Department of Biology **Updated July 4, 2025**

A Guide to Thesis Writing and Defence

The work in your thesis is probably excellent but it is a courtesy and good strategy to make the reading of your thesis as simple and pleasurable as possible for your examiners. You must:

1) save as PDF or Word document

2) finish it completely;

3) **submit** it to the Graduate Studies Advisor 2 weeks (10 business days) before the tentative M.Sc. exam and 5 weeks (25 business days) before the tentative Ph.D. exam; ***you must notify the Graduate Studies Assistant, 5 business days prior to the submission so a Head's Delegate and Chair can be secured, without this you cannot submit to the School of Graduate Studies***.

4) correct any typing errors;

5) make sure pages are numbered;

6) arrange the thesis in a logical manner;

7) make it as concise as possible.

An appendix to this guide gives more detailed instructions on the preparation of the thesis.

General Forms of Theses

There is a leaflet from the School of Graduate Studies with the above title which you may obtain online at:
http://queensu.ca/sgs/sites/webpublish.queensu.ca.sgswww/files/files/Students-thesis%20completion/SGS-General_Forms_of_Theses_RevisedJune2011.pdf
It will indicate to you the quality of the paper and printing required, the number of copies you need (you will need more) and where to put the copyright sign, which must be on the approved international form.

Following are the Department of Biology recommendations (note recommendations not rules) for thesis format:

A) Number of Copies

You will submit electronically to biolgsa@queensu.ca a copy of your thesis 10 business days (MSc) or 25 business days (PhD) prior to your defence. The Graduate Studies Advisor will send a copy to each member of your committee, along with the details of the meeting and other documents.

B) **Format**

The thesis shall consist of the following in order as given:

Traditional Format	**Manuscript or Publication Format**
Title page	Title page
Abstract (350 words)	Abstract (350 words max.)
Co-authorship (if necessary)	Co-authorship (if necessary)
Acknowledgements	Acknowledgements
Table of Contents	Table of Contents
List of Tables	List of Tables
List of Figures & Illustrations	List of Figures & Illustrations
Ch.1: General Introduction	Ch.1: General Introduction
Ch.2: Literature Review	Ch.2: Literature Review
(may be included in intro.)	(may be included in intro.)
Ch.3: Materials and Methods	Ch.3-n: Manuscripts
Ch.4-n: Results	Ch.n+1: General Discussion
Ch.n+1: Discussion	Summary (may be in Chapters)
Summary	Literature Cited
Appendices	Appendices
MSc = 100 pages	MSc = 100 pages
PhD = 175 pages	PhD = 175 pages

Page limits are specific to each type of format. If you go over these limits then written permission (email to Graduate Studies Advisor) is required from each member of the supervisory committee before the thesis can be submitted.

a) **Title Page** – See the attached copy from the Graduate School leaflet.

b) **Abstract** - Do not throw this together at the last minute. It is the only part which is published widely. The Abstract should be concise (no more than 350 words) and present your important results and conclusions. Remember not to exceed the word limit since abstracts which are too long can not be included in "Dissertation Abstracts".

c) **Text** - This one word covers at least 90% of the thesis. You might consider this organization:

i) **General Introduction**

Many students like to start the thesis with a General Introduction of about three pages. In this they give an outline of the whole area, the problem which was chosen and the reasons for the approach which was taken. A short General Introduction is very useful but to help orient readers or examiners; keep it brief.

ii) **Literature Review**

A Literature Review is an essential and vital part of the thesis. It demonstrates that you know the field and have read the most important papers. Whatever you do, avoid compiling a list of abstracts. Make it interesting to read. You could take an historical approach and show how a concept was developed. You could present a hypothesis and show the evidence for or against it. Do not be afraid to indicate your own preferences. It has been suggested that the review should be written last after you have decided on the data you will present and the discussion you will write.

