



Graduate School of
Biomedical Sciences



Master's Thesis Preparation Guide
AY2016/2017

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INTRODUCTION

This guide describes the requirements and guidelines governing the preparation of master's theses to be submitted to the Graduate School of Biomedical Sciences at the University of Massachusetts Medical School in partial fulfillment of the requirements for the master's degree. Described herein are the general requirements applicable to submitted theses and guidance on the arrangement, format and submission of the student's thesis. Additionally, this guide details the policies governing the Master's Thesis and all policies pertaining to submission and publication of the thesis to the UMass GSBS.

As of 2005, the Graduate School of Biomedical Sciences requires that all students submit electronic versions of their thesis concomitant with submission of printed copies. Appropriate formats for electronic submission are described and are subject to change in the future.

Implicit in the generation of your thesis is that you prepare and present a well-written document that is free from error. Copies of the thesis submitted to the GSBS must be of professional quality. The text and any tables, figures and graphics must be sufficiently clear, sharp, and large enough to be easily readable in print and electronic formats, and suitable for microfilming, photo-duplication or other means of reproduction.

In addition to submission and filing of your thesis, you must complete and submit all required forms which are available on the GSBS intranet website at <http://inside.umassmed.edu/gsbs/handbook/>.

Questions you may have regarding the preparation of your thesis that are not addressed in this guide may be directed to the Graduate School Office.

TIMELINE FOR COMPLETION AND GRADUATION – MASTER’S DEGREE

- 40 Calendar Days from date request submitted: student submits the Master’s Thesis to Master’s Thesis Committee
- 15 Calendar Days from receipt of Master’s Thesis: Master’s Thesis Committee meets, evaluates thesis, advises student of outcome and submits Master’s Thesis Outcome Form to the Graduate School Office.
- 21 Calendar Days, if outcome is “Revise” or “Presentation”: student completes all requirements including Presentation and re-submits Master’s Thesis to the Committee
- 21 Calendar Days after Committee accepts thesis: student submits thesis to Graduate School office for Dean’s signature and publication.

GRADUATION – REQUIRED DOCUMENTS

The student must have met all requirements for graduation, successfully defended his/her thesis and submitted the following to the Graduate School Office by the following submission dates:

- Request to change program to Masters (form include: Request for LOA, Request for Master’s Thesis Committee Approval)
- Master’s Thesis Outcome Form
- Graduate Check-Out Form – Master’s Degree
- MS Diploma & Post Graduation Information
- All copies of final approved thesis, including signature page, ready for publication
- E-copy of thesis, following GSBS Guidelines (one copy)

GRADUATION DATES & FINAL SUBMISSION DATES

Graduation Dates	Final Submission Dates
Dec 31	December 30 th
Mar 31	March 30 th
First Sunday in June	First Friday in June
Aug 31	August 30 th

THESIS PUBLICATION

Submission of Thesis for Publication

Upon completion, the thesis is submitted to the Graduate School Office for the Dean's signature and publication. The thesis will be published using traditional and electronic media.

- **Paper:** Final versions of the thesis must be printed onto white, acid free 20 lb. bond paper with at least 25% rag content. Such paper must have dimensions of 8.5" x 11". Erasable bond, recycled or perforated papers are unacceptable.
- **Reproduction:** A computer and applicable software should be used to generate and reproduce the printed thesis. All printed copies should only have print on one side of each page and such print should be clean, clear, uniform and of high contrast print resolution. Dot matrix print, overstrikes, interlineations, cross outs, defective lines from paste-ups, smudges, smears, erasures and white-out are unacceptable.
- **Signature Pages:** All copies of the thesis submitted to the Graduate School of Biomedical Sciences for binding (see below) must have original signatures on the approval page. Reproductions are not acceptable. Approval pages having all signatures present should be included into the final thesis copies prior to binding.

Submission and Binding

- Submit one original and two copies, or all three sets as originals.
- Each set should be separated by a colored sheet of paper and each set needs to be securely held together with either a binder clip or rubber band.
- All sets should be contained in a box when submitted.
- Four copies of the thesis will be bound at no charge to the student. Additional copies may be ordered at the student's expense (\$11 per copy).

Thesis is generally returned from the printer in two to three weeks from date of submission.

- Four copies are provided to the student and the student can give a copy to the Thesis Advisor/Department if requested.
- The student is responsible for the cost of shipping if he is no longer on campus and needs to have the thesis shipped to a new address. This can be arranged via a credit card with the Graduate School Office.
- Two electronic PDFs of the thesis must also be submitted to the Graduate School Office at the same time that the traditional paper versions are submitted. The E-copies must include an unsigned signature/approval page.

