

Graduate Student Handbook
Graduate Studies and Research
in
Computer Science

Department of Computer Science

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TABLE OF CONTENTS

INTRODUCTION	4
Computer Science	4
Faculty of Graduate Studies	4
ADMINISTRATION OF GRADUATE PROGRAMS	5
REGISTRATION	6
Student Classification	7
PROGRAM REQUIREMENTS FOR GRADUATE STUDENT ACADEMIC PERFORMANCE	8
General	8
Pre-M.Sc. Program	8
M.Sc. Programs	9
Advisors and Advisory Committees	9
Advance Credit	10
Transfer Credit	10
Minimum Program Requirements	10
Failure to Meet Requirements	12
Lapse of Credit	13
Progress Report/Report on Student Status	13
Minimum Time Requirement	13
Maximum Time Limits	13
Extension of Time to Complete Degree Requirements	13
Thesis Proposal	14
Thesis	14
Thesis Examining Committee	14
Thesis Examination	15
Thesis Report	16
Ph.D. Program	16
Advance Credit	16
Selection Committee	17
Student's Advisor	17
Program of Study	17
Advisory Committee and Progress Reports	17
Minimum Course Requirements	18
Lapse of Credit	19
Minimum Time Requirement	19
Maximum Time Limit	19
Extension of Time to Complete Degree Requirements	19
Residence Requirement	19
Academic Standing	19
Research Requirements	19
Candidacy Examinations	19
Thesis and Thesis Proposal	20

Final Examination for the Ph.D. Degree	21
Thesis Examining Committee	21
Oral Examination	22
Ph.D. Student Timeline	22
Publication and Circulation of Theses – Master’s and Ph.D.	23
DISPUTES, DISCIPLINARY ISSUES, AND APPEALS	24
Departmental Appeals	24
Composition of the Graduate Appeals Committee	24
Faculty of Graduate Studies Appeals	24
Resolving Disputes	25
Academic Dishonesty	25
FINANCIAL ASSISTANCE	26
Student Assistantships and Teaching Assistantships	26
Scholarships and Fellowships	26
WESTERN DEANS' AGREEMENT	26
OTHER PUBLICATIONS OF INTEREST	29
FURTHER INFORMATION	29

Disclaimer

Should discrepancies appear between the information in this document and the University of Manitoba General Calendar or the Department of Computer Science Supplementary Regulations, the latter shall prevail.

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Introduction

Computer Science

The Department of Computer Science at the University of Manitoba offers a program leading to a Doctor of Philosophy degree (Ph.D.), thesis-based and coursework-only programs leading to a Master of Science degree (M.Sc.), a co-op option in the course-based Master of Science degree program, a pre-master's program to qualify students for the master's program, majors and honours undergraduate programs, majors and honours co-operative undergraduate programs, and joint programs with mathematics, statistics, and physics.

The Department offers courses and programs in:

- advanced programming
- algorithmic methods and applications
- artificial intelligence
- bioinformatics
- coding theory
- combinatorics and graph theory
- computational finance
- computational geometry
- computational graphics
- computer communications and networking
- cryptography
- databases and information Systems
- data mining
- data structures and applications
- distributed systems
- embedded systems
- human-computer interaction
- human-robot interaction
- numerical analysis
- parallel computing
- robotics
- software engineering
- theory of computing

Computer Science offers its undergraduate programs as a department in the Faculty of Science and its graduate programs as a department in the Faculty of Graduate Studies.

The department of Computer Science's honours and major programs are accredited by the Canadian Information Processing Society's (CIPS) Computer Science Accreditation Council (CSAC).

Faculty of Graduate Studies

The University of Manitoba is a public institution, established in 1877 by an act of the Manitoba Provincial Legislature. Graduate work and research have been conducted at the University from its beginning.

The first Ph.D. was granted in 1928, and the first Ph.D. in the sciences in 1930. Over 3,600 students now pursue graduate work in a wide variety of areas.

The Faculty of Graduate Studies was established in 1944 to systematize and foster graduate study throughout the University. While the development and teaching of graduate programs is primarily the responsibility of the departments within the University, the Faculty of Graduate Studies sets common standards and is in charge of their administration. As such, the Faculty admits students, monitors their progress and authorizes all graduate degrees.

The Faculty is a member of the Canadian Association of Graduate Schools. The University is a member of the Association of Commonwealth Universities, the Association of Universities and Colleges of Canada and the International Association of Universities.

Administration of Graduate Programs

Graduate programs are regulated and supervised by the Department's Graduate Studies Committee (GSC). Its membership consists of the Graduate Associate Head (as chair of the committee and a voting member), plus 5 faculty members (who must be members of the Faculty of Graduate Studies) and a graduate student member, as well as the Department Head (voting) and the Administrative Assistant (non-voting) as *ex officio* members. If the instructor teaching research methods (COMP 7220) in any given term is not one of the above, then they are also a non-voting member of GSC. The faculty members are elected by the Department Council, and normally serve for a period of three years. The student representative is elected by the computer science graduate student body. Members of GSC will abstain from voting in any situation in which a conflict of interest with his or her own student(s) exists, and will be asked to leave a meeting when a decision is being made about one of his or her own students in particular.

The Graduate Associate Head, who is appointed by the Department Head, chairs the GSC and directs the operation of the graduate program. Among other duties, the Graduate Associate Head provides advice and counseling to any individual in a graduate program, and directs the program of students who do not have an advisor, such as students in the pre-master's program. The Graduate Associate Head, with the assistance of the Administrative Assistant, sees that the policies and procedures of the Department are carried out in a timely and effective manner.

The GSC is the main policy formulating and regulating body. While it develops and considers policy, the GSC is advisory to the Head, and it is the Head and the Department Council that are the final arbiters of department policy. The terms of reference of the GSC include:

1. Deciding on admissions policies and procedures, making admission decisions, and recommending conditions of entry to all graduate programs. For Ph.D. applications, the GSC acts as the Selection Committee required by the Faculty of Graduate Studies and reviews all applications, taking into account the qualifications and calibre of the student, including evidence of research potential, whether the applicant has a topic area of research interest and the degree of support for it in the department, and the availability of adequate funding. The GSC also reviews applications to the M.Sc. and pre-master's programs, taking into account the qualifications and calibre of the student, the intended research area and support for it in the department, and the availability of adequate funding.
2. Approving M.Sc. programs (including final approval of thesis proposals, and considering credit and area of breadth for courses taken elsewhere) and acting as Chairs for M.Sc. thesis defenses. The Graduate Associate Head will appoint a member of GSC to chair any upcoming M.Sc. thesis defense after being given appropriate notice, and will be responsible for finding a chair outside of GSC if no member is available.
3. Approving Ph.D. programs (including considering credit and area of breadth for courses taken in prior programs in the Department or elsewhere), and acting as Chairs for Ph.D. candidacy exams. The Graduate Associate Head will appoint a member of GSC to chair any upcoming Ph.D. candidacy exam after being given appropriate notice, and will be responsible for finding a chair outside of GSC if no member is available.
4. Evaluating potential graduate courses before they are offered (as well as courses that have changed substantially between offerings) both for quality assurance purposes and to place them in one of the three course areas for

breadth purposes (see the *Program Requirements* section). The GSC also approves prospective reading courses and project courses and all non-computer science courses that are to be allowed for credit.

5. Recommending the course of action to be taken on deficient grades and other evidence of unsatisfactory progress, including deficient English language requirements. The Graduate Associate Head will also be notified of deficient progress reports of graduate students by the Administrative Assistant, and may request GSC to recommend a course of action on these.
6. Recommending the course of action for disciplinary situations such as plagiarism, according to the regulations of the department, the Faculty of Graduate Studies, and the University.
7. Approving applications for early transfer of a master's student to the Ph.D program.
8. Approving applications for time extensions or leave of absences (in consultation with advisor and/or committee) and for other changes in a student's program status.
9. Undertaking curriculum reviews and approving new course descriptions and course changes, after which these are forwarded to Departmental Council and the Faculty of Graduate Studies.
10. Maintaining an up-to-date Graduate Student Handbook and calendar of critical dates for graduate students. Developing other printed material (e.g. brochures) as needed.

The Department also has a Graduate Students' Association that is entirely organized by students. It organizes meetings to discuss suggestions for, and reactions to, Department policy changes affecting graduate students and programs. It may then pass resolutions or adopt positions that are communicated to the GSC. Such input is welcomed by the GSC and will have more weight than suggestions coming from individual students. There are also 3 graduate student members of the Computer Science Departmental Council elected by the Computer Science Graduate Students' Association. In addition to these official activities, the Association also arranges various social activities.

