

**Medical Microbiology and Immunology**  
**Graduate Program Guidelines**  
**2016/2017**

(Please refer to the MMI website for updated versions in subsequent years.)



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Appendix 1—Forms

Rotation Evaluations of Supervisor

Rotation Evaluation of Student

Seminar Evaluation Form

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TA Evaluation Form

Candidacy Exam Report

Thesis Acceptability

Thesis Defense Report

MMI Student Information Web Page

Appendix 2—Exam/Thesis Instructions

MMI Instructions for Candidacy Examiners

Thesis Format for the Department

## **1. General Information**

The Department of Medical Microbiology and Immunology offers programs leading to the degrees of Master of Science and Doctor of Philosophy. Students may specialize in the following areas: bacteriology, immunology, and virology. Both programs require coursework, completion of a research project and preparation and successful defense of a thesis.

Staff members are currently carrying out research in various aspects of cellular, and molecular, immunology, virology and microbial pathogenesis and the development of novel methods for the diagnosis and treatment of infectious diseases.

### **1.1 Areas of Research and Resources**

Department members are drawn from specialists in the basic biomedical sciences of medical microbiology and immunology, applied clinical microbiology and infectious diseases. We also have members cross-appointed from other basic science departments (Biochemistry, Biological Sciences and Cell Biology) and from clinical divisions or departments (Medicine, Surgery, Nephrology, Oncology, Pediatrics, Obstetrics and Gynecology, Lab Medicine and Pathology and Pulmonary Medicine). Consequently, we provide an environment fostering fruitful cross-disciplinary interactions that enrich our graduate program. Major research funding comes from a variety of sources. Individual staff research laboratories are well-equipped for research. In addition, there is a Faculty of Medicine and Dentistry transmission and scanning electron microscopy lab and a Level 3 biocontainment laboratory for working with highly contagious or pathogenic pathogens. The department also has access to confocal microscopy and fluorescence-activated cell sorting facilities, as well as laboratory animal services within the Faculty of Medicine and Dentistry core facilities. The department's research laboratories are located on the 6<sup>th</sup> floor of the Katz Group/Rexall Centre and of the Heritage Medical Research Building (HMRC). A new Institute of Virology has also been established which is part of the East West Alliance, a global network of institutions funded by the Li Ka Shing Foundation to advance medical research and education, which is housed in the Katz Building and the Alberta Diabetes Institute (ADI) in HRIF East. Additional research facilities for clinical microbiology and infectious diseases are located in the Walter C. Mackenzie Health Sciences Centre, which also houses the John Scott Health Sciences Library with its extensive biomedical collection.

## 1.2 MMI Program at a Glance

<b>Year One</b>	<ul style="list-style-type: none"> <li>• Register in two courses in consultation with the supervisor or both rotating supervisors.</li> <li>• Attend mandatory 1 hour ethics training session as well as other sessions to work toward acquiring the required 8 hours of ethics training.</li> <li>• Register in MMI 501 winter term.</li> <li>• Rotating students must decide which lab to enter by December 31 or April 30 depending on the term in which they started the program.</li> <li>• Supervisory committee must be put in place.</li> <li>• Hold first supervisory committee meeting.</li> </ul>
<b>Year Two</b>	<ul style="list-style-type: none"> <li>• PhD students (and MSc students planning to change programs) will normally register in MMI 605 in Fall term.</li> <li>• 20 minute presentation to the department on research project.</li> <li>• MSc students should complete TA requirement, PhD students may do so.</li> <li>• MSc students must make the decision to change to the PhD program by the 18 month mark.</li> <li>• Hold second supervisory committee meeting.</li> <li>• Candidacy exams scheduled or taken by the 24 month mark.</li> <li>• Finish acquiring 8 hours of ethics training.</li> </ul>
<b>Year Three</b>	<ul style="list-style-type: none"> <li>• Complete TA requirement.</li> <li>• PhD students complete Candidacy Exam by the 30-month mark.</li> <li>• PhD students give mid-stream seminar.</li> <li>• Hold third supervisory committee meeting.</li> <li>• MSc students are expected to write-up and defend thesis.</li> <li>• PhD students must complete all program requirements</li> </ul>
<b>Year Four</b>	<ul style="list-style-type: none"> <li>• MSc students must complete their degrees.</li> </ul>
<b>Year Five</b>	<ul style="list-style-type: none"> <li>• PhD students should be completing their research and get approval to write the thesis</li> </ul>
<b>Year Six</b>	<ul style="list-style-type: none"> <li>• PhD students must complete their degrees.</li> </ul>

### 1.3 U of A deadlines

**This list provides a list of items with firm deadlines and key events. The precise dates change each year. The current online University of Alberta Calendar and FGSR website should be consulted for actual deadlines.**

#### September

Early	Classes Begin
Mid-month	Fall Registration deadline
End of Month	Fees Payment deadline
	Last day for submission of unbound theses to FGSR to ensure graduation at Fall Convocation

#### November

Mid to End	Fall Convocation
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#### January

First week	Classes begin
Mid-month	Winter Registration deadline
End of Month	Fees Payment deadline

#### February

	General Awards applications due
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#### April

Early	Last day for thesis submission to FGSR of programs to ensure graduation at Spring Convocation
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#### June

	Spring Convocation
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## 1.4 Major Scholarship Deadlines

The following are approximate deadlines for some of the most commonly applied-for scholarships in the department. This is not a complete list and students and supervisors are advised to familiarize themselves with other scholarship possibilities and check the deadlines as the exact deadlines change each year.

<b>Alberta Innovates Studentships:</b>	<b>~April 1</b>
CIHR and NSERC – Canadian Graduate Scholarship Master's	December 1
CIHR Doctoral Awards	October 1
<b>NSERC Doctoral Research awards</b>	<b>October (mid)</b>
<b>Fac. of Medicine and Dentistry 75<sup>th</sup> Anniversary and Recruitment awards</b>	<b>beginning of October</b>
<b>FGSR General awards</b>	<b>~ Feb 1</b> (must be ranked earlier)
<b>QEII and Miscellaneous UofA Awards</b>	<b>~June 1</b> (QEII's and nominations for other small U of A awards are decided internally)

## 2. Graduate Program Requirements

### 2.1 Rotations and Selection of a Supervisor

- The selection of a supervisor is made by mutual agreement between the student and staff member.
- The supervisor can be any faculty member with a primary appointment in MMI or a cross-appointed faculty who is permitted to supervise MMI graduate students.
- For more information on the qualifications and responsibilities of supervisors refer to section 4.1.
- Students may opt to go directly to one supervisor or rotate in with two different supervisors during the first term of their program.  
Rotations are for two months each. The student will perform experimental work in the form of a rotation project.
- Both the supervisor and the student are required to complete assessments at the end of the rotation period. The assessment of the student by the supervisor is provided to the Graduate Coordinator. The assessment of the rotation by the student is provided to the Chair of MMI.
- No faculty member is obligated to accept a student into their laboratory.
- Rotating students should have selected a supervisor to direct the thesis project by the end of the first term. In the unlikely event a match is not found through the rotations, *the supervisor does not have to be anyone with whom rotations were done.*
- A student must have a supervisor to remain in the program. Therefore, if a rotating student has not found a lab in which to carry out their project by the end of their first term, they may not continue in the program.

### 2.2 Development of the thesis project

- Once selection of a supervisor is made, the student will design their thesis project in consultation with the supervisor.
- The progress in the project is monitored throughout the program by the supervisor and the supervisory committee as outlined in Section 4.

### 2.3. Course and GPA Requirements

*Note: Students and supervisors should consult the recommended list of course posted on the MMI website when choosing their courses.*

MSc: MMI 501

two \*3 credit graduate level courses

(at least one of these should be directly in the area of the discipline of the degree)

PhD: MMI 501

MMI 605

two \*3 credit graduate level courses

- MMI 501 is a seminar format course that should be taken in the first year.
- MMI 605 should be taken in the fall term of the second year.
  - Additional information regarding MMI 605:

The following revisions to MMI 605 were passed at the March 2014 staff meeting.



To address concerns about the alignment of MMI 605 with preparations for a candidacy exam we propose the following revisions to MMI 605. These revisions will not affect the teaching element of 605, where faculty members present four classes on a topic of interest to them. Instead, these revisions are proposed as alternatives to the grant writing section of 605.

- At the start of the semester, the course coordinator will select a faculty mentor for each student enrolled in MMI 605. The mentor will be a full or cross-appointed member of MMI selected from the faculty teaching the course that year.
- The student will work closely with their mentor to identify successful strategies for preparing a grant application that meets NSERC discovery grant guidelines. The proposal will address an experimental question emerging from the topic covered by the mentor in the course that year. The mentor will pay particular attention to strategies for the identification of relevant questions; elaboration of pertinent background material; formulation of experiments; and interpretation of data.
- Midway through the semester, each student will give an oral presentation to the class (including the mentor) that provides a programmatic overview of their planned research proposal. The presentation will be no longer than six slides, with an emphasis on strategies to address the major questions. Other students are expected to actively contribute to discussions on the respective proposals and participation at this stage contributes to the final grades.
- Working with their mentor, the student will integrate feedback from the oral presentation into their planned research proposal. The student will then prepare a full research proposal according to NSERC guidelines. Supervisors should be aware of the demands on students' time during the writing of this proposal and modify their expectations in the lab accordingly.
- At the end of the semester, the proposal will be evaluated by the mentor in consultation with the course coordinator. Each student will meet with their mentor for feedback and assessment of their proposal.

