

The MUthesis Document Class*

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Abstract

A document class, `MUthesis`, is defined that implements the formatting requirements for theses and dissertations at the University of Missouri, also referred to as the University of Missouri-Columbia by some. The class is based on `report`, but is conscious of two-sided documents as well.

1 Introduction

The `MUthesis` document class is intended to match—with minimal user effort—the formatting requirements for theses and dissertations at the University of Missouri.

Note that the graduate school is notoriously nonchalant about enforcing any formatting requirements, and many theses and dissertations have been turned in that show inconsistent formatting from frontmatter chapters compared to the main document. It should come as a surprise to no one who is familiar with \LaTeX and its design principles that this class strives for such consistency throughout the document.

Documents should be written as though using the `report` class, with the exception of the front matter (material prior to Chapter 1). In fact, it is possible to use this document class without any of the front matter, assuming one avoids the `\maketitle` command as well as other commands defined in Section ?? specific to the thesis/dissertation format.

2 Using This Class

`\documentclass` The first line of your file should be

```
\documentclass{MUthesis}
```

for dissertations,

*This document corresponds to `MUthesis` v1.10, dated 2020/04/10.

```
\documentclass[thesis]{MUthesis}
```

for theses, or

```
\documentclass[comprehensive]{MUthesis}
```

for comprehensive examinations (dissertation proposals). Note that a dissertation is written for a doctorate and a thesis for a Master's degree. You can also specify the `dissertation` option explicitly if you wish.

Loading the document class will automatically set the paper size, line spacing, and text size; changes in typeface, inclusion of images, and other aspects are changed in the usual way through compatible packages.

2.1 Class Options

The class defines the following options:

10pt,11pt,12pt Default: 12pt. Sets the text size to the given size. These are passed directly to the `report` class.

dissertation (default) Sets options for doctoral dissertations and sets the default degree to "Doctor of Philosophy" (Ph.D.)

thesis Sets options for Master's theses and sets the default degree to "Master of Science" (M.S.)

comprehensive Sets options for comprehensive examinations. Default degree is still "Doctor of Philosophy" (Ph.D.)

doublespace (default) Sets format to double-spacing. Required for final submissions.

singlespace Sets format to single-spacing. Intended for preliminary drafts or testing purposes; unacceptable for final submissions.

nolisthyphen Turn off hyphenation in the Table of Contents, List of Figures, etc. Only use this if something looks wrong with the hyphenation that cannot be solved other ways or if someone complains.

nohyphen Turn off hyphenation throughout the entire document. **Only** use this if someone actively complains about your document's hyphenation and other fixes (e.g., `\hyphenation`) do not work.

hyperpages (default) Load the `hyperref` package with options that disable hyperlinks but still link PDF page numbers to the document's page numbers.

hyper Load the `hyperref` package with hidden links and PDF pages that are linked to the real page numbers.

nohyper Disable loading of hyperref package. Use this option if you experience problems with hyperref or if you plan to include color hyperlinks or other hyperref features. If you do plan to use other hyperref features, you should include the pdfpagelabels option when loading the package.

All other options to this class are passed as-is to the report class.

2.2 Entering Document Data

Document data, such as committee members and chairs, are entered through commands. These commands may be used either in the preamble or in the document itself, provided they come before \maketitle.

| | |
|----------------|---|
| \title | The thesis/dissertation title. |
| \author | Your full name, as you want it to appear. Note that this does not need to match your name as it appears in your official University records, but if it does not, you might consider changing your official name with the University administration. |
| \date | The date (month and year) your degree will be issued. <i>This is not the date of your defense.</i> It can only be May, July, or December and the year. |
| \copyrightyear | The year of copyright, if you are printing a copyright page. Should be the same year as your graduation year, unless publication is withheld for some reason. The copyright page is <i>optional</i> . |
| \degree | <p>If your degree is something other than the default, you can change it with the \degree command. For example, a Master of Music might use</p> <pre>\degree{Master of Music}{M.M.}</pre> <p>and a Doctor of Education might be</p> <pre>\degree{Doctor of Education}{Ed.D.}.</pre> <p>The default is \degree{Doctor of Philosophy}{Ph.D.} for a dissertation or comprehensive (dissertation proposal) and \degree{Master of Science}{M.S.} for a thesis.</p> |
| \chair | The chair of your committee, as the name will appear on both the Title and Approval pages. If you are co-advised, see the \cochairs command. |
| \cochairs | Takes two arguments: the first and second co-chairs of your committee, as their names will appear on the Title and Approval pages. If you only have one advisor, or you have two advisors but the Graduate School is only aware of one of them (i.e., it's not "official"), then you should use the \chair command. |
| \firstreader | Your first committee member who is not an advisor. Note that the Graduate School makes no distinctions between inside and outside members in the thesis/dissertation itself, so all we need here is a name. |
| \secondreader | Your second committee member. This is optional for co-advised theses. |
| \thirdreader | Your third committee member. This is optional for theses and co-advised dissertations. |
| \fourthreader | Your fourth committee member (optional). Additional committee members can be added with \fifthreader and \sixthreader. |

2.3 Front Matter

| | |
|-------------------------------|--|
| <code>\frontmatter</code> | The first command after <code>\begin{document}</code> should be <code>\frontmatter</code> ; in fact, this is implicit, so this line is optional. |
| <code>\maketitle</code> | The command <code>\maketitle</code> should appear right after <code>\frontmatter</code> (or directly after <code>\begin{document}</code>). This makes the title page. An error will result if you issue this command without issuing <code>\title</code> , <code>\author</code> , and <code>\chair</code> (or <code>\cochairs</code>). |
| <code>\copyrightpage</code> | The <code>\copyrightpage</code> is optional. If it appears, then it should be directly after <code>\maketitle</code> . If no <code>\author</code> or <code>\copyrightyear</code> have appeared, an error will result. This command does nothing with the <code>comprehensive</code> option in place. |
| <code>\approvalpage</code> | The <code>\approvalpage</code> should immediately follow the <code>\copyrightpage</code> (if present) or <code>\maketitle</code> (if there is no copyright page). All committee members must have already been defined, as well as the title, author, and chair(s). This command does nothing with the <code>comprehensive</code> option in place. The spacing between names on the approval page can be adjusted by adjusting the length <code>\nameskip</code> using something like <code>\setlength</code> or <code>\addtolength</code> . |
| <code>dedication</code> | The <code>dedication</code> environment is optional. It is similar to the dedication page of a book, and formatted similarly. Example: <pre> \begin{dedication} To my mother. \end{dedication} </pre> |
| <code>epigraph</code> | The <code>epigraph</code> environment is optional. It takes one non-optional argument, which is the source of the quote. Example: <pre> \begin{epigraph}{Anonymous} ‘‘Hyperbole is the best thing ever.’’ \end{epigraph} </pre> |
| <code>acknowledgments</code> | Acknowledgments are required for all dissertations and theses. They can (and should) be omitted in comprehensive exams. This page is where you would acknowledge all those who helped you with your academic research. This is not necessarily where you would recognize loved ones who supported you during your studies. That would be more appropriately done in an optional Dedication page. It is always page ii, regardless of the number of (unnumbered) pages before it. Omitting this environment will result in a warning for theses and dissertations. |
| <code>\tableofcontents</code> | The Table of Contents is mandatory. The lists of Illustrations, Tables, Figures, and Schemes are mandatory if you have any Illustrations, Tables, etc. Most documents will only have Tables and Figures; Schemes are common in chemistry and chemical engineering, and some disciplines differentiate between Illustrations and Figures (or prefer one term over the other). If the lists appear, they should appear in the order listed here. The <code>\listofsymbols</code> macro (identical to <code>\printnomenclature</code>) is defined only if the <code>nomencl</code> package has been loaded. You are encouraged to use the following packages to generate these: <code>tikz</code> for illustrations; <code>array</code> , <code>tabularx</code> , and <code>booktabs</code> for tables; <code>graphicx</code> for figures; <code>chemfig</code> for schemes; and <code>nomencl</code> for symbols. |
| <code>\listof</code> | Note that the <code>\listof</code> macro from the <code>float</code> package is compatible with this package, so additional floats can be defined using that mechanism. |
| <code>abstract</code> | The <code>abstract</code> environment is optional (yeah, right). The Abstract should be |

one paragraph, and generally should not exceed one page in length. Note that the abstract that appears here can technically be different than the one submitted as a separate file, but that is generally not advisable.