The Department attempts to run the graduate program in a fair and equitable way, according to rules that are open and have wide consent among staff and students. Major regulations are embodied in the Department Supplementary Regulations. These are passed by the GSC and Departmental Council and then by the Faculty of Science (Committee on Curriculum and Course Changes) and the Faculty of Graduate Studies (Graduate Course Approval and Regulations Advisory Committee, or GCARAC, for short). These Supplementary Regulations are available on the Faculty of Graduate Studies' and Department of Computer Science's respective web pages. Ph.D. students should also note that the Supplementary Regulations indicate the normal progress expected in the program. This handbook also contains expository material on procedures and regulations as formulated and passed by the GSC, but in case of any conflict or contradiction the regulations of the Faculty of Graduate Studies and as modified by the Supplementary Regulations, have precedence. **It is the student's responsibility to be familiar with the regulations and to ensure that degree and progress requirements are met.** All students are therefore advised to read the calendar regulations for the Faculty of Graduate Studies and the Department of Computer Science Supplementary Regulations carefully. The Department and the Faculty of Graduate Studies also publish lists of critical dates that every graduate student should be aware of; e.g. the final dates for thesis submission, change of registration, scholarship applications, etc.

Every student has an advisor to help him/her formulate a program of study and to act as the first source of advice and counseling. The student must discuss all program changes, including all changes in registration, with the advisor and have the advisor's approval in writing before the Administrative Assistant will process any course or program changes. **If a student does not get the help he or she needs from the advisor, and has made every effort to consult with the advisor, then the student is encouraged to go to the Graduate Associate Head or the Department Head for further assistance. Students can also follow the procedures set out under *Resolving Disputes*.**

Registration

All graduate students can begin to register for the regular session in August during the week specified in the Academic Schedule. In general, candidates should come to the University about one week before registration in

order to discuss their programs with their program advisor. **Accepted students who fail to appear and register by the end of the registration period stated on their letter of acceptance WILL NOT BE ADMITTED unless special prior arrangements have been made with the Head of the Department.**

Any student whose program of study extends over more than one year must re-register in each succeeding year of the program (both terms) until the degree is obtained – this is true even if the only thing that remains is the submission of a thesis. Students who fail to re-register will not retain the status of graduate student and must apply for re-admission, if they wish to continue studies at a later date. Information about Registration Fees is given under Tuition Fees in Graduate Studies in the Registration and Fees section of the University of Manitoba General Calendar.

With the permission of the Department, a student whose application has been approved may begin research work in the spring or summer preceding initial registration. There is also a limited registration during the first week in January.

Student Classification

Full-time: Students are considered to be full-time if they identify themselves as full-time and the Department certifies at registration that their academic programs for the registration period will be that of a normal full-time student. (To hold the status of “Full-Time”, graduate students may not be employed for more than an average of 12 hours per week for teaching assistantship duties. Hours for work shall include not only contact hours but also a reasonable estimate of preparation time, if appropriate).

Part-time: Graduate students who do not meet the criteria specified for full-time students may apply for part-time status. The application can be found on the faculty of graduate studies website. The application must be approved by the student’s advisor and the department head prior to submission to the Faculty of Graduate Studies.

Leave of Absence Status: In exceptional circumstances, the Head of the Department may recommend to the Dean of Graduate Studies that a student be granted a leave of absence for a period of time not to exceed one year. While on leave of absence, a student would not be expected to maintain study and/or thesis research work. Leave of absence students will be required to maintain continuous registration and pay the appropriate re-registration fees. **A leave of absence status does not extend the time limits as outlined in the faculty regulations.** If you are thinking of the possibility of a leave of absence, you should first discuss this with your supervisor and the Graduate Associate Head. You must formally apply for a leave of absence by writing a letter to the Graduate Associate Head explaining the rationale and justification for such a leave. The Graduate Associate Head will then bring your letter to the GSC, who will make a recommendation to the Head.

Additional Courses

Graduate students in a program of study may take additional courses which are not part of the degree requirements, and will not be included in the grade point average and shall be classified as occasional (O.S.). Fees will be assessed on an individual course basis.

Auxiliary Courses

Extra courses which are not actually part of the student’s program, but which are specified and required by the Department (or by the Advisory Committee at the Ph.D. level) may be classified as AX Auxiliary) so as not to be included in the degree program grade point average.

No student may register for any course until the student has consulted with his or her advisor. Together, they should fill the departmental registration form, sign it, and bring it to the office of the Administrative Assistant for processing.

Continuing Courses

Graduate courses in the Department of Computer Science are intended to be finished in **one term**: project work, assignments, etc. should not be extended beyond the term in which the course is offered. If a student encounters a situation where this occurs, he or she should bring this, in confidence, to the attention to the Graduate Associate

Head or the Head. For exceptional circumstances only, a grade classification of CO may be recommended by the instructor to allow a student to continue beyond the term in which the course is offered, until such time as a final grade can be established. The department head will consider any CO and may or may not approve these. The deadline for removal of a CO is not later than one year from the end of the term in which the course was originally registered. If the course is not completed by the next September and the student intends to complete the course, they must re-register for it. The form for continuing status must be submitted with the examination register for each CO assigned.

Program Requirements for Graduate Student Academic Performance

General

Responsibility for the enforcement of regulations concerning minimum academic performance rests, in the first instance, with the Graduate Studies Committee. As soon as the Department becomes aware that a student has failed to achieve the required minimum in any aspect of their program, the Graduate Studies Committee shall decide either to make a remedial recommendation that will allow continuance in the program, or to make no recommendation (in which case the student would be required to withdraw from the program). Voluntary withdrawal from a program is not permitted once the grades have been declared and indicate the student has failed to achieve the required minimum. Any recommendation at the department level will supersede student requests for voluntary withdrawal. The student will be informed of the recommendation by the Department and will have an opportunity to appeal the recommendation at the department level. Department appeal procedures are published as an Appendix to the Supplementary Regulations.

If, through an oversight, the Department fails to make a recommendation, the Faculty of Graduate Studies will notify the Department and the student of the deficiency and advise that unless a remedial recommendation is forwarded to the Faculty of Graduate Studies within 14 days, the student will be required by the Dean to withdraw. The required withdrawal is placed on the student's record.

A student who has been required to withdraw from a graduate program at the University of Manitoba may be permitted to enroll in another graduate program in the Faculty only if the application for admission is approved by the Dean of Graduate Studies.

Graduate courses in the Department of Computer Science are categorized by GSC for breadth purposes as being in one of three areas: Fundamentals, Foundations, or Applications. These areas are referred to in specific programs below in terms of criteria for evaluating breadth of an individual student's program. When the list of grad courses available each term is prepared, the breadth area for each will be posted, in order that students can better plan their programs. The Department Head will endeavour to ensure there is a reasonable number of courses in all areas each year, but students should be proactive in choosing course areas to satisfy the breadth requirements of their program: there is no guarantee that any particular course will be offered in any given year.

Students are responsible for ensuring that they meet degree and program requirements, including choosing courses such that breadth requirements are satisfied. While the Faculty office endeavors to assist all students as they proceed in the various programs, a final and thorough check is not done until the final year of the program, prior to graduation. Students are cautioned, therefore, to check all regulations with respect to the degree requirements.

Any student re-registering between receiving unsatisfactory grades and a decision by the Graduate Faculty on a deficiency, does so at his or her own risk.

Pre-M.Sc. Program

The Pre-Master's year will comprise a maximum of five full courses (30 credit hours) of which a maximum of four (24 credit hours) may be taken in Computer Science. The Graduate Associate Head is the advisor of all Pre-Master's students. Accepted Pre-Master's students must consult with the Graduate Associate Head before courses

will be approved. Each program will be designed to complement the individual student's background and correct any program deficiencies prior to admission to the Master's program.

Students in the Pre-Master's program are required to achieve a grade point average of 3.0 (B) in course work with no grade below a C+.

When a student has failed to meet the requirements, the Graduate Studies Committee is required to consider possible remedial recommendations. These are made on an individual basis, but the following are typical:

1. Students deficient in 6 hours of credit or less with a grade of C in a course or courses may be permitted to repeat the course or courses, or take equivalent substitute courses.
2. Students deficient in 6 hours of credit or less and with a grade of D or F in a course or courses, may be permitted, if the overall average is C or better, to repeat the course or courses or take an equivalent substitute course.
3. Students deficient in more than 6 hours of credit may be permitted to repeat the year, or the courses or take equivalent courses.

NOTE: A student may be permitted to remove deficiencies in grades by repeating courses only once for each course to a maximum of 9 credit hours of course work. If a course is repeated the highest grade obtained in that course will be used in the determination of the grade point average. The grade point average is cumulative on a program if more than one year is required to complete the course requirements of a pre-Master's program.

M.Sc. Programs

There are two M.Sc. programs in the department: the thesis based program, and the coursework-only M.Sc. The coursework M.Sc. is normally considered a terminal degree: because there is no core research component to the degree itself, it is normally very difficult to show the proficiency in research that is normally required for entry into a Ph.D. program. The coursework-only M.Sc. also has a co-op option. Work terms in this co-op option are normally scheduled for summer terms, since the department generally offers no graduate coursework in summer.

