



UNIVERSITY OF ALBERTA
FACULTY OF MEDICINE & DENTISTRY
Department of Oncology

*Graduate Student
Handbook
2017-18*

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Oncology Graduate Program eClass website:

<https://eclass.srv.ualberta.ca/course/view.php?id=37941>

Faculty of Graduate Studies and Research (FGSR) Graduate Program Manual:

<https://www.ualberta.ca/graduate-studies/about/graduate-program-manual>

FGSR Policies and Regulations in University of Alberta Academic Calendar:

<http://calendar.ualberta.ca/content.php?catoid=20&navoid=4975#academic-integrity-and-ethics-training-requirement>

THE DEPARTMENT OF ONCOLOGY GRADUATE PROGRAM

1. INTRODUCTION

The Department of Oncology is a research-oriented department that provides a focus for cancer-related teaching and research within the Faculty of Medicine & Dentistry (FoMD). The Department is based at the Cross Cancer Institute (CCI), a tertiary cancer facility operated by Alberta Health Services that provides cancer care to northern and central Alberta. The Department has seven academic divisions: Experimental Oncology, Medical Oncology, Medical Physics, Oncologic Imaging, Palliative Care Medicine, Radiation Oncology, and Surgical Oncology.

The Department of Oncology offers thesis-based M.Sc. and Ph.D. degrees under two specializations, “Cancer Sciences” and “Medical Physics”. The specialization of Cancer Sciences serves the needs of the Divisions of Experimental Oncology, Medical Oncology, Oncologic Imaging, Palliative Care Medicine, Radiation Oncology and Surgical Oncology, whereas the specialization in Medical Physics serves the needs of the Division of Medical Physics. The specializations of the Oncology Graduate Program operate under guidance from the Faculty of Graduate Studies and Research (FGSR) and the Faculty of Medicine and Dentistry (FoMD).

Students are directed in their graduate work by their research supervisors and their supervisory committees. This direct supervision, as well as departmental oversight, ensures that the students receive high level training in various aspects of research, including experimental design, critical thinking, science writing, data presentation, and ethics.

2. DEGREE REQUIREMENTS AT A GLANCE

Cancer Sciences	Medical Physics
<p><u>M.Sc.</u></p> <ul style="list-style-type: none"> J Three courses (9 units) in graduate level courses J Completion of 8 hours of academic integrity & ethics training J For students entering in 2016 or later, completion of 8 hours of professional development training and an Individual Development Plan J Annual supervisory committee meetings J Successful defense of M.Sc. thesis 	<p><u>M.Sc.</u></p> <ul style="list-style-type: none"> J Eleven didactic courses (29 units) and two laboratory courses (4 units) in graduate level courses J Completion of 8 hours of academic integrity & ethics training J For students entering in 2016 or later, completion of 8 hours of professional development training and an Individual Development Plan J Annual supervisory committee meetings J Completion of BME 320 or 321 J Successful defense of M.Sc. thesis
<p><u>Ph.D.</u></p> <ul style="list-style-type: none"> J Four courses (12 units) in graduate level courses J Completion of 8 hours of academic integrity & ethics training (if not completed already as a requirement for the M.Sc. degree) J For students entering in 2016 or later, completion of 8 hours of professional development training and an Individual Development Plan (if not completed already as a requirement for the M.Sc. degree) J Annual supervisory committee meetings J Completion of the Ph.D. candidacy exam J Successful defense of the Ph.D. thesis 	<p><u>Ph.D.</u></p> <ul style="list-style-type: none"> J Completion of M.Sc. course requirements plus two additional Ph.D. courses (6 units) J Completion of 8 hours of academic integrity & ethics training (if not completed already as a requirement for the M.Sc. degree) J For students entering in 2016 or later, completion of 8 hours of professional development training and an Individual Development Plan (if not completed already as a requirement for the M.Sc. degree) J Completion of BME 320 or 321 (if not completed already as a requirement for the M.Sc. degree) J Annual supervisory committee meetings J Completion of the Ph.D. candidacy exam J Successful defense of Ph.D. thesis

3. OVERVIEW OF THE ONCOLOGY PROGRAM

3.1 *Student supervision*

Students enrolled in the Cancer Sciences specialization normally identify a prospective supervisor(s) prior to admission. Students in Medical Physics identify research supervisors by May of their first year. During the introductory meeting between a student and the supervisor, the supervisor should cover important topics with the student related to graduate studies in Oncology. These topics are listed in the *Department of Oncology Conversation Checklist* (see Oncology Graduate Program eClass site). This introductory meeting should occur within the first term of appointment of the supervisor.

The student's supervisory committee must be selected within the first year of graduate studies. Together with the supervisor, the supervisory committee monitors and facilitates progress of the student throughout the degree program. See Sections 4.6 and 4.7 for information on the composition of the supervisory committee and the details of supervisory committee meetings, respectively. Students are required to have at least one supervisory committee meeting per year. Meetings may be held more frequently if deemed necessary by the supervisor, the supervisory committee or the student. To maintain good standing in the department, students must receive satisfactory ratings at these meetings.

FGSR policies on graduate student supervision can be found at <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-8-supervision-oral-examinations-and-program-completion/8-1-supervision-and-supervisory-committees>.

3.2 *Funding*

The Cancer Sciences specialization does not normally admit prospective students unless financial support is available. Detailed information on stipends for Cancer Sciences students can be found in Section 11.2. Students in Medical Physics should discuss funding policies with prospective supervisors. Prospective supervisors of both specializations will assist the student in securing funds through application to internal and external agencies, or may provide support from their research funding. It is beneficial for a student to obtain his/her own funding even when the supervisor has sufficient grant funding as each studentship award increases the impact of the student's CV. Information on funding commitments, applying for studentships and travel awards, and policies regarding research allowances, can be found in Section 6.

3.3 *Registration and course work*

Students beginning graduate studies at University of Alberta in 2011 or later are required to register and pay tuition and fees each consecutive term (Fall, Winter, Spring, and Summer) to maintain status in the program. Students admitted to the graduate program prior to 2011 must register and pay tuition and fees for Fall and Winter terms, but not Spring and Summer unless the student is registered in a course in those terms. In Fall and Winter terms, students must register for 9 units of course work and/or thesis; in Spring and Summer terms, students register for 6 units of course work and/or thesis. See the FGSR manual and Academic Calendar for additional details, particularly those regarding registration at the time of program completion:

-) <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-6-program-planning-and-registration>; and
-) <http://calendar.ualberta.ca/content.php?catoid=20&navoid=4975#registration>.

Students must maintain a GPA of at least 2.7 out of 4 (B-) in order to remain in the graduate program and must obtain a pass grade [2.3 out of 4 (C+)] in each graduate course completed. The specific course requirements vary between the specializations and are determined by the Graduate Coordinating Committees (GCCs). Course selection should be made in consultation with the supervisor and supervisory committee.

For complete course requirements in Cancer Sciences, please refer to Section 11.3. For complete Medical Physics course requirements; please refer to Section 12.1.

3.4 Academic integrity and ethics training

All students registered in Oncology must complete eight hours of training in academic integrity and ethics. Fundamental ethics concepts to be addressed include research and scholarly integrity, intellectual property, conflict of interest, supervisor/student conflicts, human research ethics and animal research ethics. This requirement can be met by combinations of the following:

-) Attendance at the FoMD Ethics and Scientific Integrity Day (5 hours);
-) Completion of the FGSR Graduate Ethics Training online course: <https://www.ualberta.ca/graduate-studies/current-students/academic-requirements/ethics> (5 hours; required for Medical Physics students, optional for Cancer Sciences students);
-) Attendance at annual Oncology 661 lectures on Human/Cancer/Genetics Research Ethics (1.5 hours per lecture);
-) Completion of Part 1 -- The Care and Use of Animals in Research, Teaching and Testing: <http://www.reo.ualberta.ca/Education-Training-User-Support/Animal-Research-Ethics-Training/Animal-Research-Ethics-Training-Pt1.aspx> (2 hours);
-) Completion of the online Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans: <http://www.pre.ethics.gc.ca/eng/education/tutorial-didacticiel> (2 hours);
-) Additional resources recommended by FGSR: <https://www.ualberta.ca/graduate-studies/current-students/academic-requirements/ethics/resources>
-) Participation/attendance at various seminars and workshops advertised through FGSR or FoMD that have been approved as ethics training; and
-) Participation in other *ad hoc* sessions approved by special request in writing to the Associate Chair, Graduate Studies, Oncology, or to the GCC chairs.

Each student should provide the Oncology Graduate Program Office with a copy of training certificates and/or other relevant documentation, so that these can be included in the student's file. This training component of the graduate program is mandatory and must be fulfilled prior to the Ph.D. candidacy examination or prior to the M.Sc. thesis defense. A student will not be allowed to graduate unless he/she has fulfilled this University requirement.

FGSR policies and University requirements on ethics training can be found at:

-) <https://www.ualberta.ca/graduate-studies/current-students/academic-requirements/ethics>; and
-) <http://calendar.ualberta.ca/content.php?catoid=20&navoid=4975#academic-integrity-and-ethics-training-requirement>.

3.5 Professional development training and the Individual Development Plan

It is recognized that many students do not continue in academic and/or research careers following graduation. In order to raise awareness of other career opportunities available to our graduates, the

University of Alberta encourages students to pursue professional development training. Students beginning their graduate studies at the University of Alberta in the fall term of 2016 or later are required to complete 8 hours of professional development training as well as an Individual Development Plan (IDP). Information on this training and preparation of an IDP can be found at:

-) <https://www.ualberta.ca/graduate-studies/professional-development/professional-development-requirement>; and
-) <http://calendar.ualberta.ca/content.php?catoid=20&navoid=4975#professional-development-requirement>.

The IDP should be completed by the end of the first year in graduate studies for the master's program, and by 18 months of study in the doctoral program. The professional development training requirement for students entering in 2016 or later must be fulfilled prior to the Ph.D. candidacy examination or prior to the M.Sc. thesis defense. Documentation of professional development training and the completed IDP should be provided to the Oncology Graduate Program Office, so that these can be included in the student's file.

3.6 Requirements for completion of the M.Sc. program

In addition to annual supervisory committee meetings and completion of coursework and ethics training (and professional development training for Fall 2016 admissions onwards), the M.Sc. candidate must prepare and successfully defend a thesis describing the results of his/her research project. M.Sc. students in Medical Physics must complete a thesis focusing on Medical Physics (*e.g.*, Radiotherapeutic Physics, Radiological-Nuclear Imaging Physics, Magnetic Resonance Physics, or General Medical Physics). Students in both specializations will be examined orally on the contents of the thesis by a committee formed according to FGSR regulations. The thesis and examination are described in more detail in Sections 9 and 10, respectively.