2.4 The Main Text

- `\mainmatter` The first command of the main text **must** be `\mainmatter`. This command does things like reset page counters, change page numbering, and other important formatting. An effort is made to issue a warning if this command is absent.
- `\chapter` Chapters are described in the usual way, with the `\chapter` command. This command is “smart” enough to know whether it is used in `\frontmatter`, `\mainmatter`, and `\backmatter`, as well as whether it is in the main text or in the appendix.
- `\appendix` The `\appendix` command is used the same way as in `report`.

2.5 Back Matter

- `\backmatter` The main text, including appendices, if present, ends with the `\backmatter` command. This command is automatically issued in the bibliography in documents that do not use `chapterbib`, but it is advisable to issue it prior to that.
- `\bibliography`
`thebibliography` The bibliography can be entered in the standard ways: manually, using the `thebibliography` environment, or automatically, with `BIBTEX` and an appropriate bibliography style.

Note that **there is a difference between a references section and a bibliography**. The former is a list of documents cited in the text; the latter is a list of all references consulted during the making of the document, regardless of whether they are cited in the text. Theses and dissertations have bibliographies, so it is recommended that you issue `\nocite{*}` right before `\bibliography` to make sure your entire `BIBTEX` database gets added to the bibliography.

The style of the bibliography is entirely up to you and your advisor. In the absence of a strong preference, it is recommended that you follow the citation style of a major journal or book publisher in your field. References can be numeric or author–year style; packages such as `cite` and `natbib` will help facilitate this.

This class has not been tested with `BIBTEX`; it is unknown whether there are any compatibility issues, though it is worth noting that at the time of writing, Biber (`BIBTEX`’s back-end) is incapable of handling author lists longer than a few authors long, and therefore (in the author’s opinion) that package has a long way to go before it is accepted in the mainstream.

This class is compatible with the `chapterbib` package, which allows for reference lists at the end of each chapter and a comprehensive bibliography at the end of the document. Reference lists at the end of the document are not numbered if `chapterbib` is included.

- `glossary` Glossaries are optional (and in fact relatively rare in theses and dissertations). They can be included by including the `glossaries` package. The `MUthesis` class is aware of this package and redefines the environment to be compatible. See the documentation for the `glossaries` package.

| | |
|--------------------|---|
| | Note that if you want a list of symbols (nomenclature), try the <code>nomenc1</code> package and the <code>\listofsymbols</code> (or <code>\printnomenclature</code>) command. |
| <code>index</code> | An index is rare in a thesis/dissertation, but one can be included by the <code>makeidx</code> package and associated commands. See the documentation for that package. |
| <code>vita</code> | A Vita is required for dissertations, but not for theses. This is included via the <code>vita</code> environment. There are no restrictions on the length. This is not intended to be a curriculum vitae; instead, think of a brief biography of the author, such as would appear at the end of a book. |

2.6 Compatibility with Standard Packages

The `MUthesis` document class is specifically aware of the features of the following packages and redefines some of their internals for consistency in formatting:

chapterbib This class has only been tested with numeric citation styles. As currently implemented, in-chapter reference lists have the header **References**, while the comprehensive bibliography at the end is unnumbered and has the heading **Bibliography**. You can change these defaults by redefining `\refname` and `\bibname`.

natbib This class overrides some of `natbib`'s settings, particularly with respect to how numbers are formatted. If you want to change something and it does not seem to be working, try redefining it *after* `\begin{document}`, as the class may be undoing your redefinitions.

nomenc1 The `nomenc1` package automatically has the heading "List of Symbols," though this can be restored or changed by redefining `\nomname`, as usual.

glossaries Slight tweaks are made to format the glossary and list of acronym headers.

makeidx Indices are compatible with this class.

float This class takes care of defining new floats with this package, to the point that no additional work should be required by the user.

hyperref This class is compatible with `hyperref`. The `hyperref` package is loaded by default, though the default options are stripped down so as to fix the numbering of pages in the PDF but not actually create hyperlinks. Using `hyperref` with full links is supported in this version as well. See the documentation for the `hyper`, `hyperpages`, and `nohyper` class options.

subcaption This class is compatible with `subcaption`, though its use is strongly discouraged: subcaptions look tacky. If you insist on using them, know that the `[hyper]` option will create spurious entries in the list of figures. This is solved by including the `hyperref` package explicitly, e.g., `\usepackage[pdftaglabels,hidelinks]{hyperref}`.

There are no known compatibility problems with other packages, but any that occur will be mentioned. However, users are *strongly* advised to **avoid the following packages**, as they will subvert formatting done by the class:

titlesec Do not mess with the titles or sections this way

tocloft It is unknown what will happen if you use this on top of the tweaks to the Table of Contents and List of [objects] that have already been implemented

geometry,fullpage,a4wide,a4,chngpage It is not advisable to redefine margins or page geometry

`\caption` `\captionsetup` Users should feel free to use the `caption` package to tweak the look of their captions, though it is already loaded and used by this class—instead of using the optional arguments, use `caption`’s `\captionsetup` command.

2.7 Known Issues

`\title` `\chapter` `\author` **Lowercase letters in headings** The chapter headings, title, and (on the title page) author’s name are made uppercase to conform to the Graduate School’s templates via L^AT_EX’s `\MakeUppercase` macro, which has the side effect that things like names or chemical symbols will also be made uppercase, even in cases in which you might not want that to happen. For example, an author named McDonald might want his/her last name to be written McDONALD on the title page, but it would instead be rendered MCDONALD.

To fix this, use David Carlisle’s `textcase` package with the `overload` option, then use `\NoCaseChange` on the letter(s) in question. You will likely have to use `\protect` to prevent macro expansion until the appropriate location. For example,

```
\author{James M\protect\NoCaseChange{c}Loughlin}
\title{The Effects of Dichromates
(\protect\NoCaseChange{\ce{Cr^{6+}}}) in Aquifers}
```

after including the `textcase` and `mhchem` packages would render the appropriate case in both instances.

3 Example Dissertation

The following will more or less reproduce the front matter and back matter in the example files the graduate school produces.

```
\documentclass{MUthesis}
% options:
% doublespace -- the default, indicates double spacing as per MU
% requirements; use for all final copies
```

```

% singlespace -- for early work; not acceptable for final draft
% dissertation -- default; indicates this is a dissertation
% thesis -- indicates this is a Master's thesis; changes the default
%             for \degree{}}{} to Master of Science / M.S.
% comprehensive -- indicates this is a comprehensive exam; disables
%             \copyrightpage and \signaturepage
% nolisthyphen -- disallows hyphenation in the Table of Contents and
%             the list of figures/tables; only use if the graduate
%             school or your committee complain
% nohyphen -- disallows hyphenation /everywhere/; don't use unless
%             someone complains (and even then, fight back!)
% hyperpages -- default; loads hyperref with stripped down options
% hyper -- loads hyperref with page labels and invisible links
% nohyper -- turns off loading of hyperref completely; usually the
%             hyperpages option, which uses hyperref only to fix page
%             labels (so that i is called i, not 1, in the PDF),
%             is a better choice. Use this if you want to load hyperref
%             with other options than either "hyper" or "hyperpages"
%             loads.
%
% All other options are passed as-is to the "report" class; the default size
% is 12pt, but you can specify 10 or 11 pt (or any other size supported by
% "report")

\usepackage{txfonts}
\usepackage{graphicx}
\DeclareGraphicsExtensions{.pdf,.png,.jpg,.mps}

\title{Family Type and Incidence of Childhood Depression}
\author{Jeffery Lehmkuhl}
\date{May 2001} % The date you'll actually graduate -- must be
%             % December, May, or July
\copyrightyear{2001} % year of graduation / publication
%\cochairs{}}{} % multiple chairs
\chair{Thomas Sink} % a single chair
\firstreader{Vijay Kumar}
\secondreader{Gary Cortez}
\thirdreader{John Smith}
\fourthreader{Gail Newman}

% Your degree's name;
%\degree{Doctor of Philosophy}{Ph.D.}
% defaults to {Doctor of Philosophy}{Ph.D.} (option "dissertation"; default)
% defaults to {Master of Science}{M.S.} for theses (option "thesis")

\begin{document}
\frontmatter % optional (automatically set at \begin{document})
\maketitle % mandatory
\copyrightpage % optional
\approvalpage % mandatory