Advisors and Advisory Committees

Each thesis Master's student must have an advisor upon entry into the program, and may have a co-advisor if this is agreed upon. Thesis M.Sc. student advisors must be approved by the Department head. The advisor will advise the student on a program of study, direct research, and supervise the thesis work. If for any reason a student is in a position where they have no advisor, the Graduate Associate Head will normally be deemed the interim advisor for the student, or the Graduate Associate Head or Department Head may appoint another member of the department (who is also a member of the Faculty of Graduate Studies) to act as the student's advisor. Each thesis M.Sc. student will subsequently have an advisory committee appointed within eight months of the start of the student's program. This committee will consist of the advisor (and co-advisor, if any), and two additional members. These additional members must both be members of the Faculty of Graduate studies, and at least one of the additional members must be from the Department of Computer Science. The other may be from another unit in the University of Manitoba, if the student and advisor so desire, but there is nothing wrong with having a committee that is entirely from within the department. The advisory committee is proposed on a written form, signed by the student and all committee members. Names of nominated committee members will then be circulated to GSC by the Graduate Associate Head for comments and advice before approval by the Department Head. The Department Head may later approve modifications to advisory committee membership if needed. The advisory committee will handle primary reviews of the student's thesis proposal (before submitting these for final approval to GSC) as well as approve the student's progress reports.

The Advisor of all coursework M.Sc. students is the Graduate Associate Head, who is the sole member of these students' advisory committees.

Advance Credit

Advance credit for courses taken elsewhere toward a degree at this University will be given consideration on an individual basis by GSC. A course cannot be used for credit toward more than one degree.

Application for advance credit must be made within the first year of the program. No more than half of the required course work for the program can be given advance credit. Regardless of the extent of advance credit received, all students are required to pay the program fee.

Students wishing to have courses considered by GSC for advance credit should supply the Graduate Associate Head with documentation regarding their previous courses: official course descriptions and course syllabi, for example.

Transfer Credit

Students may, with permission of GSC, take a course at a different university and have it apply to their degree at the University of Manitoba. Students should put in an informal request with the GSC, to make sure the course is acceptable, and then a Letter of Permission must be completed and paid for with the Registrar's Office in order to have the course transfer to the University of Manitoba. This must all be done and approval obtained **before taking the course**.

Minimum Program Requirements

Thesis M.Sc. requirements are:

- a) A minimum of 15 credit hours of course work, including a 3-credit hour Research Methodologies course is required; all courses must be at the 7000 level and no more than 6 credit hours will normally be taken in any single major area (as defined by the major areas in the previous Section). The Research Methodologies course is not deemed to fall into any of the major areas. Research Methodologies must be taken in the first term it is available after the student's entry to the thesis program.
- b) The student will research, write, and present a thesis that meets appropriate standards as judged by GSC (at the proposal stage) and the student's thesis examining committee (for the final thesis). The thesis must, of course, also adhere to Faculty of Graduate Studies requirements.
- c) The student will give an oral presentation of the results of the thesis in the form of a defense of the thesis to the examining committee, normally chaired by a member of GSC. This defense will be open to the public.

Students in the thesis M.Sc. program are required to attain a minimum of C+ in each course that is to be included in the student's Master's program, and an overall B average in any term. Students who fail to maintain this standing will be required by the Faculty of Graduate Studies to withdraw, unless a departmental recommendation to the contrary is approved by the Board of Graduate Studies.

Students in the Thesis M.Sc. program may apply to the Department at any time to transfer to the coursework option. If such a transfer is granted by the department head, the student must then satisfy all requirements of the coursework M.Sc. program.

Coursework M.Sc. requirements are:

A minimum of 24 credit hours of course work, 18 credit hours of which must be at the 7000 level (the remaining 6 credit hours may be at either the 7000-level or the 4000-level). There must be at least 6 credit hours at the 7000 level in each of the major areas (as defined in the previous Section). Research Methodologies may only be taken by a coursework M.Sc. student with special permission of the GSC, and would normally be done by those intending to transfer from the coursework to the thesis M.Sc. Research Methodologies is deemed not to fall into any of the major areas (as defined in the previous section), and so someone taking Research Methodologies and remaining in the coursework M.Sc. program will still need at least 18 credit hours of coursework at the 7000 level.

Students in the Coursework M.Sc. program may apply to the GSC to transfer to the Thesis option (should a suitable thesis topic and advisor be found), normally within the first twelve months after starting the Coursework M.Sc. program. If such a transfer is granted, the student must then meet all the requirements of the thesis M.Sc. program (including taking Research Methodologies at the earliest opportunity).

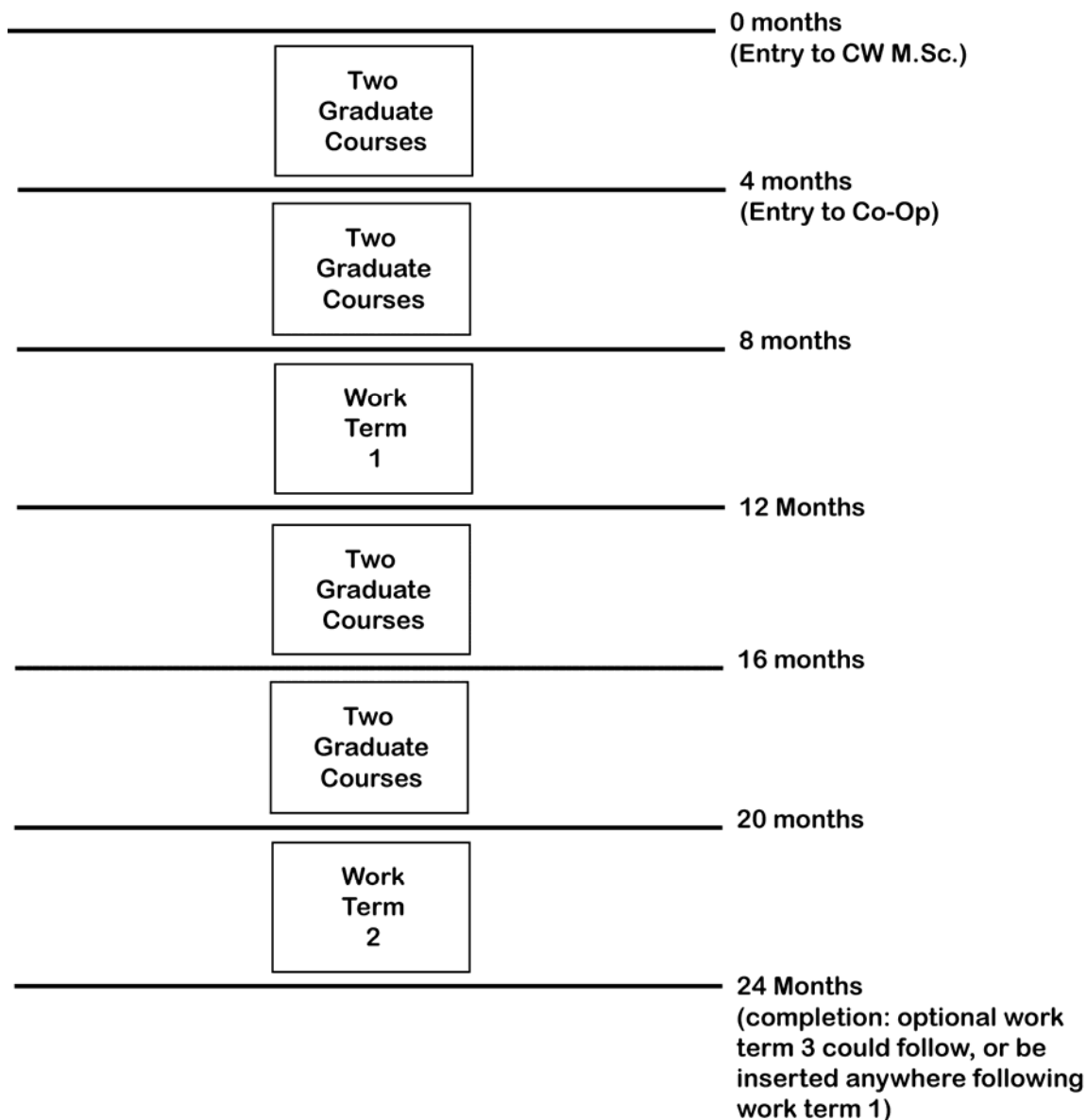
Co-Op Option Within the Coursework M.Sc.:

Coursework M.Sc. students in the first year of graduate studies may apply through the department's co-op office to enter the co-op option. Students in the thesis M.Sc. program are not eligible for this option. Students in the co-op option cover all the requirements of the coursework-only M.Sc., and also complete at least two, and as many as three, four-month work terms (which may be taken consecutively with the same employer if desired) in placements the graduate associate head and the co-op office deem to be of value in terms of experience in Computer Science at the Master's level. Each work term is associated with a 0-credit hour graduate course. Each of these courses is pass-fail, and requires a written report on the student's work term. See the ROASS documents for each of these courses for the required content of this report. Failure to pass one of these courses will impact the student as a deficient grade in the same way that a poor grade in any other graduate course would. That is, the consequences of failing any of these courses will normally mean removal from the graduate program.

Students apply to enter the Co-op option only after (at least) their first academic term in the coursework M.Sc. program has been completed, and only after the student has successfully completed all CANTEST language requirements (if the latter are necessary based on the student's original admission to the coursework M.Sc. program). Admission is determined by the department's Co-op office and the Graduate Associate Head, and is based on the student's prior academic background, grades received in their first term at the University of Manitoba, and suitability to potential work placements, based on an interview with the student. Entry to the co-op option is competitive: limits are partly based on the resources of the department to manage co-op placements, as well as likely available work placements.