3.7 Timeline for the M.Sc. degree

The minimum residency requirement for the M.Sc. degree in Oncology is one year. The M.Sc. program usually takes two to three years to complete. The University time limit for M.Sc. degrees is four years. Under extenuating circumstances, extensions can be obtained from the FGSR by written request. M.D.'s and other health professionals registered in the program are frequently required to spend a portion of their time in clinical activity; however, at least 80% should be devoted to academic research. The time spent in clinical activity does not count towards the degree requirement.

3.8 Change of status from M.Sc. to provisional Ph.D. candidate

Students enrolled in the M.Sc. program can request a transfer to the status of provisional Ph.D. student. The Associate Chair, Graduate Studies, Oncology, will monitor the process. Students who are performing well in their research and their course work, and who wish to transfer, are encouraged to do so within their first two years. In any case, the transfer from the M.Sc. program to the Ph.D. program must take place early enough in the student's program to enable the student to complete the candidacy exam within the first three years of entering graduate studies in Oncology.

To transfer to the Ph.D. program, students must obtain approval from their supervisors and all members of the supervisory committee. Approval of the transfer is based on the student's academic record, completion of required courses (exceptions may be made for courses that are not offered every year), progress in his/her M.Sc. research and demonstration of the potential to expand the scope of the

research. The latter is demonstrated by writing a Ph.D. proposal, which must be approved by the supervisory committee. In the Cancer Sciences specialization, the Ph.D. proposal must also be reviewed by the Cancer Sciences GCC prior to transfer to the Ph.D. program. For both specializations, **the Ph.D. proposal should be approved at least 4-6 months prior to the end of the student's third year** in graduate studies in Oncology. Additional details regarding the Ph.D. proposal can be found in Section 7.

Members of the supervisory committee confirm approval of transfer to the Ph.D. degree by signing the appropriate section of the *Supervisory Committee Report Form* (see Oncology Graduate Program eClass site for the most recent template). Official change of category to the Ph.D. degree will be initiated by the Department of Oncology Graduate Program Office after the supervisor, supervisory committee, and Associate Chair have approved the transfer, and other conditions have been met (*e.g.*, review of the Cancer Sciences Ph.D. proposal by the CS-GCC, approval of the transfer for Medical Physics students by the Medical Physics Program Director). **Timing of the transfer may affect eligibility for the University Doctoral Recruitment scholarship. See Training Program Administrator for additional details.**

Years of residency as an M.Sc. student will be applied to the Ph.D. program when transferring from the M.Sc. to the Ph.D. program. For example, a student who begins as an M.Sc. student in 2017 then transfers from M.Sc. to Ph.D in 2019, is considered to have started their graduate program in 2017. Credit for courses and training activities will be transferred to the Ph.D. program on the recommendation of the supervisor and the supervisory committee.

3.9 Requirements for completion of the Ph.D. program

Students can be admitted to the PhD program either directly or by transfer from the M.Sc. program (see Section 3.8). Ph.D. candidates are considered provisional until they successfully complete the Ph.D. candidacy examination. Annual supervisory committee meetings must be held to monitor progress in the program (see Section 4.7 for details).

Coursework required for completion of the Ph.D. program is detailed in Sections 11.3 (Cancer Sciences) and 12.1 (Medical Physics). Ethics and professional development training requirements are detailed in Sections 3.4 and 3.5, respectively. In addition, students are required to complete a Ph.D. candidacy examination to demonstrate knowledge of scientific and technical concepts relevant to the specialization, critical thinking skills, and the ability to synthesize original hypotheses and design approaches to test these hypotheses, as expected of Ph.D. students in the Oncology program. Please refer to Section 8 for details of the Ph.D. candidacy examination. **All coursework, ethics training, professional development training (if required), the Ph.D. proposal, and the Ph.D. candidacy examination must be completed by the end of the student's third year of graduate studies.**

Ph.D. candidates must prepare and successfully defend a thesis describing the results of the candidate's research project. Ph.D. students in Medical Physics must complete a thesis focusing on Medical Physics (*e.g.*, Radiotherapeutic Physics, Radiological-Nuclear Imaging Physics, Magnetic Resonance Physics, or General Medical Physics). Students in both specializations will be examined orally on the contents of the thesis by a thesis defense committee formed according to FGSR regulations. See Sections 9 and 10 for details regarding the thesis and the final Ph.D. examination, respectively.

Students are expected to prepare manuscripts on their research and submit them to scientific journals. Although not a formal requirement, the goal of every Ph.D. student should be to write three first-authored publications in good quality journals. Reaching this goal will ensure that the student is

competitive for post-Ph.D. fellowship awards and post-Ph.D. positions, and has more choices with regards to job opportunities and/or career paths. Although not every student will meet this goal, the Department expects that a Ph.D. candidate have at least one first-authored manuscript under revision by a peer-reviewed journal before the Department will accept the Ph.D. thesis for examination. The manuscript must be relevant to the subject matter of the thesis.

3.10 Timeline for the Ph.D. degree

The minimum residency requirement for a Ph.D. degree in Oncology is two academic years of full time attendance. The Ph.D. program will usually take four to six years to complete. However, the length of the Ph.D. program is necessarily dependent upon the progress achieved within the research project. It is to the advantage of Ph.D. students who experience difficulty making progress in their projects to inform the Associate Chair, Graduate Studies, Oncology, of their concerns early so that supportive action can be implemented. The University time limit for Ph.D. degrees is six years. Under extenuating circumstances, extensions can be obtained from the FGSR by written request.

4. OVERSIGHT OF THE STUDENT'S GRADUATE PROGRAM

4.1 Role of Faculty of Graduate Studies and Research

The FGSR is responsible for overseeing the general administration of graduate programs. The FGSR office houses documentation related to application, admission, programs, course grades, examinations, and theses. Additional information can be found at <http://uofa.ualberta.ca/graduate-studies/about/graduate-program-manual/section-1-areas-of-responsibilities>. The FGSR Graduate Program Manual is available at <http://uofa.ualberta.ca/graduate-studies/about/graduate-program-manual>. Policies and practices of the Oncology Graduate Program have been developed based on guidelines provided by FGSR in alignment with policies of the FoMD.

4.2 Roles of the Associate Chair and Oncology Graduate Program Office

The office of the Associate Chair, Graduate Studies, Oncology, acts as a liaison with the FGSR and the FoMD and oversees the entire Oncology graduate program. The Associate Chair is therefore the Graduate Coordinator for the Department of Oncology. The Associate Chair is aided by an Advisory Committee, which includes the Department Chair and representation from the specializations of Cancer Sciences and Medical Physics. The mandate of the committee is to make policy recommendations for the overall governance of the Oncology graduate program. The Associate Chair is assisted by the Training Program Administrator. All enquiries and accompanying paperwork (admission enquiries, forms, correspondence, etc.) should be directed to the Oncology Graduate Program Office (*i.e.*, the Training Program Administrator who is assisted in these duties by the Graduate Program Assistant).

4.3 Role of the Graduate Coordinating Committees (GCC)

There are two Graduate Coordinating Committees (GCCs) in the Oncology Graduate Program: the Medical Physics GCC (MP-GCC) and the Cancer Sciences GCC (CS-GCC). Each GCC is chaired by a representative from within the specialization with experience in graduate student supervision. The role of the GCC is to uphold standards of academic excellence within the specialization and the program.

The responsibilities of the GCCs are:

-) To set regulations for students within the specializations (including course requirements);
-) To select students for admission to the program;
-) To assist in facilitating appropriate supervisor-student pairings;
-) To ensure that the students' supervisory committees are struck within one year of commencing the graduate program;
-) To review the membership of supervisory committees, Ph.D. candidacy examination committees, and M.Sc. and Ph.D. thesis committees;
-) To ensure that each supervisory committee meets at least once a year;
-) To monitor the progress of graduate students within the specializations by annual review of the supervisory committee meeting reports;
-) To make recommendations, in consultation with the supervisor, for the appropriate action in the event that a student fails a course or courses;
-) For the Cancer Sciences specialization, to provide constructive feedback to the students on their Ph.D. proposals and make recommendations to the supervisor and supervisory committee regarding the suitability of the candidate, the approach and the project for a Ph.D. degree;

-) For the Medical Physics specialization, to review yearly the existing courses offered in Medical Physics program, to consider re-arranging the curriculum to improve the educational process, to consider creation of new courses and to react to any other issues (e.g., admission, recruitment) pertaining to Medical Physics;
-) To facilitate career development of graduate students; and
-) To act as the interim supervisor for rotational students, and for students who are without a supervisor.

CS-GCC membership includes the CS-GCC Chair; the Associate Chair, Graduate Studies, Oncology; the Oncology Training Program Administrator; a minimum of four representatives from divisions of the Department of Oncology that have graduate students in the Cancer Sciences specialization; the Experimental Oncology Division Director (*ex officio*); and the Oncology Department Chair (*ex-officio*). Additional Division Directors and/or the Clinical Fellowship Coordinator will be invited to attend CS-GCC meetings as required. A list of current members of the CS-GCC is available on the Oncology Graduate Program eClass site.

MP-GCC membership includes the Program Director, who chairs the committee, and each person with an academic appointment in the Division of Medical Physics of the Department of Oncology, or any other person with an academic appointment who teaches any of the classes offered as part of the Medical Physics Graduate Program. One student representative, elected by the Medical Physics graduate students, will sit as a non-voting member of the committee. The graduate students' representative will serve for a two-year term commencing in September and will not attend confidential portions of the MP-GCC's meetings.

4.4 *Qualifications and responsibilities of the supervisor*

It is the responsibility of the GCC to ensure the quality of graduate level supervision. Supervisors must have an appointment within the Department of Oncology and

-) Be currently active in research;
-) Have adequate time to supervise the student;
-) Have sufficient peer-reviewed research funding for the proposed project;
-) Have the space and time to accommodate the number of students under supervision; and
-) Hold a degree that is equivalent or higher than that for which the student is a candidate, or have a demonstrated record of successfully supervising students for the degree. Individuals with M.D. degrees may supervise Ph.D. students in the Cancer Sciences specialization when Departmental justification is provided and approved by the Associate Dean, Research-Graduate Programs, FoMD.
-) For the Medical Physics program, must hold either a Ph.D. in Physics, or a Ph.D. in Engineering Physics (or other fields of physical engineering) with Medical Physics certification by the appropriate College or Board from Canada or the USA, respectively.

Another supervisor may be added by the supervisor, or at the request of the Associate Chair, Graduate Studies, Oncology, with approval from the Associate Dean, Research-Graduate Programs, FoMD.

Supervisors should not normally take on more than three graduate students until they have successfully graduated a student from the University of Alberta.