```



```

% optional
\begin{dedication}
  To my sister
\end{dedication}

% optional / usually absent
\begin{epigraph}{Anonymous}
  ‘‘Hyperbole is the best thing ever.’’
\end{epigraph}

% Acknowledgments are required for all dissertations and theses
\begin{acknowledgments}
This page is where you would acknowledge all those who helped you with your
academic research. This is not necessarily where you would recognize loved ones
who supported you during your studies. That would be more appropriately done in
an optional Dedication page. Think more, ‘‘I thank Professor Smith \dots’’
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Vestibulum eu tellus.
Nullam et odio eget sapien porttitor interdum. Donec vel ante. Maecenas in sem
a nunc viverra hendrerit. Quisque ut massa quis pede blandit pharetra.

Pellentesque sed ligula sit amet ligula scelerisque sagittis. Nulla adipiscing
tellus at pede. Cras id nunc vel diam congue dictum. Donec a nulla nec eros
ornare consequat. Nullam quis orci. Nam adipiscing, erat in congue
pellentesque, dolor eros euismod quam, a egestas mauris magna varius justo.

Sed eu sem et lorem blandit volutpat. Duis pulvinar, arcu quis suscipit
convallis, ante elit auctor dui, in fermentum diam velit a mauris. In risus
odio, consectetur quis, ullamcorper in, rutrum ut, metus.

Vestibulum rutrum quam ut ante. Integer velit. Sed commodo sem tempor lacus.
\end{acknowledgments}

% Table of Contents is mandatory; lists are mandatory if you have any of them;
% they must be in this order
\tableofcontents
%\listofillustrations
\listoftables
\listoffigures
%\listofschemes
%\listofsymbols % or \printnomenclature; requires nomencl package

% The abstract is optional...yeah, right.
\begin{abstract}
The Short Academic Abstract is not to exceed one page in length. The Abstract
should be double-spaced. This should be a separate file on your CD saved as
‘‘short.pdf.’’

If you want to use the same Abstract (or a longer version) in the thesis or
dissertation, that is permissible.

```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Vestibulum eu tellus. Nullam et odio eget sapien porttitor interdum. Donec vel ante. Maecenas in sem a nunc viverra hendrerit. Quisque ut massa quis pede blandit pharetra. Pellentesque sed ligula sit amet ligula scelerisque sagittis. Nulla adipiscing tellus at pede. Cras id nunc vel diam congue dictum. Donec a nulla nec eros ornare consequat. Nullam quis orci.

Nam adipiscing, erat in congue pellentesque, dolor eros euismod quam, a egestas mauris magna varius justo. Sed eu sem et lorem blandit volutpat. Duis pulvinar, arcu quis suscipit convallis, ante elit auctor dui, in fermentum diam velit a mauris. In risus odio, consectetur quis, ullamcorper in, rutrum ut, metus. Vestibulum rutrum quam ut ante. Integer velit. Sed commodo sem tempor lacus.

Donec lectus. Ut lectus. Cras luctus vulputate quam. Suspendisse potenti. Proin enim. Fusce quis mauris. Nullam eu augue. Fusce ligula neque, viverra eu, fermentum quis, vestibulum faucibus, ligula. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Curabitur rutrum.

\end{abstract}

\mainmatter % this line is mandatory

\chapter{The Efficiency of Everything}

Blah blah blah.

Blah blah blah.

Blah blah blah.

Blah blah blah.

Blah blah blah.

Blah blah blah.

Blah blah blah.

Blah blah blah.

\include{chapter2}

% end of body

%%%

\appendix

\chapter{Data That Need Showing}

\backmatter % mandatory; prepares for bibliography, glossary, index

\nocite{*}

\bibliographystyle{mybibstyle}

\bibliography{MUexample}

\begin{vita} % required for dissertations; optional for theses

The body of the text begins here. This should be indented and double-spaced.

There are no restrictions on the length. This is not intended to be a curriculum vitae. Jeffrey Smith was born\dots Ut tellus augue, aliquet ut, tincidunt non, congue ac, justo. In tempus, mauris sit amet tincidunt dapibus,

nulla nunc dignissim nulla, nec auctor tortor velit non felis. Mauris lacus massa, scelerisque id, tincidunt quis, rutrum id, est.

Duis congue vestibulum dui. Nullam consectetur, risus nec fermentum ornare, diam dolor hendrerit mauris, a accumsan mi turpis at sem.

Curabitur condimentum, erat ac dictum sollicitudin, neque lectus varius turpis, euismod aliquet lorem magna quis leo. Quisque vitae ipsum quis dolor eleifend faucibus. Phasellus fringilla metus ut nisi. Sed et risus. Sed ullamcorper dolor sit amet nisl. Nullam viverra. Lorem ipsum dolor sit amet, consectetur adipiscing elit.

Ut ultrices, quam at consectetur ornare, ligula risus euismod turpis, non mattis lectus metus vel ligula. Aliquam metus lacus, faucibus non, porta ut, adipiscing ac, turpis. Fusce quis dolor. Nam vitae eros. Integer et nulla. Vestibulum rhoncus faucibus enim. Praesent pellentesque ipsum et ligula.

Donec risus mauris, volutpat vel, fermentum at, tincidunt vel, urna. Nam vitae nisl ut orci hendrerit luctus. Nam lacus leo, molestie at, aliquet ut, adipiscing et, tellus. Proin porttitor. Aenean condimentum mauris hendrerit tellus. Aenean ornare libero sit amet ipsum. Integer vulputate, sem eleifend lacinia tempor, dolor lorem sagittis augue, non dictum sapien libero nec odio.

\end{vita}

\end{document}

4 Implementation

4.1 Default settings

`\univ@name` The name of the University; its value, which you should never have to change, is “University of Missouri”; the University’s thesis/dissertation guidelines say “University of Missouri-Columbia,” but this is several years out of date. The Graduate School may eventually update it, but until then, I made the executive decision to follow the University’s name/brand guidelines and leave it this way.

```
1 \newcommand*{\univ@name}{University of Missouri}
```

There are several other internal commands used to define the degree name, its abbreviation, the type of document, and various other things that are controlled by class options.

```
2 \newcommand*{\@degree}{Doctor of Philosophy}
```

```
3 \newcommand*{\@degreeabbrv}{Ph.D.}
```

```
4 \newcommand*{\thesis@type}{Dissertation}
```

```
5 \newcommand*{\list@hyphen@penalty}{50}
```

```
6 \newcommand*{\documentname}{\thesis@type}
```

```
7 \newif\ifdouble@space
```

```
8 \newif\ifload@hyperref
```

```

9 \newif\ifis@dissertation
10 \newif\ifack@found
11 \ack@foundfalse

\degrees Special commands are defined for degrees (e.g., \degrees C yields °C) and
\micro the “micro” symbol (e.g., 5.6~\micro m yields 5.6 μm); these features use the
textcomp package. Important: you cannot use \degree for this purpose, as that
macro is used to define the name of your degree (e.g., Doctor of Philosophy)!

12 \RequirePackage[full]{textcomp}
13 \AtBeginDocument{%
14   \providecommand*\degrees{\textdegree}%
15   \providecommand*\micro{\textmu}%
16 }

```

4.2 Class Options

`\text@size` The text size is defined here so we can pass it along to report without problems.

```

17 \DeclareOption{10pt}{\def\text@size{10pt}}%
18 \DeclareOption{11pt}{\def\text@size{11pt}}%
19 \DeclareOption{12pt}{\def\text@size{12pt}}%

20 \DeclareOption{dissertation}{%
21   \global\is@dissertationtrue
22 }
23 \DeclareOption{thesis}{%
24   \global\is@dissertationfalse
25   \renewcommand*\thesis@type{Thesis}%
26   \renewcommand*\@degree{Master of Science}%
27   \renewcommand*\@degreeabbrv{M.S.}%
28 }

```

The comprehensive option is for dissertation *proposals* (comprehensive exams), which do not have a copyright page, approval page, or acknowledgments.

```

29 \DeclareOption{comprehensive}{%
30   \is@dissertationfalse
31   \renewcommand*\documentname{Dissertation Proposal}
32   \addtocontents{toc}{%
33     \protect\ifack@found\protect\else
34       \protect\global\protect\ack@foundtrue
35     \protect\fi
36   }
37   \AtBeginDocument{%
38     \let\copyrightpage\relax
39     \let\approvalpage\relax
40   }%
41 }
42 \DeclareOption{doublespace}{\double@spacetrue}
43 \DeclareOption{singlespace}{\double@spacefalse}
44 \DeclareOption{nolisthyphen}{\renewcommand*\list@hyphen@penalty{10000}}

```

```
45 \DeclareOption{nohyphen}{%
```

We turn hyphenation off by telling TeX not to hyphenate until a character that should be beyond the end of the line.

```
46     \righthyphenmin=62%
```

```
47     \lefthyphenmin=62%
```

```
48 }
```

```
49 \newcommand*{\hyper@options}{}%
```

```
50 \DeclareOption{hyper}{%
```

```
51     \load@hyperreftrue
```

```
52     \renewcommand*{\hyper@options}{pdfpagelabels,hidelinks}
```

```
53 }
```

```
54 \DeclareOption{hyperpages}{%
```

```
55     \load@hyperreftrue
```

```
56     \renewcommand*{\hyper@options}{implicit=false,pdfpagelabels,draft}
```

```
57 }
```

```
58 \DeclareOption{nohyper}{\load@hyperreffalse}
```

```
59 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{report}}
```

```
60 \ExecuteOptions{doublespace,dissertation,hyperpages,12pt,letterpaper,oneside,openany}%
```

```
61 \ProcessOptions\relax
```

```
62 \LoadClass[\text@size]{report}
```

4.3 Process document class options

`\doublespacing` Spacing (single vs. double); this is handled by the `setspace` package for double spacing. Since the default is single-spacing, I just defined those macros and environments to do nothing when single spacing is in effect.

