The NDdiss2$_\varepsilon$ class*

2017-05-09

Abstract

The NDdiss2$_\varepsilon$ class can be used to typeset dissertations submitted to the University of Notre Dame's Graduate School. This class conforms with the Graduate School guidelines as of Spring 2013 for the layout of the Ph.D. dissertations and Master's theses.

Contents

*Version 3.2017.1, dated 2017-05-09.

1 Introduction

The LaTeX 2_ε document class NDdiss2_ε is suitable for producing dissertations and theses conforming to the Spring 2013 guidelines of the Graduate School at the University of Notre Dame. The package is extends the standard LaTeX book class.

The latest version of this class and related documentation can be found in a few places:

- On CTAN: `https://ctan.org/pkg/nddiss`
- On GitHub: `https://github.com/ndlib/nddiss`
- On the University of Notre Dame's Graduate School website: `http://graduateschool.nd.edu/`

1.1 Disclaimer

While this class does as much formatting as it can, there are a few formatting items that you, the user, must do manually (see Section 5). Please keep in mind that only *you* are responsible for the correct formatting of your dissertation/thesis. Should you have questions, please consult the official formatting guide or email `dteditor@nd.edu`.

1.2 Dependencies and Limitations

This classfile depends on many other packages to be installed. All of these required packages are available through MiKTeX and TeXLive, and chances are good they are already installed by your TeX distribution. Refer to section 6 for a list of the essential packages.

The document class has only been tested with a small subset of available packages. There are numerous packages you may want to use for your work, but they may have to be modified accordingly. Things lacking include support for the subfigure and subcaption package and proper formatting of the captions in such an environment. Formatting of the captions could be much easier with the caption[1] in general, and is a thing-to-do for future versions. Permitting use of the subfigure and subcaption packages would also be a good thing to do if an update is

[1] caption package by Axel Sommerfeldt v3.0b[2004/05/16] and higher

ever made for reaosns other than resolving conflicts caused by changing Graduate School regulations. If you want to use a subfigure environment and don't need the caption capabilities of the subcaption package, adding the following code to your preamble may allow you to do this and still have your captions formatted according to the Graduate School's rules.

```
\usepackage{subcaption}
\makeatletter
\renewcommand\LT@makecaption[3]{%
  \LT@mcol\LT@cols c{\hbox to\z@{\hss\parbox[t]\LTcapwidth{%
  \vskip\abovetableskip%
  \centering\normalspacing
  #1{#2 }\\[\single@skip]
  {#3}\par
  \endgraf\vskip\belowtableskip}%
  \hss}}}
\makeatother
```

1.3 History

The NDdiss2$_\varepsilon$ package is an extensive rewrite by Sameer Vijay of an earlier NDthesis class for formatting dissertations. Megan Patnott updated NDdiss2$_\varepsilon$ to the 2013 Graduate School Formatting guidelines. The NDThesis class was by D. A. Peterson.

2 Quick Start

This section provides a template you can use to get started. The distribution comes with a more detailed file, `template.tex`, that is similar, but more detailed.

```
\documentclass[numrefs,final]{nddiss2e}

\begin{document}

\frontmatter

\title{Title in Title Caps}
\author{Your Name}
\work{Dissertation}
\degaward{Doctor of Philosophy}
\advisor{}
\department{}
\maketitle
\makepublicdomain % There is also a copyright option

\begin{abstract}
Abstract here
```

```
\end{abstract}

% dedication is optional
\begin{dedication}
For Someone
\end{dedication}

\tableofcontents
\listoffigures
\listoftables

% list of symbols is optional
\begin{symbols}
\sym{a}{definition of a}
\end{symbol}

% preface is optional
\begin{preface}
Preface here
\end{preface}

\begin{acknowledge}
Thanks to everyone
\end{acknowledge}

\mainmatter

\chapter{A New Dawn} % Chapter 1
All the text ...

\appendix
\chapter{Additional Data} % Appendix A

\backmatter
\bibliographystyle{nddiss2e}
\bibliography{bibdatabase}

\end{document}
```

3 Usage

Invoke the NDdiss2$_\varepsilon$ document class by adding `\documentclass[`⟨*options*⟩`]{nddiss2e}` at the beginning of your LaTeX source file. For most people the options `\documentclass[draft]{nddiss2e}` is good enough for the initial revisions. If you want your figures to display, use `\documentclass[review]{nddiss2e}`.