The supervisor's responsibilities are:

-) To complete the conversation checklist, (see Oncology Graduate Program eClass site) together with the student, within the first 4 months of supervision of the student;
-) To provide assistance in planning a student's program and professional development;
-) To stay informed about the student's research activities and progress;
-) To maintain open communication throughout the student's program of studies;
-) To communicate expectations regarding participation in group meetings, performance of lab duties, and time commitments;
-) To ensure the student has appropriate training for the research project;
-) To inform the student of the supervisor's commitment of financial support; and
-) To discuss practices with respect to co-authorship, first authorship, order of authorship, and acknowledgement of contributions. Note: General guidelines on authorship are also available from the FGSR Graduate Program Manual and the university's Intellectual Property Guidelines for Graduate Students and Supervisors. See: <http://uofa.ualberta.ca/graduate-studies/about/graduate-program-manual/section-10-intellectual-property>.

FGSR guidelines regarding responsibilities of the supervisor can be found at <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-1-areas-of-responsibilities/1-2-the-supervisor>.

4.5 Responsibilities of the student

Students must be pro-active in ensuring progress in their graduate programs. It is the obligation of the student:

-) To keep the supervisor informed of progress on a day-to-day basis, as well as through preparation of an annual progress report for distribution to the student's supervisory committee;
-) To keep accurate and complete records which must be accessible to the supervisor;
-) To stay up-to-date with the scientific literature in the field;
-) To attend Oncology 660/661 seminars (for Cancer Sciences students), thesis defense seminars and other seminars and symposia relevant to the research project;
-) To ensure that his or her course registration is accurate, complete, and finished before the required deadlines; and that tuition and fees are paid by the deadline;
-) To complete ethics (and professional development, if needed) training and other training required to conduct the thesis research; and
-) To carry out expected lab-specific responsibilities, such as shared tasks, equipment maintenance, ordering consumables, etc., as discussed with the supervisor.

FGSR guidelines regarding responsibilities of the student can be found at <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-1-areas-of-responsibilities/1-1-the-graduate-student>.

4.6 Composition and role of the supervisory committee

Selection of a supervisory committee should occur within the first year, and preferably soon after the student has settled into a defined project. The supervisory committee will consist of the supervisor, and at least two other members of the University academic staff. At least one member of the supervisory committee, not including the supervisor, must hold a Ph.D.. The composition of the committee is

formulated jointly by the supervisor and the student. Following approval of the membership of the committee by the Associate Chair, Graduate Studies, the Oncology Graduate Program Office submits the *Approval of Supervisor/Supervisory Committee* form to FGSR. It is the Department's responsibility to ensure that the members of the supervisory committee have expertise relevant to the student's project, and are competent in advising at the required level. The Associate Chair and relevant GCC have the authority to discuss the composition of supervisory committees and to make recommendations for additions or changes.

The role and responsibilities of the supervisory committee are:

-) To monitoring and facilitating the student's progress in his/her research program;
-) To make recommendations on the choice of course work and training activities;
-) To approve transfer of an M.Sc. student to the Ph.D. program, including approval of the Ph.D. proposal;
-) To approve scheduling of the candidacy exam (for Ph.D. students) and the thesis defense;
-) To give approval to the student to write the thesis; and
-) To form the nucleus of the examining committees for the candidacy examination (in the case of Ph.D. students) and for the thesis defense.

FGSR guidelines regarding the composition of the supervisory committee can be found at <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-8-supervision-oral-examinations-and-program-completion/8-1-supervision-and-supervisory-committees>.

4.7 Annual supervisory committee meeting requirements

The supervisory committee must meet with the student at least once a year, but students, supervisors, or members of the supervisory committee may request more frequent meetings if they think it necessary. Meetings are not examinations. The supervisory committee is there to assist the student by providing collective advice, as well as helping with decisions to be made in the research project and intended study path.

Prior to the supervisory committee meeting, the student should:

-) Prepare an annual research progress report and distribute to the committee;
-) Prepare a slide presentation (~20 min in length);
-) Update student information in the *Supervisory Committee Report* form and forward to the supervisor; and
-) Update his/her CV.

The annual progress report (3 to 5 double-spaced pages, plus additional pages for references and figures) should summarize the project objectives and hypotheses being tested, the student's research work over the previous year, including both accomplishments and difficulties that may have impeded progress, and proposed research for the next year. The report must be distributed to the members of the supervisory committee at least three days in advance of the meeting. The slide presentation should explain and expand on information in the progress report, and is meant to aid in the discussion of research progress and future plans at the supervisory committee meeting.

To assist in monitoring student progress, the *Supervisory Committee Report* form must be completed by the student prior to each supervisory committee meeting and forwarded to the supervisor, who will review the report and bring a copy to the Supervisory Committee meeting. A template for the report is

available on the Oncology Graduate Program eClass website. The report should include an update on courses taken and planned, ethics and professional development training completed, awards, publications or abstracts and any other information deemed to be of interest to the supervisory committee.

M.Sc. students who are seeking elevation to the Ph.D. program (normally in the first or second year), as well as Ph.D. students in their first or second year, must write a Ph.D. proposal which should include a progress report as described above, as well as a rationale and outline of the work proposed for the remainder of the student's graduate work. Ph.D. proposals should be appended to the *Supervisory Committee Report* form for the meeting at which the proposal is discussed. Further information on the Ph.D. proposal can be found in Section 7.

It is the responsibility of the supervisor to set a date for the supervisory committee meeting in consultation with the student and other members of the committee and to book the room for the meeting. The student is responsible for booking any audio-visual equipment needed.

Supervisory committee meetings generally follow the same format:

1. Normally, the student remains in the room for the entire meeting.
2. The supervisor provides a brief update on the student's progress in the program (coursework, conference attendance, publications, funding, volunteer activity, ethics and professional development training).
3. The student presents his/her research objectives, results, difficulties, and future plans, with interruptions by the supervisory committee for discussion and advice.
4. If relevant, the student and committee discuss upcoming milestones such as elevation from M.Sc. to Ph.D. program, timing of the candidacy exam, or whether there is sufficient experimental data to write the thesis.
5. The supervisor takes minutes, with an emphasis on the student's accomplishments, recommendations for future experiments, and any discussion regarding milestones. This can be recorded on the *Supervisory Committee Report* form at the meeting, or circulated to the committee and the student after the meeting.
6. The student's research progress is then assessed by checking the appropriate box on the *Supervisory Committee Report* form.
7. The supervisory committee (including the supervisor) and student must then sign the *Supervisory Committee Report* form. If decisions are made regarding important milestones, the committee members and student should withhold signatures until after reviewing the minutes. The student and supervisor should retain copies of the signed report.

As soon as possible after the supervisory committee meeting, the following package must be submitted to the Oncology Graduate Program Office:

-) The completed *Supervisory Committee Report* form signed by all supervisory committee members and the student;
-) Minutes of the meeting (if not included in the report's comments section);
-) The student's Progress Report (not required if a Ph.D. proposal is submitted at this time);
-) The student's Ph.D. proposal, if applicable;
-) Documents related to the student's candidacy exam (see *Guidelines for the Ph.D. Candidacy Exam* package), if applicable;
-) Any publications or abstracts (including title, date and location of conference, or citation if published) on which the student is author or co-author; and

) The student's updated CV.

A copy of the report and attachments will be kept in the student's file and brought to the attention of the GCC if problems are flagged. The supervisor of a student whose committee has not met for over a year will receive an official reminder from the Graduate Program Assistant. This will be followed by an official reminder from the GCC Chair and/or Department Chair if necessary.

4.8 Student-supervisor conflicts

The relationship between a graduate student and supervisor represents a long-term commitment on both sides. Occasionally, problems will arise between a student and supervisor, which, if left unresolved, may severely jeopardize the student's chance of completing a graduate degree. A student encountering problems which cannot be resolved through discussion with the supervisor should immediately consult the CS- or MP-GCC chair before taking any other action. The GCC Chair; Associate Chair, Graduate Studies, Oncology; and Division Director may meet with the supervisor and members of the supervisory committee to discuss the problem further. Courses of action include suggestions for changes to the composition of the supervisory committee, transfer of the student to another supervisor within the Department, or transfer of the student to another University Department. In cases where the conflict cannot be resolved to the student's satisfaction, the student may be asked to withdraw from the program without prejudice. Should the student-supervisor relationship become disrupted, the appropriate GCC will act as the student's interim supervisor.

5. RESOURCES FOR STUDENTS

The Graduate Students' Association (GSA) is committed to providing high quality services to the University of Alberta's graduate student community. The GSA has a sponsored an ombudsperson dedicated to graduate student issues. This free service offers help to graduate students facing academic, research, and personal issues. Further details on the types of services and support available from the GSA is available on their website at <http://www.gsa.ualberta.ca/>.

Other resources available to assist students include:

-) The Student Success Centre: <http://www.studentsuccess.ualberta.ca/>
-) The Centre for Writers (C4W): <http://c4w.ualberta.ca/>
-) The Oncology Graduate Students' Association
-) The Student Ombudservice: <http://www.ombudservice.ualberta.ca/>
-) The Career Centre (CAPS): <http://www.caps.ualberta.ca/>

6. DETAILS OF FINANCIAL ASSISTANCE

6.1 *Stipend support*

Students in the Cancer Sciences specialization are normally provided a basic annual stipend (see Section 11.2). Students must be made aware of any exceptions to the basic stipend guideline when they are admitted to the program. Students in Medical Physics should discuss funding policies with prospective supervisors. In cases where the supervisor has insufficient funds for a full stipend, the student must be allowed to work part-time to supplement their partial stipend. Funding for additional years beyond normal tenure (3 years for an M.Sc. and 6 years for a Ph.D.) should be negotiated between the student and supervisor.

Stipends for students who take part-time employment prior to completing their degree requirements, even if maintaining their registration in the Department of Oncology graduate program, will be determined on a case-by-case basis. Students who take full-time employment prior to completing their degree requirements, even if maintaining their registration in the Department of Oncology graduate program, are not eligible to receive a stipend.

6.2 *Studentship awards*

Students are responsible for notifying the department of any studentships, bursaries, or other awards received, which contribute to their stipend or tuition payment. To maximize potential funding opportunities, it is essential that students receiving awards consult with the Training Program Administrator regarding award start dates.

Students in the Oncology graduate program may be eligible for studentship awards from a variety of sources. Information regarding some of these graduate studentships can be found at the following sites:

-) University of Alberta awards: <https://uofa.ualberta.ca/graduate-studies/awards-and-funding>
-) FoMD awards: <https://www.ualberta.ca/medicine/research/awards>
-) Women and Children’s Health Research Institute awards: <http://www.wchri.org/>
-) Cancer Research Institute of Northern Alberta (CRINA) awards: <https://www.ualberta.ca/cancer-institute>
-) Department of Oncology awards: <https://www.ualberta.ca/medicine/departments/oncology/education/graduate-studies/scholarships-and-fees>

Several of the above websites also provide information regarding studentships awarded by external agencies such as Alberta Innovates, Canadian Institutes of Health Research, Natural Science and Engineering Research Council, and the Alberta Cancer Foundation.