The normal start of the first work term will be the first summer following the student's admission to the coursework M.Sc. program, or the start of the third term after the student's admission to the coursework M.Sc. program, whichever is later. Subsequent work terms may or may not be contiguous to the first. Students who do not obtain the necessary work term placements will be removed from the Co-op option.

It is possible to participate in the co-op option with no impact on degree time-to-completion. The department does not normally offer graduate courses in the summer, so if two work terms were both taken during sequential summer terms, a student would graduate at exactly the same time he or she would if they were not participating in the Co-op option. Ideal progress through the program is shown in the following diagram, where 0 months would normally correspond to a September admission, making the 8-month point the first summer:



Failure to Meet Requirements

When a student has failed to meet the requirements in either M.Sc. program, the Graduate Studies Committee is required to consider possible remedial recommendations to the Faculty of Graduate Studies. These are made on an individual basis, but the following are typical:

1. Students deficient in 6 hours of credit or less may be permitted to repeat the course or courses, or take an equivalent substitute course or courses.
2. Students deficient in 6 hours of credit or less with a grade of D or F, or deficient in more than six credit hours, will normally be required to withdraw from the program.

If individual circumstances are judged to be extraordinary, the department may make a special appeal to the Faculty of Graduate Studies for approval of a remedial recommendation falling outside those prescribed above. A student may be permitted to remove deficiencies in grades by repeating courses only once for each course to a maximum of 6 credit hours of course work. If a course is repeated or a supplemental examination is written, the highest grade obtained in that course will be used in the determination of the grade point average.

Lapse of Credit

A candidate for a degree will not be permitted to count toward that degree any graduate courses taken more than eight years prior to the date of the awarding of the degree. This stipulation does not apply to work of the pre-Master's year.

Progress Report/Report on Student Status

The series of progress reports that are required for each M.Sc. students are an extremely important tool in managing a graduate program, from both a student and faculty viewpoint. Progress reports are required at least annually (by June 15) by the Faculty of Graduate studies, and students are not allowed to re-register without a current progress report in place. However, given that the nominally-intended timespan of an M.Sc. program is two years, it is important that these be done more often than once a year. The progress report allows expectations for future milestones in a student's program to be stated in writing and made clear to all parties. If problems arise and these milestones are not met, remedial action can more quickly be taken and long-term problems minimized if less than a full year passes between such reviews. If the student's next progress report is intended to be done less than a year in the future, the advisor should note this, along with milestones to be completed by that date, on the current Progress Report. Progress reports are made by the Graduate Associate Head in the case of coursework M.Sc. students, and the advisory committee in the case of thesis M.Sc. students. They are then submitted for approval by the Department Head (at least **two weeks** before the Faculty of Graduate Studies deadline).

Minimum Time Requirement

The minimum time required for students engaged in full-time study in the thesis master's program is a total of one academic year.

Maximum Time Limits

The maximum time allowed for the completion of the M. Sc. degree in Computer Science is 5 years.

Extension of Time to Complete Degree Requirements

All requests for extensions to the maximum time limit will first be considered by GSC, and its recommendation will be forwarded for consideration by the Executive Committee of the Faculty of Graduate Studies. Normally only one extension will be permitted, for a period of up to, but not exceeding, two years.

The Executive Committee of the Faculty of Graduate Studies may require that students being granted extensions enroll full-time during the period of the extension. They may also recommend conditions or remedial work to be associated with the extension.

Students must complete the *Request for Extension* Form, discuss it with their advisor, and submit it with a statement from the advisor to the GSC for recommendation to the Faculty of Graduate Studies. **This form must be received by the GSC at least five months prior to the expiration of the time limit** and by the Faculty of Graduate Studies at least four months prior to the expiration of the time limit.

Thesis Proposal

Every thesis M.Sc. student must, in consultation with his or her advisor and usually within the first year, prepare a formal thesis proposal. Proposals must provide a review of important work related to the student's proposed research area and include a precise problem statement, a sketch of a proposed solution with sufficient detail for reviewers (who may not be completely familiar with the area) to assess the likelihood of the student being successful, a timeline for the completion of the work, and a bibliography. A thesis proposal is expected to be from ten to fifteen double-spaced pages in length, not including the bibliography. Thesis proposals well beyond this limit, or which are considered unreadable due to poor English, may be rejected at the discretion of the Graduate Associate Head. Sample copies of proposals can be requested from the Administrative Assistant.

Primary thesis proposal reviews are done by the members of the student's advisory committee. A form for this purpose is available on the department's website – the form indicates the criteria by which a proposal should be evaluated, and requests detailed comments on these criteria. Advisory committee members are strongly encouraged to be as detailed on this form as possible, since the purpose of these reviews is to provide solid grounds to GSC that the proposal should be accepted. After reviews are received, the proposal, reviews, and a submission form (also available on the department's website) indicating that the student and advisor approve the submission and feel it meets the guidelines of an appropriate proposal, are submitted together to the Graduate Associate Head for approval by GSC.

The Graduate Associate Head will delegate member(s) of GSC to examine the proposal and reviews. On behalf of the GSC, the member or members will either accept the proposal as it stands, request revisions to be subsequently verified by the Graduate Associate Head, or reject the proposal, requiring revisions and resubmission to the GSC for full review in future. In the latter two cases, specific feedback indicating what must be done to make the proposal acceptable will be provided through the Graduate Associate Head.

Departmental regulations state that thesis proposals must be deemed acceptable by GSC a minimum of **seven months** before a thesis may be defended. In the case where the GSC rejects a proposal or requests formal revisions to be verified by the Graduate Associate Head, the revised proposal must be deemed acceptable (by the GSC in the former case, by the Graduate Chair in the latter) before this seven-month period can begin. Students must be aware of this regulation, and plan their thesis proposal submission early. Remember, the point of a proposal is to get approval for the research program *before* it starts – substantial work toward the thesis research should not occur until the proposal is accepted.

Thesis

In general, the Master's thesis should show that the student has mastery of the field and is fully conversant with the relevant literature. For information regarding the specific format, please refer to the Thesis Guideline book available from Graduate Studies. The thesis itself should normally be completed and defended within 24 months.

The physical and electronic copies of the thesis deposited with the University are University property. Out of courtesy, a student (or his or her advisor) will normally provide bound copiers of the thesis for the departmental library, and for the advisor and other members of the examining committee, but this is not a formally required.

Thesis Examining Committee

The student's advisor will recommend a suggested Thesis Examining Committee to the Department Head on the *Thesis Title and Appointment of Examiners* form. This form must be submitted to the Department Head one month before the intended defense date, to allow time to consider the suitability of the committee to evaluate the particular thesis. Note that while the Faculty of Graduate Studies allows distribution of the thesis to the committee with less than one month before the defense, provided the committee all agrees, that committee must still be officially formed a month prior. That is, even if a student is attempting to meet a tight deadline for thesis submission, there is no reason the examining committee itself should not be known a month before the defense: examining committee members should be chosen on the basis of the best ability to evaluate the thesis, not whether a member's schedule permits a defense on short notice.

The Examining Committee must consist of the advisor, any co-advisor, and a minimum of two other persons, one of whom must be from outside the Department. All but one of these examiners must be members of the Faculty of

Graduate Studies. It will be the duty of the examiners to examine and report on the student's thesis. In certain instances, the advisor may wish to recommend an external examiner from outside the University of Manitoba. Prior to recommendation to the Faculty via the *Thesis Title and Appointment of Examiners* form, an informal inquiry as to the external examiner's willingness to serve should be made by the thesis advisor. The Dean of Graduate Studies will consider such external examiner appointments individually.

The advisor will arrange for the distribution of the thesis to the thesis examiners, notifying the Graduate Studies Office whenever a student's thesis is distributed for examination. Students have the right to an examination of the thesis if they believe it is ready for examination.

Thesis Examination

The Department of Computer Science requires that Master's students give an oral presentation of the results of their thesis research as part of a defense of the thesis.

The departmental *Thesis Defense Booking Form* (available on the Department's website) must be completed and turned in to the Graduate Associate Head at least **two weeks** before the intended defense date. This is so that there is adequate public notice (the Department will put up posters announcing the defense at least a week before the defense date), and to allow time for the Graduate Associate Head to find a suitable chair for the defense. Attendance at the defense is open to all members of the University community and to the public. All graduate students are strongly encouraged to attend all defenses in the department, to better understand the process and help them to prepare for their own defense.