`\singlespacing`
`doublespace`
`singlespace`

```
63 \ifdouble@space
```

```
64     \RequirePackage{setspace}
```

```
65 \else
```

```
66     \newenvironment{doublespace}{}{}%
```

```
67     \newenvironment{singlespace}{}{}%
```

```
68     \let\doublespacing\relax
```

```
69     \let\singlespacing\relax
```

```
70 \fi
```

4.4 Margins

These macros define the correct margins to satisfy the graduate school if letter sized paper (the default) is used. If you use something other than letter sized paper, you are on your own.

```
71 \setlength{\oddsidemargin}{0.5truein} % binding margin at least 1.5in
```

```
72 \setlength{\evensidemargin}{0.0truein} % non-binding margin only 1in
```

```
73 \setlength{\textwidth}{6.0truein} % 6in wide typing area
```

```
74 \setlength{\topmargin}{-0.5truein} % headers at top of page 0.5in from edge
```

```
75 \setlength{\headheight}{0.2truein} % room for header
```

```
76 \setlength{\headsep}{0.3truein} % header 0.3in from body, body 1in from top
```

```
77 \setlength{\textheight}{9.0truein} % 9in high typing area
```

```

78 \setlength{\footskip}{0.4truein} % footer 0.4in from body,
79 % 0.6in from bottom (allows for trimming)

```

Widow/orphan control; anything less than 10000 allows these to happen, which is strictly forbidden by most style sheets.

```

80 \widowpenalty=10000
81 \clubpenalty=10000

```

Text/float fraction tweaks; we allow slightly more of the page to be filled than the default, which is 0.5. The default `\topfraction` can also be tweaked (default: 0.7), as can `\textfraction` (default: 0.2).

```

82 \renewcommand*\floatpagefraction{0.6}

```

4.5 Chapter and section commands

`\toc@label` Instead of redefining `\chapter` after we encounter `\appendix`, I redefine this command and leave `\chapter` alone.

```

83 \newcommand*\toc@label{\frontmatter}

```

`\if@first@in@section` This one was defined to make the word Chapter (or Appendix) appear in the table of contents.

```

84 \newif\if@first@in@section
85 \@first@in@sectionfalse

```

`\chapter` The only change here from `report` is that we indent the text right after the heading.

```

86 \renewcommand\chapter{%
87   \if@openright\cleardoublepage\else\clearpage\fi
88   \thispagestyle{plain}%
89   \@afterindenttrue
90   \global\@topnum\z@
91   \secdef\@chapter\@schapter
92 }

```

These two `\providecommand` lines define commands that are overridden if/when `hyperref` gets loaded. They essentially do nothing if it is not loaded.

```

93 \providecommand*\texorpdfstring[2]{\expandafter #1}
94 \providecommand*\phantomsection{}

```

`\@chapter` The only difference in `\@chapter` from `report.cls` is the part about contents lines.

```

95 \def\@chapter[#1]#2{\ifnum \c@secnumdepth >\m@ne
96   \refstepcounter{chapter}%
97   \typeout{\@chapapp\space\thechapter.}%

98   \addcontentsline{toc}{chapter}%
99   {\protect\numberline{\thechapter.}%
100    \texorpdfstring{\MakeUppercase{#1}}}%
101   {\thechapter. #1}%
102   }%
103 \else

```

```

104             \addcontentsline{toc}{chapter}%
105             {\texorpdfstring{\MakeUppercase{#1}}{#1}}%
106         \fi
107         \chaptermark{#1}%

108         \if@twocolumn
109             \@topnewpage[\@makechapterhead{#2}]%
110         \else
111             \@makechapterhead{#2}%
112             \@afterheading
113         \fi}

\@makechapterhead Heading for the chapter command; all caps, bold, but otherwise ordinary text.
                  Less space than in standard reports.
114 \renewcommand{\@makechapterhead}[1]{%    % Heading for \chapter command
115     \vspace*{30\p@}                      % Space at top of text page.
116     \begin{center}\large\bfseries
117         \ifnum \c@secnumdepth >\m@ne
118             \MakeUppercase\@chapapp\ \thechapter % 'CHAPTER' and number.
119             \par\nobreak
120         \fi
121         \addvspace{\topskip}
122         \MakeUppercase{#1}
123     \end{center}
124     \par\nobreak                          % TeX penalty to prevent page break.
125     \vskip 24\p@                          % Space between title and text.
126 }

\@makeschapterhead Exactly the same as \@makechapterhead except without the Table of Contents
                   entry.
127 \renewcommand{\@makeschapterhead}[1]{%    % Heading for \chapter* command
128     \vspace*{30\p@}                      % Space at top of page.
129     \begin{center}
130         \large\bfseries                  % Title.
131         \MakeUppercase{#1}\par
132     \end{center}
133     \nobreak                             % TeX penalty to prevent page break.
134     \vskip 24\p@                         % Space between title and text.
135 }

\@dotsep Default separation between dots in the table of contents is 4.5; we reduce it here
          so it looks a bit more aesthetically pleasing. Units are "math units" (mu), where
          18 mu = 1 em.
136 \renewcommand*{\@dotsep}{2}

\l@chapter This macro creates chapter headings in the Table of Contents. If this is the first
           chapter after \mainmatter or \appendix, it adds the word Chapter or Appendix
           to the Table of Contents as well.
137 \renewcommand{\l@chapter}[2]{%

```

```

138 \addpenalty{-\@highpenalty}%
139 \addvspace{\baselineskip}%
140 \if@first@in@section
141     \addvspace{2\baselineskip}%
142     \parindent\z@ {\bfseries\toc@label} \par
143     \addvspace{\baselineskip}%
144     \@first@in@sectionfalse
145 \fi
146 \@dottedtocline{0}{0.0em}{1.5em}{\bfseries#1}{\bfseries#2}
147 }

\section We use slightly different spacings around section headings than in the report
\subsection class. Note that \z@ means “0 pt.”
\subsubsection 148 \renewcommand{\section}{%
\paragraph 149 \@startsection{section}{1}{\z@
\subparagraph 150 {4.5ex \@plus 2ex \@minus .2ex}
151 {0.001ex \@plus .2ex}
152 {\normalfont\bfseries}}
153 \renewcommand{\subsection}{%
154 \@startsection{subsection}{2}{\z@
155 {3.25ex \@plus 1ex \@minus .2ex}
156 {0.001ex \@plus .2ex}
157 {\normalfont\bfseries}}
158 \renewcommand{\subsubsection}{%
159 \@startsection{subsubsection}{3}{\z@%
160 {3.25ex \@plus 1ex \@minus .2ex}%
161 {0.001ex \@plus .2ex}%
162 {\normalfont\bfseries}}
163 \renewcommand{\paragraph}{%
164 \@startsection{paragraph}{4}{\z@%
165 {2.5ex \@plus 1ex \@minus .2ex}%
166 {-1em}%
167 {\normalfont\normalsize\bfseries}}
168 \renewcommand{\subparagraph}{%
169 \@startsection{subparagraph}{5}{\z@%
170 {0.0ex \@plus 1ex \@minus .2ex}%
171 {-1em}%
172 {\normalfont\small\bfseries}}

\contentsname Default ToC name in report is “Contents”; we change it to be consistent with the
Graduate School’s requirements.
173 \renewcommand*{\contentsname}{Table of Contents}

\tableofcontents Tweaks to the Table of Contents.
174 \renewcommand\tableofcontents{%
175 %\if@openright\cleardoublepage\else\clearpage\fi
176 \renewcommand*{\thepage}{\roman{page}}%
177 \pagestyle{plain}%