Use the option `\documentclass[final]{nddiss2e}` for your formatting check submission, and `\documentclass[final,noinfo]{nddiss2e}` for the final sub-

mitted version.

If you have two advisors, add the option `twoadvisors` here, and then use `\secondadvisor{}` later on the title page to give the name of the second advisor.

By default, all documents produced using this class are formatted as one-sided, doublespaced, letter-sized pages, per the Graduate School requirements. In theory, the class file's specifications should override your system's defaults. If, however, you are getting A4 paper, try adding `\pdfpagewidth{8.5in}` and `\pdfpageheight{11in}` immediately after the `\documentclass` in your file.

3.1 Options

`draft` `review` `final`

Exactly *one* of these options must be used. The `draft` and `review` options enable faster processing of the document and also include annotations to help write and edit it.

The `draft` option enables a fast processing and preliminary document showing the labels for citations, tables, figures etc. and a black solid rule highlighting the horizontal overflows. Additionally, figures are replaced with placement boxes showing where the included figure would be placed. Such a document would be the one you would prepare for revising your text during writing stages.

The `review` option makes it possible to prepare a document that is one step closer to the final version. Almost all the formatting of the final version is present, but the labels and keys as in the `draft` option are also displayed. A document prepared with the `review` option would be the one to personally check for proper formatting and possibly giving to your advisor if she wished to suggest corrections.

The `final` option produces the document to be submitted to the Graduate School for formatting checks and as the final version.

`twoadvisors`

The `twoadvisors` option will produce a title page with space for two advisors. Use the `\secondadvisor` macro command (discussed in Section 4.1) on the title page to give the name of the second advisor.

`noinfo`

The `noinfo` option disables the information page produced when the `review` or `final` style options are used. It is recommended that you only use this option when making the final submission to the Graduate School.

`numrefs` `textrefs`

These options determine how citations are displayed in the text. The default style is `numrefs`. The `numrefs` option produces a numbered citation sytle by using `natbib` and the "nddiss2e" or "nddiss2enoarticletitles" citation style file[2]. The `textrefs` option changes the citation style to be similar to "author-date" style with the same files.

`sort` `compress` `sort&compress`

At most one of these options should be selected. The `sort` option will cause both numerical and "author-date" style references to be sorted in the order that they appear in the bibliography when multiple references are cited. The `compress` option compresses numerical citations, e.g. it turns [1,2,3] into [1-3], and does nothing to "author-date" style references. The `sort&compress` option first sorts

[2] `nddiss2e.bst` is a slight modificiation of `abbrvnat.bst` in the `natbib` package; `nddiss2enoarticletitles.bst` is essentially the same as `nddiss2e`, but does not display the titles of journal articles, as this is the standard in some fields

and then compresses numerical references, and only sorts "author-date" style references.

Since the same set of packages and style files result in differing citation formats, refer to the documentation for `natnotes.dvi` in your `TEXMF` tree, to be aware of the various ways in which you can make a citation in your text.

`10pt` `11pt` `12pt` These options adjust the font size of the body text. The choice is only applicable when the `draft` option is used, and defaults to `10pt`. When `review` or `final` is used, this option is ignored and `12pt` is used.

`twoside` The `twoside` option causes the class file to prepare a document meant to be printed double-sided. This option is strictly for if you want to prepare a two-sided document for your own use. The only difference from the one-sided document is in the page layout. Do NOT use this option when preparing to submit it to the Graduate School.

`nocenter` The `nocenter` option allows non-centered chapter titles. Do NOT turn in your document this way to the Graduate School!

`openbib` The `openbib` option formats your bibliography in the following manner:
Author
Article/book title
Other information
Website, if applicable
Usually you would not need to use this option since the default layout of the `bibliography` is acceptable.

4 Arrangement of Contents

A dissertation or a thesis document contains the following parts, in the order listed. Only those marked as optional may be omitted.

1. Title Page
2. Copyright page
3. Abstract *(optional for Master's thesis)*
4. Dedication *(optional)*
5. Table of Contents
6. List of Figures
7. List of Tables
8. List of Symbols *(optional)*
9. Preface *(optional)*
10. Acknowledgments *(optional)*
11. Text

12. Appendix (or Appendices) *(optional)*

13. Bibliography (or References, or Works cited)

The macros and environments described below ease the formatting of these parts.