The defense will be chaired by a member of the GSC (or alternative if no members are available) selected by the Graduate Associate Head. The defense should normally be attended by the full examining committee. It is possible to have some members of the committee in attendance via teleconferencing facilities (but it is up to the advisor to ensure such facilities are available – in particular, you cannot necessarily assume a remote advisor will automatically have access to such facilities). The defense will begin with a 20-30 minute oral presentation by the candidate of the results of the thesis research. This will be followed by two rounds of questions put to the candidate by each member of the examining committee (beginning with the External Examiner, moving to the other examiners, and concluding with the student's advisor and/or co-advisor). The first round should normally last no more than 30 minutes. The advisor may put questions on behalf of members of the examining committee who are unable to be present. The second round should last no more than 15 minutes. Questioning may be extended if necessary but only under exceptional circumstances should it be allowed to exceed 60 minutes. During both of these rounds, the chair has the right and responsibility to terminate a line of questioning if they feel it has been exhausted. The chair must also take action to preclude any inappropriate assistance provided to the student from the advisor or other examiners. **It is the student's job to answer the questions posed to him or her – no one else should be providing or clarifying answers.** Further, **only the student** should ask for a clarification of another examiner's questions. If time permits, following these two rounds of questions the chair may allow an opportunity for questions by other members of the University community in attendance. The chair will note that questions from outside the examining committee will have no bearing on the committee's deliberations.

The chair will then request all but the examining committee to leave the examination room, and will then survey the examiners for their decisions on the thesis and the defense and obtain their signatures in the appropriate places on the *Report of the Thesis Examining Committee* form. While the chair is not in a position to judge the thesis, he or she **is** in a position to judge the defense and must do so by choosing to sign or not sign the defense portion of the *Report of the Thesis Examining Committee* form accordingly. If the thesis or defense is considered unacceptable by any of the examiners or the chair (in the case of the defense), the defense will be considered a failure.

As a result of their examination of the thesis, the examiners may require a student to make any revisions to the thesis that they see fit, and the advisor shall see that all such revisions are completed before the report is submitted. An examiner has the right to withhold signing the thesis approval line on the Report of the Thesis Examining Committee until the candidate shows that the agreed-upon revisions have been carried out.

Following the Examiners' decision, the chair or the advisor will then communicate the results to the student.

The *Thesis Defense Guidelines* document, available on the department's website, details the expectations of each of the participants in the Defense (the student, advisor, examiners, chair), and offers helpful reminders for each role. This document should be read by all parties before the defense occurs.

Students are allowed two attempts at defending their thesis. If both of attempts are unsuccessful, the student will be required to withdraw from the program.

Thesis Report

The judgment of the examiners on the work of the thesis shall be reported to the Faculty of Graduate Studies in the qualitative terms "approved" or "not approved". Such verdicts must be unanimous, and each examiner (and in the case of the defense, the chair) must indicate by signature, concurrence with the verdict. If the examiners are unable to reach a unanimous decision, this fact must be reported to the Board of Graduate Studies in the form of signed majority and minority statements on the *Master's Thesis/Practicum Final Report* form, available from the Faculty of Graduate Studies website.

The candidate will be recommended for the Master's degree upon the receipt by the Faculty of Graduate Studies of the favorable report of the thesis examining committee, and when the corrected copy is submitted to the Faculty of Graduate Studies.

Ph.D. Program

The degree of Doctor of Philosophy is granted only upon evidence of general proficiency and of distinctive accomplishment in a special field. A recognized ability for independent investigation must be demonstrated by the candidate in a thesis which embodies original research or creative scholarship and is presented with a high degree of literary skill. It is a research degree and is never conferred solely as a result of study extending over any prescribed period.

Advance Credit

Advance credit for courses completed prior to admission to a Ph.D. program will be considered on an individual basis by the Graduate Studies Committee. The GSC will make recommendations in this regard to the Faculty of Graduate Studies using the *Recommendation for Advance Credit (Transfer of Courses)* form, under the following guidelines:

1. Application for advance credit must be made within the first year after registering in the program.
2. No more than half of the required course work for the program can be given advance credit from exterior institutions.
3. A course may not be used for credit toward more than one degree, diploma or certificate.
4. The student must register at the University of Manitoba for one academic year as a full-time student and must also complete the thesis at The University of Manitoba.
5. Regardless of the extent of advanced credit received, all students are required to pay the program fee.

Students wishing to have courses considered by GSC for advance credit should supply the Graduate Associate Head with documentation regarding their previous courses: official course descriptions and course syllabi, for example.

Selection Committee

When an application has been received, the GSC, acting as the Selection Committee, shall investigate the student's qualifications and report on suitability for Ph.D. study. In making admission decisions, the GSC may also consider the availability of an adequate supervisor given the student's research interests, and whether appropriate funding is available for the student. If acceptance is recommended by the Selection Committee and approved by the department Head and the Dean of Graduate Studies, a letter of acceptance is sent by the Faculty of Graduate Studies.

Student's Advisor

Every Ph.D. student will have an advisor (part of an Advisory Committee, see below) who is appointed by the Department Head. The advisor must be a member of the Faculty of Graduate Studies, be active in research, have expertise in a discipline related to the student's program, and hold a Doctoral degree. Subject to the approval of the Department Head, a student may have an advisor and co-advisor. In this case, the advisor and co-advisor must be members of the Faculty of Graduate Studies. Since most students have only a single advisor, the remainder of this section refers to advisor in the singular for the purposes of simplicity – this does not exclude the possibility of a co-advisor anywhere an advisor is referred to.

The advisor's duty is to advise the student on a program and courses, direct the student's research, and supervise the student's thesis work. The student's advisor also acts as a channel of communication to the student's Advisory Committee, the department, and the Faculty of Graduate Studies. Until an advisor is appointed, the Graduate Associate Head will act as the student's advisor.

Program of Study

As soon as possible after a student has been accepted, the student's program of study, which includes information about course work to be taken and the research area in which the thesis will be done should be forwarded to the Faculty of Graduate Studies. The GSC assesses the background of each accepted Ph.D. student, and the program of study and any changes thereto must be approved by the student's advisor, the Advisory Committee, and the Department Head. The approval of the student's advisor and the signature of the administrative assistant are required for registration.

Advisory Committee and Progress Reports

The Department Head is responsible for the establishment of an Advisory Committee for each Ph.D. student, which must be formed within eight months of the student's entry into the program. The Advisory Committee will consist of the advisor (and co-advisor, if one is deemed warranted), and a minimum of two other members of the Faculty of Graduate Studies. One of the members of the Advisory Committee, other than the advisor (and co-advisor) must have a major affiliation either with an ancillary department or, if the ancillary work is taken in the same department as the major subject, with a department other than the major department. The membership of this Committee, as well as any changes in its membership, must be approved by the Dean of Graduate Studies. It will be the duty of this Committee to approve the student's program of study and to exercise general supervision over the student's work until graduation. The Committee shall meet at least once a year to review the student's progress and to report this progress to the Faculty of Graduate Studies via the student's progress report form. The progress report is required by the Faculty of Graduate Studies by June 30 of each year, and students are not allowed to re-register if this report has not been submitted. While progress reports are required *at least* annually, it is encouraged to do this more often, so that students and faculty are aware of current status and expectations for the future. If the next progress report is intended to be done less than a year in the future, the date should be made explicit on the progress report itself, so that all involved are aware of the deadline by which goals should be met. The progress report must be approved by the Department Head before it can go to the Faculty of Graduate Studies, and so such forms must be in to the department by June 15 to allow for adequate review by the Department Head. The procedures for the progress report are as follows: The student will be asked by his advisor to prepare a written progress report for distribution to his Committee prior to the progress report meeting. The adviser will arrange a meeting before the

end of June. At the meeting, the student will give a presentation of approximately 15-20 minutes on her/his current research progress and future plans. The committee will then have an opportunity to question the student about the research program and offer criticisms and suggestions. The advisor will chair the meeting and will prepare a draft of the *Progress Report Form*. At the end of the meeting, the advisor will go over the form with the student and the committee to obtain agreement on the text and to obtain signatures. The form requires that the student's progress be judged as satisfactory or unsatisfactory. If there is evidence of unsatisfactory performance, the student may be required to withdraw.

Minimum Course Requirements

The Ph.D. program includes both a breadth component and depth component. The breadth component is intended to ensure that the student has an adequate background to be awarded the Ph.D. degree in computer science. The breadth component is satisfied by earning "checks" via a combination of graduate courses. Each graduate course is designated by the GSC as falling into one of the three areas of computer science defined in the *General Program Requirements* section of this document. A student must earn five checks with at least one, but no more than two, in each of these major areas. Some checks may be satisfied by prior courses taken by the student in a prior graduate degree – the GSC will evaluate each student's background upon entry to the program, and will assess the number of checks remaining to be satisfied. These remaining checks must be satisfied by an appropriate combination of graduate courses, where a grade of B+ or better must be achieved to earn a check. Graduate courses from other departments may also be approved by the Graduate Studies Committee as being acceptable in a given area for breadth on an individual basis.

Irrespective of the number of breadth checks that may be covered by a student's previous courses, the Ph.D. program requires a minimum of 12 credit hours of courses at the 7000 level beyond the Master's degree. Depending on the student's background, a student may have to take more than 12 credit hours in order to both satisfy the course requirements as well as the necessary breadth checks. Students may be permitted by the GSC to take approved graduate-level courses from outside the department, and these will be considered on an individual basis. The student is expected to complete the course requirements and satisfy the breadth requirement, as set out below, by the end of the 22nd month of the program.