6.2.1 *Studentship deadlines*

Approximate deadlines for some of the awards held most commonly by students in Oncology are as follows (note that these dates can vary from year to year):

Vanier Canada Graduate Scholarship	September
FoMD – 75 th Anniversary Awards	September
Canadian Graduate Scholarship Master’s (CIHR, NSERC)	October
CIHR Doctoral Awards	October
NSERC Doctoral Awards	October
FGSR Department-Specific Awards	October
Prostate Cancer Canada: Graduate Studentship in Prostate Cancer Research	January
WCHRI Graduate Studentships	February
FGSR General Awards	February
Alberta Innovates Studentships	April
University of Alberta Specialized Awards	June
QEII nominations	July

IMPORTANT:

Applications for funding require *completed* application forms to be brought to the Oncology Graduate Program Office in CCI room 2243 (Department of Oncology Office) in order to obtain the Department Chair’s signature. Once the signature is obtained, the Oncology Graduate Program Office will forward the forms to the Faculty of Medicine and Dentistry (FoMD) Research Office. The department requires a minimum of **2 – 5 business days** to obtain the Chair’s signature, and the FoMD Research Office requires **5 business days** to review the forms before submitting to the funding agency. Applications must therefore be submitted to the Graduate Program Office **no later than 9 business days before deadlines listed on the studentship application.**

6.3 *Travel awards*

Students presenting talks or posters at conferences are encouraged to apply for travel awards. These funds must be used for conference registration fees, accommodation, travel or other allowable expenses incurred as a result of attending the meeting. Please check eligibility requirements and application deadlines, as these vary among funding sources.

The Brian & Gail Heidecker Oncology Graduate Student Travel Endowment provides awards of up to \$500 each year to assist graduate students in the Department of Oncology participating in symposia and conferences related to cancer research. Information regarding this award can be found at <https://www.ualberta.ca/medicine/departments/oncology/education/graduate-studies/scholarships-and-fees>.

The University of Alberta Graduate Student Association (GSA) and the FGSR also provide travel awards. Information for these awards can be found at <http://www.gsa.ualberta.ca/en/Funding/ATA.aspx> and <https://www.ualberta.ca/graduate-studies/awards-and-funding/scholarships/fgsr-graduate-travel-awards>, respectively.

Conference organizers also frequently provide a limited number of travel awards.

6.4 Policies and guidelines regarding research allowances

Some granting agencies provide a research allowance to graduate students. All expenditures by the student from this allowance must be approved in advance by the supervisor or, where guidance is required as to the suitability of specific expenditures, by the appropriate GCC. Allowable items must relate directly to the student's research and would include books, journals, periodicals, travel, etc. Items that are normally associated with entertainment should not be purchased through a research allowance, even if these items have additional functions that can be used in a research setting. Proper documentation of items purchased must be provided with the expense claim.

(N.B. If these policies disagree with the official policies of the granting agency, the latter will hold.)

7. GUIDELINES FOR THE PH.D. PROPOSAL

Students registered in the Ph.D. program, and M.Sc. students wishing to transfer to the Ph.D. program, must write a Ph.D. proposal that is approved by their supervisory committee usually within 12-30 months of registering in the graduate program. The Ph.D. proposal must be approved (and for the Cancer Sciences specialization, must be reviewed by the CS-GCC) before initiating the Ph.D. candidacy exam process. Consequently, the deadline for the Ph.D. proposal is dictated by the FGSR requirement to complete the Ph.D. candidacy examination prior to the end of year 3 in the student's graduate program.

The Ph.D. proposal must be written by the student and should clearly delineate the role of the student and the scope of the project. Input from the supervisor and supervisory committee is encouraged. For Cancer Sciences, the Ph.D. proposal must not exceed 6 pages, including one page for the abstract. For Medical Physics, the Ph.D. proposal should not exceed 10 pages, including one page for the abstract. For both specializations, the remaining pages should be divided into Introduction, Progress Report, and Proposed Experiments including the hypothesis, objectives, a brief description of experiments and summary statement describing the importance of the proposed work. Ph.D. proposals in Medical Physics must also include a timeline outlining the milestones expected (experiments, submission of abstracts and papers). For both specializations, appendices (not included in the page limit) should be restricted to figures, references, questionnaires and tables. The student's *Curriculum Vitae* including publications, abstracts, presentations, awards, membership on committees, etc., must also be appended to the Ph.D. proposal. **The Ph.D. proposal must be submitted to the supervisory committee at least one week prior to the scheduled supervisory committee meeting.**

The Ph.D. proposal will be reviewed by the supervisory committee (and the CS-GCC for Cancer Sciences students) to determine whether it has the originality and scope appropriate to the degree of Ph.D. These committees will pay particular attention to the following in their appraisal:

-) That the proposed topic addresses a significant problem and therefore advances the field;
-) That the methodology proposed enables testing of the hypothesis;
-) That the methods of data analysis are appropriate to the data set so that meaningful conclusions can be drawn;
-) That the time frame is sufficiently outlined and realistic; and
-) That the student has access to all the expertise required to complete the project, and if not, how that expertise will be accessed.

The supervisory committee will provide input to the student during the supervisory committee meeting and either approve the Ph.D. proposal or request revisions. If the Ph.D. proposal is not approved, sufficient details must be provided to the student and supervisor to facilitate re-submission of an acceptable proposal. Once the proposal has been approved by the supervisory committee, each supervisory committee member will sign the *Supervisory Committee Report* form. The student will then submit the following documents to the Oncology Graduate Program Office:

-) Ph.D. proposal;
-) Completed and signed *Supervisory Committee Report* form;
-) Minutes of the supervisory committee meeting(s) at which the Ph.D. proposal was discussed/accepted; and
-) Student's updated *Curriculum Vitae*.

For Cancer Sciences students, the Ph.D. proposal must be reviewed by the CS-GCC at a regularly scheduled GCC meeting. Changes/additions to the supervisory committee membership may be

suggested/requested by the CS-GCC following review of the proposal. Constructive feedback will be provided to the student and supervisor by the chair of the CS-GCC. Copies of the CS-GCC chair's recommendations will be forwarded to the Associate Chair, Graduate Studies, Oncology, and to the Oncology Graduate Program Office for inclusion in the student's file. It is in the student's interest for the student and supervisor to seriously consider comments made by the CS-GCC, as issues that are not addressed may surface during the candidacy examination.

8. GUIDELINES FOR THE PH.D. CANDIDACY EXAMINATION

FGSR defines the Ph.D. candidacy examination as an oral examination “in which students must demonstrate to the satisfaction of the examining committee that they possess an adequate knowledge of the discipline and of the subject matter relevant to the thesis, and the ability to pursue and complete original research at an advanced level.”

The FGSR requires that **all Ph.D. students take an oral candidacy examination within 24-36 months of joining the graduate program** as either M.Sc. or Ph.D. students (for exceptions, please see Section 8.6). The candidacy examination must be passed no less than six months prior to the final thesis examination. At the time of candidacy, most - if not all - of the course work is completed and the thesis project is started or well-defined.

FGSR guidelines for Ph.D. candidacy examinations can be found at <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-8-supervision-oral-examinations-and-program-completion/8-3-conduct-of-examinations>.

In the Oncology graduate program, the candidacy exam requires preparation of a written document in the form of a research grant proposal which the student defends orally before their Ph.D. candidacy examination committee.

8.1 Format of the Cancer Sciences Ph.D. candidacy exam grant proposal

In the Cancer Sciences specialization, the student’s thesis project can be included in the candidacy grant proposal, but must not make up more than one-third of the grant proposal. The candidacy grant proposal is expected to be more encompassing, with the student’s project serving only as the starting point for the development of new ideas, hypotheses and approaches that are independent of the supervisor’s research program.

The candidacy exam grant proposal is similar in nature to that submitted to a granting agency such as the CIHR (specific details and formatting requirements are provided in the *Guidelines for the Ph.D. Candidacy Exam* document, which can be found on the Oncology Graduate Program eClass site). Briefly, the grant proposal may be up to 11 pages long with single line spacing and 1-inch margins. Appended references, explanatory diagrams and figures do not count towards the page limit. The proposed research plan should outline work that could typically be accomplished by three people over three years.

Writing a successful proposal on a scientifically relevant question is a difficult and challenging endeavor. The essential background of the scientific problem should be summarized in a few pages. The description of the proposed work should occupy about 60% of the proposal. General statements about relevance should be restricted to one succinct introductory paragraph and another at the end. Most importantly, the student should pose the specific questions to be answered, provide a clear rationale for the scientific approach to be taken, provide a description of the techniques and controls to be employed, and discuss the interpretations that might be drawn. A brief discussion of the limitations and pitfalls of the approach should also be included. Students are encouraged to visit the CIHR website or other similar websites to obtain general information on how a grant proposal should be written.

In addition to the 11-page proposal, the student must write a **one-page abstract** that includes a brief summary of background, hypotheses, and objectives. Objectives should include approaches and methodology.

8.2 Format of the Medical Physics Ph.D. candidacy exam proposal

Students in Medical Physics are required to write and defend a research proposal for their Ph.D. candidacy examination. The student must successfully pass one of the Advanced Specialization Courses (ONCOL 691-3) in their particular field of specialization before proceeding to the candidacy examination. It is advised that the student uses the documents (*e.g.*, class notes, and powerpoint) prepared in the Advanced Specialization Courses as the bases of the documents for the candidacy examination with clear subheadings; abstract (1 page), introduction to the topic and the problem to be solved, fundamental knowledge behind the problem, presentation of any preliminary theoretical or experimental data, suggestions to solving the problem, proposed future experiments to solve the problem and detailed timeline of proposed milestones. The proposal document must not be greater than 25 pages excluding figures, graphs, references and tables. The candidate must demonstrate that he or she has sufficient background knowledge in the proposed topic and in general medical physics to be successful.

8.3 Timeline for preparation for the Ph.D. candidacy examination

For students in the Cancer Sciences specialization, preparation for the candidacy examination cannot be initiated until after the Ph.D. proposal is approved by the supervisory committee and review by the appropriate GCC.

For the Medical Physics program, following approval of the Ph.D. proposal, the student must register in one of the Advanced Specialization Courses (Oncol 691, 692 or 693) and receive a passing grade before proceeding to the candidacy examination.

The candidacy examination will only be scheduled following approval of the date and topic by the student's supervisory committee, as documented in the *Supervisory Committee Report* form.

Students who are ready to prepare for their candidacy exam, as well as their supervisors, should carefully read the documents in the *Guidelines for the Ph.D. Candidacy Exam* package which can be found on the Oncology Graduate Program eClass website. Signatures on the *Guidelines* document certify that the student and supervisor have read and agree to adhere to these guidelines.