Make sure your references in the text fit the references in your reference list. Above all write well. Theses have been rejected because they were very difficult to read.

iii) **Materials and Methods**

It is impossible to judge the quality of your results unless it is clear to the examiner exactly how you did the experiments. It is also very useful for your supervisor and for students who may follow you to have a compendium of methods. Your methods may be based on, or identical with, methods in the literature. Give the reference but still present the full method. You cannot expect examiners to spend time in the library looking up your methods. If you have made calibration curves, present them. Explain how you analyzed your data. Some material which is not essential, can go in an appendix. You may think it is useful to include a computer program, in case it is ever required again, but it is not essential and can go in an appendix. The derivation of an equation may also be best placed in an appendix, along with standard curves and very detailed, previously published methods.

iv) **Results and Discussion**

Some students prefer to discuss the implication of results at the time the results are presented; but the majority of students will find that it is best to keep them separate. Different areas of biology may be more suited to either treatment. Discussion in the results, which is repeated in the discussion section, is redundant and tedious.

A traditional thesis is not a manuscript for publication and should be treated quite differently. It is a treatise on a subject and will include material which will never find its way into a journal. You will show how you developed your ideas and experiments and will include some experiments which were successful and some which failed. In a manuscript for publication, you will be much more selective in the data you present. The writing of the thesis represents one of the only opportunities to be solely responsible for an extended piece of writing. The completion of a PhD thesis "marks the transition from student to independent scholar" (Research Student and Supervisor, Council of Graduate Schools, Washington, D.C.)

Present your data clearly and concisely and, where possible, graphically. You may be able to divide your data into essential data for the examiner while she/he reads the thesis and supplementary data. This latter data can be placed in an appendix and could include such material as unprocessed data which may be useful to future students.

Essential data should be in the form of tables and figures which should be placed immediately following the page on which they are mentioned. It is sometimes possible to write the thesis in such a manner that the data is spread evenly throughout the thesis rather than large amounts appearing in one place. The legend of a figure should be on the page facing the figure so that when the thesis is opened, the legend is on the left and the figure on the right. The legend should contain all the information required to understand the figure and it should not be necessary to refer to the text. If two lines appear in a figure it may be easier to understand the figure if the lines are labelled, rather than just using different symbols. Similarly, a table should contain all the information necessary for understanding the table.

In a Discussion you are expected to put forward your own ideas and attempt to come to conclusions about your data. It is perfectly reasonable to point out the inadequacies of your work and to suggest new approaches since you cannot be expected to do everything in two, three or even five years. You may be asked to expand on this in your defence.

v) **Conclusions**

Some students like to add a short summary to point out the main conclusions of the work. In some cases this is useful but often it is redundant.

vi) **Literature Cited**

It is usual to put the list of references in alphabetical order. Your own area may cite publications in a particular manner. An acceptable form in biochemical journals is:

Duggleby, R.G. and Dennis, D.T. (1974) *Nicotinamide adenine* dinucleotide - specific glyceraldehyde 3-phosphate dehydrogenase from *Pisum sativum* L., J. Biol. Chem. 249, 162-166.

or

Lawenstein, J.M. (1971). The pyruvate dehydrogenase complex and citric acid cycle, in Comprehensive Biochemistry, Volume 185, M. Florkin and E. Stotz (eds.), Elsevier Publ. Co., Amsterdam, p. 1.

vii) **Appendices**

Reference has already been made to the use of an appendix. Appendices could be used much more extensively to remove non-essential material from the text, thereby rendering the text easier to read. Each appendix should be self-contained.

(e) **Writing the Thesis** - How you go about converting your data into a thesis is something you will have to decide for yourself. Many students start by drawing the

figures and then writing the text around them. Similarly, they will collect the references and write the review around them. It is usual for a student to write an outline and review it with the supervisor. After this first draft is submitted to the supervisor a second draft or a final draft can be prepared.

You must remember that a thesis is not just a record of your results but also an indication of your ability to present material. It is difficult to suggest means of improving your style. Ask the graduate coordinator or consult with the Writing Centre for advice.

f) **The Oral Defence** - The examiner must submit a written report on your thesis one week before a Ph.D. Defence. If two examiners say the thesis should not be defended, the exam will be cancelled. The Chair of the committee is the Dean of Graduate Studies or a delegate for a Ph.D. exam. For the M.Sc. exam, the Chair is selected by the Graduate Studies Advisor and will be from another department. You may not know this person but it does not matter; the Chair is there to see that the committee follows the rules of the School of Graduate Studies. You will be asked to leave the room while the Chair reads the examiners' comments and also asks for verbal comments. Often the comments are contradictory, but sometimes all the examiners have seized on one point. It is not uncommon for the examiners to become sidetracked and start to talk about something else. If you seem to be waiting for some time it is probably not because of your thesis.