SAMPLE TITLE PAGE – Formatting for the Title Page

This format must be used, or your dissertation will not receive final signature from the Dean.

TITLE (IN CAPITAL LETTERS)

A Masters Thesis Presented

By

(NAME IN FULL)

Submitted to the Faculty of the
University of Massachusetts Graduate School of Biomedical Sciences, Worcester
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

(MONTH, DAY AND YEAR)

(MAJOR SUBJECT)

SAMPLE SIGNATURE PAGE – Formatting for the Signature Page

This format must be used, or your dissertation will not receive final signature from the Dean.

TITLE (IN CAPITAL LETTERS)

A Masters Thesis Presented

By

(NAME IN FULL)

The signatures of the Master's Thesis Committee signify completion and approval as to style and content of the Thesis

(Signature)

(Name Typed), Chair of Committee

(Signature)

(Name Typed), Member of Committee

(Signature)

(Name Typed), Member of Committee

(Signature)

(Name Typed), Member of Committee

(Signature)

(Name Typed), Member of Committee

The signature of the Dean of the Graduate School of Biomedical Sciences signifies that the student has met all master's degree graduation requirements of the school.

(Signature)

Anthony Carruthers, Ph.D.,
Dean of the Graduate School of Biomedical Sciences

Program

(Typed)

Month, Day and Year

(Typed)

CONTENTS AND ARRANGEMENT

The arrangement and construction of a thesis manuscript may vary depending on the specific topic of research and stylistic approaches of the author. Generally, the content of a thesis should include a body of work which displays original scholarship, expressed in literate style and possessing a distinct contribution to a particular field of study. Your thesis may include both published as well as unpublished original materials and should clearly convey all areas of your studies that demonstrate original scholarship and an advancement of knowledge in the domains in which your research was conducted. This thesis, when completed, will constitute a published work, and as such, should be prepared accordingly.

The following are guidelines concerning the organization of the manuscript proper. They should be taken as a basis for thesis preparation from which deviations may be made under the guidance of your Thesis Advisor or Committee.

Document Divisions

The thesis consists of three major sections which will be described below:

- Front matter
- Body matter
- Back matter

Front Matter

- Title Page
- The title page should be written to conform to the standard thesis title page adopted by the GSBS which is presented in the following example Sample Title Page (P. 17).
- Signature Page
- The signature page should include the complete title of your thesis, the list of your committee members (providing space for signatures), the name of the Thesis Advisor and the Dean of the GSBS, followed by your program affiliation and the date. You will find an example of this here: Sample Signature Page (P. 18).
- Dedication (optional)
- If you wish, you may include a brief dedication section here.
- Acknowledgements

- This section is customarily used to provide acknowledgement to those individuals or groups of influence relevant to the execution and completion of your thesis work.
- Abstract
 - This section should provide a very concise summary of the entire body of work contained in your thesis. This relatively short section might contain elements that introduce the rationale for your research, summarize relevant and noteworthy findings and conclude with how the work advances the knowledge in your field of study. Suggested abstract length is approximately 150 words or less for theses.
- Table of Contents
 - Your table of contents should include all front, body and back matter contained in the thesis excluding the cover page.
- List of Tables
 - This should summarize all tables contained in the thesis as indicated by table number and the title of each table.
- List of Figures
 - This should summarize all figures contained in the thesis as indicated by figure number and the title of each figure.
- List of Third Party Copyrighted Material
 - This should summarize all material (Figures, Tables etc) created by a third party (published and unpublished) that are included in the thesis. This list should include the Figure or Table number, the publisher or author and the permission to use the material (license number) granted by the publisher.
- List of Symbols, Abbreviations or Nomenclature (optional)
 - This is an optional section which may be included to summarize frequently used symbols, abbreviations or acronyms, as well as nomenclature that is specific to your field (that may not be immediately identified or understood by those who are outside the specific field of study).
- List of Multimedia Objects or Files (optional)
 - This section will be necessary should you choose to include references to various types of multimedia in your thesis. Examples of these might include original video clips, sound

recordings, or files that are not easily adapted for inclusion in the final printed copy of the thesis.

- Preface
- This section normally includes references to publications that represent the work contained within the thesis and/or may mention work performed during thesis studies that will not be presented in the thesis. Additionally, this section should be used to identify explicitly any portions of the text, tables, figures or materials that were not directly generated by the author and thus should reference the sources of such materials. It is expected that any non-original materials (i.e., originating from co-authored works) would be included with the consent of those who generated them and that such inclusions would not constitute a large part of the thesis body (see below).