### **2.3. Course and GPA Requirements continued**

- Course selection should be made in consultation with the supervisor or both potential supervisors in the case of rotating students
- Students in both programs are expected to maintain a GPA of 3.0 or more in these designated courses and in all courses taken for credit while in graduate school.
- Terminal MSc students are required to maintain a program GPA of at least 2.7; however, students wishing to proceed to a later PhD in the Department must maintain a program GPA of at least 3.0.
- Students are required to maintain a GPA of at least 3.0 in the PhD program.
- Students must obtain a minimum of a B- for a course to count towards their degree

### **2.4 Ethics Training**

All students are required to take a minimum of eight hours of ethics and academic integrity training as part of their graduate program.

Documentation of ethics training must be provided to the department.

*For many of the university run sessions this occurs automatically, but students are advised to follow up to ensure the department has received confirmation of their attendance.*

**One hour of ethics training is a MANDATORY session:** Introduction to Ethics and Personal Responsibility in the Lab (1 hour). Given by the Department of Biochemistry by Dr. Kristen Conn and Dr. Leo Spyropoulos,

The remaining 7 hours can be accrued by any combination of the following:

- \* Faculty of Medicine and Dentistry Ethics and Scientific Integrity (ESI) Day (5 hours)
- \* Part I – The Care and Use of Animals in Research, Teaching and Testing (1.5 hours)
- \* Ethics Online (Link: <http://www.gradstudies.ualberta.ca/degreesuperv/ethics/>) (5 hours)
- \* Online Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS) (Link: <http://www.pre.ethics.gc.ca/english/tutorial/>) (2 hours)
- \* Research Facilitation Offices provides various sessions intended to make up-to-date information available to the dynamic university research community. (Link: [http://www.rso.ualberta.ca/pdfs/RASS\\_2009\\_10.pdf](http://www.rso.ualberta.ca/pdfs/RASS_2009_10.pdf))
- \* Various seminars and workshops advertised through FGSR or FoMD that have been approved as ethics training.
- \* Other adhoc sessions can be approved by special request in writing to the Graduate Training Committee. Students are encouraged to talk to the Graduate Coordinator before formally making a request.

To gain credit for adhoc sessions where attendance is not automatically supplied to the Department, students must provide a 2-3 sentence reflection on the session. An example of a reflection can be found in the resources section of the MMI website.

## **2.5 Research Presentations**

Although these seminars are not given for credit, they are a requirement.

They are designed to help the student focus on how things are going in their work, gain experience giving scientific seminars and allow them to share their research progress with department.

This is also an opportunity for students to solicit feedback from the MMI community about how they might surmount research challenges.

### **2.5.1 Second Year Presentation**

At the beginning of the second year all students will give a 20 minute presentation on their research project. These seminars are scheduled by the Coordinator of MMI 501 in the Friday noon hours seminar slot. The seminars occur in September and October and two students are scheduled for each day.

### **2.5.2 The Midstream Seminar:**

All PhD students will give an hour-long seminar on their own research open to all members of the department at approximately the half-way point through their degree work.

These will be given in the MMI 501 timeslot, usually in the first term of the student's third year. The MMI 501 Coordinator will contact students to schedule these seminars.

The supervisor is required to enlist two additional faculty members to provide the student with feedback on the delivery of the seminar. The student is required to submit a form to the office indicating such feedback was received. The form is posted on the resources section of the MMI website.

## **2.6 Teaching Assistant (TA) Requirement**

MMI believes training in teaching is an important component of the education of graduate students. Therefore, MMI requires all MMI graduate students to serve as teaching assistants at least once. Students *may* serve as a TA in addition to the one required term, up to two units per term, but, this requires permission from their supervisor and it must not interfere with their work in the lab.

### **2.6.1 Timing of TA requirement**

- The TA requirement should be completed in the second or third year of the program.
- Students cannot TA in their first term and can do so only with permission from their supervisor during their second term.
- PhD students must be mindful of when they will be taking their candidacy exams so there is no time conflict.

### **2.6.2 Payment for serving as a Teaching Assistant**

- The FGSR mandates the pay rate and it depends on if the student is in an MSc or PhD program
- TAs are set up as 'teaching units'.
- A teaching unit is considered to be approximately 3 hours per week X 17 weeks (one term) @ around \$30 per hour. This does not include the time spent attending the lectures where required.
- Students are paid over and above the regular stipend for the required as well any additional times they serve as a TA.
- The 3 hours per week is an average and approximate--there may be intense work over a short period of time, fewer hours over two terms, or some other configuration needed for individual courses.
- The precise workload will vary depending on the course, but in order to make teaching assistantships relatively similar guidance is provided below for Course Instructors.

### **2.6.3 Expectations of TAs and Guidelines for Course Instructors employing TAs in MMI**

- Students and supervisors should discuss how the student's TAing requirement will impact on their research time in the lab before they begin TAing.
- Instructors have a responsibility to provide TAs with a meaningful teaching experience.
- Instructors must communicate expectations clearly before the beginning of the course,
- Instructors should give frequent feedback
- Instructors must provide a written evaluation for each TA at the end of the course (see form Appendix 1).
- TAs are expected to attend lectures, but these hours are not paid.

- Paid TA responsibilities include tutorial preparation, tutorial or lecture presentation time, and time spent answering student questions in person or by email and some marking although this should not be the primary duty.  
*Additional funds are available to instructors to cover heavy marking loads and they may hire the TA or other students for this function*

#### **2.6.4 Assignment of TAs to courses**

- The assignment of TAs to courses is generally done in the early summer by the Chair of the Education Committee
- Students will be asked their TAing preferences, and where possible, they will be matched with these.
- Where there is interest from several students in the same course, the coordinator will select the student they think would be best suited to TA.

### **2.7 Overview of Annual Supervisory Committee Meetings**

- See Sections 4.3 and 4.4 for information on the composition of the supervisory committee and the details of supervisory committee meetings.
- Students are required by FGSR policy to have at least one committee meeting per year.
- Meetings may be held more frequently if deemed necessary by the supervisor, supervisory committee or the student.
- These meetings can be initiated by either the student or the supervisor.
- To maintain good standing in the department students must receive a satisfactory rating at these meetings.

### **2.8 Elevation to the PhD program**

- If a student wishes to elevate from the MSc program to a PhD program the student must have permission from the supervisory committee to do so.
- The decision should be made within the first 18 months of a student entering the program.
- If the decision is not made by that time the student will be expected to complete an MSc first, although the student is welcome to enter the PhD program after the conclusion of the MSc.

### **2.9 Overview of Candidacy Exams and Thesis Defense**

In order to become a PhD candidate the student must pass the candidacy exam.

The candidacy exam is comprehensive and addresses the qualifications of the student in terms of their ability to pursue and complete original research at an advanced level.

The details of the Candidacy Examination process are found in section 5 of these guidelines.

#### **2.10 Extensions for completion of Program Requirements**

- The policies set by FGSR Council require PhD students to complete all program requirements by the end of the third year (including Candidacy Examination).

- In extenuating circumstances, students can apply for a one-year extension to the program requirement.
  - To apply, the student must write a letter of request to the Graduate Coordinator indicating the reasons why an extension is required two months prior to the end of three years.
  - The request is decided upon by the Graduate Coordinator in consultation with the supervisory committee.
  - If granted, the department will inform FGSR of the extension.

#### 2.11 Extension to Program

- The maximum time allowed by the University of Alberta for an MSc program is 4 years and a PhD program is 6 years.
- In extenuating circumstances, students can apply for a one-year extension to their program.
  - To apply, the student must write a letter of request to the Graduate Coordinator indicating the reasons why an extension is required at least two months prior to when their eligibility to be in the program ends.
  - A letter of support from the supervisor is required.
  - The request is decided upon by the Graduate Coordinator in consultation with the supervisory committee.
  - If granted, the department will inform FGSR of the extension.

**In the case a second extension is required, the same procedure to apply is required except that the department must forward a recommendation for an extension to FGSR for their approval.**

### 3. General Policies for Graduate Students and Supervisors

#### 3.1 Qualifications and Responsibilities of Graduate Student Supervisors

By undertaking supervision of a graduate student supervisors are agreeing to abide by the principles outlined in this document.

In the Department of Medical Microbiology & Immunology, the Graduate Training Committee recommends to the Department Chair (a) the suitability of individual Faculty members as graduate student supervisors, and (b) the suitability of individual Faculty members to sit on supervisory committees. The following are general guidelines for the qualifications of graduate student supervisors, which complement the FGSR Guidelines presented in the *Graduate Program Manual*.

