

prepared to defend any statements made during the presentation and demonstrate sufficient knowledge and understanding of the chosen field. The student must read extra material in order to answer the questions that will be asked during the oral examination, and material not specifically included in the papers may be presented in the talk for the purposes of clarification. The student is encouraged to approach the mid-level examination in the same manner as his/her oral defense. The presentation is not a standard 20-minute lecture and the questions of the examiners (if agreed upon prior to the talk) take precedence in guiding the direction of the discussion over the order of the slides. The examiners may ask the student to use the blackboard to sketch diagrams and answer questions from memory. Do not expect to use your slides as a "cheat sheet".

The examination will take approximately 90 minutes; questions may be asked during the presentation or following the presentation - the format will be settled on prior to the start of the examination. Please allow 2 hours when scheduling for the mid-level examination in order to ensure adequate time for evaluation of the student's performance and for summarizing the recommendations.

EVALUATION OF THE EXAMINATION

At the end of the mid-level examination, the student will be asked to leave the room, while the examiners evaluate the student's performance (strengths and weaknesses) and give advice for improvement. The examination panel should provide specific feedback on the ability of the student to answer questions in preparation for the oral thesis defense. This information must be outlined on the departmental form "Low and Mid-Level Comprehensive Form" which must completed by the supervisor. The completed form must be signed by all members of the committee and the student before submission to the department office.

The student must print out a copy of the form available on this URL:
http://www.schulich.uwo.ca/biophysics/docs/graduate/mid_level_comprehensive.pdf
and bring it to the examination.

NEGATIVE OUTCOME

If the performance is judged unsatisfactory, the reasons must be clearly stated on the form with suggestions for improvement, and a second attempt should be scheduled. If the performance is judged unsatisfactory during the second attempt, the student will be asked to withdraw from the graduate program. The decision by the mid-level examination committee to judge a performance as unsatisfactory will not be taken lightly. The committee will view unsatisfactory performance during the mid-level examination as equivalent to failure to successfully defend a doctoral thesis. The student may appeal the decision of the mid-level examination committee following the procedures listed on this URL:
http://www.schulich.uwo.ca/biophysics/graduate/current_students/policies_and_procedures.html

EXPERT LEVEL OF KNOWLEDGE is the student's expert knowledge within the area of his/her thesis.

The student's grasp of this level is tested by:

- regular discussions with their supervisor
- scheduled meetings with his/her advisory committee
- attendance and participation at seminars and scientific meetings
- the writing of scientific manuscripts
  (and in response to reviewers comments associated with those publications)
- finally at the oral examination of his/her PhD thesis

While the range of knowledge may be limited, the knowledge within that range is substantial and detailed. By this stage, the student will be the department's "expert" on the topic in question. Besides the specialized knowledge, students are expected to have a broader, but less detailed grasp of the knowledge context of their topic. This is the sort of knowledge involved in writing the introduction/review section of the thesis and likely to form the basis of questions during the thesis defense.