Upon recommendation by the GSC, the Dean of Graduate Studies may approve courses to be taken at another university for credit toward the degree. Such recommendation must be brought to the GSC for approval **prior to** the student's intended enrollment at the other university.

Students in the Ph.D. program are required to attain a minimum of C+ in each course for graduate credit. Note that this is the minimal grade for holding credit – to count as a breadth check, a grade of B+ must be attained.

When a student has failed to meet the requirements, the GSC may make one of the following remedial recommendations to the Faculty of Graduate Studies:

1. Students deficient in 6 hours of credit or less may be permitted to repeat the course or courses, or take an equivalent substitute course or courses.
2. Students deficient in 6 hours of credit or less with a grade of D or F, or deficient in more than six credit hours, will normally be required to withdraw from the program.

NOTE: Students deficient in more than 6 hours of credit are normally required to withdraw. If the circumstances are judged to be extraordinary, the department may make a special appeal to the Board of Graduate Studies for approval of a remedial recommendation falling outside those prescribed above. A student may be permitted to remove deficiencies in grades by writing supplemental examinations or repeating courses only once for each course to a maximum of 6 credit hours of course work. If a course is repeated or a supplemental examination is written, the highest grade obtained in that course will be used in the determination of the grade point average.

Lapse of Credit

A candidate for a degree will not be permitted to count toward that degree any graduate courses taken more than eight years prior to the date of the awarding of the degree.

Minimum Time Requirement

The minimum time requirement for the program of study for the degree will normally be two years of study beyond the level of the master's degree, or three years beyond the level of an Honours bachelor's degree. The student may be permitted to spend one of these years in an approved program of research or study elsewhere. Such permission may be granted by the Dean of Graduate Studies on the recommendation of the student's Advisory Committee and the Department Head.

Maximum Time Limit

A student's candidature shall lapse if the degree is not completed within seven years following registration in the Ph.D. program. The Executive Committee of Graduate Studies shall have the power, in special circumstances, to grant dispensation from this provision.

Extension of Time to Complete Degree Requirements

The rules and procedures for extending the time to complete the Ph.D. degree are the same as for the master's program.

Residence Requirement

A total of one academic year at the University of Manitoba devoted to full-time postgraduate study subsequent to admission into the Ph.D. program is required of all students. The student must be available to the campus. To retain status as a full-time student, the student must obtain prior permission from the Faculty of Graduate Studies through the Department before undertaking full-time employment.

Academic Standing

A minimum grade of at least C+ is required for each course that is to be included in the student's Ph.D. program and the student must also maintain an overall B average. Students who fail to maintain this standing will be required to withdraw, unless a departmental recommendation to the contrary is approved by the Board of Graduate Studies.

Research Requirements

In addition to the breadth component, the Ph.D. also has a depth component. The depth component is intended to ensure that the student demonstrate independent thought and the ability to carry on advanced research in a field of computer science. Depth is demonstrated by developing a research area, passing a candidacy examination, submitting a formal thesis proposal, and ultimately writing and successfully defending a Ph.D. thesis.

Candidacy Examinations

The purpose of the candidacy examination is to ascertain whether a student is capable of independent thought and research and has sufficient knowledge of current research and methodologies in all areas relevant to his/her thesis research. The candidacy examination may precede or follow the submission and acceptance of the formal Ph.D. thesis proposal (see the next section). The candidate must prepare a written description of the research being

undertaken, which should include a survey of a significant portion of the relevant literature in the chosen area and provide some insight into possible research directions. This must be delivered to all Advisory Committee members at least two weeks before the examination date. The Graduate Associate Head must also be informed at least **two weeks** in advance, via the *Candidacy Exam Booking Form*, in order that a suitable chair for the examination may be found. The examination will be attended only by the candidate, the Advisory Committee, and the examination Chair (who is appointed by the Graduate Associate Head and will normally be a member of GSC). The examination will be oral and will begin with a 20-30 minute presentation by the candidate on research done to date as well as an outline of research planned for the future. The presentation will be followed by questions from the Committee. Following the examination, the Advisory Committee will determine if the result is a pass or failure. The decision of the examiners must be unanimous for a candidate to pass the examination. The Chair will communicate the result to the candidate, the department, and the Faculty of Graduate Studies. The candidacy examination must be completed at least 12 months prior to the student's intended defense date, and Faculty of Graduate Studies regulations allow a student to attempt the candidacy examination only twice.

Thesis and Thesis Proposal

An essential feature of Ph.D. study is the candidate's demonstration of competence to complete a research project and present the findings. The thesis must constitute a distinct contribution to knowledge in the major field of study, and the material must be of sufficient merit to be, in the judgment of the examiners, acceptable for publication. The thesis style must follow a standard style manual acknowledged by a particular study and recommended by the department, be lucid and well written, and be reasonably free from typographical and other errors. Further details about the format of the thesis itself may be found in the *Thesis Guidelines* document available from the Faculty of Graduate Studies.

In order to gain approval to produce a Ph.D. thesis, and in order to protect the student's interests and ensure adequate progress through the program, a formal proposal for the Ph.D. thesis is mandated by the Faculty of Graduate Studies. The purpose of the Ph.D. thesis proposal is to ensure that the student has a topic that is likely to result in contributions that are sufficient for Ph.D.-quality research, and a detailed enough research plan that the goals of the student's research are likely to be achieved. The formal Ph.D. thesis proposal document must provide a review of important work related to the student's proposed research topic and include a precise problem statement, and a sketch of a proposed solution with sufficient detail for the advisory committee to assess the likelihood of the student being successful. It must also emphasize the quality, substance, and originality of contributions, and contain a timeline for the completion of the work. A Ph.D. thesis proposal is expected to be concise and well written, and be able to achieve its objectives in ten to fifteen double-spaced pages, not including the bibliography. The student's Advisory Committee serves as the reviewers of the thesis proposal, and as such they may allow the proposal to be longer, but students are encouraged to be able to justify their work and describe its merits concisely, within the confines of the length described here. A thesis proposal is intended to serve the goals of the proposal outlined above, and as such, it must be prepared as a thesis proposal: **simply circulating prior papers authored or co-authored by the student, or the candidacy document (if the candidacy has already been performed) is not sufficient for this purpose.**

The reviewers of the Ph.D. thesis proposal are the members of the student's examining committee. The advisory committee must meet formally to decide on the acceptability of the thesis proposal, and any individual examiner may request revisions, or reject the document. In the case of rejection, specific instructions must be supplied to the student indicating how the proposal may be made acceptable. In the case of rejection by any examiner, the thesis proposal must be revised, resubmitted, and re-reviewed by all examiners. In the case of the proposal being acceptable to examiners but requiring revision, examiners have the right to review the revised document to ensure that it meets their approval, but may also leave approval of revisions in the hands of the advisor. When, in the entire committee's opinion, the thesis proposal is acceptable, the committee will indicate this by filling in the Faculty of Graduate Studies *Thesis Proposal Form* and submitting it to the Department and Faculty of Graduate Studies. A copy of the final thesis proposal must also be filed with the Department, and the student is encouraged to give a public seminar in the Department describing his or her work. **Faculty of Graduate Studies regulations state that approval of the thesis proposal must be documented and forwarded to the Faculty of Graduate Studies on the Progress Report Form within 24 months of the student's initial registration in the program.**

Final Examination for the Ph.D. Degree

The Final examination for the Ph.D. degree proceeds in two stages:

1. Examination of the candidate's thesis.
2. Oral examination of the candidate on the subject of the thesis and any matters relating thereto.

Students have the right to an examination of the thesis if they believe it is ready for examination. As part of appointing an examining committee, which must be done before the examination can take place, the thesis advisor must furnish a written statement of opinion to the effect that, the thesis is (is not) ready to be examined. Faculty of Graduate Studies regulations state that the thesis may not be formally submitted for examination more than twice.

Thesis Examining Committee

The advisor, (as Chairperson of the Advisory Committee), will consult with the Advisory Committee, and will recommend to the Department Head the names of at least three thesis examiners; these examiners will include the student's advisor, an external examiner, and at least two other persons (in addition to any co-advisor), one of whom must be from a department other than the Department of Computer Science. All internal examiners must be members of the Faculty of Graduate Studies. Under normal circumstances these internal examiners will be the members of the student's Advisory Committee. The Department Head will take these recommendations, and forward a list of examiners to the Dean of Graduate Studies for approval.

The student's advisory committee will recommend a distinguished scholar in the student's field of research from outside the University of Manitoba, to serve as the external examiner on the Examining Committee, after having ascertained that individual's willingness to serve. This recommendation will be made to the Department Head, who will consider this individual and make recommendation to the Dean of Graduate Studies for approval. The advisor and the student must submit a declaration to the Faculty of Graduate Studies that neither party has performed collaborative research work with the external examiner within the last five years.

Changes in the membership of the Examining Committee must be approved by the Department Head, and recommended to the Dean of Graduate Studies, who shall then convey the changes to the members of the Advisory and Examining Committee. No changes shall be made in the Examining Committee after the thesis is submitted by the Faculty of Graduate Studies to the Committee. Should the thesis not be submitted for examination within twelve months after the appointment of the Examining Committee, the Committee appointment will lapse and a new appointment will be necessary. It will be the duty of the examiners to examine and report on the candidate's thesis.