- The prospective supervisor should have a successful record of graduate supervision.
- The prospective supervisor must have adequate time to supervise each prospective student.
- The prospective supervisor must be capable of supervising the number of students proposed.
- The prospective supervisor should normally have adequate research funding for the proposed project, of a type that ensures the academic freedom of graduate students.
- The prospective supervisor must have the necessary facilities and resources available for graduate student research and provide an appropriate academic environment.
- For prospective supervisors lacking experience in graduate supervision, a senior experienced supervisor with a primary appointment in MMI will be appointed as an Adjunct supervisor by the graduate training committee (with the consent of the proposed supervisor, the Adjunct supervisor, the student and the department chair) to assist in the supervision the student for three years. Adjunct supervisors should have graduated at least one PhD student. Adjunct supervisors will often become a member of the supervisory committee.
- The role of the senior Adjunct supervisor is envisioned to be primarily one of a mentor who assists the new supervisor (when needed) and a resource for the student for additional guidance and information. It should be noted that a Adjunct supervisor is not automatically a co-author on publications associated with the student. As for all publications, co-authorship should reflect a significant intellectual contribution to the manuscript. The Adjunct supervisor is expected to assist with activities such as the choice of courses, mentoring students for presentations such as in MMI 501, choosing the supervisory committee.
- It is the responsibility of supervisors to ensure students are provided with detailed instruction in record keeping including how laboratory notes need to be maintained and how electronic and film based data should be stored and backed up. Supervisors should also discuss with students how they will monitor that laboratory notes are being kept properly. Supervisors should ensure this includes regular co-signing of records when there is potential intellectual property.
- Although supervisors cannot help students write their candidacy exam proposals, they are encouraged to advise students on good grant writing strategies and general approaches on how to select topics and how to define hypotheses. Supervisors should encourage students to talk to their other committee members, experts on and off campus and other students about their research proposal. The details of the process are outlined in section 6.

- The thesis is a document that is also written by the student. Since a thesis may contain significant portions of manuscripts, students should have made a major contribution to the writing of the manuscripts. Supervisors are encouraged to allow the students to write the initial drafts of the manuscripts and the student should also be involved in the editing process.
- Supervisors should encourage and facilitate the completion of the degrees in a timely fashion.
- **It is the responsibility of the supervisor to schedule the exams and obtain appropriate rulings from FGSR.** Details of the process are outlined in subsequent sections.

### **3.2 Guidelines for Research with Actual or Potential Intellectual Property**

Students need to present their work orally for evaluation and should be encouraged to present their work at scientific conferences and publish their findings as part of their academic and scientific development. This should not preclude students from engaging in research that has potential valuable intellectual property, however the following guidelines are intended to make sure students are able to fulfill their requirements for the program.

- When students are engaged in research that has potential or existing intellectual property value, the supervisor is responsible for informing the student of the issues surrounding confidentiality and public disclosure.
- The supervisor is responsible putting a reasonable plan in place to ensure the issues of confidentiality do not severely impede the student's academic obligations particularly with respect to giving the required seminars in the department.
- Students must be free to discuss all aspects of their work with the members of the supervisory committee, and therefore specific non-disclosure agreements may need to be put in place with the supervisory committee over and above the usual understanding that the proceedings of a supervisory committee meeting are confidential.
- In light of the issues described above, it is strongly suggested that students and supervisors construct research plans that provide the student with sufficient unencumbered material to present in public forums and minimally that they can present to the department.

### **3.3 Responsibilities for Graduate Student Financial Support**

- As outlined in the Financial Assistance section earlier, all supervisors are responsible for the financial support of graduate students under their supervision.
- It is the student's responsibility to apply for appropriate external funding.
- It is the supervisor's responsibility to facilitate students' applications for external funding in a timely fashion.
- On the rare occasion that a supervisor has to let a student go because of financial exigency, they are not allowed to take on a new student for at least one calendar year.

- Supervisors must make students aware of their financial situation and their ability to support the student for their graduate career.
- Students must make supervisors aware of outside commitments such as enrolling in another program or part or full-time employment.

### **3.4 Equality and Respect**

Supervisors should be reminded that students are fellow academics and should be treated with respect. Students should not be viewed as "a pair of hands" and supervised only on the technical aspects of their project. Students need time to study for courses, serve as teaching assistants, prepare for candidacy exams, write papers and read the literature. They should also be encouraged to participate in activities that enhance their academic experience such as attending seminars, meeting with seminar speakers, participating in the graduate student organization and attending conferences.

### **3.5 Graduate Student/Supervisor Conflicts**

- Due to the pressures on both supervisors and students, the relationship between them can become strained, particularly if open communication between the two is not maintained. Regular meetings between a graduate student and the supervisor, in addition to the annual supervisory committee meetings, may serve to circumvent a number of potential conflicts.
- Should problems arise, the first step is for the student and the supervisor to meet and try to identify the source of the problem and create a solution.
- Students and supervisors are encouraged to seek advice from the Graduate Coordinator and/or the Chair on how to deal with the situation.
- If the matter cannot be resolved, then a supervisory committee meeting must be called and the committee should try to resolve the conflict—either the student or the supervisor may call a meeting. This should be done immediately after it is apparent that a problem exists, before it becomes unresolvable. A member of the Graduate Training Committee may attend this meeting to try to help resolve the conflict.
- If no decisions can be made, or if a decision is made that is not satisfactory to all those involved, the student and supervisor will then meet with Graduate Training Committee and the Department Chair to resolve the conflict.
- Students can also seek assistance from Student Counselling Services ([www.uofaweb.ualberta.ca/counselling/](http://www.uofaweb.ualberta.ca/counselling/)), the GSA ([www.gsa.ualberta.ca](http://www.gsa.ualberta.ca)) or the office of the Student Ombudservice (<http://www.ombudservice.ualberta.ca/>).

### **3.6 Expectations of Graduate Students**

#### **3.6.1 Code of Behavior:**

- Students are responsible for being familiar with the Code of Student Behavior.
- Inappropriate behavior and inappropriate use of University property and resources may be punishable under the Code. These include (but are not limited to) disruptions, harassment, discrimination, damage to property, unauthorized entry, unauthorized use of facilities or equipment, misuse of library or computer resources.
- Inappropriate academic behavior punishable under the Code includes (but is not limited to) plagiarism, cheating, distribution of confidential materials, misrepresentation of the facts, research and scholarship misconduct.
- The Code is available on the web at <http://www.ualberta.ca/~unisecr/policy/sec30.ml>



3.6.2 MMI also expects that:

- Students will treat their colleagues in the laboratory with respect.
- Throughout their residency, students will attend departmental activities such as the 601 seminar series, other research seminars, journal clubs and other activities recommended by their supervisors.
- Students will inform supervisors of if they take on additional commitments such as employment or enrollment in another program as it may constitute a conflict of commitment.
- Students will follow all safety regulations imposed by the University and supervisor.
- Students will take responsibility for meeting deadlines.
- Students are responsible for keeping Laboratory notes according to the following:

### 3.6.3 Guidelines for Laboratory notes

- Laboratory notes form the basis for validation of experimental work and must be recorded diligently for experimental results to be submitted as part of a thesis and/or for publication in a scientific journal.
- Failure to keep proper laboratory notes constitutes scientific misconduct.
- Students will keep timely and detailed records of their experimental work in a laboratory notebook.
- Each page must be dated and students are expected to record all pertinent information.
- The records must be kept for at least seven years following publication of the results.
- Laboratory notebooks remain the property of the Laboratory and all notebooks and data should always remain accessible to the principle investigator. However, *with the permission of the supervisor*, a student may make photocopies of the book and related electronic data to use for analyzing data and writing up results off site.
- Any confidential information must be stored in a secure manner at all times whether on campus or off.
- Supervisors may have additional requirements if protecting intellectual property is an issue.
- Failure to keep proper notes on experimental work should be brought up at supervisory committee meetings by the supervisor and is sufficient for a supervisory committee to deem the progress in research unsatisfactory. Once the student has received a warning, if the situation is not rectified in a timely fashion, it will be forwarded to the appropriate authority as a breach of scientific ethics in addition to being cause for the department to recommend termination of the program to FGSR.

## 3.7 Graduate Appeal Committee

### 3.7.1 Purpose of the Appeal Committee

All decisions regarding the administration of graduate programs within the Department of Medical Microbiology and Immunology that impact **individual graduate students** (excluding funding issues and those issues for which there is a documented U of A appeal process, e.g.; Candidacy Examinations, Thesis Defenses and Course marks) made by the Graduate Training Committee can be appealed to the MMI Graduate Appeal Committee.

It is anticipated that matters that could be referred to this committee include, but are not limited to decisions regarding a M.Sc. to Ph.D. transition (or the time limit for this decision), the timing of a candidacy examination, selection of candidacy exam research proposal topic, or exceptional requests

for exemptions from or individual modifications to the Departmental Graduate Program requirements.

### 3.7.2 Composition of the Graduate Appeal Committee

The Department of Medical Microbiology and Immunology Graduate Appeal Committee will consist of:

- Departmental Chair (Chair of the Committee)
- Graduate Student Representative of the Graduate Training Committee
- Chair of the Education Committee
- Member of the Graduate Training Committee

The Chair of the MMI Graduate Appeal Committee shall be non-voting unless a deciding vote is required.