4.1 Title Page

`\maketitle` The title page is generated by `\maketitle` with no arguments. This macro has been modified for providing a title page in the correct format.

You can set information to display on the title page by using the following commands before invoking `\maketitle`.

`\title{}`
- The title of the document, using the `\title` macro. You may use linebreaks within the title, protected via `\protect\\` and the title may be up to four lines long.

`\author{}`
- Give your name in full and exactly as registered with the Graduate School, using the `\author` macro, e.g. `\author{Gary Graham Gordon-Graeme}`).

`\work{}`
- Whether the document is a *Thesis* or a *Dissertation* as the argument of the `\work` macro, e.g. `\work{Dissertation}`).

`\degaward{}`
- Specify the degree you're aiming for with the `\degaward` macro. Should be one of `\degaward{Doctor of Philosophy}` (without the "in *subject*" or `\degaward{Master of Science\\in\\Engineering}`.

`\advisor{}`
- Give the name of your advisor with the `\advisor` macro.

`\secondadvisor{}`
- Give the name of your second advisor, if any, with the `\secondadvisor` macro. You also need to pass in the `twoadvisors` option in the `\documentclass` declaration.

`\department{}`
- Give the name of your department with the `\department` macro, e.g. `\department{Gnulogical Engineering}`).

`\degdate{}`
- The month and year of the defense of the thesis with the `\degdate` e.g. `\degdate{June 2004}`). If you forget to declare this, the current month/year will be used.

4.2 Copyright Page

`\makecopyright` The `\makecopyright` macro should be invoked after `\maketitle` to produce a
`\copyrightholder{}` copyright page. Prior to calling `\makecopyright`, you may specify a different
`\copyrightyear{}` name for the copyright holder (the default is the name given through the `\author` macro) and for the copyright year (the default being the current year). Do this with the `\copyrightholder{`⟨*name*⟩`}` and `\copyrightyear{`⟨*year*⟩`}` macros.

`\makepublicdomain` Alternatively, you can use `\makepublicdomain` to produce a page with the

message "This document is in the public domain." Note that the absence of the copyright page does *not* place your dissertaion in the public domain, you must declare it as such explicitly.

4.3 Abstract Page(s)

`abstract` The abstract text should be placed between `\begin{abstract}` and `\end{abstract}`. If the abstract is longer than one page, the environment will place the author's name in the top-right header.

`\abstractname{}` You may use `\abstractname{`⟨*text*⟩`}` to change the abstract caption to `text`. Default name: `Abstract`. You probably don't need to change it.

4.4 Dedication

`dedication` The dedication is optional. If you want one, use the dedication envrionment. The format of dedication is essentially free. This environment will center the text of your dedication vertically on the page.

`\dedicationame{}` You may use `\dedicationname{`⟨*text*⟩`}` to change the title for the dedication page. Default name: `\mbox{}` i.e. an empty title. You probably don't need to change it.

4.5 Table of Contents; Lists of Figures and Tables

`\tableofcontents` `\listoffigures` `\listoftables` Use the macros `\tableofcontents`,`\listoffigures` and `\listoftables`, *in this order*, to produce the required table of contents and lists of figures and tables.

`\contentsname{}` `\listfigurename{}` `\listtablename{}` You may use `\contentsname`, `\listfigurename` and `\listtablename` to change the titles for these sections. By default they are `CONTENTS`, `FIGURES`, and `TABLES`. You probably don't need to change them.

4.6 List of Symbols

`symbols` The list of symbols is optional. Use the symbols envrionment to format a list of symbols/abbreviations used in your work. The envrionment takes an optional argument specifying the desired format, e.g. `\begin{symbols}[cl]` for first column centered and the next column aligned left. By default, the first column will be right aligned and the second column will be left aligned. You may use any of the standard `tabular` column alignment options.

`\sym{}{}` The command `\sym{`⟨*symbol*⟩`}{`⟨*definition*⟩`}` may make the task of entering the symbols and their meanings in the symbols environment easier. `\sym` takes two arguments: the first, a math "object" and the second, the plain text describing the symbol. Since the first argument is in math mode, any plain text needs to be wrapped with `\mathrm{..}` Likewise, any math symbol in the second argument needs to placed in `$..$`. Example: `\sym{\beta_\mathrm{norm}}{Definition for $\beta$}`

`\symbolsname{}` You may use `\symbolsname{}` to change the title of the symbols section. Default name: `SYMBOLS`.