Sufficient copies of the thesis for all members of the Examining Committee should be delivered to the Faculty of Graduate Studies by the appropriate deadline. It is the responsibility of the Faculty of Graduate Studies to distribute the thesis to all examiners at one and the same time.

Role of the Internal Examiners

Each internal examiner (except the candidate's advisor/co-advisors) will submit to the Dean of Graduate Studies, within one month of the receipt of the thesis, a written report (with a copy to the Head) giving evaluation of the thesis, noting its merits and deficiencies (if any), and, if appropriate, suggesting revisions. The report shall contain a definite statement as to whether or not the student may now proceed to oral examination and shall place the thesis in one of the following categories:

1. The thesis, as a written document, is basically acceptable as it stands or with minor revisions (the student may proceed to the oral defense).
2. The thesis, though basically meeting the requirements for a Ph.D. thesis, may require revisions that are more than minor, but the candidate may proceed to the oral examination. (This category should only be used in those

unusual circumstances where the examiner has reservations such as are capable of being dispelled in an oral examination.)

3. The thesis needs major revisions before it could be considered acceptable and/or proceed to an oral examination.
4. The thesis is unacceptable.

NOTE: No one should infer that the placing of the thesis into category 1 or 2 above means that the thesis has received final approval. The placing of the thesis into either category 3 or 4 above constitutes a failure.

Role of the External Examiner

The Dean of Graduate Studies requests the external examiner to give a detailed report on the merits and deficiencies of the thesis as well as an overall evaluation. The external examiner will be asked to report findings in the same categories as those used by the internal examiners. The external examiner is requested to present a report to the Dean of Graduate Studies within one month of the receipt of the thesis. If an external examiner is appointed from overseas, adequate time must be allowed for the transmission of the thesis and the receipt of the report.

The external examiner should be encouraged to attend the candidate's oral examination, but is not required to do so. In cases where the department judges that there are special reasons for inviting the external examiner to attend the oral, a special request for financial assistance may be submitted to the Dean of Graduate Studies.

Oral Examination

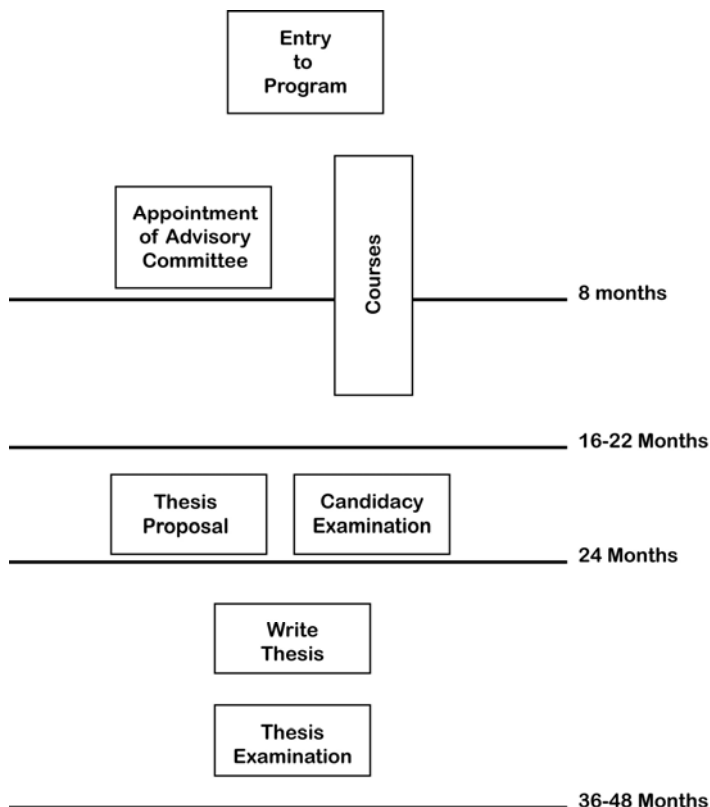
A student must pass an oral examination on the subject of the thesis and matters relating thereto before obtaining the Ph.D. degree. The examination will be conducted by an Oral Examination Committee consisting of not less than four persons. One of these will be the Dean of Graduate Studies or a representative chosen from among senior scholars at the University, who will be Chair. The other members will normally be the thesis examiners.

The final Oral Examination is open to all members of the University community. Students and Faculty are invited and encouraged to attend Oral Examinations but are not permitted to participate in the formal questioning. The format of the examination is entirely dictated by Faculty of Graduate Studies regulations, and students are directed to the Faculty of Graduate Studies Calendar for details.

A candidate may not present him/herself for oral examination on more than two occasions. A student who receives a failure on either the written thesis or the oral examination twice shall be required to withdraw from the Faculty of Graduate Studies.

Ph.D. Student Timeline

The major milestones in the program of a Ph.D. student, and the appropriate times at or before they should occur are shown in the following figure. This may be considered a summary of the various elements discussed above.



Ph.D. Student Timeline

Publication and Circulation of Theses – Master’s and Ph.D.

All graduate students registering in a degree program at the University of Manitoba will be advised that as a condition of being awarded the degree, they will be required to grant a license of partial copyright to the University and to the National Library of Canada for any thesis submitted as part of the degree program. (This makes the thesis available for further research only. Publication for commercial purposes remains the sole right of the author.) Ph.D. students will be required to provide a copy of the abstract for *Dissertation Abstracts International* and to authorize publication of the abstract in that publication. An abstract of not more than 350 words, prepared by the author and approved by the advisor, is sent to the publishers of the above work in which the abstract is printed and the availability of the thesis on microfilm at the National Library of Canada is announced.

The forms and conditions pertaining to these licence agreements are available at the Graduate Studies Office. This and other related regulations may give rise to important questions of law, and students may need additional legal advice on the copyright laws of Canada and/or other countries. Students who wish to obtain legal advice concerning their subsequent rights are advised to do so prior to signing the agreements. Signing of the license agreements is normally done after the contents of the thesis have been delineated and the importance of copyright and/or patents fully comprehended.

Publication in the above manner does not preclude further publication of the thesis or any part of it in a journal or in a book. In this case, acknowledgement should be made that the work was originally part of a thesis at the University of Manitoba.

Copyright in theses is protected by international copyright law. A copyright symbol © is incorporated on a page containing statements of permission to microfilm and to lend copies of the thesis. After completion, this page

should be inserted in the thesis immediately following the title page. Blank copies of this page are available from the Graduate Studies Office.

Restriction of Theses

In exceptional cases not covered by the regulation concerning patents (further information on patents is available at the Graduate Studies Office) where adequate cause can be shown to delay publication, the student may request the Dean of Graduate Studies to restrict access to any copies of a thesis submitted to the University of Manitoba, for a period up to three years after submission, and the Dean, in consultation with the student's thesis advisor, shall determine for what period, if any, such access will be so restricted. The student always retains the right to allow access by designated individuals.

Disputes, Disciplinary Issues, and Appeals

Departmental Appeals

Where at all possible, appeals of adverse decisions should be made, in the first instance, at the departmental level. In general, the Department of Computer Science can only recommend a particular action to the FGS with regard to student progress and/or status in the program. In addition, the Department may decide to make no recommendation, in which case the regulations of the FGS would be automatically invoked.

The following outlines the procedures for review of Departmental decisions/recommendations:

1. When a departmental decision is made with regard to a student's status and/or progress in a graduate program, the student will be informed, by the Graduate Associate Head or the Department Head, of the nature of the decision and of the possible consequences.
2. Within one week of receiving the decision/recommendation, the student may request a review of the decision by the Department of Computer Science Graduate Appeals Committee. This request is made to the Head or the Graduate Associate Head in writing, accompanied by a written statement from the student outlining the grounds of the appeal.
3. The Graduate Appeals Committee, which is advisory to the department head, will normally review the case within one week of receipt of the request. The student has the right to appear before the Graduate Appeals Committee, and the committee may request that other parties appear before it to provide information. Sessions of the Graduate Appeals Committee are otherwise closed.
4. The decision of the Graduate Appeals Committee, to uphold the original recommendation or to make a new recommendation, will be forwarded to the Department Head for his or her consideration.
5. The Department Head will take the recommendations of both the GSC and the Graduate Appeals Committee into consideration and will forward the departmental recommendation to the Dean of Graduate Studies and will inform the student promptly of this recommendation.

Composition of the Graduate Appeals Committee

The Graduate Appeals Committee will consist of 4 staff members, two staff member alternates and one graduate student. Staff members must be members of the Faculty of Graduate Studies. No panel member may concurrently be a member of the GSC. Panel members are appointed by Department Council in the same manner as the GSC. Any panel member who was responsible for the decision/recommendation under consideration, or who is otherwise materially involved in the case being considered, shall excuse himself/herself from the deliberations and be replaced by an alternate.

Faculty of Graduate Studies Appeals

Appeals against withdrawal required by the Faculty of Graduate Studies may be directed to the Executive Committee of Graduate Studies. Procedures for such appeals are outlined in documents that may be obtained from the Faculty of Graduate Studies office.