In the event that one or more of the designated committee members has a perceived conflict of interest, then the Chair of the Department of Medical Microbiology and Immunology shall determine the composition of the appeal committee.

### 3.7.3 The process for appeals:

- Students should always consult with the Graduate Coordinator first over issues/decisions that they are concerned about.
- The committee shall receive written submissions from the student and other interested parties and may elect to hear verbal submission from the interested parties.
- The Chair of the MMI Graduate Appeal Committee shall ensure that the written facts and any verbal presentations are duly received and discussed by the committee.
- The Chair will then elicit a decision on the appeal by the committee by means of a secret ballot.
- The appeal will be determined to be successful by a simple majority vote.
- The Chair of the MMI Graduate Appeals Committee shall then minute the results with copies being forwarded to the Graduate Coordinator, Department Chair and the interested parties.
- The Graduate Coordinator and Graduate Training Committee shall then implement the decision of the committee.

## 4. Details of Financial Assistance and Scholarship Information

### 4.1 Financial Assistance

Each supervisor is responsible for finding financial support for the graduate student during completion of the degree according to the following:

- The supervisor is required to support the student for up to **three years for an MSc and up to five years for a PhD**.
- The level of stipend support in MMI was \$19,000 per year plus fees up to and including the 2012 Academic year.
- Students entering the program from 2011 on are under a new tuition and stipend structure.
- All students entering after 2011 will receive a net pay  $\geq$  \$19,000/annum after paying tuition and fees. However, the gross annual stipend for domestic students is now \$25,000 for domestic students and \$27,796 for international students, the latter higher amount is to cover the cost of differential fees paid by international student.
- Students are responsible for saving to pay their tuition and fees for each term (Fall, Winter, Spring/Summer).
- To remain in the program the student must find a supervisor willing to financially support them from external operating grants or contracts awarded to the supervisor, or possibly student awards (see below), by January 1 (or May 1, depending on the entry date) of the first year.
- Students who are completing their theses may be provided with up to three months support for MSc students and up to six for PhD students from the point at which their supervisory committee approves writing of the thesis; supervisors are not obligated to provide any financial support beyond this.
- *Stipends are provided for full-time study only.* It is the responsibility of students to inform their supervisor and the MMI graduate program administrator if they enroll in another program such as Medicine or Nursing or accept employment. There is no obligation to pay a stipend when students are significantly engaged in another program or employed elsewhere.
- For students who enter other programs or employment who are very close to completion, supervisors are encouraged to pay the supplement to cover tuition for one semester, particularly when there are experiments still necessary to complete the thesis research.
- For students who lapse their registration while pursuing another degree, the student may be reinstated to the program with a stipend during the summer months if they return to perform experiments or engage full time in writing of the thesis. If students lapse their registration, it is the responsibility of the student to cover the reinstatement penalty.
- It is the student's responsibility to be fully aware of the policies of the University of Alberta and the conditions of any scholarships they hold with regard to a conflict of commitment.
- Students who receive a UofA Doctoral Recruitment Award will keep the first \$5000 with the remainder applied to the stipend.
- When students obtain internal or external scholarships valued at more than \$3000 but less than the minimum stipend, this scholarship will be applied towards the annual stipend (eg 75th Anniversary award, QEII scholarships) and the supervisor shall top up the stipend to the minimum stipend.
- Supervisors of students who receive a national scholarship valued at  $\leq$  \$30,000/year are required to top up the students' compensation to \$30,000/year. For example, the NSERC and

- CIHR Masters awards are only \$17,500 but the university provides an automatic scholarship that covers tuition and fees, leaving ~\$6,500 for the supervisor to pay.
- For information on paid holidays and other leaves, please see section 3.8.
  - When students are serving as teaching assistants their teaching assistantship pay will be over and above their stipend. *However, this comes with the expectation that students maintain steady progress at their research during this period.*
  - All students, if they are qualified to do so, are required to apply to outside granting agencies, such as NSERC, CIHR and Alberta Innovates Health Solutions for funding as soon as it is appropriate to do so.
  - Domestic students who receive a UofA Doctoral recruitment award are obliged to apply for a Tri-Council award in the coming year.
  - Students should also apply for any University-sponsored fellowships for which they qualify.
  - Students with excellent academic records are encouraged to apply for NSERC awards prior to or at the initiation of the graduate program.
  - The Department has a limited amount of funding to support graduate student research assistantships and teaching assistantships that is allocated by the Chair.

## 4.2 Scholarships

Please also refer to the Financial Section for more information on how scholarships are applied to annual stipends.

Students in the MMI program may qualify to apply for scholarships from a variety of National and Provincial funding agencies such as CIHR, NSERC, AIHS and many scholarships offered by Foundations for medical research in specialized areas. In addition there are several scholarships available through FGSR as well as the Faculty of Medicine.

Students accepted or enrolled in the graduate program are encouraged to apply for studentships through the Department to outside agencies such as Alberta Innovates, NSERC or CIHR, etc. NSERC applications must be made internally through the department, which ranks and forwards all qualified applicants.

PhD students receiving major scholarships from NSERC and CIHR are eligible to receive the U of A President's Doctoral Prize of Distinction valued at \$10,000 for the first year and provides 18 units of fee index plus non-instructional fees in subsequent years that the major doctoral prize is held.

MSc NSERC and CIHR scholarship winners may be eligible to receive Walter H Johns Graduate Fellowship (equivalent to tuition and fees) from the Faculty of Graduate Studies. Please refer to the FGSR website for detailed information.

Alberta Innovates offers a further incentive as a top up award for students who are awarded a graduate studentship from a national agency such as CIHR or NSERC. .

The main internal awards that MMI students receive are the QEII MSc and PhD Scholarships, the University Doctoral Recruitment award and the FoMD 75<sup>th</sup> Anniversary Award and Recruitment awards.

Students directly entering the PhD program as well as students who elevate to the PhD program within the first year of their program are eligible for the University Doctoral Recruitment Award.

To learn more about graduate student scholarships, please consult the Faculty of Graduate Studies and Research web page at: <http://www.gradstudies.ualberta.ca/awardsfunding/>. Entrance awards must be applied for early and therefore students who have applied to the program later in the year will not qualify.

### **4.3 Holidays**

Students are entitled to all statutory holidays, the university closure days between December 24<sup>th</sup> and December 31<sup>st</sup> and two weeks of paid vacation.

Vacations should be discussed with supervisors a minimum of two weeks in advance as supervisors may request students not take time off during critical periods such as preparation of grants.

Any disputes over timing and duration of vacations should be referred to the Graduate Coordinator.

### **4.4 Sick Leave**

Graduate students are entitled to up to two weeks of paid sick leave per year (Sept. 1 – Aug. 31).

Students with serious illness or personal matter require an absence of more than two weeks should request an unpaid leave from the department in writing.

Extended leaves will require formal leave from the program. Such leaves will extend the time limit for completion of the program and require appropriate documentation.

### **4.5 Graduate Student Maternity and other Leaves of Absence**

A leave of absence for up to one year may be requested by MMI graduate students who are pregnant or need to be away from the lab for a period of time for ‘documented compelling reasons, such as a serious illness’. Students should initially discuss the need for such absences with their supervisors. See the following information from FGSR:

#### **“Approved Leave of Absence**

Students who are unsure about appropriate start and end dates for a proposed leave of absence and how these dates align with University's four-term system, should initially consult with the graduate program administrator and graduate coordinator, and if still unsure, with the FGSR.

The FGSR will consider a departmental recommendation for a leave of absence for parental or other documented compelling reasons, such as a serious illness.

The department and student must complete an Application for Leave of Absence form and submit it to the FGSR with detailed documentation from the student's family physician or specialist. An expected date of return must be indicated. A leave of absence is normally granted for up to one year.

The form is available on the FGSR website at [www.gradstudies.ualberta.ca](http://www.gradstudies.ualberta.ca) (Registration & Fees).

*[A copy of this form is also included with the forms at the back of this handbook in Appendix 1].*

If approved, the student must return by the specified date in order to continue in the program. Readmission to the program will not be required. The department should direct a returning student to the FGSR to reinstate registration in the program.

The time limit for completion of the degree will be automatically extended by the duration the leave for an FGSR-approved leave of absence.

**Supervisors who pay their students' stipends from their CIHR grants as well as students who hold CIHR scholarships, should be aware that the agency will reimburse them for up to six months of parental or other leave. Such leaves must be requested at least 30 days in advance with a letter from the student that includes: 1) the dates of the leave 2) that the student is the primary caregiver for the child 3) that the student will not be receiving employment insurance or other parental benefits from other sources and 4) that during the leave the student will not be engaged in his or her research activities or employed in any capacity. A second letter from the supervisor approving the leave and confirming the dates of absence must accompany that letter. After it has been confirmed that the student has returned to the lab, CIHR will extend the stipend by the duration of the leave to a maximum of six months. For further information, please consult the CIHR website.**

**Alberta Innovates** also has a provision for parental and other leaves of up to six months for students following an application outlining the purpose of the leave. The support of the University is required. Scholarship holders may receive up to 20 weeks of paid maternity leave and paid paternal leave may also be awarded to scholarship holders when the mother works. The duration of this leave can be up to 20 weeks, less any period of maternity leave taken by the mother. Alberta Innovates will extend the award by the duration of the approved leave on the student's return. For further information, consult the Alberta Innovates website.