```



```

178 \if@twocolumn
179 \@restonecoltrue\onecolumn
180 \else
181 \@restonecolfalse
182 \fi
183 \chapter*{\contentsname
184 \mkboth{\%
185 \MakeUppercase\contentsname}\MakeUppercase\contentsname}}%
186 \pdfbookmark{\contentsname}{\contentsname}%
187 % Next line is the other change from report.cls
188 {\hyphenpenalty=\list@hyphen@penalty\starttoc{toc}}%
189 \if@restonecol\twocolumn\fi
190 }

```

`\@dottedtocline` The following code keeps page numbers from protruding into the margin when
`\thetocindent` \TeX can't figure out how to make the line shorter; copied from umthesis.cls (UMass
Amherst / John Ridgway)

```

191 \def\thetocindent{-1}
192 \newlength{\MUthesis@contentshangindent}
193 \setlength{\MUthesis@contentshangindent}{1.55em}
194 \renewcommand{\@dottedtocline}[5]{%
195 \ifnum #1>\c@tocdepth \else
196 \ifnum \thetocindent = #1 \else
197 \def\thetocindent{#1}
198 \ifdouble@space\addvspace{\topskip}\fi
199 \fi
200 \vskip \z@ \@plus.2\p@
201 {\leftskip #2\relax \rightskip \@tocrmarg \parfillskip -\rightskip
202 \advance\rightskip by 0pt plus 1fil\relax% ragged-right contents...
203 \parindent #2\relax\@afterindenttrue
204 \interlinepenalty\@M
205 \leavevmode
206 \@tempdima #3\relax
207 \advance\leftskip \@tempdima \null\nobreak\hskip -\leftskip
208 \hangindent\MUthesis@contentshangindent
209 {#4}\nobreak%
210 \leaders\hbox{$\m@th\mkern \@dotsep mu \hbox{.}\mkern \@dotsep mu$}%
211 \hskip3em plus1fill\relax%
212 \normalfont \normalcolor #5%
213 \par}%
214 \fi}

```

4.6 Lists of Figures and Tables

`\tablenumberwidth` The width of numbers in the table of contents is hard-coded into report.cls; this
makes it mutable

```

215 \newlength{\tablenumberwidth}
216 \setlength{\tablenumberwidth}{2.3em}

```

`\listoffigures` We use `\chapter` here, rather than `\chapter*`, so it appears in the Table of Contents. Since we are in `\frontmatter`, no number is generated.

`\listoftables`

```

217 \renewcommand\listoffigures{%
218     \if@twocolumn
219         \@restonecoltrue\onecolumn
220     \else
221         \@restonecolfalse
222     \fi
223     \chapter{\listfigurename}%
224     \mkboth{\MakeUppercase\listfigurename}%
225             {\MakeUppercase\listfigurename}%
226     {\normalsize\parindent\z@\textbf{\figurename\hfill Page}\par}%
227     {\hyphenpenalty=\list@hyphen@penalty\@starttoc{lof}}%
228     \if@restonecol\twocolumn\fi
229 }
230 \renewcommand\listoftables{%
231     \if@twocolumn
232         \@restonecoltrue\onecolumn
233     \else
234         \@restonecolfalse
235     \fi
236     \chapter{\listtablename}%
237     \mkboth{%
238         \MakeUppercase\listtablename}%
239             {\MakeUppercase\listtablename}%
240     {\normalsize\parindent\z@\textbf{\tablename\hfill Page}\par}%
241     {\hyphenpenalty=\list@hyphen@penalty\@starttoc{lot}}%
242     \if@restonecol\twocolumn\fi
243 }

```

`\l@figure` Dotted line in List of Figures; we reuse this for tables and other floats as well.

`\l@table`

```

244 \renewcommand*\l@figure{%
245     \addvspace{\baselineskip}% blank line between entries of LoF
246     \@dottedtocline{1}{1.5em}{\tablenumberwidth}
247 }
248 \let\l@table\l@figure

```

`\caption` Caption tweaks. We use the caption package for this.

`\abovecaptionskip`

`\belowcaptionskip`

```

249 \setlength\abovecaptionskip{\topskip}
250 \setlength\belowcaptionskip{\topskip}
251 \RequirePackage{caption}
252 \captionsetup{font=small,labelsep=period,labelfont=bf}

```

`\textfloatsep` We had 75% more space between floats and the text

```

253 \setlength{\textfloatsep}{1.75\textfloatsep}

```

`\appendix` Appendix also has to produce the word “Appendix” in the Table of Contents

```

254 \renewcommand{\appendix}{%

```

```

255 \if@openright\cleardoublepage\else\clearpage\fi
256 %%\par
257 \setcounter{chapter}{0}%
258 \setcounter{section}{0}%
259 \renewcommand*{\@chapapp}{\appendixname}%
260 \renewcommand*{\thechapter}{\@Alph\c@chapter}

```

Write Appendix just above the first appendix in the Table of Contents. We also exclude sections, subsections, etc. from the ToC.

```

261 \immediate\write\@auxout{%
262   \noexpand\@writefile{toc}{%
263     \noexpand\c@tocdepth=0%
264     \noexpand\renewcommand*{\noexpand\toc@label}{\appendixname}%
265     \noexpand\@firstin@sectiontrue
266   }%
267 }%
268 }

```

4.7 Special commands

`\frontmatter` These are used to change page numbering, set chapter numbering, etc.; the `\frontmatter` command is issued automatically at the beginning of the document.

```

269 \newif\if@mainmatter
270 \@mainmatterfalse
271 \newif\if@backmatter
272 \@backmatterfalse
273 \newcommand{\frontmatter}{%

```

No chapter or section numbers in the front matter.

```

274 \setcounter{secnumdepth}{-1}%
275 \global\@mainmatterfalse
276 \global\@backmatterfalse
277 \global\@firstin@sectionfalse
278 \pagenumbering{roman}%

```

turn off page numbers until the acknowledgments section

```

279 \pagestyle{empty}%
280 }

```

`\mainmatter` The `\mainmatter` command is mandatory; it puts the word “Chapter” in the Table of Contents, sets page numbering to Arabic numerals (starting from 1), and resets the chapter counter.

```

281 \newcommand{\mainmatter}{%
282 \if@openright\cleardoublepage\else\clearpage\fi
283 \restorepagemargins
284 % Section numbering by default goes all the way down, but only out to
285 % subsections in the Table of Contents
286 \setcounter{secnumdepth}{7}%
287 \setcounter{tocdepth}{3}%

```

```

288 \global\@mainmattertrue
289 \global\@backmatterfalse
Put "Chapter" in the Table of Contents.
290 \immediate\write\@auxout{\noexpand\@writefile{toc}{%
291   \noexpand\renewcommand*{\noexpand\toc@label}{\chaptername}%
292   \noexpand\@first@in@sectiontrue}%
293 }
294 \pagestyle{plain}%
295 \doublespacing
296 \pagenumbering{arabic}%
297 \setcounter{chapter}{0}%
298 }

```

`\backmatter` This turns chapter numbers off again (bibliography, etc.).

```

299 \newcommand{\backmatter}{%
300   \if@mainmatter\else
301     \ClassWarning{MUthesis}{Encountered 'backmatter' with no 'mainmatter'}
302     \AtEndDocument{%
303       \ClassWarningNoLine{MUthesis}{Encountered 'backmatter' with no 'mainmatter'}%
304     }
305   \fi
306   \setcounter{secnumdepth}{-1}%
307   \addtocontents{toc}{\protect\setcounter{tocdepth}{3}}
308   \global\@backmattertrue
309   \global\@mainmatterfalse
310 }

```

We should have encountered `\mainmatter` (and probably `\backmatter`) at some point

```

311 \AtEndDocument{%
312   \if@mainmatter
313     \ClassWarningNoLine{MUthesis}{No 'backmatter' encountered (no bibliography?)}%
314   \else
315     \if@backmatter\relax\else
316       \ClassWarningNoLine{MUthesis}{No 'mainmatter' or 'backmatter' encountered}%
317     \fi
318   \fi
319 }

```

4.8 Front matter

`\copyrightpage` Copyright page is optional.

```

320 \newcounter{real@page}
321 \newcommand{\copyrightpage}{%
322   \clearpage