At least 8-12 weeks prior to the projected Ph.D. candidacy exam date, the student should meet with his/her supervisor and supervisory committee in order to discuss:

-) The candidacy exam topic (*i.e.*, the hypothesis, objectives and a brief overview of approaches of the grant proposal, in the form of a **one-page abstract**); and
-) The intended date of the candidacy exam.

The supervisor/supervisory committee can provide general input into the candidacy exam topic, keeping in mind that the purpose of the exercise is to encourage the student to develop their own ideas and approaches within the context of their research field. The supervisory committee should discuss potential examiners.

At least six weeks before the exam date, the Oncology Graduate Program Office must be provided with the following items:

1. A copy of the *Guidelines for the Ph.D. Candidacy Exam* document signed by the student and supervisor to be kept in the student's file.
2. A copy of the *Supervisory Committee Approval of Ph.D. Candidacy Exam Topic* form signed by each member of the supervisory committee. The title of the Ph.D. candidacy exam topic (or grant proposal for Cancer Sciences students), the Ph.D. candidacy examination date, and the date on which the proposal will be handed to the members and chair of the Ph.D. candidacy examination committee must be indicated. This form is included in the *Guidelines* package.
3. A copy of the completed *Request for Approval of the Two Faculty Members to be Added to the Ph.D. Candidacy Examining Committee* form indicating the names of the two examiners and their fields of expertise. The fields of expertise of the two additional members must be appropriate for the examination topic. It is the responsibility of the supervisor(s) to ensure that examiners meet eligibility and "arm's length" criteria as described in Section 8.4. This form is also included in the *Guidelines* package.

The composition of the examining committee will be reviewed by the Associate Chair, Graduate Studies, Oncology, and/or the GCC chairs to ensure that the Ph.D. candidacy examination committee has sufficient expertise in the student's field of research, and with Ph.D. candidacy examinations in general. Once the examination committee has been approved, the Oncology Graduate Program Office will fill out the *Notice and Approval of Ph.D. Candidacy Examining Committee* form and submit it to the FGSR for final approval. This notice must be received by the FGSR at least three weeks in advance of the examination.

During the six weeks leading up to the exam date, the student should be excused from all other research work in order to prepare for the candidacy examination. Exceptions to this must involve discussion between the student and supervisor, and if necessary with input from the Associate Chair, Graduate Studies, Oncology. The candidacy exam proposal must be written during the **first four weeks of this protected time**, so that it is ready for distribution two weeks prior to the exam.

At least two weeks before the examination, the student must forward the finished candidacy examination proposal to the Oncology Graduate Program Office, who will forward it to the Ph.D. candidacy examining committee, including the chair. Failure to hand in the grant proposal on time, in the absence of exceptional circumstances, will result in the candidacy exam being cancelled at the discretion of the CS- or MP-GCC, as appropriate. If it is necessary to reschedule the exam, the GCC may impose additional requirements for the written proposal.

In the interval between distribution of the proposal and the date of the exam, the student is strongly encouraged to have a mock examination with other students and post-doctoral fellows in the department in order to better prepare for the actual exam.

It is the responsibility of the supervisor to ensure that the examination committee members are informed of meetings and details of examinations, and that proper arrangements, including room booking and projector and laptop if required, are made for the student's examination. The Graduate Program Assistant can help with these arrangements.

8.5 Conducting the candidacy examination

8.5.1 The Ph.D. candidacy examining committee composition

The Ph.D. candidacy examining committee must have a minimum of five, and a maximum of seven, faculty member examiners:

-) All examiners are voting members of the committee and must be either active in the general subject area of the student's research, or bring relevant expertise to the assessment of the thesis.
-) The supervisor and supervisory committee members are *ex officio* examiners.
-) The committee must have a minimum of two "arm's length" examiners.*
-) The examination must be chaired by a faculty member who is not the supervisor (or co-supervisor) but is a member of the Department of Oncology. The chair is not an examiner, thus does not vote. The candidacy examination chair is appointed by the Associate Chair, Graduate Studies, Oncology.
-) At least half of the examiners must have a degree which is equivalent to, or higher than, the degree being examined.
-) At least half of the examiners on every examining committee must be tenured, tenure-track, or retired University of Alberta faculty members.
-) All members must attend the examination.

* An "arm's length" examiner 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). Except in special circumstances (fully justified in writing to the Dean, FoMD), an arm's length examiner should not be a close collaborator of the supervisor(s) within the last six years.

8.5.2 Role of the chair

The chair is responsible for:

-) Ensuring that departmental and FGSR regulations relating to the candidacy examination are followed;
-) For the Cancer Sciences specialization, ensuring that the examiners and the student are aware of the *Candidacy Examination Feedback Report* form (available on the Oncology Graduate Program eClass site) prior to the start of the examination;
-) Bringing relevant documentation to the examination, including the student's file, and for the Cancer Sciences specialization, the *Candidacy Examination Feedback Report* form;
-) Reviewing the student's status in the program with the examination committee just before examination of the student commences;
-) Moderating the discussion and directing questions (the chair may participate in the questioning);
-) Taking minutes during the exam: for the Cancer Sciences specialization, particular note should be made regarding criteria detailed in the *Candidacy Examination Feedback Report* form; and
-) Facilitating the committee decision on the outcome of the examination to ensure that it aligns with departmental and FGSR guidelines.

8.5.3 *Format of the examination*

The examination is carried out as follows:

1. The chair introduces members of the examining committee to each other and to the student.
2. The chair briefly describes the examination process, and establishes the order of questioning (from most external to most internal).
3. The student then leaves the room, and the chair and/or supervisor discuss the student's status in the program, highlighting achievements and difficulties that may have affected the timeline for the candidacy examination.
4. The student is called back to the room, and gives an oral presentation of the candidacy examination proposal. The oral presentation should give the highlights of the proposal and should be ~20 minutes (maximum 25 minutes) long.
5. The oral presentation is followed by two rounds of questioning. Generally, each examiner is given 20 minutes to ask questions during the first round. The second round of questioning is usually shorter, but can last as long as 15-20 minutes per examiner. Although there are no strict rules regarding the examination format, the first round of questioning usually focuses directly on the proposal, while the second round of questioning is more peripheral.

NOTE: The student should be prepared for a broad range of questions related to the grant proposal as well as more generally-oriented background questions. One of the main objectives of the candidacy exam is to assess the student's ability to think and to reason. It is therefore important to keep in mind that some questions can be adequately answered with "related knowledge" rather than "factual knowledge". For example, if the student doesn't know the answer to a question but does know something about the topic, it may be to the student's advantage to attempt to answer the question based on logic and deduction. For students in Medical Physics, questioning will be related to the Ph.D. topic as well as to any general medical physics topic. It is understood that the student should also expect, at least, one round of medical physics questions that are outside the Ph.D. topic.

6. After the final round of questioning, the student is invited to comment on any aspects of the examination. This is an opportunity for the student, for example, to revisit specific questions in order to clarify their answers.
7. The student is then asked to leave the room while the examining committee deliberates the outcome as described in the next section.
8. Once the outcome is decided, the student is called back to the room and informed of the decision, with sufficient feedback from the chair that the reasons for the outcome are clear to the student.

8.5.4 *Assessment and outcomes of the candidacy examination*

The outcome of the exam will be based on the written document as well as on the oral defense of the proposal, with more weight placed on the oral defense. Overall, the student is assessed on the following:

-) Writing style: clarity, proper grammar, proper and sufficient referencing, good use of figures;
-) Content of written document: clear rationale, clear hypothesis, objectives designed to address hypothesis, logical flow of experiments;
-) Knowledge and understanding of the field and relevant techniques specific to this proposal;
-) Broad knowledge of the discipline;
-) Critical thinking skills;
-) Ability to integrate concepts and ideas;
-) Clarity in response to questions during the oral defense;
-) Ability to 'think on his/her feet'; and

-) For the Cancer Sciences specialization, the student must also demonstrate an ability to propose new hypotheses distinct from the supervisor's work.

The candidacy examination may result in one of the following outcomes, as described in the FGSR Graduate Program Manual (<https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-8-supervision-oral-examinations-and-program-completion/8-3-conduct-of-examinations>):

-) Adjourned
-) Pass
-) Conditional pass
-) Fail; with recommendation to repeat the candidacy (only if this is the first candidacy examination), to terminate the doctoral program, or to change category to a master's program.

If the Examining Committee fails to reach a decision, the department will refer the matter to the Dean, FGSR, who will determine an appropriate course of action.

Adjourned: *A majority of examiners must agree to an outcome of Adjourned.* The candidacy examination should be adjourned in the event of compelling, extraordinary circumstances such as a sudden medical emergency taking place during the examination or possible offences under the Code of Student Behaviour after the examination has started.

Pass: *All or all but one of the examiners must agree to an outcome of Pass.* If the student passes the candidacy examination, the department should complete the *Report of Completion of Candidacy Examination* form and submit it to the FGSR.

Conditional Pass: *A majority of examiners must agree to an outcome of Conditional Pass.* If the candidacy examining committee agrees to a conditional pass for the student, the chair of the examining committee will provide in writing within five working days to the Dean, FGSR, the graduate coordinator and the student:

-) The reasons for this recommendation,
-) The details of the conditions,
-) The timeframe for the student to meet the conditions,
-) The approval mechanism for meeting the conditions (e.g. approval of the committee chair or supervisor, or approval of the entire committee, or select members of the committee), and
-) The supervision and assistance the student can be expected to receive from committee members.

Conditions are subject to final approval by the Dean, FGSR.

At the deadline specified for meeting the conditions, two outcomes are possible:

-) All the conditions have been met. In this case, the department will complete the *Report of Completion of Candidacy Examination* form and submit it to the FGSR; or
-) Some of the conditions have not been met. In this case, the outcome of the candidacy examination is a Fail, and the options below are available to the examining committee. Note that the options are different after a failed second candidacy examination.

Fail: If the candidacy examining committee agrees that the student has failed, the committee chair will provide the reasons for this recommendation to the department. The graduate coordinator will then

provide this report, together with the department's recommendation for the student's program, to the Dean, FGSR, and to the student. For failed candidacy examinations, an Associate Dean, FGSR, normally arranges to meet with the student and others as required before acting upon any department recommendation.

When the outcome of a student's first candidacy examination is "Fail" options (1), (2), and (3) below are possible recommendations. When "Fail" is the outcome of a student's second candidacy examination, only options (2) and (3) are available.

1. Repeat the Candidacy: *A majority of examiners must agree to an outcome of Fail and Repeat the Candidacy.* If the student's first candidacy exam performance was inadequate but the student's performance and work completed to date indicate that the student has the potential to perform at the doctoral level, the examining committee should consider the possibility of recommending that the student be given an opportunity to repeat the candidacy exam. Normally, the composition of the examining committee does not change for the repeat candidacy exam.