4.7 Preface

preface — The preface environment is provided for formatting the preface to your work.

\prefacename{} — You may use \prefacename to change the name of this section. Default name: PREFACE.

4.8 Acknowledgments

acknowledgments — The environment acknowledgments is used to format the acknowledgment *chapter*.

\acknowledgename{} — You may use \acknowledgename to change the name of this section. Default name: Acknowledgments.

4.9 Text

\mainmatter — Use the macro \mainmatter to mark the beginning of your text. You can then use \part, \chapter, \section, \subsection, and \subsubsection commands, as you would with the book class. Text is formatted in \normalspacing i.e. double-spacing. The pages are numbered in plain pagestyle such that the page numbers are centered in the bottom. The chapter titles can be multi-line, and if so are formatted doubly spaced.

\unnumchapter{} — Use the macro \unnumchapter to create to create unnumbered chapters that appear in the Table of Contents.

4.10 Appendix

\appendix — Use the command \appendix after the last normal chapter to signal that all following chapters are to be appendices. This use is the same as in the book class. To begin an appendix, use the \chapter{⟨*title*⟩} macro.

4.11 Backmatter

\backmatter — The \backmatter macro separates the bibliography, index and glossary from the main matter and any appendices.

4.12 Bibliography

\bibliography — If you are using BibTeX (and why would you not want to use BibTeX?), use the \bibliography{⟨*bibfile*⟩} macro to generate the bibliography. You should refer to BibTeX manual for details about making a .bib file and format for the entries.

For citing references in the text, the package natbib is included with either the settings numbers,sort&compress (numrefs option) or authoryear,sort (textrefs option). The package natbib is a fantastic package that has numerous macros for *citing* in different ways.

Warning: The packages cite and citation are NOT compatible with the natbib package, and will cause errors if used.

thebibliography — If you are not using BibTeX make your own bibliography by using the thebibliography environment. In this case, you would have to write the reference entries

in the right format in your `.tex` source file itself. If you are using the `textrefs` option, you'll need to consult the natbib manual to ensure that you enter your entries in the format required by the package.

`\bibname{}` You may use `\bibname{`⟨*newbibname*⟩`}` to change the name of this section. Default name: `Bibliography`.

4.13 Chapter-wise Bibliography

By default the bibliography appears at the end of your work and contains all the references from the entire entity. If you need to have a separate bibliography for each chapter, you can do it in the following way. First, load the package chapterbib without any options in the preamble of your main source file and redefine the commands `\bibname` and `\bibsection` as shown below.

```
%% Main source file %%
\documentclass[...]{nddiss2e}
\usepackage{chapterbib}
\renewcommand{\bibname}{Cited works}
\renewcommand{\bibsection}{\section{\bibname}}
...
\begin{document}
\include{chptr1}
...
\include{appndx}
\end{document}
```

To process the bibliography for each chapter individually, the chapters or sections must be separated into different files and *include* them in the main file, as shown above. Each such `\included` file must contain its own `\bibliographystyle{nddiss2e}` and `\bibliography{...}` command at an appropriate position. There should not be any bibliographic commands in the main source file.

After compiling the main tex file once (with `latex` or `pdflatex`), the `.aux` files needed by `bibtex` will have been created and you can then run `bibtex` on each of the separate source files to obtain a `.bbl` for each file. The remaining steps are the same as for a normal `.tex` file.

You can find more details of this in the natbib manual.

5 Note For Authors

The dissertation author must make sure that the following conditions are met in order to generate a dissertation acceptable by the Graduate School:

- The List of Figures must be *before* the List of Tables, i.e. the macro command `\listoffigures` comes before `\listoftables` in the frontmatter.

- Table captions must be *above* the corresponding table, In case of the table environment, this can be achieved by putting `\caption` before you include the table (e.g. in a tabular environment).
- Figure captions should be *below* the corresponding figure. In the figure environment, the `\caption` goes after the `\includegraphics` macro command.
- The bibliography is the last section/chapter of the thesis—unless you are using the *chapter-wise* bibliography.