When you enter the room you will be asked to give a short talk of approximately ten – fifteen minutes. This, hopefully, will make you feel relaxed prior to the questions. It is better not to simply review your thesis since you can assume that everyone has read it. Tell the committee why you think the work is important and the conclusions you have reached. Suggest work which might be done and how you would have modified the experiments if you were to perform the work again.

You will be asked questions first by the external examiner, followed by the rest of the committee, then the Head or delegate. Your supervisor comes last and may not ask questions. In the first round of questions, each examiner is normally limited to 15 or 20 minutes. After the first round, there may be a second round of questioning. Remember you are there to defend the thesis not to agree with the examiners. Remember that the examiner is often asking questions because he or she feels obligated to do so and is not deliberately attacking your work. Many examiners are, in fact, truly interested in knowing more about your results.

You will be asked to leave the room again while a decision is reached. The committee has three options: 1) passed; 2) referred; 3) failed. The first does not mean the thesis is perfect but that the changes are small. The second means more extensive revisions and one member of the committee, usually your supervisor, will have to verify that you have made the required changes. There is often a time limit on these changes and if the changes are not made by that time your pass will automatically become a fail. Be warned, and complete the changes promptly. If you fail, the committee will usually give you some idea about how you should proceed.

Appendix A

Detailed Preparation of Thesis

FONT SIZE Although the Graduate School allows theses to use smaller fonts for footnotes and appendices, Biology requires that the entire thesis including figures with embedded labels, footnotes, references and appendices use a 12 point font.

PAGINATION. Each page of every thesis must be assigned a number and the pages must be consecutively arranged. The preliminaries, from this Title Page through the abstract, are numbered consecutively in small Roman numerals (ii, iii, iv, v, etc.), typed in the upper right hand corner of the page. Although no number is typed on the Title Page, that page is counted as "i". Consecutive Arabic numerals are typed in the upper right hand corner of each page beginning with the first page of the text and including all separately paged figures, tables, plates, bibliography and appendices. Complete pagination is essential. Un-numbered pages or pages numbered with number and letter (e.g., 3A, 3B) can easily be lost.

MARGINS. On all pages of the text a margin of 1" should be kept on the top, right side, and bottom. A margin of 1-1/2" should be kept at the left side.

PREPARATION OF ILLUSTRATIONS. If illustrations (graphs, charts, maps or photographs) are used, they or copies must be provided for all copies of the thesis. Photographs should be numbered as figures. No illustrative material too large to be folded into the regulation binding, and none detached from the binding, will be accepted.
All graphs and line drawings, etc., should be printed or drawn in black India ink on white paper, unless the included material (e.g., a map) has been printed commercially. All lettering closely associated with the illustrations (photographs included) should be printed or commercial letters used. The size of the letters should be in proportion to the size of the illustrations. Any illustrations not prepared by yourself should be indicated and the correct citation given in the legend. If a figure has been modified from the original, indicate this in the legend also.

Photographs may be secured to the page with good quality rubber cement or with dry mounting tissue. It may be preferable to print the photographs on 8-1/2" x 11" sheets. In this way the photographs are bound into the thesis and there is no possibility of loss.

Illustrations should be numbered consecutively with Arabic numerals.

PREPARATION OF TABLES. The student is referred to "Style Manual for Biological Journals" 1960, American Institute of Biological Sciences, 2600 P Street, NW, Washington 6, D.C., pp. 40-43, for an excellent discussion on the preparation of tables.

However, a few modifications are pertinent.

No vertical rules are used in tables. Tables are usually typed parallel to the print line, but extensive data may be typed vertically.

All tables are numbered consecutively with Arabic numerals. The table number is typed in capital letters (e.g., TABLE 2) above the table. The legend follows immediately after.