If the recommendation of a repeat candidacy is formulated by the examining committee and approved by the FGSR, the student and graduate coordinator are to be notified in writing of the student's exam deficiencies by the chair of the examining committee. The second candidacy exam is to be scheduled no later than six months from the date of the first candidacy.

2. Change of Category to a Master's Program: *All or all but one of the examiners must agree to an outcome of Fail and Change of Category to a Master's Program.* This outcome should be considered if the student's candidacy examination performance was inadequate and the student's performance and work completed to date indicates that the student has the potential to complete a master's, but not a doctoral, program; or
3. Termination of the Doctoral Program: *All or all but one of the examiners must agree to an outcome of Fail and Terminate the Doctoral Program.* If the student's performance was inadequate, and the work completed during the program is considered inadequate, then the examining committee should recommend termination of the student's program.

8.5.5 Feedback to the student

During deliberation of the examination outcome, members of the examining committee are encouraged to address specific criteria noted in the *Candidacy Examination Feedback Report* form (available on the Oncology Graduate Program eClass site) in sufficient detail to convey to the student how their final decision was reached. The chair will verbally review critical feedback with the student immediately after the examination. Within a week of the examination, the chair will forward to the student a hard copy of the completed feedback form.

8.6 Extension of the deadline for the candidacy examination

All program requirements with the exception of the Ph.D. thesis defense must be completed within 3 years. Students should therefore take the Ph.D. candidacy examination within 24-36 months of entering the graduate program if they were admitted as a Ph.D. student. Under FGSR rules, M.Sc. students that transfer to the Ph.D. program have an additional year to complete their candidacy examination. However, every effort should be made to complete their program requirements within 3 years. Extensions will be granted only under exceptional circumstances. To obtain an extension, both the student and supervisor must write a letter to the appropriate GCC explaining the reasons for the delay in

taking the Ph.D. candidacy examination. A likely consequence of failing to meet the deadline for the Ph.D. candidacy examination is transfer to the M.Sc. degree and defense of the M.Sc. thesis before admission to the Ph.D. program.

9. GUIDELINES FOR THE M.SC. AND PH.D. THESIS

FGSR mandates for students in a master's degree program that "the thesis, at a minimum, should reveal that the student is able to work in a scholarly manner and is acquainted with the principal works published on the subject of the thesis. As far as possible, it should be an original contribution."

FGSR mandates that a "doctoral thesis, at a minimum, must embody the results of original investigations and analyses and be of such quality as to merit publication, meeting the standards of reputable scholarly publications. It must constitute a substantial contribution to the knowledge in the student's field of study."

9.1 *Approval to write the thesis*

When students believe they have completed the experimental work required for their project, they should hold a supervisory committee meeting to ask permission to write the thesis. Supervisory committee members must sign the appropriate page of the *Supervisory Committee Report* form to demonstrate approval that the experimental work is of sufficient quality and scope for the thesis to be written.

Although not a formal requirement, the goal of every Ph.D. student should be to write three first-authored publications in good quality journals. Not every student will meet this goal, however, the Department expects that a Ph.D. candidate have at least one first-authored manuscript under revision by a peer-reviewed journal before the Department will accept the Ph.D. thesis for examination.

9.2 *Guidelines and recommendations for the thesis document*

Students are strongly encouraged to discuss the format and organization of their thesis with their supervisor before they start writing the thesis. The supervisor or Graduate Program Office can direct the student to previous students' theses that may serve as models for content and format of the thesis. The FGSR will accept theses in "traditional" or "paper-based" formats, or a combination of the two.

9.2.1 *Traditional thesis format*

The traditional format consists of the following chapters, followed by a complete list of references:

-) Introduction, ending with the hypothesis, goals and objectives of the thesis work;
-) Materials and methods: this should be in sufficient detail for another student to repeat the work;
-) Results (one chapter for each major hypothesis or line of experimentation; typically 2-3 for an M.Sc. student and 3-4 for a Ph.D. student): each chapter can have a brief introduction and discussion section within it; and
-) Discussion and future directions.

9.2.2 *Paper-based thesis format*

The paper-based format typically has the following chapters, followed by a complete list of references (including those in the published papers):

-) Introduction;
-) One chapter for each paper: each of these chapters can be formatted as in the publication but may also focus more on the student's contribution to the paper; any "data not shown" in the

publication must be presented either here or in an appendix; these chapters may require further details on experimental methods that were not provided in the publication;

-) Additional chapter(s) for unpublished work; and
-) Overall discussion and future directions.

For details on formatting the thesis, including formatting the table of contents, lists of figures, tables, etc., please see the FGSR Graduate Program Manual, in particular:

<https://www.ualberta.ca/graduate-studies/current-students/academic-requirements/thesis-requirement-and-preparation>.

While the thesis writing should be that of the student, the supervisor is expected to provide feedback to the student throughout the process on organization of the thesis, interpretation of the results, and clarity of the student's writing.

10. GUIDELINES FOR THE M.SC. AND PH.D. THESIS DEFENSE

10.1 Requirements prior to the date of the M.Sc. thesis examination

10.1.1 Timelines for approval and convening of the M.Sc. examination

The students should be aware of deadlines to be met for submission of the final thesis to FGSR for spring and fall convocation. For M.Sc. thesis examinations, important factors to be considered are:

-) The supervisor, supervisory committee and student should discuss examiners for the M.Sc. defense with the Associate Chair, Graduate Studies, Oncology, at least 4 weeks before the examination. Names of the members of the final oral examining committee must be forwarded by the Graduate Program Office to FGSR for approval on a *Notice of Examining Committee and Examination Date* form at least three weeks prior to the final oral examination.
-) Although, the supervisory committee is not required to certify an M.Sc. thesis, the student's supervisor is expected to ensure that the thesis is of sufficient substance for the examination.
-) **A copy of the thesis must be supplied to each examiner at least three weeks prior to the oral examination.** The Graduate Program Office is responsible for circulating copies of the thesis to the examining committee.

10.1.2 Selection and composition of the M.Sc. examining committee

FGSR regulations and guidelines for examining committees can be found at:

<https://uofa.ualberta.ca/graduate-studies/about/graduate-program-manual/section-8-supervision-oral-examinations-and-program-completion/8-2-the-structure-of-examining-committees>

M.Sc. final examinations are conducted with a minimum of three, and maximum of five, examiners:

-) The supervisor;
-) The supervisory committee member(s); and
-) At least one arms-length examiner.

An "arm's length" examiner 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). Except in special circumstances (fully justified in writing to the Dean, FoMD), an arm's length examiner should not be a close collaborator of the supervisor(s) within the last six years.

In addition:

-) At least half of the examiners must have a degree which is equivalent to, or higher than, the degree being examined; and
-) At least half of the examiners must be tenured, tenure-track, or retired University of Alberta faculty members.

The chair of the M.Sc. examination committee must be a member of the Department of Oncology, and is appointed by the Associate Chair, Graduate Studies, Oncology. The examining committee chair does not vote or sign the *Thesis Approval/Program Completion* form. Under exceptional circumstances, the chair of the examination committee may also serve as an examiner and a voting member.

10.2 Requirements prior to the date of the Ph.D. thesis examination

10.2.1 Timelines for approval and convening of the Ph.D. examination

The students should be aware of deadlines to be met for submission of the final thesis to FGSR for spring and fall convocation. In planning for these deadlines, important factors to be considered are:

-) The Associate Dean, Research--Graduate Programs, FoMD, must approve the external examiner. The approval request should be submitted by the Oncology Graduate Program Office to FoMD **at least 2 months prior to the expected defense date**. See Section 10.2.3 for further details on the external examiner.
-) The supervisory committee must approve the Ph.D. thesis before the thesis can be sent to the external examiner. The student should allow 2 weeks for supervisory committee review, and additional time to make revisions if requested. The supervisor and supervisory committee must then indicate that the thesis is of adequate substance and quality to warrant examination by signing the *Departmental Acceptance of Thesis* signature sheet (template can be found on the Oncology Graduate Program eClass website). **The external examiner and other committee members must receive the thesis at least four weeks before the examination date**. The Graduate Program Office is responsible for circulating copies of the thesis to the examining committee.
-) The supervisor, supervisory committee and student should discuss additional examiners for the defense with the Associate Chair, Graduate Studies, Oncology, at least 4 weeks before the examination. Names of the members of the final oral examining committee must be forwarded by the Oncology Graduate Office to FGSR for approval on a *Notice of Examining Committee and Examination Date* form **at least three weeks prior to the final oral examination**.

10.2.2 Composition of the Ph.D. examining committee

FGSR regulations and guidelines for examining committees can be found at:

<https://uofa.ualberta.ca/graduate-studies/about/graduate-program-manual/section-8-supervision-oral-examinations-and-program-completion/8-2-the-structure-of-examining-committees>

The Ph.D. final examination committee has a minimum of five, and maximum of 7, faculty members:

-) The supervisor;
-) The supervisory committee;
-) One external examiner from outside the University of Alberta (see Section 10.2.3); and
-) At least one additional arm's length examiner (see Section 10.1.2 for a description of "arm's length").

In addition:

-) At least half of the examiners must have a degree which is equivalent to, or higher than, the degree being examined; and
-) At least half of the examiners must be tenured, tenure-track, or retired University of Alberta faculty members.

The Chair of the Ph.D. examination committee must be from the Department of Oncology and is appointed by the Associate Chair, Graduate Studies, Oncology. The examining committee chair may participate in discussions related to examination outcome, however, the chair does not vote or sign the *Thesis Approval/Program Completion* form.

10.2.3 Selection of the external examiner

The responsibility for appointing the external examiner rests with the FoMD. The external examiner should be a recognized authority in the student's field of research and an experienced supervisor of Ph.D. students. The external examiner should not have been an external examiner for another Department of Oncology Ph.D. defense within the previous 2 years. The supervisor consults with the Associate Chair for the nomination of an external examiner. The Oncology Graduate Program Office submits the name to the Associate Dean, Research--Graduate Programs, FoMD, for approval. This is done on the *Approve External Reader or Examiner for Final Doctoral Oral Examination* form at least two months in advance of the examination date. The submission must include a CV of the external examiner (including experience with graduate student education) and a short statement of the examiner's qualifications, provided to the Associate Chair by the supervisor.

The external examiner must be in a position to evaluate the thesis objectively and to provide a critical analysis of the student's work. It is essential that the external examiner does not have a current or previous association with the student, supervisor, or the Department that would prevent objective analysis. A proposed examiner associated with the student as a research collaborator or co-author would therefore not be eligible. A proposed examiner with a recent association with the supervisor (e.g. as a former student or close collaborator) would also not be eligible.