5.1 Tips and Suggestions

- It is *strongly* recommended that you compile your document with pdfLaTeX. Compiling to dvi or postscript first may result in "fuzzy" fonts when viewing the document on your screen. Additionally, the benefits of `hyperref` and `pdflscape` are only available if you compile using pdfLaTeX.
- Use the `\toprule`, `\midrule` and `\bottomrule` macro commands (from the booktabs package) in tables for generating the appropriate horizontal rules. Refrain from using vertical rules to separate columns in tables as much as possible.
- Use the longtable environment for handling very long tabular materials. Example:

```
\begin{longtable}{lc}
\caption[]{LONG TABLE CAPTION \label{tab:longtable} }
\toprule
Heading 1 & Heading 2 \\
\midrule
\endfirsthead
\caption[]{ } \\ % doesn't matter what text is in the continued caption.
\midrule
Heading 1 & Heading 2 \\
\midrule
\endhead
\endfoot
\bottomrule
\endlastfoot
% Now the tabular material %
Long & Table etc. \\
\end{longtable}
```

- If a figure or table is very wide and will not fit on a page, use the landscape environment (from the included lscape package) to format them in *landscape* mode. They will automatically appear on a separate page. If you use pdfLaTeX to compile your document, then the included pdflscape package will flip this page on the screen for easier reading.

- The sidewaystable environment (from the included rotating package) is incompatible with the current class and should be avoided.
- Usually the width of the figure and table captions is 90% of the textwidth (i.e. `0.9\textwidth`). If needed, the width can be changed on a case-by-case basis by doing one of the following:
  - Use a minipage environment of appropriate width and enclose your tabular or figure float inside it, or
  - set the `\capwidth` inside the table or the figure environment, and `\LTcapwidth` *outside* the longtable environment, e.g.,

```
\begin{table}[H]
\setlength{\capwidth}{0.8\textwidth}
\centering
\caption{TABLE CAP\label{tab:this}}
\begin{tabular}{lc}
...
\end{tabular}
\end{table}
```

```
\setlength{\LTcapwidth}{6in}
\begin{longtable}{lccc}
...
\end{\longtable}
```

- Use the tabularx environment for the actual formatting of the tables (within the table environment). It differs slightly from tabular environment and you should refer to their documentation in the `TEXMF` tree for more information.
- If you've used a longtable environment in your document, it might be necessary to compile the document multiple times so as to get proper alignment of columns. This is documented in the longtable manual.
- If you wish to use `\footnotes` in the longtable environment, please read its documentation. There are some handicaps present.
- To cite a website in your bibliography[3], use the following format in your `.bib` file:

```
@Misc{fairley2000,
author =       "N. Fairley",
title =        "Casa{XPS} {VAMAS} processing software",
howpublished = "Website",
note =         "\url{http://www.casaxps.com}",
}
```

When processed with the `nddiss2e.bst` citation style file this gives:
111. N. Fairley. CasaXPS VAMAS processing software. Website. `http://www.casaxps.com`.

[3]More info at `http://www.tex.ac.uk/cgi-bin/texfaq2html?label=citeURL`

5.2 You Found Errors?

Errors in a LaTeX document are to be expected. If you have a problem that is that seems to be more than a typo or unbalanced brace, it is possible that there is a conflict between the packages you have included and those that NDdiss2$_\varepsilon$ uses. If you find yourself in that situtation, there is a mailing list for handling support issues with NDdiss2$_\varepsilon$. Look through the archive, and if there are no answers, please send an email to `ND-LATEX-USERS@listserv.nd.edu` (registration required). The more effort you spend in isolating the problem or in troubleshooting will make it more likely that others can reproduce the problem and help you solve it. Also if you have a problem that you then solve, please also email the list. Your doing so will help the next person to have that problem, and will also make the maintainers aware of it, so future versions of the class file can be better.

6 Other Packages Used

A number of packages are required by default and must be present in your TeX search path (if you use a package manager such as MiKTeX or TeXLive, it will take care of this for you). As far as possible, these have been tested for proper formatting style with the NDdiss2$_\varepsilon$ class file. The list includes ifthen, exscale, ifpdf, ifluatex, ifxetex, xspace, longtable, indentfirst, tabularx, showkeys, enumerate, latexsym. epsfig, color, graphicx, url, setspace[4], amsmath, float, lscape, rotating, booktabs, and natbib[5]. Sameer urges you to read the documentation of these packages available in the `TEXMF` tree, if you think you might use their features or want to tweak some advanced options. Of these packages, ifpdf, longtable, natbib, booktabs, rotating, url, and setspace are not part of the LaTeX required distribution, so you may need to download them. They are all available through both MiKTeX and TeXLive; note that ifpdf is part of the oberdiek bundle, which is what you need to download to get that package if it is not already installed on your system.