Body Matter

The body of the thesis is that section which presents the thesis rationale, research and conclusions. This section is divided into chapters, the first of which should be the thesis introduction. Subsequent chapters of the thesis body should present the research findings, division of which should be performed according to where logically separable topics might exist in the whole of the thesis project. In most cases such separations might be obvious in the form of published or unpublished manuscripts, each of which could constitute a separate chapter in the body matter.

As manuscripts for publication are frequently very concise documents written in distinct styles, where appropriate, such manuscripts should be expanded into a format that is stylistically consistent with the rest of the thesis and should include additional material in sufficient detail to allow a clear and precise judgment to be made of the importance and originality of the research reported in the thesis. These papers must have a cohesive, unitary character making them a report of a single program of research.

In general, when co-authored papers are included in a thesis, the candidate must have made a substantial contribution to such bodies of research. In addition, the candidate is required to make an explicit statement in the thesis as to who contributed to such work and to what extent. This statement should appear in the preface to the thesis. Since the task of the examiners is made more difficult in these cases, it is in the candidate's interest to specify clearly the contributions of all authors of the co-authored papers.

- Introduction
- The introduction of your thesis should be the first chapter in the body of the thesis and should clearly explain the rationale and objectives of your research topic. Additionally, the thesis introduction should provide a clear and comprehensive review of literature that is relevant to understanding background, scope and findings of the research you would present in subsequent

chapters. This introduction may be mutually exclusive from the more focused introductions you may have at the beginning of each of your subsequent research chapters.

- (Research Chapters are included here)
- Final Summary and Conclusions (or Discussion)
- This section should provide a final thesis summary of the research findings and conclusions of the thesis work that are relevant to the advancement of knowledge in the field.

Back Matter

- Appendices (optional)

This is an optional section that may be included to present additional findings of a separable nature to that of the research chapters, which may not constitute an additional chapter. Also, this section may include material that cannot unitarily be included within the overall topic of the thesis, but may include findings that have contributed largely to the thesis research.

- Bibliography

This section should format all referenced materials contained within the thesis into a concise listing at the ultimate of the document. The format of this bibliography is at the discretion of the author and committee and usually follows that format which is most common in the journals of the field. Whenever possible, citation software such as *EndNote*[®] or *ReferenceManager*[®] should be used to manage references and to aid in building the works cited section. These software packages facilitate easy search, download and organization features for large citation databases (e.g. from PubMed citations) and have automated bibliographic construction features that can conform to most accepted journal formats.

GENERAL FORMATTING

- **Fonts:** The preferred font size is 12 in either the Times New Roman or Arial styles. If necessary, different typefaces (font sizes or styles) may be used within headings, tables, figures, and appendices. Non-standard typefaces, such as script, are generally not acceptable (excluding commonly accepted symbols).
- **Line Spacing and Margins:** All main text should be double spaced (3 lines per vertical inch) and should only be printed on one side of each page throughout the thesis (double sided pages are not permitted). Single spaced lines may be used for certain sections of the thesis including the table of contents, tables, figure legends, long quotations, footnotes, and bibliographical citations. Margins must be at least 1 1/2 inches wide at the top and left, and 1 inch wide at the bottom and right. Illustrations, tables and figures should conform to these margins as well. The

spacing and placement of footnotes throughout the text should be consistent and conform to margin constraints.