Once the external examiner has been approved, the Associate Dean, FoMD will issue a letter of invitation to the external. The external examiner must receive the thesis at least four weeks before the final oral examination. The external examiner is asked to prepare a brief written evaluation (2-3 pages) of the thesis (scope, structure, methodology, quality, significance of impact) and submit this to the Associate Chair, Graduate Studies, Oncology, prior to the exam or to the examining committee chair at the beginning of the exam. The external examiner will be asked to place the thesis temporarily in one of the following categories: (a) acceptable with minor or no revisions, (b) reserve judgment, or (c) unacceptable without major revisions. If the external examiner selects the unacceptable category, the examiner is asked to contact the Dean, FGSR, immediately, since the final oral examination may have to be postponed. The written report will not be shown to the student prior to the examination. The external examiner should not contact the supervisor or student directly regarding the thesis.

The external examiner will also be asked to make travel arrangements in consultation with the Oncology Graduate Program Office. FGSR has limited funding available for external examiners if the supervisor provides a compelling rationale for why it would be particularly important to have an external examiner in attendance. The supervisor should complete and submit a *Request for Funds for External Examiner Travel* form. The Walter Mackenzie Visiting Speaker Fund through the FoMD may be another option for obtaining external examiner funding (<http://www.med.ualberta.ca/research/fundingopportunities/visitingspeaker>).

10.3 Attendance of examiners and others at the thesis defense

All members of the examining committee must be in attendance, which includes members participating through teleconferencing. Members of the Faculty of the student's home department as well as members of the FGSR have the right to attend but should notify the Chair of the examining committee of their intention. Other persons may attend with the permission of the Dean of FGSR or chair of the examining committee. The Dean may participate fully in the examination. Other persons may ask questions but cannot stay for the deliberations.

10.4 Conducting the thesis examination

FGSR regulations and guidelines for conducting thesis examinations can be found at <https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-8-supervision-oral-examinations-and-program-completion/8-3-conduct-of-examinations>

10.4.1 Role of the chair

The chair is responsible for:

-) Ensuring that departmental and FGSR regulations relating to the conduct and outcome of the examination are followed;
-) Ensuring that relevant documentation is brought to the examination, including the student's file, and the *Thesis Approval/Program Completion* form;
-) Moderating the discussion and directing questions (the chair may participate in the questioning);
-) Taking minutes during the exam; and
-) Facilitating the committee decision on the outcome of the examination to ensure that it aligns with departmental and FGSR guidelines.

10.4.2 Thesis defense seminar

For M.Sc. students, a public thesis defense seminar is optional. If no public seminar is presented, the student will give a short oral presentation (~20-25 min) to the examining committee just before questioning begins at the defense.

Ph.D. students are required to give a public thesis defense seminar. This seminar usually is immediately prior to the defense, but could be at another suitable time within a few weeks of the oral examination. All examiners must be present either in person or by teleconference at the seminar. Examiners are asked to hold questions regarding the seminar for the oral examination.

10.4.3 Oral examination

The oral examination is conducted as follows:

- 1 The chair introduces members of the examining committee to each other and to the student, then briefly describes the examination process and establishes the order of questioning (from most external to most internal).
- 2 The student will be asked to leave the room and the student's academic history will be reviewed by the supervisor.
- 3 The candidate will then be asked to return. There will usually be two rounds of questioning (approximately 20 minutes per examiner in the first round; up to 20 minutes per examiner in the second round) with a five minute break between the two rounds of questioning.
- 4 At the close of the examination, the student is asked whether they have any final comments.
- 5 The student then leaves the room while the examiners discuss the student's performance and quality of thesis. For the adjudication, no final verdict is rendered without each examiner giving an opinion.
- 6 The student is then readmitted and the committee's decision is communicated by the chair who briefly summarizes the deliberations leading to that decision. It is useful for the chair to keep a record of the exam noting time-line, order of questioning, summarizing the opinions of each examiner and the substance of the discussion. That record will be kept in the student's file in the Oncology Graduate Program Office.

10.4.4 Possible outcomes of the thesis examination

The decision of the examining committee will be based both on the content of the thesis and on the candidate's ability to defend it. Normally, if all but one member of the committee agrees on a decision, the decision shall be that of the majority, except when the one dissenting vote is that of the external examiner at a Ph.D. thesis defense. If this happens, it must be reported to the Vice-Dean, FGSR, who will determine an appropriate course of action. If two or more dissenting votes are recorded, the department will refer the matter to the Vice-Dean, FGSR, who will determine an appropriate course of action.

The thesis examination may result in one of the following outcomes, as described in the FGSR Graduate Program Manual (<https://www.ualberta.ca/graduate-studies/about/graduate-program-manual/section-8-supervision-oral-examinations-and-program-completion/8-3-conduct-of-examinations>):

-) Pass
-) Pass subject to revisions
-) Adjourned
-) Fail

Pass: *All or all but one of the examiners must agree to an outcome of Pass.* Thesis is approved as is. Examining committee members sign the *Thesis Approval/Program Completion* form immediately. Note: if one of the examiners fails the student, but the student passes, that examiner does not have to sign the approval form. The *Thesis Approval/Program Completion* form is completed by the department and submitted to FGSR.

Pass subject to revisions: *All or all but one of the examiners must agree to this outcome.* Members who wish to sign can do so immediately. The examining committee chair or supervisor withholds the signature until the thesis is amended satisfactorily and all other committee members have signed. If problems arise in the amendment process, the chair or supervisor may wish to solicit opinions from the other committee members. The student must complete revisions within 6 months of the date of the final examination. Once revisions are satisfactorily completed, the *Thesis Approval/Program Completion* form is completed by the department and submitted to FGSR.

Adjourned: *A majority of examiners must agree to this outcome.* No member of the committee signs the signature page. The final oral examination should be adjourned in the following situations:

-) The revisions to the thesis are sufficiently substantial (if further research or experimentation or major reworking of sections are required, or if the committee is not satisfied with the general presentation of the thesis) that it will require a reconvening of the examining committee. The committee should not propose that the candidate has passed; rather the committee shall adjourn the examination.
-) The committee is dissatisfied with the candidate's oral presentation and defense of the thesis, even if the thesis itself is acceptable with or without minor revisions.
-) Compelling, extraordinary circumstances such as a sudden medical emergency during the examination.

If the examination is adjourned, the committee should:

- J Refrain from signing the *Thesis Approval/Program Completion* form.
- J Specify in writing to the student, with as much precision as possible, the nature of the deficiencies and, in the case of revisions to the thesis, the extent of the revisions required. Where the oral defense is unsatisfactory, it may be necessary to arrange some discussion periods with the candidate prior to reconvening the examination.
- J Decide upon a date to reconvene. If the date of the reconvened oral examination depends upon the completion of a research task or a series of discussions, it should be made clear which committee members will decide on the appropriate date to reconvene. The final date set for reconvening shall be no later than six months from the date of the examination. A final decision of the examining committee must be made within six months of the initial examination.
- J Make it clear to the student what will be required by way of approval before the examination is reconvened (*e.g.*, approval of the committee chair or supervisor, approval of the entire committee, or of select members of the committee).
- J Specify the supervision and assistance the student may expect from the committee members in meeting the necessary revisions.
- J Advise the Vice-Dean, FGSR in writing of the adjournment and the conditions.
- J When the date is set for the adjourned final oral examination, the department will notify the FGSR. Normally the Dean, Vice-Dean, Associate Dean or Pro Dean attends the examination.

Fail: *All or all but one of the examiners must agree to an outcome of Fail.* If the final examination committee agrees that the student has failed, the committee chair shall provide the reasons for this recommendation and the department's recommendation for the student's program in writing to the Vice-Dean, FGSR and to the student. The Vice-Dean, FGSR will arrange to meet with the candidate and with department representatives before acting upon any department recommendation. A decision of the FGSR which affects a student's academic standing (*i.e.*, required to withdraw) is appealable.

It is the duty of the chair to report the examining committee's decision and reasons for the decision to the Associate Chair, Graduate Studies, Oncology, immediately after an examination with the outcome of Fail. It is the responsibility of the Associate Chair to report on this decision together with a recommendation for the student's program to the Dean, FoMD; the FGSR; and to the student.

10.5 Submission of the Thesis to FGSR

Students are ultimately responsible for preparing and submitting their theses to the FGSR in the proper format. Further information is available on the FGSR website (<https://uofa.ualberta.ca/graduate-studies/about/graduate-program-manual/section-8-supervision-oral-examinations-and-program-completion/8-4-thesis-requirements>). Following completion of the final oral examination at which the thesis is passed or passed subject to revisions, the candidate shall make the appropriate revisions where necessary and submit the approved thesis to the FGSR within six months of the date of the final oral examination. The FGSR is very strict regarding formatting. Please **allow 2 weeks for final confirmation of acceptance of the thesis by FGSR**, as it is not uncommon for FGSR to request revisions in the document or associated paperwork. Please see Oncology Graduate Program eClass site for further information on thesis submissions.

If the thesis is not submitted to the FGSR within the six-month time limit, the candidate will be considered to have withdrawn from the program. After this time, the candidate must apply and be re-admitted to the FGSR and register again before the thesis can be accepted.

If the final oral examination is adjourned, the six-month time limit will take effect from the date of completion of the examination where the thesis was passed with or without revisions.

Students must submit their final theses to the FGSR for approval before the deadline dates set out in the Academic Schedule of the Calendar to be considered for the next convocation.

Students must also ensure that they are registered in Thesis in their last registration prior to convocation.

10.6 Restricting access to a thesis

Students wanting to restrict access to their theses for up to two years must complete and submit the *Restrict Thesis Access* form available in the FGSR Forms Cabinet (<https://uofa.ualberta.ca/graduate-studies/about/resources-for-faculty-and-staff/forms-cabinet>), or the Graduate Program eClass website, to FGSR with supporting documentation. The request must be made prior to the submission of the thesis to FGSR. If the thesis is submitted through Thesis Deposit and the request to restrict access has been approved, then FGSR will hold the thesis and release it at the end of the embargo period.