Other packages may or may not be appropriate for use with the NDdiss2$_\varepsilon$ class when producing copies to be submitted to the Graduate School. Please be careful when using packages that change the default fonts, or the page layout.

In general, the official guidelines of the Graduate School are followed to the maximum extent possible. This includes proper formatting of the title page and the abstract page (from the ndthesis package), numbering of the pages in the *frontmatter*, generation of properly formatted table of contents, list of figures etc., as well as bibliography at the end. Per the guide, the number of different fonts and font sizes used is kept to a minimum. The contents, all lists and the bibliography are single-spaced but the inter-line spacing for the rest of the document is double.

[4] v6.7[2000/12/01] or above
[5] v8.31[2009/07/16] or above

6.1 Generating PDF document

The NDdiss2$_\varepsilon$ class also allows production of pdf documents with pdfLaTeX . As of Spring 2013, this is the preferred method of compilation. In this case, the hyperref and pdflscape packages are also required. The hyperref package ensures that the generated pdf document contains internal as well as external links for citations and bookmarks. A document produced by this method also contains embedded fonts (*press quality* pdf) and is suitable for electronic submission to the library and for microfilm archiving. Although the most appropriate options for hyperref are passed on, for advanced features refer to its documentation. The pdflscape package flips pages with landscape orientation in the pdf file for easier reading, but the location of the page numbers does not change.

Figures must be in pdf, jpeg, png, or gif format, and not in encapsualted postscript (eps). An easy way to convert *eps* files to *pdf* files is to use the utility `epstopdf` or `eps2pdf`, which should be available on your unix-like distribution already (should you have one). It is also possible to convert your eps files to pdfs using an online conversion tool. Searching for "eps to pdf" brought up several free options in Fall 2012.

7 The Implementation

Following is our attempt at documenting the source of the NDdiss2$_\varepsilon$ class file for the TEX hackers.

At the start, we define the base version of LATEX 2$_\varepsilon$ needed and the label information for the NDdiss2$_\varepsilon$ class.

```
\NeedsTeXFormat{LaTeX2e}[1999/12/01]
\ProvidesClass{nddiss2e}
    [2016/10/16 v3.2016%
     Notre Dame Dissertation document class]
%
```

`\dissfileversion` `\dissfiledate`

The `\dissfileversion` and `\dissfiledate` macros contain the version and the date of the release.

```
\providecommand{\dissfileversion}{3.2017.1}
\providecommand{\dissfiledate}{2017/05/09}
%
```

New boolean variables for the options used in NDdiss2$_\varepsilon$ class are set here with default values.

```
\newif\ifdiss@draft             \diss@drafttrue
\newif\ifdiss@review            \diss@reviewfalse
\newif\ifdiss@final             \diss@finalfalse
\newif\ifinfo@page              \info@pagetrue
\newif\ifadvisors@two           \advisors@twofalse
\newif\ifdiss@dedication        \diss@dedicationfalse
\newif\ifnum@refs               \num@refstrue
\newif\ifcentered@chaptitle     \centered@chaptitletrue
\newif\if@ltfirstcaption
%
```

`draft` `review` `final`

Exactly one of these options must be present in order to get a proper document. These options set appropriate boolean variables (flags) and pass some common options to the parent book class.

```
\DeclareOption{draft}{
    \setlength\overfullrule{5pt}
    \typeout{DRAFT MODE}\typeout{}\info@pagefalse%
    \diss@drafttrue\diss@reviewfalse\diss@finalfalse
    \PassOptionsToClass{letterpaper,oneside,draft}{book} }
%
\DeclareOption{review}{
    \typeout{REVIEW MODE}\typeout{}\info@pagetrue%
    \diss@draftfalse\diss@reviewtrue\diss@finalfalse
    \PassOptionsToClass{12pt,letterpaper,oneside,final}{book} }
%
\DeclareOption{final}{
    \setlength\overfullrule{0pt}
```

```
    \typeout{FINAL MODE}\typeout{}\info@pagetrue%
    \diss@draftfalse\diss@reviewfalse\diss@finaltrue
    \PassOptionsToClass{12pt,letterpaper,oneside,final}{book} }
%
```

numrefs
textrefs

The options `numrefs` or `textrefs` select the appropriate citation style i.e. "numbered" or "textual", respectively. By choosing `textrefs`, one can get "author-date" style of citation in the text. The default is `numrefs`.

```
\DeclareOption{numrefs}{
  \typeout{NUMBERED REFERENCES}\num@refstrue}
\DeclareOption{textrefs}{
  \typeout{TEXTUAL REFERENCES}\num@refsfalse}
```