If footnotes are used with a table, they should be typed below the table. All footnotes should be single spaced, and each footnote referred to by small Arabic letters.

CANADIAN LIBERALISM IN WARTIME

A Study of the Defence of Canada Regulations

and

Some Canadian Attitudes to Civil Liberties in Wartime

1939-1945

by

GEORGE RAMSAY COOK
(must be your full legal name)

A thesis submitted to the Department of History

in conformity with the requirements for

the degree of Master of Arts

Queen's University

Kingston, Ontario, Canada

April 15, 2024

(must be the final submission month and year)

Appendix B

XIII. Thesis Requirements

Acceptable Formats. The Department of Biology recommends that the text be organized into one of the following two formats that differ mainly in whether the information is arranged in a form publishable in biological journals or in a more Traditional thesis style.

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Acknowledgements	Acknowledgements
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(may be included in intro.)	(may be included in intro.)
Ch.3: Materials and Methods	Ch.3-n: Manuscripts
Ch.4-n: Results	Ch.n+1: General Discussion
Ch.n+1: Discussion	Summary (may be in Chapters)
Summary	Literature Cited
Appendices	Appendices
MSc = 100 pages	MSc = 100 pages
PhD = 175 pages	PhD = 175 pages

2. **Manuscript Format.** Theses prepared using this format should generally conform to the style required for submission to the prospective journal. The Literature Cited may be collected in one section at the end of the thesis or at the end of each manuscript. Sometimes collecting it all at the end is a valuable aid in meeting the page limit guidelines. In addition, Figures and Tables should be numbered (Figure 3.1 etc.) to conform to Chapter numbers.

   Manuscripts included as Chapters may be review, theoretical or data papers organized as required by the appropriate journals. The General Introduction should outline the subject and background for the research and indicate how the manuscripts are related to one another in addressing the subject of the thesis. Manuscript titles can be used as chapter titles. The General Introduction and Literature Review may be combined, and it should have a broader perspective than the Data Chapters themselves. The General Discussion should briefly discuss the contributions to the field made by this work, highlighting the major findings and tying the Chapters together. The Summary (usually one or two pages) should list, numerically, the main subject and findings from the thesis research.

   The student must be the first author on the majority of manuscripts included in the

thesis. Manuscripts on which the supervisor or another person is first author may be included in the thesis. Theses containing manuscripts that are included in another individual's publication or thesis or co-authored must include a detailed statement in the General Introduction stating the student's contribution to the work.

4. **Page Limits.** The maximum number of pages for an M.Sc. thesis (traditional or manuscript format) is 100 pages inclusive of everything but appendices. For a Ph.D. thesis (traditional or manuscript), the maximum number of pages is 175 inclusive of everything but appendices. If a student wishes to submit a thesis that is longer than these maxima, then he or she must obtain written permission from each member of the supervisory committee before submission.

5. **Figures.** Traditionally the legend is on the facing page (legend plus fig only count as one page) and the figure appears close to where it is first mentioned. This style, however, is a holdover from the days of the ink and typewriter and is no longer necessary. Better to put the legend on the same page as the figure, below it, and this page is numbered. You may insert each figure right after where it is first mentioned in the text or group all figures at the end of each chapter. If figures are grouped together, legends can each be put on the same page as the figure, or the legends can be grouped together as a list under the title 'Figure captions' that precedes the Figures. If you put figure captions in a list like this, make sure each figure is clearly labelled in the lower right corner of the page (Figure 1.1, 1.2, etc). You should put no more than one figure on each page, though multipart figures are OK (a, b, c, etc). Sometimes the separate parts of multipart figures need to be put on different pages. All of the material on pages with figures must fit inside the required 2.5 cm margin.

6. **Further Details.** A leaflet produced by the School of Graduate Studies, ("General Forms of Theses"), describes further details of thesis format, particularly for the title page. This is available on the web at: http://queensu.ca/sgs/sites/webpublish.queensu.ca.sgswww/files/files/Students-thesis%20completion/SGS-General Forms of Theses RevisedJune2011.pdf

7. **Seminars**. Prior to graduating, candidates for the Ph.D. and MSc degree are required to present the results of their thesis research to the Biology Department as a Departmental Seminar.