```

This makes the page number “c” in the PDF (no number is printed), which avoids hyperref warnings about invalid/duplicate page numbers. We set the

page number back to its original value (plus 1) to make sure subsequent pages' right/left situations in the PDF are still correct.

```

323 \setcounter{real@page}{\value{page}}%
324 \renewcommand*{\thepage}{\alph{page}}%
325 %
326 \pdfbookmark{Copyright}{Copyright}%
327 \thispagestyle{empty}%
328 \null\vfill
329 \noindent
330 \begin{minipage}{0.98\textwidth}
331   \centering\copyright\ Copyright by \@author\ \copyright@year \par
332   \doublespacing
333   All Rights Reserved
334 \end{minipage}
335 \vspace{1.25in}\null
336 \clearpage
337 \pagenumbering{roman}%
338 \setcounter{page}{\value{real@page}}%
339 \stepcounter{page}
340 \let\copyrightpage\relax
341 }

```

`\maketitle` Make the title page. The `\ifco@chairs` macro allows for co-chairs.

```

342 \renewcommand{\maketitle}{%
343   \begin{titlepage}
344     \pagestyle{empty}%
345     \thispagestyle{empty}%

```

The next three lines make the title page page i (required) and unnumbered (also required); it appears in the PDF's outline, but not in the Table of Contents.

```

346     \pdfbookmark{Title Page}{Title Page}%
347     \setcounter{page}{1}%
348     \null
349     \vfill
350     \begin{center}%
351       \setlength{\parskip}{1.25\baselineskip}%
352       \MakeUppercase{\@title} \par
353       \rule{4in}{1pt}%
354       \par
355       A \documentname\par
356       presented to\par
357       the Faculty of the Graduate School\par
358       at the \univ@name \par
359       \rule{4in}{1pt}%
360       \par
361       In Partial Fulfillment\par
362       of the Requirements for the Degree\par
363       \@degree\par
364       \rule{4in}{1pt}%
365       \par

```

```

366     by\par
367     \MakeUppercase{\@author}\par
368     \ifco@chairs
369         Dr.\@firstchair\ and Dr.\@secondchair, \thesis@type\ Supervisors
370     \else
371         Dr.\@chair, \thesis@type\ Supervisor
372     \fi
373     \par
374     \MakeUppercase{\@date}\par
375 \end{center}%
376 \vfill
377 \null
378 \end{titlepage}%
379 \clearpage
380 \renewcommand*{\thepage}{\alph{page}}%
381 \setcounter{footnote}{0}%
382 \let\thanks\relax
383 \let\maketitle\relax
384 }

```

\approvalpage The approval page is required, but not numbered.

```

385 \newlength{\nameskip}
386 \setlength{\nameskip}{0.5in}
387 \newlength{\rule@thickness}
388 \setlength{\rule@thickness}{0.5pt}
389 \newcommand*{\rule@width}{0.55\textwidth}
390 \newcommand{\approvalpage}{%
391   \renewcommand*{\thepage}{\alph{page}}%
392   \cleardoublepage

```

The following four lines put the Approval Page in the PDF outline and make the PDF page number “a,” assuming hyperref is loaded. If it is not, they do nothing.

```

393   \providecommand*{\pdfbookmark}[3][{}]{%
394     \pdfbookmark{Approval Page}{Approval Page}%
395     %\pagenumbering{alph}%
396     %\setcounter{page}{1}%
397     \thispagestyle{empty}%
398     {\addtolength{\baselineskip}{0.5ex}\setlength{\parindent}{\z@}%

```

```

399   The undersigned, appointed by the dean of the Graduate School, have examined
400   the\par
401   \MakeLowercase{\thesis@type} entitled
402
403   \begin{center}
404     \vspace{1ex}%
405     \begin{minipage}{0.8\textwidth}\noindent\centering
406       \MakeUppercase{\@title}
407     \end{minipage}
408     \vspace{1ex}%
409   \end{center}

```

```

410
411 presented by \@author,\par
412 a candidate for the degree of {\@degree},\par
413 and hereby certify that, in their opinion, it is worthy of acceptance.\par
414 }
415 \vskip 1.25\nameskip
416 \begin{center}
417   \ifco@chairs
418     \rule{\rule@width}{\rule@thickness}\par
419     Professor \@firstchair, co-chair\par
420     \vskip\nameskip
421     \rule{\rule@width}{\rule@thickness}\par
422     Professor \@secondchair, co-chair\par
423     \vskip\nameskip
424   \else
425     \rule{\rule@width}{\rule@thickness}\par
426     Professor \@chair, chair\par
427     \vskip\nameskip
428   \fi

Readers (committee members); first reader is always there.
429   \rule{\rule@width}{\rule@thickness}\par
430   Professor \@firstreader, member\par
431   \vskip\nameskip

Second reader and further, if present
432   \ifsecond@reader
433     \rule{\rule@width}{\rule@thickness}\par
434     Professor \@secondreader, member\par
435     \vskip\nameskip
436   \fi
437   \ifthird@reader
438     \rule{\rule@width}{\rule@thickness}\par
439     Professor \@thirdreader, member\par
440     \vskip\nameskip
441   \fi
442   \iffourth@reader
443     \rule{\rule@width}{\rule@thickness}\par
444     Professor \@fourthreader, member\par
445     \vskip\nameskip
446   \fi
447   \iffifth@reader
448     \rule{\rule@width}{\rule@thickness}\par
449     Professor \@fifthreader, member\par
450     \vskip\nameskip
451   \fi
452   \ifsixth@reader
453     \rule{\rule@width}{\rule@thickness}\par
454     Professor \@sixthreader, member\par
455     \vskip\nameskip

```

```

456 \fi
457 \end{center}
Make certain there is nothing on the back of the approval page
458 \cleardoublepage
459 }

```

dedication The dedication environment is optional and not numbered.

```

460 \newcommand*{\dedicationname}{Dedication}
461 \newenvironment{dedication}{%
462 \if@openright\cleardoublepage\else\clearpage\fi
463 \null\vfil

```

The next two lines change the page number in the PDF to “d” if hyperref has been loaded. They do nothing if it has not.

```

464 \renewcommand*{\thepage}{\alph{page}}%
465 \thispagestyle{empty}%
466 \pdfbookmark{\dedicationname}{\dedicationname}%
467 \vfill
468 \begin{quotation}
469 }\par\end{quotation}\vfill\vfil\null}

```

epigraph Epigraph is optional. The optional argument is the person to whom to attribute the quotation. The next two lines change the page number in the PDF to “e” if hyperref has been loaded. They do nothing if it has not.

```

470 \newcommand*{\epigraphname}{Epigraph}
471 \newenvironment{epigraph}[1]{%
472 \clearpage\null\vfil
473 \renewcommand*{\thepage}{\alph{page}}%
474 \gdef\epi@author{#1}%
475 \thispagestyle{empty}%
476 \pdfbookmark{\epigraphname}{\epigraphname}%
477 \vfill
478 \begin{quote}
479 }\end{quote}
480 \hspace{0.25\linewidth}---\epi@author\par
481 \vfill\vfil\null
482 }

```

acknowledgments Acknowledgments are required, and required to be numbered page ii; we use that fact to set the page counter. RANT: it’s super-duper annoying in two-sided documents that the acknowledgments (a “chapter”) starts on an even-numbered page! It requires me to do all kinds of creative things (such as redefining \cleardoublepage) and is generally unnecessary and stupid.¹

```

483 \newlength{\other@margin}
484 \newif\ifmargins@normal
485 \margins@normaltrue

```

¹Pretty much every rule the administration makes at the University of Missouri is unnecessary and stupid.


```

486 \newcommand{\reversepagemargins}{%
487   \if@twoside
488     \ifmargins@normal
489       \other@margin=\oddsidemargin\relax
490       \global\oddsidemargin=\evensidemargin\relax
491       \global\evensidemargin=\other@margin\relax
492       \global\margins@normalfalse
493     \fi
494   \fi
495 }
496 \newcommand{\restorepagemargins}{%
497   \if@twoside
498     \ifmargins@normal
499       \relax
500     \else
501       \other@margin=\oddsidemargin\relax
502       \global\oddsidemargin=\evensidemargin\relax
503       \global\evensidemargin=\other@margin\relax
504       \global\margins@normaltrue
505     \fi
506   \fi
507 }
508 \let\normal@cleardoublepage\cleardoublepage
509 \renewcommand*{\cleardoublepage}{%
510   \ifmargins@normal
511     \normal@cleardoublepage
512   \else
513     \clearpage
514     \if@twoside
515       \ifodd\c@page
516         \hbox{}\newpage
517       \if@twocolumn\hbox{}\newpage\fi
518     \fi
519   \fi
520 \fi
521 }
522 \newcommand*{\ackname}{Acknowledgments}
523 \newenvironment{acknowledgments}{%
524   \chapter{\ackname}%
525   \phantomsection
526   \pagenumbering{roman}%
527   \setcounter{page}{2}% graduate school requirement that this is page ii....
528   \reversepagemargins
529   \pagestyle{plain}%
530   \global\ack@foundtrue
531   \begin{doublespace}
532 }{\end{doublespace}}%
533 \thispagestyle{plain}%
534 }