The option `nocenter` allows non-centered chapter titles.

```
\DeclareOption{nocenter}{\centered@chaptitlefalse}
%
```

The `openbib` option is useful in creating indented bibliography. Usually you would not need to use this option since the default layout of the `bibliography` is very much acceptable.

```
\DeclareOption{openbib}{%
   \PassOptionsToPackage{openbib}{natbib}
}
%
```

The `sort` option is passed to natbib, and causes multiple citations to be listed in the sequence they appear in the bibliography.

```
\DeclareOption{sort}{%
    \PassOptionsToPackage{sort}{natbib}
}
%
```

The `compress` option is passed to natbib, and causes numerical citations to be compressed so that, e.g. 1,2,3 becomes 1-3. Does not also sort.

```
\DeclareOption{compress}{%
    \PassOptionsToPackage{compress}{natbib}
}
%
```

The `sort&compress` option sorts numerical citations, and then compresses them.

```
\DeclareOption{sort&compress}{%
    \PassOptionsToPackage{sort&compress}{natbib}
}
%
```

The other options are declared in the following lines.

twoadvisors

The `twoadvisors` option sets the flag for modifying the layout of the title page.

```
\DeclareOption{twoadvisors}{\typeout{TWO ADVISORS}\typeout{}%
    \advisors@twotrue}
%
```

10pt
11pt
12pt

The options `10pt`, `11pt` or `12pt` are passed on to the book class if appropriate, depending on whether the `\diss@draft` flag is set true.

```
\DeclareOption{10pt}{%
 \ifdiss@draft%
  \PassOptionsToClass{10pt}{book}%
 \else%
  \OptionNotUsed%
  \ClassWarningNoLine{nddiss2e}%
    {Font size 10pt not allowed; using 12pt}%
 \fi%
}
\DeclareOption{11pt}{%
 \ifdiss@draft%
  \PassOptionsToClass{11pt}{book}%
 \else%
  \OptionNotUsed%
  \ClassWarningNoLine{nddiss2e}%
    {Font size 11pt not allowed; using 12pt}%
 \fi
}
\DeclareOption{12pt}{%
   \PassOptionsToClass{12pt}{book}%
}
%

\DeclareOption{noinfo}{\info@pagefalse}
%
```

The `twoside` option is for when you want to prepare a two-sided document for your own use. The only difference from the one-sided document is in the page layout. This option is passed on to the parent book class.

```
\DeclareOption{twoside}{\typeout{TWO SIDED DOCUMENT}%
  \PassOptionsToClass{twoside}{book} }%
%
```

All options other than those defined above are ignored and a warning is printed on the screen during compile-time. After processing all the options, the book class is loaded with the specified options.

```
\DeclareOption*{\ClassWarning{nddiss2e}%
    {UnknownOption `\CurrentOption'} }%
\ProcessOptions\relax
\LoadClass{book}
%
```

At this stage, the packages ifthen, exscale, etoolbox ifpdf, ifluatex, ifxetex, longtable, xspace, indentfirst, tabularx, enumerate and latexsym are loaded. It is important to load these in a specific order so as not to cause conflicts in definitions of certain macros.

```
\RequirePackage{ifthen,exscale,etoolbox}
\RequirePackage{ifpdf,ifluatex,ifxetex}
\ifboolexpr{bool{pdf} or bool{xetex} or bool{luatex}}{}{%
  \ClassError{nddiss2e}{%
```

```
      PDF Output is required to support the PDF/A format.
  }{DVI output is not supported. Use pdflatex to generate the dissertation.}
}
\RequirePackage[a-2b]{pdfx}
\RequirePackage{longtable}
\RequirePackage{threeparttable}
\RequirePackage[flushleft]{threeparttablex}
\RequirePackage{xspace}
\RequirePackage{indentfirst}
\RequirePackage{tabularx}
\RequirePackage{enumerate}
\RequirePackage{latexsym}
\RequirePackage{textcase}
%
```