Appeal Deadlines: For departmental decisions: within 7 days of receiving notice from the Department of the recommended action. Appeals to the Faculty of Graduate Studies: within 21 days of the date when advice of the action is received from the Faculty of Graduate Studies by the student.

Resolving Disputes

All graduate students have an advisor, and the advisor should be the first person consulted in any case where a student feels that he or she has been treated unfairly. If the student feels that he or she cannot get a fair resolution by going to the advisor, possibly because the advisor is involved in the matter under dispute, the student should consult the Department Head or the Graduate Associate Head. The student should also consider informing the president of the Department's Graduate Student Association, and the student representative on the Department's GSC. Disputes that cannot be resolved informally by the advisor, Head, or Graduate Associate Head, or that have effects on other students or that have ramifications for Department policy, will be considered by the GSC. After these informal avenues have been exhausted, the student may make a formal (written) complaint to the Department's Graduate Review Panel (whose procedures are outlined in the Supplementary Regulations) which will render an independent recommendation for resolution of the dispute to the Head. The student can also avail himself/herself of the services of the University Ombudsman, the Student Advocate, or the Equity Services Officer. The student can also seek advice from the University of Manitoba Graduate Student Association.

Academic Dishonesty

NOTICE TO ALL GRADUATE STUDENTS REGARDING DISCIPLINARY ACTION :

After consultation with the Faculty of Graduate Studies (FGS) the GSC feels it is important to bring to students' attention the fact that the penalties imposed by the FGS for such infractions as academic dishonesty do not represent an upper bound on the severity of the penalty. In particular, side-effects caused by FGS penalties will still apply. Thus, for example, receiving an FGS-imposed grade of 'F' for academic dishonesty will be treated in exactly the same way as an "earned" grade of 'F' and will normally cause the GSC to recommend required withdrawal from the program. (This is because Computer Science typically does not recommend remedial action for deficient grades of 'D' or 'F').

University of Manitoba General Calendar. Section 7.1

Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room (e.g., crib notes, pagers or cell phones). Exam cheating can also include exam impersonation. (Please see Section 4.2.8 on Exam Personation). A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty.

To plagiarize is to take ideas or words of another person and pass them off as one's own. In short, it is stealing something intangible rather than an object. Plagiarism applies to any written work, in traditional or electronic format, as well as orally or verbally presented work. Obviously it is not necessary to state the source of well known or easily verifiable facts, but students are expected to appropriately acknowledge the sources of ideas and expressions they use in their written work, whether quoted directly or paraphrased. This applies to diagrams, statistical tables and the like, as well as to written material, and materials or information from Internet sources.

To provide adequate and correct documentation is not only an indication of academic honesty but is also a courtesy which enables the reader to consult these sources with ease. Failure to provide appropriate citations constitutes plagiarism. It will also be considered plagiarism and/or cheating if a student submits a term paper written in whole or in part by someone other than him/herself, or copies the answer or answers of another student in any test, examination, or take-home assignment.

Working with other students on assignments, laboratory work, take-home tests, or on-line tests, when this is not permitted by the instructor, can constitute Inappropriate Collaboration and may be subject to penalty under the Student Discipline By-Law.

An assignment which is prepared and submitted for one course should not be used for a different course. This is called "duplicate submission" and represents a form of cheating because course requirements are expected to be fulfilled through original work for each course.

When in doubt about any practice, ask your professor or instructor.

Financial Assistance

Student Assistantships and Teaching Assistantships

The Department hires students, subject to the Canadian Union of Public Employees (CUPE) regulations, for demonstrating, marking and teaching assistant positions. This makes it fairly difficult to hire a person who has not yet registered as a student, since both expertise and seniority have a role in the hiring procedure. The number of positions varies from year to year. Salary levels are dependent on the work involved, however the range is from approximately \$10.00 to \$14.00 per hour. In addition, the supervisor, or other Faculty members, may be able to provide support or research assistantships out of their individual grant or contract funds. No student will be permitted to lecture more than one course in a term and students on scholarships that limit extra employment hours should note that these limits must be strictly adhered to.

Scholarships and Fellowships

Canadian students are strongly encouraged to apply for NSERC scholarships. A Master's level NSERC scholarship (PGSA) has a value of approximately \$ 17,000, and a PhD scholarship (PGSB) of approximately \$ 18,000. The deadline date to submit an NSERC application is late September. Since this must be processed through your current department it is important to check with the person in charge for any internal deadlines.

Canadian and non-Canadian students are encouraged to apply for the University of Manitoba Graduate Fellowship (approximate value \$6,000 - \$10,000 dependent on program type).

Applications for all scholarships/fellowships may be picked up at the Dept. of Computer Science General Office or the Faculty of Graduate Studies.

See <http://www.umanitoba.ca/gradstu/awards> for further scholarships/fellowships (there are hundreds of them!).

Western Deans' Agreement

This agreement was established in 1974 as an expression of co-operation and mutual support among universities offering Graduate programs in western Canada. Its primary purpose is the reciprocal enrichment of graduate programs throughout western Canada. This agreement is not intended to preclude other agreements between participating institutions.

1. The Western Deans' Agreement provides an automatic tuition fee waiver for visiting students. Graduate students paying normal required tuition fees to their home institution will not pay tuition fees to the host institution.
2. Students may be required to pay student, activity, application, or other ancillary fees to the host institution, according to general policies in effect at the host institution. Wherever possible, these fees will also be waived.
3. Students will qualify for the fee waiver if they: present the "*Authorization Form: Western Deans' Agreement*" signed by the Dean or designate and the Department Head or Graduate Advisor of a participating Western institution specifying the courses to be taken for credit toward a graduate degree program at their home institution; are in good standing in a graduate program at the home institution. Have paid all current and back fees at the home institution.
4. Students must meet all requirements as prescribed by the host university's regulations, deadlines, class capacities, and course prerequisites.

5. Registration is possible in courses at both the graduate and undergraduate levels, and in credit courses offered through distance education or other means. To be eligible, courses must be an integral part of the applicants' graduate degree program. Fee waiver is not permitted for audit or non-credit courses.
6. Students must have the Authorization Form approved by the relevant Department Head and the Faculty of Graduate Studies at the host institution at least two weeks prior to the commencement of the course(s) requested. The fee waiver is not available retroactively.
7. Students are subject to regulations of the home institution governing credit for the courses to be undertaken. As a condition of registration at the host institution, students will arrange for official transcripts from the host institution to be sent to the home institution confirming successful completion of courses selected.
8. Students must send confirmation of registration and notice of any change to the graduate Records Office of the home institution at the time of registration or course change is completed.
9. Students may not claim fee waivers under the terms of this Agreement for a period of more than 12 months total.
10. Each institution has its own regulations regarding the maximum number of transfer credits permitted in a given degree program.

Participating Universities

University of Alberta
 University of Brandon
 University of British Columbia
 University of Calgary
 University of Lethbridge
 University of Manitoba
 University of Northern British Columbia
 University of Regina
 University of Saskatchewan
 Simon Fraser University
 University of Victoria

Other Publications of Interest

Department of Computer Science Supplementary Regulations, Department of Computer Science, E2-445 EITC, University of Manitoba, Winnipeg, MB, Canada R3T 2N2, " (204) 474-8313 or FAX (204) 269-9178. Also available at: <http://www.cs.umanitoba.ca/newsite/graduate.htm>

University of Manitoba Graduate Calendar Available from the Faculty of Graduate Studies. http://www.umanitoba.ca/faculties/graduate_studies/publications/index.html

Information for International Students at the University of Manitoba, International Centre for Students, 541 University Centre, University of Manitoba, Winnipeg, MB, Canada R3T 2N2, " (204) 474-8501 or FAX (204) 275-5253. Website <http://umanitoba.ca/student/ics/>

Thesis Guidelines, Faculty of Graduate Studies, 500 University Centre, University of Manitoba, Winnipeg, MB, Canada R3T 2N2, " (204) 474-9377. http://www.umanitoba.ca/faculties/graduate_studies/publications/index.html

Further Information

Specific inquiries about the areas noted may be addressed to those listed below:

Faculty of Graduate Studies

Faculty of Graduate Studies,
500 University Centre
The University of Manitoba,
Winnipeg, Manitoba, R3T 2N2
(204) 474-9377

Scholarships and Awards

Financial And Awards Office,
422 University Centre
The University of Manitoba,
Winnipeg, Manitoba, R3T 2N2
(204) 474-9531

University Residence and Other Housing

Housing and Student Life,
415 University Centre
The University of Manitoba,
Winnipeg, Manitoba, R3T 2N2

(204) 474-9717 re Off Campus housing
(204) 474-9942 re Residences

International Student Affairs

International Centre for Students,
541 University Centre
The University of Manitoba,
Winnipeg, Manitoba, R3T 2N2
(204) 474-8501

International Student Organization (ISO),
541 University Centre
The University of Manitoba,
Winnipeg, Manitoba, R3T 2N2
(204) 474-8501

Graduate Students Affairs

Graduate Students Association (GSA),
221 University Centre
The University of Manitoba,
Winnipeg, Manitoba, R3T 2N2
(204) 474-9181