```

```

535 \AtEndDocument{%
536   \ifack@found\else
537     \ClassWarningNoLine{MUthesis}{No 'acknowledgments' environment;\MessageBreak
538       this environment is required for all\MessageBreak
539       theses and dissertations}
540   \fi
541 }

```

abstract The abstract environment is optional (yeah, right), and must appear in the table of contents; we also put the title at the top of the page.

```

542 \renewenvironment{abstract}{%
543   \if@openright\cleardoublepage\else\clearpage\fi
544   \phantomsection
545   \pagestyle{plain}%
546   \begin{center}
547     {\large\bfseries\MakeUppercase{\@title}}\par
548     \par\vspace{1.25\topskip}%
549     \@author
550     \par\vspace{\topskip}%
551     \ifco@chairs
552       Dr.\@firstchair\ and Dr.\@secondchair, \thesis@type\ Supervisors \par
553     \else
554       Dr.\@chair, \thesis@type\ Supervisor \par
555     \fi
556     \par\vspace{2\topskip}%
557     \MakeUppercase{\bfseries\expandafter{\abstractname}}%

```

This adds the abstract to the Table of Contents and fixes its entry in the PDF outline as well.

```

558   \addcontentsline{toc}{chapter}%
559     {\texorpdfstring{\MakeUppercase{\abstractname}}
560     {\abstractname}}%
561   \end{center} \par \addvspace{-0.75\topskip}%
562   \begin{doublespace}%
563   \indent
564 }
565 {\par\end{doublespace}}

```

vita A Vita is required for dissertations.

```

566 \newif\ifvita@present
567 \vita@presentfalse
568 \newenvironment{vita}{%
569   \chapter{Vita}
570 }{\global\vita@presenttrue}

```

Check for missing vita in a dissertation

```

571 \AtEndDocument{
572   \ifis@dissertation
573     \ifvita@present\relax

```

```

574 \else
575 \ClassWarningNoLine{MUthesis}{No 'vita' environment found; a vita is
576 required for dissertations}%
577 \fi
578 \fi
579 }

```

`thebibliography` Because so many packages redefine the `thebibliography` environment, we redefine it to match the graduate school's requirement at the beginning of the document, after any packages. This should make it compatible with things like `chapterbib`, though this has not been tested.

```

580 \let\MUthesis@bib@name\bibname
581 \newcommand*{\refname}{References}%

```

```

582 \newif\ifMUthesis@use@chapterbib
583 \MUthesis@use@chapterbibfalse
584 \newif\ifMUthesis@use@natbib
585 \MUthesis@use@natbibfalse

```

We use numbers in bibliographies as “1.” rather than “[1]” here; if using `natbib`, we redefine `\bibnumfmt` after `\begin{document}` instead.

```

586 \renewcommand*{@biblabel}[1]{\hfill #1.}%

```

We use `\bibsection` here so that `natbib` uses it when the time comes. It is redefined at `\begin{document}` to override `natbib`'s wishes.

```

587 \newcommand{\bibsection}{}
588 \AtBeginDocument{%
589 \ifpackageloaded{chapterbib}%
590 {\MUthesis@use@chapterbibtrue}%
591 {\MUthesis@use@chapterbibfalse}%
592 \ifpackageloaded{natbib}%
593 {\MUthesis@use@natbibtrue
594 \renewcommand*{\bibnumfmt}[1]{#1.}
595 }%
596 {\MUthesis@use@natbibfalse}%
597 \renewcommand{\bibsection}{}%
598 \ifMUthesis@use@chapterbib
599 \if@backmatter
600 \chapter{\bibname}%
601 \let\MUthesis@bib@name\bibname
602 \else
603 \section*{\refname}%
604 \addcontentsline{toc}{section}{\protect\numberline{}\refname}%
605 \let\MUthesis@bib@name\refname
606 \fi
607 \else
608 \chapter{\bibname}%
609 \if@backmatter\relax\else\backmatter\fi
610 \fi
611 \@mkboth{\MakeUppercase\MUthesis@bib@name}

```

```

612         {\MakeUppercase\MUthesis@bib@name}%
613     \singlespacing
614 }
615 \renewenvironment{thebibliography}[1]{%
616     \bibsection
617     \ifMUthesis@use@natbib
618         \bibpreamble
619         \bibfont
620         \list{\@biblabel{\the\c@NAT@ctr}}
621             {\@bibsetup{#1}\global\c@NAT@ctr\z@}%
622     \else
623         \list{\@biblabel{\@arabic\c@enumiv}}%
624         {%
625             \if@backmatter
626                 \labelwidth 20pt%
627                 \leftmargin\labelwidth
628             \else
629                 \settowidth\labelwidth{\@biblabel{#1}}%
630                 \leftmargin\labelwidth
631                 \advance\leftmargin\labelsep
632             \fi
633             \@openbib@code
634             \usecounter{enumiv}%
635             \let\p@enumiv\@empty
636             \renewcommand\theenumiv{\@arabic\c@enumiv}%
637         }%
638     \fi

```

If we have per-chapter bibliographies (with chapterbib), we redefine the bibitem code so that there are no numbers in the main bibliography.

```

639 \if@backmatter
640 \ifMUthesis@use@chapterbib
641 \ifMUthesis@use@natbib
642 \renewcommand*{\bibnumfmt}[1]{%

```

FIXME: This code works, but likely breaks some natbib features.

```

643 \def\@lbibitem[##1]##2{%
644     \item[\hfill]{\hspace{-\labelwidth}\if@files@
645         {\let\protect\noexpand
646         \immediate
647         \write\@auxout{\string\bibcite{##2}{##1}}}\fi\ignorespaces}%
648     }%
649 \else
650 \renewcommand*{\@bibitem}[1]{%
651     \item[\hfill]{\hspace{-\labelwidth}\if@files@
652         \immediate\write\@auxout
653         {\string\bibcite{#1}{\the\value{\@listctr}}}\fi\ignorespaces
654     }%
655 \fi
656 \fi

```

```

657 \fi
The rest is from report.cls and/or natbib.sty
658 %% FIXME should these next two lines be there?
659 %% \sloppy
660 %% \interlinepenalty=10000%
661 \sfcode'\.\@m
662 \ifMUthesis@use@natbib
663 \let\NAT@bibitem@first@sw\@firstoftwo
664 \let\citeN\cite \let\shortcite\cite
665 \let\citeasnoun\cite
666 \fi
667 {\ifMUthesis@use@natbib
668 \bibitem@fin
669 \bibpostamble
670 \fi
671 \def\@noitemerr
672 {\@latex@warning{Empty 'thebibliography' environment}}%
673 \endlist
674 \ifMUthesis@use@natbib\bibcleanup\fi
675 }
676 }

```

`nomencl` This code makes the `nomencl` package compatible with this class. The command
`\nomname` `\listofsymbols` is an alias for `\printnomenclature`.

```

\listofsymbols 677 \AtBeginDocument{%
678 \ifpackageloaded{nomencl}{%
679 \ClassWarningNoLine{MUthesis}
680 {Redefining the nomenclature to fit with MUthesis.cls}%
681 \renewcommand*{\nomname}{List of Symbols}%
682 \let\listofsymbols\printnomenclature
683 \def\thenomenclature{%
684 \chapter{\nomname}%
685 \nompreamble
686 \list{}{%
687 \labelwidth\nom@tempdim
688 \leftmargin\labelwidth
689 \advance\leftmargin\labelsep
690 \itemsep\nomitemsep
691 \let\makelabel\nomlabel%
692 }%
693 }%
694 }{}%
695 }

```

`glossaries` We redefine the appropriate commands from the `glossaries` package, if it has
`\acronymname` been loaded, for compatibility with this class.

```

696 \AtBeginDocument{%
697 \ifpackageloaded{glossaries}{%