**NSERC** will provide for up to four months paid parental leave for scholarship holders if it is taken within six months of a child's birth or adoption and provided one's university permits parental leaves (which the U of A does, as evidenced above). If both parents are NSERC award holders, they may both take leave, but only up to a total of four months. A letter similar to that required by CIHR is required; please consult the NSERC website for details. Unpaid leave of up to three years can be requested of NSERC only for reasons of maternity, child rearing, illness or health-related family responsibilities and only if approved by the university.

## 5. Detailed Guidelines for Supervisory Committees and Meetings

### 5.1 The role and composition of the Supervisory Committee

The role of Graduate Student Supervisory Committee is to annually evaluate the student's progress in their program and to provide the student with constructive advice for their graduate program and thesis research.

The Supervisory Committee is also responsible for decisions regarding formal advancements within the program such as elevation to the PhD program going forward to the PhD candidacy exam, approval for writing up and setting the thesis defense.

MMI requires Supervisory Committees be formed for MSc and PhD students.

Within the first six months of the graduate program, the Supervisory Committee should be formed and the first supervisory committee meeting held. The first meeting provides students an opportunity to get valuable feedback from their supervisory committee at an early point in the program. Students are asked to prepare a one page report and brief presentation that outlines their research plan at that stage. Committees will not evaluate the student's performance at this meeting. Students are required to hold their first full committee meeting by their 12th month in the program. Students wishing to elevate to the PhD program must seek formal approval from their committee, either at this meeting or another convened prior to the 18 month mark. This will take place within the context of a structured committee meeting that includes a progress report, a presentation of research progress and goals, and an evaluation by the committee of the student's progress (see details below). All other committee meetings are to occur at least annually after the initial meeting.

The Supervisory Committee is composed of at least two faculty members in addition to the supervisor(s). In this case, an Adjunct supervisor does not count as a supervisor.

The committee members are recommended by the supervisor in consultation with the student. The committee members must meet the qualifications outlined by FGSR (<http://www.gradstudies.ualberta.ca/gpm/Section8.aspx>) and the Department:

Thesis-based master's students: Every thesis-based master's student must have a supervisor. It is not a University requirement for master's students to have a supervisory committee; however, some departments may require them. Although departmental master's supervisory committees do not require FGSR approval, it is normally expected that the student's supervisory committee will be part of the master's final examining committee. Therefore, departments should ensure that the members of the supervisory committee meet the eligibility criteria as examiners.

Doctoral students: Every doctoral student's program shall be under the direction of a supervisory committee approved by the FGSR based on recommendations from the department. A doctoral supervisory committee must have at least three members, and must include all the supervisors. As *ex-officio* members of the candidacy and the doctoral final examining committees, all members of the supervisory committee must meet the eligibility criteria for examiners. Compliance with the University of Alberta's *Conflict Policy – Conflict of Interest and Commitment, and Institutional Conflict* is mandatory. The supervisory committee is chaired by one of the supervisors.

The committee shall arrange for the necessary examinations and for adjudication of the thesis. The committee shall have a formal regular meeting with the student at least once a year.

The department should ensure that the members of a supervisory committee are sufficiently competent and experienced to serve at the required level. In forming a supervisory committee, the department should consider the rank and experience of the prospective members, their publications and other demonstrations of competence in the subject area or field of specialization, and the prospective members' experience in graduate supervision. The department shall recommend the names of the supervisory committee members no later than the end of the first year of the student's doctoral program, and well in advance of the candidacy examination."

### **MMI-Specific Guidelines:**

- MMI recommends only two members in addition to the supervisor. However, as projects become more cross-disciplinary, additional committee members may be appropriate.
- At least one member on the committee, in addition to the supervisor, should have a primary appointment in MMI and familiar with the MMI program.
- In accordance with FGSR Council policy, rank should be considered in committee composition.
- Any actual or perceived conflicts of interest for the key relationships between the Student and the Committee Members and the Supervisor and the Committee Members should be considered in accordance with FGSR guidelines and the University's Conflict of Interest Policy and Procedures. <https://policiesonline.ualberta.ca/PoliciesProcedures/Pages/DispPol.aspx?PID=25>
- The definition of conflict of interest as per the Policy is: *A situation in which there is or may be perceived to be a divergence between the private financial benefit or financial interest or personal benefit of a person, family member, or an outside party, and that person's obligations to the University, such that an impartial observer might reasonably question whether related actions to be taken or decisions made by the person would be influenced by consideration of the person's own interests.*
- Any personal or business relationship between the key individuals may constitute a conflict of interest. For example, spouses can serve as members of the same supervisory committee, but not as supervisor and committee member.
- Actual or perceived conflicts of interest in the key relationships must be declared to the Reporting Officer (the Chair, or in the case of the Chair, the Dean) on an annual basis or as they arise. When graduate students are involved in a declared conflict of interest, the Chair will liaise with the Graduate Coordinator in dealing with the management of the conflict of interest.
- The supervisor must recommend the Supervisory Committee to the Department for approval who will then request approval from FGSR.
- The approval of the committee by the FGSR should be granted before the first committee is held.
- The Supervisor serves as the chair of the Supervisory Committee



The Supervisory Committee must meet at least once a year with the student to review progress made both academically and in the thesis research.

Details regarding the committee meeting itself and the potential outcomes are explained below in Section 5.2.

All supervisory committee decisions that make specific recommendations concerning the graduate student can be appealed to the Graduate Training Committee.

The decisions of the Graduate Training Committee can be appealed to the Department of Medical Microbiology and Immunology Graduate Appeal Committee which is chaired by the Chair of the Department of Medical Microbiology and Immunology (see Graduate Appeal Committee).

## **5.2 Supervisory Committee Meetings**

### **5.2.1 Overview**

The objectives of Supervisory Committee meetings are to:

- a. Keep committee members apprised of progress
  - b. Assess the project results and progress
  - c. Define problems in the project and, if necessary in a positive fashion find creative solutions
  - d. Review the project objectives and focus
  - e. Make key decisions such as elevation to PhD and Candidacy examination timing.
- Scheduling of Supervisory Committee meetings is normally done by the supervisor.
  - It is ultimately the responsibility of the supervisor to ensure that the student has annual supervisory committee meetings.
  - Students are entitled to request committee meetings at shorter intervals when they require greater input from the committee particularly if a project hits major roadblocks.

As outlined in detail below, for each committee meeting, the student is required to submit a progress report that includes a review of research progress, courses taken and the grades obtained in these courses. At the meeting the supervisor reviews the student's record and the student presents a review of the relevant background and research progress for the previous year as well as a plan for future research. Future plans, both research and academic, are then considered at the meeting.

### **5.2.2. The Report:**

- The purpose of the report is to provide the student with practice in writing succinctly about their research, provide the committee with background and a record of the student's progress to date.
- The report should be given to the Supervisory Committee and the Graduate Administrator 7 days before the meeting.
- A copy of that report goes in the student's file and is available to the Graduate Training Committee.

The report should be a maximum of 4 pages in length and deal succinctly with the following issues:

- a. Background

- b. Project objectives
- c. Hypotheses being tested since the last meeting
- d. Summary of research progress
- e. Difficulties or issues that have impeded progress (if any)
- f. Hypotheses to be tested in next 6-12 months
- g. Append list of courses taken (or being taken) with grade attained
- h. Copies of title page and abstract of any published papers, submitted manuscripts or abstracts written since last meeting.

### **5.2.3. The Meeting:**

The meeting format should generally follow the format described below:

- a. Brief overview of student's progress by the supervisor (~5 minutes)
- b. Student's presentation of research results since the previous meeting (~20 minutes)
- c. Questions and answers
- d. Student presentation of hypothesis to be tested and the proposed approaches for the following 6-12 months
- e. Discussion of the objectives and proposed approaches
- f. Student presentation of proposed difficulties
- g. Discussion of how best to deal with the issues raised above
- h. Discussion of related issues such as elevation to PhD or timing of Candidacy

### **5.2.4. Feedback and Assessment:**

The Supervisor should record the events of the meeting using the departmental form "MMI Graduate Student Progress Report" (Appendix 1, see MMI website for latest version).

The supervisor should record on the form the basis for the assessment as well as the specific recommendations made by the committee.

Once the form is complete, the supervisor, with the help of the committee where necessary, will discuss the committee's recommendations while all of the committee members remain present. At the end of the discussion, the form will be signed by the supervisor, committee members and student. The student may append their own written comments to the form.

The discussion and signature of the student will ensure that both the supervisor and the student have the same interpretation of the events of the meeting. This is particularly important when decisions such as when to write the thesis are made or the progress is deemed unsatisfactory.

**The student should make copies** of the form for themselves, the supervisor and the members of the supervisory committee.