- **Page Numbering:** The pages preceding Chapter I should be numbered consecutively in small Roman numerals. The cover page should be considered page “i” but should not be numbered, nor should the title page be numbered (as “ii”). Beginning with the first page of Chapter I and continuing through the bibliography or appendix, pages should be numbered consecutively in Arabic numerals. The numbers should appear in the upper right corner of the page, flush with the upper margin and should not be followed by a period. Chapters should be numbered in Roman numerals consecutively throughout the Thesis, with the word “CHAPTER” used as part of the designation followed by the Roman numeral. This heading should be centered and near the top of the page.
- **Headings:** Chapters should be designated throughout the thesis with the word “CHAPTER” used as part of the heading followed by consecutive Roman numerals. This heading should be centered and near the top of the page. Headings for main divisions within a chapter should be centered, but should have only the first letter of the principle words capitalized. Sub-divisions within the main divisions should be indicated by side heads.
- **Footnotes:** Footnotes should be numbered consecutively throughout the thesis. The place in the text at which a footnote is introduced should be marked with an Arabic numeral in superscript at the end of the sentence, and after punctuation, if any. The footnote should be placed at the bottom of the same page to which the reference is made in the text. The footnote should be single spaced and separated from the main text of the page by a solid line. Footnote text may have reduced font size (9-10).
- **Tables and Figures:** The word "Table" designates tabulated numerical data or text used in the body of the thesis and in the appendices. Tables consist of an arrangement of facts, figures, and values in an orderly sequence usually in rows or columns. The word "Figure" designates all other nonverbal material used in the body of the thesis and in the appendices, such as charts, graphs, maps, photographs, plates, drawings, diagrams, etc. Headings for tables and figures should use the words “Table” or “Figure” followed by Arabic numerals and should be numbered consecutively. Usually, tables and figures are numbered according to the chapter number followed by a decimal followed by consecutive numbering beginning with 1 (e.g., Table 3.1 denotes chapter 3, table 1). Consecutive numbering for tables and figures is reset at the start of each new chapter. Placement of tables and figures should occur within each chapter on separate pages immediately following the chapter text which refers to them. All tables and figures should be accompanied by legends describing each section of the table or figure (see list of tables and list of figures). These should have headings identical to that of the coordinate table or figure followed by the title of the table or figure. The legend page should immediately precede the table or figure page and in all cases be oriented so that both the legend and table or

figure can be read simultaneously (printed sides facing each other). These imbedded pages should conform to the regular consecutive page numbering of the chapter and should not simply be inserted without numbering.

Third party copyrighted matter

The student should obtain permission (preferably written), from the owner(s) of each third party copyrighted material to be included in his/her dissertation. If the student has taken text from a third party, referencing the source(s) is sufficient. If the student is using an image, table, chart, or material that has been published, he/she should obtain written permission from the publisher. This will typically include a license number (see below). If this is not possible; i.e. the author or publisher cannot be contacted or does not respond, the student must give full attribution to the author. If unpublished material created by an author is included, the student must obtain permission (in writing) from the author and full attribution must be given.

Third party copyrighted material and permission to use this material should be listed in the Front Matter (see page 9). Examples are included below.

Sample Page

Figure Number	Publisher	License Number
Figure 1-2	Nature Publishing Group	2330811110362

The following figures were reproduced from journals: No permission required

Figure Number	Publisher
Figure 1-1	Theoretical Biology and Biophysics Group, Los Alamos National Laboratory

ELECTRONIC THESIS DOCUMENTS

Saving your thesis as a PDF file (Mac OS X instructions)

By saving your thesis in Portable Document Format (PDF) it is easier to share the document with other people. For example, you can email the PDF or make it available on public file servers.

Once you have compiled your thesis, there are two paths by which you may proceed depending on whether:

Option A: your thesis comprises individual chapter files which are printed separately or **Option B:** your thesis comprises a single large file or individual chapters - either of which is printed as a single large print job.

Option A - Your thesis comprises individual chapters that are printed separately

Open the thesis documents to be saved as a PDF file; choose File > Print; choose a command from the PDF pop-up menu.

1. To create a PDF file, choose Save as PDF. This creates a digital master PDF file. All graphics are at full resolution, and the file includes each font character it uses.
2. To create a smaller PDF file, choose Compress PDF. This compresses some images in the file, and produces a PDF file that may be smaller than a digital master PDF. It's especially useful if you need to email the file or if you don't plan to print the file.
3. Save each file or chapter with a unique filename.
4. In Adobe Acrobat, choose "Create PDF" from the "File" menu and select "From multiple files."
5. A dialog box appears in which you can browse your computer and select all the files to construct your document by pressing "Choose..."
6. Select all the files you wish to insert (shift-click for multiple selections or command-click for out of order selections) and press "Add" (the order of selection is not important).
7. The documents are listed in the panel on the right. The order of the documents can then be adjusted by using the buttons under the "Arrange files" pane on the left.
8. Press "OK" to create the PDF (or "preview" to view a copy prior to this step).
9. Provide a file name for the document and a save location.

10. Under "File" select "Reduce File Size." Rename again (if you wish) and/or click "OK" and watch the file process.

11. Copy/Burn the final file to a CD.

Option B - your thesis comprises a single large file or individual chapters - either of which is printed as a single large print job.