```

```

698 \ClassWarningNoLine{MUthesis}
699 {Redefining glossaries to fit with MUthesis.cls}%
700 \renewcommand*{\acronymname}{List of Acronyms}%
701 \glstoctrue
702 \renewcommand*{\@gls@toc}[2]{%
703 \ifglstoc
704 \ifglsnumberline
705 \addcontentsline{toc}{#2}%
706 {\numberline{}}\texorpdfstring{\MakeUppercase{#1}}{#1}}%
707 \else
708 \addcontentsline{toc}{#2}{\texorpdfstring{\MakeUppercase{#1}}{#1}}%
709 \fi
710 \fi
711 }%
712 }{}%
713 }

```

`makeidx` We redefine `\printindex` for compatibility with this class if `makeidx` has been included.

```

714 \AtBeginDocument{%
715 \ifpackageloaded{makeidx}{%
716 \ClassWarningNoLine{MUthesis}
717 {Redefining the index to fit with MUthesis.cls}%
718 \let\old@printindex\printindex
719 \renewcommand{\printindex}{%
720 \if@openright\cleardoublepage\else\clearpage\fi
721 \singlespacing
722 \addcontentsline{toc}{chapter}%
723 {\texorpdfstring{\MakeUppercase{\indexname}}{\indexname}}%
724 \old@printindex
725 }%
726 }{}%
727 }

```

4.9 Commands and environments for front matter

`\degree` These commands are the user interface; their function is to store names and dates
`\copyrightyear` for future use on the title page, copyright page, and approval page.

```

728 \newcommand*{\degree}[2]{\gdef\@degree{#1}\gdef\@degreeabbrv{#2}}
729 \let\copyright@year\relax
730 \def\copyright@year{\ClassWarningNoLine{MUthesis}{No copyright year given}}
731 \newcommand*{\copyrightyear}[1]{\gdef\copyright@year{#1}}

```

`\chair` Commands used to define the thesis/dissertation committee.

```

\cochairs 732 \newif\ifco@chairs
\firstreader 733 \co@chairsfalse
\secondreader 734 \def\@chair{\ClassWarningNoLine{MUthesis}{No \noexpand\chair defined}}
\thirdreader 735 \newcommand*{\chair}[1]{\gdef\@chair{#1}\co@chairsfalse}
\fourthreader
\fifthreader
\sixthreader

```

```

736 \newcommand*{\cochairs}[2]{\gdef\@firstchair{#1}\gdef\@secondchair{#2}%
737   \co@chairstrue}
738 \def\@firstreader{\ClassWarningNoLine{MUthesis}{No \noexpand\firstreader defined}}
739 \newcommand*{\firstreader}[1]{\gdef\@firstreader{#1}}%
740 \newif\ifsecond@reader
741 \second@readerfalse
742 \newcommand*{\secondreader}[1]{\gdef\@secondreader{#1}\second@readertrue}
743 \newif\ifthird@reader
744 \third@readerfalse
745 \newcommand*{\thirdreader}[1]{\gdef\@thirdreader{#1}\third@readertrue}
746 \newif\iffourth@reader
747 \fourth@readerfalse
748 \newcommand*{\fourthreader}[1]{\gdef\@fourthreader{#1}\fourth@readertrue}
749 \newif\iffifth@reader
750 \fifth@readerfalse
751 \newcommand*{\fifthreader}[1]{\gdef\@fifthreader{#1}\fifth@readertrue}
752 \newif\ifsixth@reader
753 \sixth@readerfalse
754 \newcommand*{\sixthreader}[1]{\gdef\@sixthreader{#1}\sixth@readertrue}

```

| | |
|---|---|
| <p>illustration</p> <p>\illustrationname</p> <p>\listillustrationname</p> <p>\theillustration</p> | <p>Define an illustration environment and the associated list of illustrations. These are essentially the same as the table and figure environments.</p> <pre> 755 \newcounter{illustration}[chapter] 756 \newcommand*{\illustrationname}{Illustration} 757 \newcommand*{\listillustrationname}{List of Illustrations} 758 \renewcommand\theillustration 759 {\ifnum \c@chapter>\z@ \thechapter.\fi \@arabic\c@illustration} 760 \def\fps@illustration{tbp} 761 \def\ftype@illustration{1} 762 \def\ext@illustration{loi} 763 \def\fnun@illustration{\illustrationname\nobreakspace\theillustration} 764 \newenvironment{illustration} 765 {\@float{illustration}} 766 {\end@float} 767 \newenvironment{illustration*} 768 {\dblfloat{illustration}} 769 {\end@dblfloat} 770 \newcommand\listofillustrations{% 771 \if@twocolumn 772 \@restonecoltrue\onecolumn 773 \else 774 \@restonecolfalse 775 \fi 776 \chapter{\listillustrationname}% 777 \@mkboth{% 778 \MakeUppercase\listillustrationname}% 779 {\MakeUppercase\listillustrationname}% 780 {\normalsize\parindent\z@\textbf{\illustrationname\hfill Page}\par}% 781 {\hyphenpenalty=\list@hyphen@penalty\@starttoc{loi}}% </pre> |
|---|---|

```

782 \if@restonecol\twocolumn\fi
783 }
784 \let\l@illustration\l@figure

scheme Define a scheme environment and the associated list of schemes for chemically
\schemename reacting systems. These are essentially the same as the table and figure environ-
\listschemename ments, too.
\thescheme
785 \newcounter{scheme}[chapter]
786 \newcommand*{\schemename}{Scheme}
787 \newcommand*{\listschemename}{List of Schemes}
788 \renewcommand\thescheme
789 {\ifnum \c@chapter>\z@ \thechapter.\fi \@arabic\c@scheme}
790 \def\fps@scheme{tbp}
791 \def\ftype@scheme{1}
792 \def\ext@scheme{los}
793 \def\fnm@scheme{\schemename\nobreakspace\thescheme}
794 \newenvironment{scheme}
795 {\@float{scheme}}
796 {\end@float}
797 \newenvironment{scheme*}
798 {\dblfloat{scheme}}
799 {\end@dblfloat}
800 \newcommand\listofschemes{%
801 \if@twocolumn
802 \@restonecoltrue\onecolumn
803 \else
804 \@restonecolfalse
805 \fi
806 \chapter{\listschemename}%
807 \@mkboth{%
808 \MakeUppercase\listschemename}%
809 {\MakeUppercase\listschemename}%
810 {\normalsize\parindent\z@\textbf{\schemename\hfill Page}\par}%
811 {\hyphenpenalty=\list@hyphen@penalty\@starttoc{los}}%
812 \if@restonecol\twocolumn\fi
813 }
814 \let\l@scheme\l@figure

\newfloat
\listof 815 \AtBeginDocument{%
\float@listhead 816 \@ifpackageloaded{float}{%
817 \renewcommand*{\float@listhead}[1]{%
818 \if@twocolumn
819 \@restonecoltrue\onecolumn
820 \else
821 \@restonecolfalse
822 \fi
823 \chapter{#1}
824 \@mkboth{%

```



```

825         \MakeUppercase{#1}}
826     {\MakeUppercase{#1}}%
827 }%
828 \renewcommand*{\listof}[2]{%
829     \@ifundefined{ext@#1}{\float@error{#1}}{%
830         \expandafter\let\csname l@#1\endcsname\l@figure
831         \float@listhead{#2}%
832         {\normalsize\parindent\z@\textbf{\csname fname@#1\endcsname\hfill
833             Page}\par}%
834         {\hyphenpenalty=\list@hyphen@penalty
835             \@starttoc{\csname ext@#1\endcsname}}}%
836     \if@restonecol\twocolumn\fi
837 }%
838 }%
839 }{}%
840 }%

```

4.10 Page numbers in the PDF

To get page numbers in the PDF, I use `hyperref`'s `pdfpagelabels` option. The `hyperpages` option uses the `implicit=false` and `draft` options to `hyperref` so that links are not enabled but the pages still have the correct labels in the PDF. The user could re-enable this later using `hyperref`'s commands, but it is better to use the `hyper` option to the document class. The `nohyper` option prevents the document class from loading `hyperref`, just in case anyone has trouble.

`\pdfbookmark`

```

841 \ifload@hyperref
842   \AtBeginDocument{%
843     \expandafter\RequirePackage[\hyper@options]{hyperref}
844   }
845 \else
846   \AtBeginDocument{%
847     \providecommand*\pdfbookmark}[3][{}]{}%
848   }
849 \fi

```

Start the document in "frontmatter" mode by default

```

850 \AtBeginDocument{%
851   \frontmatter
852 }

```