**The original signed form as well as the committee report should be given to the MMI office to be retained in the student's file.**

### **5.2.5. Guidelines for proceeding when progress is deemed unsatisfactory:**

If progress is deemed unsatisfactory, the Supervisory Committee will:

- a. Make specific recommendations (in writing on the committee report form) for remedial action by the student,
- b. Indicate what assistance the student should seek or obtain from the committee or other sources.
- c. Set a date for a subsequent meeting to re-assess student's progress. This meeting must be held in a timely fashion (2-3 months).
- d. The supervisor will alert the Graduate Coordinator who will counsel the student

If progress is deemed unsatisfactory a second time:

- **The Supervisory Committee may recommend a change of program for the student.**
- The possible recommendations include transition from PhD to MSc program or termination from the program.
- The recommendation is made to the Graduate Training Committee who makes their recommendation to the Graduate Coordinator and/or the Chair.
- The department then makes a recommendation to the Dean of FGSR.

## 6. Detailed Guidelines for the Candidacy Examination

### 1. Preamble:

Graduate students are required to pass a candidacy examination to become a PhD candidate in MMI.

From the FGSR Program Manual (currently going through Governance to be in the Calendar): "For candidacy examinations, students must demonstrate to the satisfaction of the examining committee that they possess:

- a) an adequate knowledge of the discipline and of the subject matter relevant to the thesis;
- b) the ability to pursue and complete original research at an advanced level; and
- c) the ability to meet any other requirements found in the department's published policy on candidacy examinations."

### **Purpose and arrangement of the Candidacy Examination**

- To become a PhD candidate the student must pass the candidacy exam.
- The candidacy exam is comprehensive and addresses the qualifications of the student in terms of their ability to develop original research at an advanced level.
- The exam consists of two parts; 1) a written proposal and 2) an oral defense of that proposal. The written proposal forms the basis for the majority of the questions.
- The FGSR Manual provides further details on the timing and the composition of the examining committee (<http://www.gradstudies.ualberta.ca/gpm/Section8.aspx>).
- Students must successfully complete MMI605 prior to the candidacy examination.
- The candidacy exam will normally only be scheduled following approval by the student's supervisory committee documented in a committee meeting report.
- The supervisory committee meeting determines if the student is ready to take the exam and the general timing for the scheduling of the exam.

### 2. Participants:

The candidacy exam requires contributions from the student, the student's supervisor, the student's supervisory committee, two external examiners, a designated exam chair, and the MMI

graduate coordinator.

### **3. Responsibilities:**

#### Candidate:

- The candidate will complete MMI 605 prior to the exam.
- The candidate will prepare a written research proposal that describes an independent avenue of investigation that stems from their own area of research.
- The candidate will arrange to meet with the exam chair at least one week prior to the exam to discuss the examination guidelines.
- The candidate will defend the research proposal in a comprehensive oral exam.
- 

#### Supervisor:

- The supervisor will schedule the exam within the first 30 months of the student's tenure in the department.
- The supervisor will provide the student six weeks free of lab work to prepare for the candidacy.
- The supervisor will select two external examiners in consultation with the supervisory committee.
- The supervisor cannot provide any input into the content of the proposal but may provide general help with grant writing skills and strategies. Prior to the exam, the supervisor will read the written proposal and confirm in writing to the graduate coordinator that the research proposal was written in its entirety by the student. At this point, the supervisor will not provide feedback or suggestions to the candidate.

#### The exam chair:

- The examination chair moderates the examination, ensures a fair examination process, chairs the discussion of the exam after the student has left the committee to its adjudication, and then records and reports the results of the examination to the student and to the department.
- At the beginning of the exam, the chair introduces the student and explains to the student and committee how the exam will be run, specifying the sequence of the events, the number of rounds of questioning (generally two), the order of questioning (generally starting with the arms' length examiner, followed by the departmental examination committee member who is not a member of the supervisory committee, the committee members, and finally the student's supervisor), and length of time each examiner has for questioning.
- To provide as much uniformity and continuity as possible, all candidacy exams are chaired by the departmental designated chair. The chair moderates discussions, keeps minutes of the exam, generally aids the student in completing a fair exam and files a report concerning the outcome of the examination.
- The chair does not vote at the evaluation stage.

#### The graduate coordinator:

- The graduate coordinator will work with departmental administrators to identify an exam chair and schedule the defense.
- The graduate coordinator will approve the composition of the examination committee.
- The graduate coordinator will submit notice of the candidacy examination and examination committee composition to the Faculty of Graduate Studies and Research for

approval at least 3 weeks prior to the proposed examination date.

The examining committee:

The examining committee determines whether the candidate meets departmental requirements of a PhD student. To this end, the committee considers whether the research proposal demonstrates a sufficient grasp of the design and execution of complex research experiments. The examining committee is asked to consider whether the written proposal clearly establishes the candidate's ability to synthesize pertinent data into a coherent series of research hypotheses or ideas. The committee is also asked to consider whether the proposed experiments rigorously test those ideas, if the candidate has adequately addressed potential pitfalls and concerns, and if the candidate has formulated a future set of experiments that have the potential to have a meaningful impact on the area of research. The examining committee is encouraged to explore these issues in the oral component of the exam, and to determine the depth and breadth of the candidate's knowledge and research strengths. In addition, the committee is asked to confirm that at least 50% of the research proposal requires the material input of a minimum of two graduate students and one technician.

- The candidacy exam committee consists of the supervisory committee plus two academic members of the University at arm's length to the student and the supervisor. MMI requires that at least one of the examiners comes from outside the Department. FGSR requires one examiner fulfill the criteria of being an arms length examiner, meaning they did not have any affiliation with the student's research or the supervisor's research within the last seven years.
- The Chair of the Department or the graduate coordinator nominates the extra-supervisory members of the candidacy committee (usually those recommended by the supervisory committee) by forwarding their names to the Faculty of Graduate Studies and Research.
- If not already a member of the examination committee, the Chair of the Department may participate in the exam as a non-voting member.
- The Dean or Associate Dean of the FGSR or the Dean's designate may attend and participate fully in the examination, but any other persons must have permission of the Dean to attend the examination.

**4. Components:**

Research proposal:

The candidate will write a grant proposal that consists of (1) a one page summary and (2) a detailed research proposal. The one-page summary should be single spaced, limited to one page, 12 point Times, with 0.75 inch margins. The research proposal should be written in 12 point Times, double-spaced, with 0.75 inch margins, and limited to 22 pages, not including figures and references. The proposal should include: pertinent background literature, hypothesis, rationale, and experimental design and significance, potential pitfalls and a short section of future directions. The research proposal should stem from the thesis research being conducted by the student. However, more than 50% of the proposal should include experiments that go beyond the current scope of experiments developed in the supervisor's lab, and be of sufficient depth to require the material input of at least two graduate students and one technician. Students are required to rigorously establish their ability to identify questions and design appropriate experimental approaches.

Oral presentation:

At the start of the exam, the student will present a 10-15 minute summary of the research proposal.

Oral defense:

- The first round of questioning (about 15 minutes per examiner) derives from the proposal, but may be more comprehensive in nature.
- Examiners are invited to ask questions that they feel should be in the student's knowledge base. With this type of questioning, examiners are not trying to determine if the students are able to recite information but rather if they are able think "on their feet" calling upon their knowledge base when necessary.
- Students will not be given subject areas to study but are expected to be able to answer more general questions in their research area.
- The goal of the examination is to determine if the student is able to identify important questions, generate hypotheses, propose experiments to test the hypotheses and interpret data. A certain amount of basic knowledge is required to do this effectively, but one need not be encyclopedic in their background information. This means that to prepare for the examination, one should not memorize the contents of textbooks, but instead read primary research papers and understand why experiments were done, what experiments might be done to better answer the question and what the next step might be.
- The exam lasts from 2 to 3 hours, at which time the student leaves the room while a decision is made on the outcome of the examination by the voting members of the committee.

**5. Timing:**

- Students are required to take their candidacy exams within the first 30 months of entering the program. This is regardless of whether a student starts as a PhD student or as an MSc student.
- Students are encouraged to take their candidacy exam after 18 months, and before 30 months. If the exam has not taken place by 24 months, it must be scheduled to take place some time within the next 6 months.
- Once the supervisory committee approves the student for a candidacy exam, the examination can be scheduled.
- Students are provided a total of six weeks free from experimental work to write the proposal and prepare for the examination. Students take four weeks to write the proposal and two weeks to prepare for the examination once the proposal has been submitted to the examination committee. The schedule for time away from the bench should be discussed with the supervisor.
- Once the timing of the exam is set, a candidacy examination committee and the candidacy examination chair are selected.
- Notice of the candidacy examination and examination committee composition is submitted by the department to the Faculty of Graduate Studies and Research at least three weeks prior to the proposed examination date.
- It is the student's responsibility to meet with the exam chair one week prior to the examination to review the format of the exam.

**6. Evaluation:**

At the conclusion of the examination, the candidate will be asked to leave the room while the examiners discuss the following questions in the context of the candidate's thesis research

progress. The following are representative expectations that should be met for students to proceed as PhD candidates.