11. INFORMATION SPECIFIC TO THE CANCER SCIENCES SPECIALIZATION

11.1 Cancer Sciences Graduate Program timeline

Year 1	<p><u>All</u>: Discuss Conversation Checklist at introductory meeting with supervisor. Form and meet with supervisory committee. Plan coursework so that it can be completed by the end of Y2 if possible.</p> <p><u>M.Sc. (entering September 2016 or later)</u>: Complete Individual Development Plan by the end of Y1.</p>
Year 2	<p><u>All</u>: Complete required coursework. Meet with the supervisory committee. Ensure that a general research direction is established.</p> <p><u>M.Sc.</u>: If planning to transfer to the Ph.D. program, discuss a due date in Y2 or early Y3 for submission of your Ph.D. proposal.</p> <p><u>Ph.D.</u>: Submit Ph.D. proposal to the supervisory committee for approval at the supervisory committee meeting. Identify a date for your candidacy examination (to be held in Y3). <u>Ph.D. students entering September 2016 or later</u>: Complete Individual Development Plan by March.</p>
Year 3	<p><u>M.Sc.</u>: Plan to defend your thesis as early as possible in Y3. Ethics training requirements (and professional development requirements for students entering September 2016 or later) must be completed prior to convocation.</p> <p><u>Ph.D.</u>: Set a date and take your candidacy examination as soon as possible after completing your courses. FGSR requires that you complete your candidacy exam and ethics training (and professional development requirements for students entering September 2016 or later) by the end of Y3. Plan to publish a paper in Y3.</p>
Year 4,5	<p><u>Ph.D.</u>: Plan to publish at least two manuscripts before your thesis defense. The sooner you start writing up your results the more organized your thesis will be and the more competitive you will be for scholarships.</p>
Year 5	<p><u>Ph.D.</u>: Plan to submit and defend your thesis before the end of the fifth year. Hold a supervisory committee in time to get permission to start writing up. Delay beyond the end of the 6th year will require application to FGSR for an extension of your program.</p>

11.2 Stipend support

The recommended basic annual stipend for graduate students in the Cancer Sciences specialization is \$25,000, from which students must pay their tuition and fees. The students must be made aware of any exceptions to the basic stipend guideline when they are admitted to the program. If the CS student holds a minor award (<\$13,000 per year), it is recommended that the supervisor tops up the award from his/her grants to give a total annual stipend of \$25,000. If the CS graduate student receives a major award (i.e., \$13,000 or greater), the recommended total funding level (including the award plus contributions from the supervisor's grant) is increased to \$27,000 per annum. If the student is awarded a studentship valued at \$27,000 or greater, the supervisor is encouraged to use his/her research grant funding to cover the cost of the student's tuition and fees. Students who are progressing satisfactorily in the Cancer Sciences program can expect to receive a graduate student stipend for the normal tenure of

their program (3 years for an M.Sc. student; 6 years for a Ph.D. student). Funding for additional years beyond normal tenure should be negotiated between the student and supervisor. In exceptional cases where the supervisor has insufficient funds for a full stipend, the student must be allowed to work part-time to supplement their partial stipend.

11.3 Course requirements

Selection of graduate student courses is done in consultation with the supervisor and the supervisory committee. Additional courses may be assigned or recommended by the CS-GCC based upon the background of the student and the area of specialization undertaken. M.Sc. students are required to pass 3 graded courses (9 units credit). Ph.D students are required to pass 4 graded courses (or 12 units credit). For Ph.D. students who already hold an M.Sc. degree in the same or related field, the minimum course requirement is 6 units in graded graduate courses.

The following specific course requirements must be observed by all Cancer Sciences graduate students:

1. All CS graduate students are required to take either **Oncology 520 (Tumour Biology)** or **Oncology 524 (Nutrition and Metabolism Related to Cancer)** for credit. Oncology 520 is a 3-unit course offered in the winter term of alternate years. Oncology 524 is a 3-credit course offered in the fall term of alternate years. The decision as to which course is taken should be made in consultation with the supervisor and the supervisory committee. Students whose supervisors are in Experimental Oncology generally take Oncology 520. Students are not precluded from taking both Oncology 520 and 524 towards accumulating their required course weights.
2. All CS graduate students are required to take **Oncology 660/661 (Current Topics in Cancer Research)** for credit. Oncology 661 is a one-credit fall term course. Oncology 660 is a two-credit winter term course. Students would normally take Oncology 660/661 for credit in the second year of their program.
3. To develop their oral presentation skills, CS Ph.D. students are **required to give one formal seminar (normally through Oncology 660) every year** if the schedule permits. First year students will normally be exempt from this requirement.
4. **CS graduate students are expected to attend all Oncology 660/661 research seminars** whether or not they are enrolled in Oncology 660/661.

The list of additional courses approved to complete the course requirements for either the M.Sc. or Ph.D. degree in Oncology can be found on the Oncology Graduate Program eClass website (<https://eclass.srv.ualberta.ca/course/view.php?id=37941>).

The Department recognizes that in some instances, a required course may not be the most appropriate course for every student enrolled in the specialization of Cancer Sciences. Thus, the CS-GCC will consider requests from supervisors to substitute other courses as follows:

-) *Oncology 660/661 substitutions*: Requests for substituting another course for Oncology 660/661 may be considered when the substitute course provides an appropriate venue for the student to give a 45 minute presentation to a critical audience.
-) *Oncology 520/524 substitutions*: Requests for substituting another course for Oncology 520 or 524 can be made when the substitute course is the equivalent of Oncology 520 and 524 in scope and rigor and is focused on the topic of cancer.

-) *Courses that are not on the approved course list:* Requests to take a graded graduate course for credit to satisfy part of the graduate course requirements when the course is not on the approved course list will be considered on an individual basis.
-) *Taking an undergraduate course for credit to satisfy part of the graduate course requirements:* Thesis-based master's and doctoral students may only take undergraduate courses for credit to satisfy their graduate program requirements when the course is deemed necessary and the undergraduate course is not in the student's field of specialization and/or major area of study.

The approval process in these exceptional instances requires:

1. Approval of the substitute course by the supervisor and supervisory committee;
2. The supervisor to make a request to the Associate Chair, Graduate Studies, Oncology, or Chair of the CS-GCC in writing and to provide supporting documentation (*i.e.*, course syllabus); and
3. Presentation of the request to the CS-GCC. The supervisor may be invited to attend the meeting of the CS-GCC to present his/her case.

11.4 Laboratory rotations

Students entering Cancer Sciences may opt to rotate through the laboratories of up to three eligible academic staff before deciding whom to choose as their supervisor. The purpose of the rotation is to familiarize the student with the various areas of research and expertise within the Department and to optimize student/project compatibility. The act of rotation constitutes an act of good faith on the part of both the student and the potential supervisor and is not a binding contract. The final pairing of students and supervisors will, therefore, be agreed upon in a manner that is mutually acceptable to both parties and to other potential supervisors. During the rotation period the CS-GCC will serve as the student's interim supervisor and at the end of the rotation will administer student-supervisor pairing. Each rotation will be one month in length and will run from Sept 1 to 30, Oct 1 to 31, and Nov 1 to 30, or from Jan 1 to 31, Feb 1 to 28/29, and March 1 to 31. In each rotation the students will be expected to learn something about the techniques being used in the laboratory, to familiarize themselves with ongoing research projects, and to discuss prospective graduate student projects with their rotation supervisor. Students who choose to rotate should first obtain the *Graduate Student Rotation* form from the Graduate Program Administrator. It is a departmental requirement that each supervisor indicate his or her willingness to supervise the student for a given period by signing the *Graduate Student Rotation* form prior to the rotation.

Upon completion of laboratory rotations, the student, in consultation with rotation supervisors, will choose a laboratory in which to carry out the research project. The student will inform the Chair of the CS-GCC of his or her decision. The Chair of the CS-GCC will inform the other rotation supervisors and the Training Program Administrator of the student's decision.

12. INFORMATION SPECIFIC TO THE MEDICAL PHYSICS GRADUATE PROGRAM

12.1 Course requirements

12.1.1 Course requirements for the M.Sc. degree

New Medical Physics M.Sc. students begin their studies in September. In their first year, M.Sc. students take 11 didactic courses and 2 laboratory courses (33 credits total) as noted in the list below. In addition, BME 320 or 321 (3 credits) must be completed at any time during the program.

Required courses for first year of M.Sc., Medical Physics program					
<i>Fall term</i>		<i>Winter term</i>		<i>Spring session</i>	
ONCOL 550	Medical Radiation Physics	BME 564	Fundamentals of Magnetic Resonance Imaging	ONCOL 554	Laboratory in Medical Radiation Physics
ONCOL 558	Health Physics	ONCOL 552	Fundamentals of Applied Dosimetry	ONCOL 556	Laboratory in Imaging
ONCOL 560	Technology in Radiation Oncology	ONCOL 564	Physics of Nuclear Medicine		
ONCOL 562	Theory of Medical Imaging	ONCOL 568	Physics of Diagnostic Radiology		
ONCOL 566	Radiation Biophysics				
ONCOL 600	Graduate Medical Physics Seminar	ONCOL 600	Graduate Medical Physics Seminar		
Required course to be completed by the finish of the program (one of the following):					
BME 320 (Fall)	Human Anatomy and Physiology: Cells and Tissues	or	BME 321 (Winter)	Human Anatomy and Physiology: Systems	

12.1.2 Course requirements for the Ph.D. degree

New Medical Physics Ph.D. graduate students begin their studies in September. In their first year, new Ph.D. students take all 11 didactic courses and 2 laboratory courses that are required for the M.Sc. (if not already taken) plus 2 elective courses from the list below. BME 320 or 321 must also be completed at any time during the program if the equivalent course has not been taken before.

Required courses to be completed by the finish of Ph.D. program in Medical Physics			
<ul style="list-style-type: none">) All 11 didactic courses and 2 laboratory courses that are required for the M.Sc. (if not already taken), or their equivalent) BME 320 or 321 (if not already taken) or an equivalent course) 6 units of advanced specialization coursework (based on research interests and discussions with the candidate's supervisor and Director of the Medical Physics program) or elective 			
<i>Advanced specialization course (Fall term):</i>		<i>Advanced specialization course (Winter term):</i>	
ONCOL 690	Biomedical Magnetic Resonance Methods and Applications	ONCOL 691	Advanced Magnetic Resonance Physics
<i>Elective (Fall term):</i>		ONCOL 692	Advanced Radiological and Nuclear Imaging Physics
PHYS 511	Advanced Quantum Mechanics I	ONCOL 693	Advanced Radiotherapeutic Physics

12.1.3 Advanced specialization courses

These are advanced courses on topics in magnetic resonance, radiological-nuclear and radiotherapeutic physics. Each student will have an approved Ph.D. topic, and will give four didactic graduate-level lectures of 45 minutes each with a 15-minute question period per lecture related to the PhD topic. During the weeks for the student presentations, there will be two one-hour sessions per week. The student prepares a literature search, literature synopsis, detailed outline of courses, 20 page class-presentation notes, followed by the four lectures. Medical physics instructors will mentor and evaluate the students through every step of the process. Faculty and fellow students are invited to attend the lectures. The student must successfully pass one of the Advanced Specialization Courses before proceeding to the candidacy examination.

12.2 Ph.D. thesis defense regulations specific to Medical Physics

The following guidelines may be followed for external readers, under the assumption that the external reader has indicated general acceptance of the thesis:

-) When the external does not attend the final oral examination, and the student has passed the final oral examination (with the assent of the external), the external examiner's name and institution will be typed on the signature page, and the chair of the examining committee will initial the external's signature line. All other examining committee members will sign the signature page.
-) When the external examiner attends the final oral examination, the external shall sign the thesis along with the other committee members.