1. Open the thesis documents to be saved as a PDF file; choose File > Print; choose a command from the PDF pop-up menu.
2. To create a PDF file, choose "Save as PDF." This creates a digital master PDF file. All graphics are at full resolution, and the file includes each font character it uses.
3. To create a smaller PDF file, choose "Compress PDF." This compresses some images in the file, and produces a PDF file that may be smaller than a digital master PDF. It's especially useful if you need to email the file or if you don't plan to print the file.
4. Save the thesis with a unique filename.
5. In Adobe Acrobat, open the new (PDF) thesis file.
6. Review the file to insure that page order and images are OK (please check that the order is correct).
7. Under "File" select "Save as" and rename and save the file (e.g., My Thesis).
8. Under "File" select "Reduce File Size," Rename again (if you wish) and/or click "OK" and watch the file process.
9. Copy/Burn the final file to a CD.

Saving your thesis as a PDF file (PC instructions)

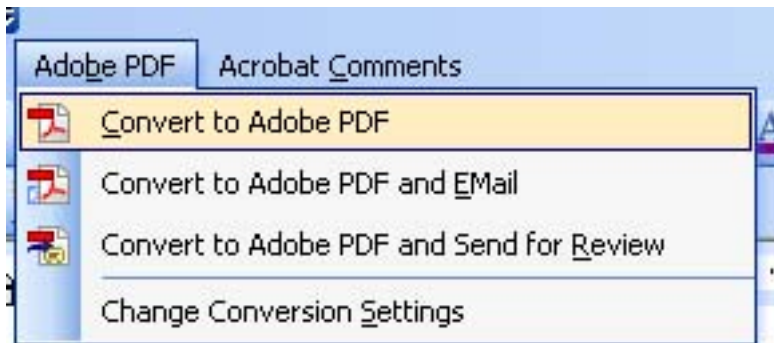
By saving your thesis in Portable Document Format (PDF) it is easier to share the document with other people. For example, you can email the PDF or make it available on public file servers.

Once you have compiled your thesis, there are two paths by which you may proceed depending on whether:

Option A) your thesis comprises individual chapter files which are printed separately or **Option B)** your thesis comprises a single large file or individual chapters - either of which is printed as a single large print job.

Option A - Your thesis comprises individual chapters that are printed separately

Open the thesis documents you want to save as a PDF file; Select Adobe PDF> Convert to Adobe PDF



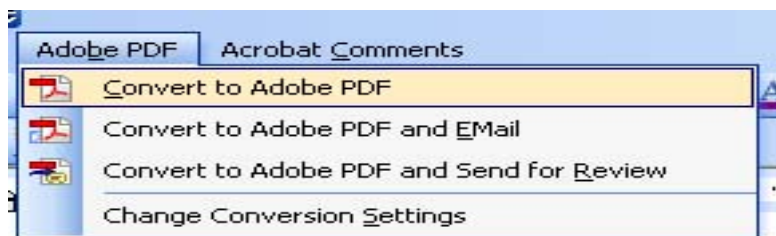
1. The Adobe Program will 'PDF' the chapter
2. Save each file or chapter with a unique filename.
3. In Adobe Acrobat, open the first file in the series of PDF files you have just made
4. Under menu item "Document," select "Insert pages"
5. A dialog box appears in which you can select the remaining files to append to your document (note multiple selections will be inserted in an ascending alphanumeric order).
6. Select all the files you wish to insert (Ctrl-click for multiple selections) and press "select"
7. A second, smaller dialog box appears asking where you would like to insert the pages. You should answer "after" and "last" then click "OK"
8. The pages are inserted (please check that the order is correct and that the images etc. are acceptable).
9. Under "File" select "Save as" and rename and save the file (e.g. My Thesis).

10. Under "File" select "Reduce File Size." Rename again (if you wish) and/or click "OK" and watch the file process.

11. Copy/Burn the final file to a CD.

Option B - your thesis comprises a single large file or individual chapters - either of which is printed as a single large print job.

Open the thesis document to be saved as a PDF file; select Adobe PDF> Convert to Adobe PDF; the Adobe Program will 'PDF' the chapter; Or Choose File > Print; choose a command from the PDF pop-up menu.



1. To create a PDF file, choose "Save as PDF." This creates a digital master PDF file. All graphics are at full resolution, and the file includes each font character it uses.
2. To create a smaller PDF file, choose "Compress PDF." This compresses some images in the file, and produces a PDF file that may be smaller than a digital master PDF. It's especially useful if you need to email the file or if you don't plan to print the file.
3. Save your thesis with a unique filename.
4. In Adobe Acrobat, open the new (PDF) thesis file.
5. Review the file to insure that page order and images are OK (please check that the order is correct).
6. Under "File" select "Save as" and rename and save the file (e.g. My Thesis).
7. Under "File" select "Reduce File Size." Rename again (if you wish) and/or click "OK" and watch the file process.
8. Copy/Burn the final file to a CD.