- Students should not go into the oral portion determined to merely “defend” their proposal, but be open to improving their approaches according to discussions that arise during the candidacy.
- Students should be able to identify an important question and formulate a testable hypothesis.
- Students should have the ability to assess experimental data. The proposal should be based on solid data and not a single, poorly controlled experiment or published paper. The student should be able to assess the quality of published data referred to in their proposal.
- Students should be familiar with the references that they cite in their proposal. For references to methods, as well as unreferenced methods, students should be aware of the technical requirements, strengths and weaknesses, and be able to defend the selection of method(s) in comparison to alternatives. Students should be aware that they should never cite a reference that they have never read.
- Students should clearly understand and outline the rationale for their chosen approaches (over alternative possibilities).
- Students should demonstrate experimental design capability. The majority of the experiments that they propose should be feasible and lead to interpretable results. The experiments should also address the proposed hypothesis and extend the knowledge of the field.
- Students are expected to consider multiple possibilities for their research question, and multiple possible outcomes for their experiments.
- Students should be able to analyze data. They should also be able to predict possible outcomes of experiments and identify possible interpretations of these experiments.
- Students should understand basic concepts in their field and display good breadth of knowledge.
- Students should know the value of mixing both “safe/somewhat predictable” and “risky/exploratory” directions
- Students should have effective communication skills.
- Examiners always try to find the extent of the students’ knowledge to determine if they are able to “think on their feet”. It is understood that the student will not know all of the answers to the questions, but they should be able to make predictions based on what they know about other related systems.
- Students should appreciate differences between direct and indirect effects, and correlative vs. causal relationships.

The possible outcomes of the examination are: Pass; Conditional Pass; Fail with recommendation to retake the examination; Fail with recommendation to change category to the MSc program; Fail with recommendation to terminate the PhD program.

Following the discussion of the student’s performance, the chair will poll the examiners by secret ballot to arrive at an initial outcome for the examination. This serves as a starting point for discussion. The ballots are then destroyed.

Normally, if all but one member of the committee agrees on a decision, the decision shall be that of the majority. In the event that the examining committee cannot reach consensus

concerning the outcome of the examination, the chair will then conduct a second written ballot to decide the outcome.

In accordance with Faculty of Graduate Studies and Research regulations, if there are two or more dissenting votes, the matter is referred to the Associate Dean of the Faculty of Graduate Studies and Research for determination of the appropriate course of action. Students who are deficient in some areas but demonstrate excellence in other areas should be provided with specific recommendations for areas of improvement even when granted a pass.

Pass:

In the event that the student passes the examination the Graduate Coordinator and/or the Department Chair submits a Report of Completion of Candidacy or Final Oral Examination form to the Faculty of Graduate Studies and Research to change the student's category from provisional candidate to candidate for doctoral degree. The Faculty of Graduate Studies and Research will then act on the departmental request.

Conditional Pass:

In the event that the student is deemed to have conditionally passed the Candidacy Examination, the Chair of the Candidacy Examination will submit the report to the Graduate Coordinator and the Department Chair and inform them in writing as to the basis for the decision, specific requirements, timeframe, the approval mechanism and the supervision and assistance the student will receive. Following a review of the Candidacy Examination Chair's report, the report will be submitted in writing to the Associate Dean of the Faculty of Graduate Studies and Research. The department will hold the Report of Completion of Candidacy or Final Oral Examination form until the committee agrees that the conditions have been met.

Fail:

In the event that the student is deemed to have failed the Candidacy Examination, the Chair of the Candidacy Examination will submit the report to the Graduate Coordinator and the Department Chair and inform them in writing as to the basis for the decision. The Graduate Coordinator, the Chair of the Department, and the student's supervisor in consultation with the Graduate Training Committee will establish the Department's recommendation concerning the student's program. The Departmental recommendation concerning the student's program will be submitted in writing to the Associate Dean of the Faculty of Graduate Studies and Research and the student. Normally, the Associate Dean will then meet with the student and departmental representatives before acting upon any departmental recommendation.

A decision that affects the student's academic standing (i.e., required to withdraw or transfer to a master's program) can be appealed.

The following options are to be considered by the examining committee when the outcome of a candidacy exam is 'fail'. The student can be given the opportunity to repeat the Candidacy exam, if his or her performance and work to date indicate the ability to perform at the doctoral level. If a repeat Candidacy exam is recommended (and approved by FGSR), the student must be informed of his/her exam deficiencies by the exam committee Chair and the second exam must be scheduled no later than six months from the date of the first candidacy exam. In the event the student fails the exam, the examining committee should recommend either that 1) There be a Change of Category to a MSc. program (assuming the student has shown the potential to successfully complete such a program) or 2) The doctoral program be terminated.



Following the deliberations, the candidate is invited back into the room and the Chair informs the candidate of the outcome of the examination. In the event that there are conditions or concerns raised by the examination committee, these concerns and/or conditions will be communicated clearly to the student. Then following the examination, the Examination Chair will file the appropriate report on the examination with the department.

## **7. Detailed Guidelines for the Thesis and Thesis Defense**

### **7.1 Approval to Write the Thesis**

When students believe they have completed their experimental work they should have a supervisory committee meeting to seek permission from the supervisory committee to write the thesis. The committee report form has a box to indicate the committee has granted approval for the student to write the thesis. This approval indicates the supervisory committee judges the experimental work sufficient in quality and scope for the thesis to be written.

To seek permission, students are strongly encouraged to produce the equivalent of one or more quality contributions to a co-authored paper that may be published in the future and generally two publications before completion of the PhD (depending on the scope and impact of the publications). For a PhD student one of these PhD publications should be a first-author paper in press prior to scheduling of the examination.

Students who are completing their thesis may be provided with up to three months support for MSc students and up to six for PhD students during the period when they are writing up; supervisors are not obligated to provide any financial support beyond this time period.

### **7.2 Guidelines and Recommendations for the Thesis Document:**

The following is meant to provide some guidance to students for preparing their thesis document. Students are strongly urged to discuss the format and organization of their thesis with their supervisor as they begin to write up the thesis itself. Students are also encouraged to look at former students' theses that are archived in the MMI office to get a general idea of the contents and format of a thesis.

The Faculty of Graduate Studies (FGSR) suggests that you write the thesis in one of two formats, "traditional" or "paper-based".

- FGSR requires both types to have a general structural format (structure of the thesis, paper, margins etc). For example, the thesis must have a Title Page, Abstract, Table of Contents and Table of Figures at the start, a full Bibliography at the end, and under certain circumstances a preface.
- Students should make themselves familiar with the official rules for formatting a thesis that can be found on the FGSR website.
- These structural features will be checked by FGSR when you hand in your thesis and guidelines are available from FGSR.

The Department recommends the thesis be in the traditional format: one with an introduction, a hypothesis and approach chapter, a methods chapter, results chapters (with or without an introduction and a discussion) and a discussion and future directions chapter followed by a single set of references. The advantages to this format are that:

- Examiners will know that much of the writing is the student's
- It uses less paper
- All the methods and all bibliographies are united and can be easily found.

### **7.2.1 MMI specific guidelines (regardless of the thesis format)**

#### Introduction

- For both the MSc and the PhD, the introduction is expected to provide the general and specific background most pertinent to the results presented in the thesis. The best theses will have introductions that are written in clear and concise language.
- The introduction should conclude with a statement of the objectives of the research and the main hypothesis that underlies the experimental work.
- A typical introduction for an MSc is ~25 pages and a PhD ~50 pages. These estimates are based on a line spacing of 1.5 in Times 12 point.
- Schematics are encouraged to assist the reader and to illustrate relevant models.
- Tables are particularly helpful to condense information and to keep introductions streamlined.

#### Methods

- The methodology should be described in sufficient detail to allow repetition of the experiments by someone else.
- The methods section of a paper-based thesis will likely need to be expanded to include all experimental protocols.
- The methods should be written in a concise format and diagrams may be quite helpful for illustrating complex experimental schemes.

#### Results

- The organization of the data in results chapters need not adhere to how results were published and often will reflect only the student's contribution to published papers.
- When the thesis is paper-based, the contributions of the other authors must be clearly identified on the title page of the results chapter. Where others have contributed to the results, this also should be on the first page of the results chapter.
- We do not allow 'data not shown' to appear in the thesis. If a fact is important enough to cite data, the data should be shown for reviewers to examine.

#### Discussion and Future Directions

The final discussion chapter is where the student should put the results into the context of the field, may speculate about the meaning of the data, and should outline some new questions arising from the research and briefly describe approaches to address these questions. Figures that illustrate any proposed models are highly recommended.

Bibliography - A full bibliography with all names listed is required.

Appendices – Appendices should be used judiciously. Typical items found in the appendix are “data not shown” for paper-based format where original papers had “data not shown” and data from a side project that does not fit the theme of the thesis.

Input from the supervisor – While the body of writing in the thesis should represent the student’s original work, the supervisor is expected to provide critical feedback during the process regarding organization, scope, clarity and interpretation of the results.

### 7.2.2 Bound Copies

MMI wishes to retain bound copies of each thesis for posterity.

MMI will cover the cost of printing 3 copies of the thesis: one for the department, one for the supervisor and one for the student.

\*\*\*for binding the left-hand margin must be wider (usually 1.5 inches)\*\*\*

## 7.3 Thesis Examination

### 7.3.1 Thesis approval by the supervisory committee

No examination date is to be set with FGSR until committee approval is received.

According to FGSR Guidelines, before the thesis can be sent to the external examiner, “PhD supervisory committee members shall declare in writing to the supervisor that the thesis is of adequate substance (and quality) to warrant that the student proceed to the final examination or that the thesis is unsatisfactory and the student should not be allowed to proceed to the final oral examination. (FGSR Council, 1989/06/19). However, the department requests for both MSc and PhD, the supervisory committee members declare it in writing to the Chair of the department using the form letter:

“This is to certify that (student’s name) MSc/PhD thesis is of adequate substance to warrant that s/he proceed to the final oral examination.”

The interpretation endorsed by the Department of Medical Microbiology and Immunology is that the signature on the form indicates that in the opinion of the committee members, the thesis is of a textual quality equivalent to that of a manuscript being submitted for publication to a high quality journal and that the committee members are comfortable with the scientific content of the thesis (i.e., the signature on the departmental form attests that the committee members do not feel that major changes to the content of the thesis are necessary, thus a committee member would not sign a form approving the thesis if (s)he felt a chapter should be deleted or if (s)he felt that additional data was required to go forward for the defense). If the committee does not unanimously approve the thesis, the graduate student may appeal that decision to the Graduate Training Committee.

### 7.3.2 Timelines for thesis approval and convening of the examination

The student should be aware of deadlines to be met for submitting the final document to the Faculty of Graduate Studies for spring or fall convocations.

The time line for convening the final examination committee meeting is important to consider several issues including:

- time for the supervisory committee to review and approve the thesis,
- The supervisory committee should be given two weeks to review the thesis and suggest revisions to be made. *In some cases the committee members may want to see the revised thesis before they sign off to allow the thesis to go forward for defense and students and supervisors should allow for this in the timelines to schedule the examination.*
- getting approval for the External examiner for a PhD examination from FGSR  
*A lead-time of two months before the exam date should be allowed for the Faculty of Medicine and Dentistry (FoMD) to approve of a prospective External Examiner (see section 6.3.4 for the full process)*
- the actual scheduling the examination such that all the examiners can participate (see section 6.3.3 for the composition of the examining committee).
- For an MSc examination, the thesis should be supplied to the examiners a minimum of three weeks before the examination.
- For a PhD examination the requirement is to provide the thesis to the external examiner, as well as the rest of the examining committee, four weeks before the examination date.
- The department must submit to the Faculty of Graduate Studies and Research at least 3 weeks prior to the defense date a Notice of Approval of Oral Examination Committee form. *In the case of a PhD examination, this must include the External Examiner already approved by FoMD.*

### **7.3.3 Composition of the Examination Committee:**

The examination committee is recommended by the supervisor to the department and, once approved by the department, forwarded to FGSR for approval. Please refer to the FGSR guidelines for more information on who qualifies as an examiner. This individual can be from the supervisory committee and can be a cross-appointee in our department.

FGSR Council Policy also stipulates that at least 50% of the examiners must hold a University of Alberta affiliation and that 50% of the examiners must hold the same degree or higher as the degree being sought.

#### **MSc Examination Committee – Minimum 4 examiners:**

**Supervisor**  
**Supervisory committee (minimum two members)**  
**Arm's length examiner**  
**Chair of the exam (neutral)**

#### **PhD Examination Committee – Minimum 5 examiners:**

**Supervisor**  
**Supervisory committee (minimum two members)**  
**Arm's length examiner from University of Alberta**  
**Arm's length examiner from outside the University**  
**Chair of the exam (neutral)**

To qualify as an arm's length examiner according to the policies of FGSR council, the individual must not be (or have been) a member of the supervisory committee, or have been connected with the thesis research in a significant way. The examiner should not have been associated with the student, outside of usual contact in courses or other non-thesis activities within the University, nor be related to the student or supervisor(s).

**External Examiner:** The external examiner is from a different university. An External Examiner must participate in the examination, which includes participation by remote conferencing (see 7.3.7).

**The Chair of the examination:** The final exam is chaired by a departmental designate who is not a member of the examination committee and who is present to moderate discussion and record the minutes of the exam. Since the chair of the examination is a neutral member of the Examination Committee, s/he does not vote.

The Chair is expected to meet with the student prior to the examination to review with the student the process of the examination.

**Other Participants:** If not already a member of the examination committee, the Chair of the Department may be a non-voting participant. The Dean of FGSR may appoint a pro Dean who acts as the Dean's representative and is a full voting member of the examining committee. The usual function of a pro Dean is to assure the proper conduct of the examination.

#### **7.3.4 Selection of the External Examiner**

- The External Examiner is initially identified by supervisor and the student. Supervisory committee members should then be consulted.
- The supervisor contacts the potential examiner to determine whether they would be prepared to act as an examiner for this thesis and determine approximate dates for the thesis defense.
- It is important that there is no direct contact between the student and External Examiner between the time that the External is identified and the defense.
- The Department of Medical Microbiology and Immunology then nominates the potential External Examiner to the Faculty of Graduate Studies and Research who approve the nomination and defense date.
- The nomination requires a CV of the potential examiner that documents the examiner's research competence and experience in supervising graduate students at the Ph.D. level.
- A lead-time of two months before the exam date should be allowed for the Faculty of Graduate Studies to approve a prospective External Examiner.

#### **7.3.5 The Thesis Defense (The Examination)**

##### **Thesis Defense Seminar:**

- A candidate is required to present a public seminar based on the thesis, usually just prior to the final exam.
- The presentation plus questions for a PhD seminar is generally approximately one hour long.
- Members of the examining committee must attend the public seminar
- Members of the examining committee (including the supervisor) must refrain from questions and comments during the presentation and question period.
- Any member of the University community is free to attend the seminar and question the candidate on any aspect of the presented research during the question period following the seminar.
- The chair of the examination will moderate the question period so that it does not result in the discussion of material that is more appropriate for the examination.

##### **The examination:**

- Immediately after the seminar, the examining committee convenes for the examination that usually lasts two or more hours. The questions are set to enable the committee to form an opinion on the quality of the candidate's thesis work as well as his/her capability to comprehend its significance in the context of the field.
- Therefore the questions largely pertain to the thesis itself and the surrounding field and both the document and the candidate are being evaluated.
- The supervisor usually does not participate in the questioning in the final exam.
- The student is excused from the room to allow the committee to deliberate.

### **7.3.6 Results of Thesis Examinations**

The committee can approve the thesis, approve the thesis with minor modification, adjourn the defense to a later date, or fail the thesis and defense.

Normally, if all but one member of the committee agree on a decision, the decision shall be that of the majority. The dissenting committee member does not have to sign the thesis. If the one dissenting vote is that of the External Examiner the matter must be referred to the Vice-Dean of FGSR.

When the thesis is passed with minor revisions, one or more members of the examining committee withholds their signature on the Thesis Approval/Program who then signs when the changes have been made.

The thesis defense is adjourned in the case where the required revisions to a thesis are major: more research is required or a major re-structuring or re-stating of the thesis is required; the committee is dissatisfied with the candidate's oral even though the thesis document is deemed acceptable, with or without minor revisions; or there were exceptional circumstances such as a medical emergency during the examination.

If the defense is adjourned or the thesis is failed, or there are two or more dissenting votes, the Chair will provide the reasons in writing to the candidate, the Graduate Training Committee, Chair of the Department of Medical Microbiology and Immunology, and to the Faculty of Graduate Studies and Research. The guidelines established by the Faculty of Graduate Studies and Research will then be followed.

In the event that the defense is adjourned the examination must be re-convened within 6 months and a final decision made by the Examination Committee.

In all cases where the candidate encounters significant difficulties in the thesis defense, the situation will be reviewed closely by the Faculty of Graduate Studies and Research. The Faculty of Graduate Studies and Research will consult with the Department of Medical Microbiology and Immunology and the candidate before a final outcome is determined by the Faculty of Graduate Studies and Research. The final decision can be appealed through Faculty of Graduate Studies and Research procedures. (See the FGSR manual for further information).

### **7.3.7 Attendance of Examiners at Thesis defenses and Video/Teleconferencing**

All examiners must actively participate at the thesis defense (for both the M.Sc. and Ph.D. defenses) and if they are unable to participate the defense, the defense cannot proceed and must be deferred until such time as all examiners can participate.

It is generally recognized that the active participation of an examiner during the thesis defense is preferable to an External Reader. Remote (video or tele-) conferencing helps the department to be more flexible in scheduling defense dates.

Therefore, the presence of all examiners "in person" is not necessary if prior arrangements are made to allow an examiner (frequently the External Examiner in the case of Ph.D. defenses)

to participate in the defense through either videoconferencing or teleconferencing. The preferred method is video conferencing including Skype, recognizing that when teleconferencing the examiner does not have the opportunity to visually inspect diagrams or documents that are produced during the examination.