If the `\diss@final` is set false (when using `draft` or `review` option) then the showkeys package is also loaded.

```
% \ifdiss@final\relax\else\RequirePackage{showkeys}\fi
%
```

Depending in whether you are using pdfLaTeX or plain LaTeX , epsfig, color and graphicx are loaded with respective options.

```
\ifboolexpr{bool{pdf} or bool{xetex} or bool{luatex}}{%
  \RequirePackage{epsfig}
  \RequirePackage{color}
  \RequirePackage{graphicx}
  \AtBeginDocument{
  \pdfadjustspacing=1
  }
}{%
  \RequirePackage[dvips]{epsfig}
  \RequirePackage[dvips]{color}
  \RequirePackage[dvips]{graphicx}
}
%
```

Now the natbib package is loaded with its options, appropriate to `numrefs` or `textrefs` class option. If `numrefs` is specified, then natbib is read-in with its options for "numbered" references and sorted & compressed (eg. `[3-6,8-10]`). In this case, the default delimiter is square brackets and the default seperator is a comma. For the `textrefs` option, the natbib package is read-in so as to sort the references in an "author-date" style of citations. The default delimiter and seperator, in this case, are round brackets and colon, respectively.

```
\ifnum@refs
  \RequirePackage[numbers]{natbib}
\else
  \RequirePackage[authoryear]{natbib}
\fi
```

Additionally, the packages amsmath, float, booktabs, rotating, url and setspace are loaded when (pdf)LaTeX processes `\begin{document}`. Again, the order of these packages is important. Additionaly when using pdfLaTeX , the package hyperref (for internal/external

links in the document) is also loaded. The options for this package have been tested to produce a document which can be printed on laser printers without any problems because of colored link boxes. Megan added required package pdflscape, which is part of the oberdiek bundle in MiKTeX and TeXLive. Using this package will flip landscape pages on the screen so that it's easier to read.

```
\AtBeginDocument{
\RequirePackage{amsmath}
\RequirePackage{float}
\RequirePackage{booktabs}
\RequirePackage{rotating}
\RequirePackage{url}
\RequirePackage[doublespacing]{setspace}[2000/12/01]
\ifboolexpr{bool{pdf} or bool{xetex} or bool{luatex}}{%
  \ifluatex
    \RequirePackage[luatex]{pdflscape}
  \else
    \ifxetex
      \RequirePackage[xetex]{pdflscape}
    \else
      \ifpdf
        \RequirePackage{pdflscape}
      \fi
    \fi
  \fi
  % cannot use RequirePackage since pdfx also includes hyperref
  \hypersetup{
            plainpages=false,
            pdfpagelabels,
            bookmarks=true,%
            bookmarksnumbered=true,%
            linktocpage=true,%
            breaklinks=true,%
            bookmarkstype=toc,%
            colorlinks=false,%
            pdfpagemode=UseOutlines}
}{}
}
\RequirePackage{metalogo}
%
```

Set the `\pagestyle` for the document to `plain` here and define default spacing.

```
\AtBeginDocument{
\pagestyle{plain}
\normalspacing
\typeout{Pagestyle and spacing normal}
}
%
```

Here, define some spacing macros for page layout and doublespacing.

```
\newcommand{\normalspacing}{\doublespacing}
\newcommand\single@baselinestretch{0.979}
```

```
\newcommand\double@baselinestretch{1.625}
\newlength{\usedtextsize}
\setlength{\usedtextsize}{\f@size pt}
\newlength{\single@skip}
\setlength{\single@skip}{\single@baselinestretch \usedtextsize}
\newlength{\double@skip}
\setlength{\double@skip}{\double@baselinestretch \usedtextsize}
\setlength{\footnotesep}{\double@skip}
%
```

Define new lengths for some variables for a proper layout of normal pages, pages with text and figures and pages with only floats. Note that although the geometry package is usually easier, when Megan tried to switch to that she discovered that something ends up overwriting it and, although the the showframe option showed that the margins were setting correctly, the text didn't look like they were. So these length values are set to what geometry said they should be to get a 1.5 in left margin and 1 in margins on all other sides (we'll use vspace commands later to get the 2 in top margin on pages where that's needed).

```
\setlength{\hoffset}{0pt}
\setlength{\voffset}{0pt}
\setlength{\topmargin}{-32pt}
\setlength{\headsep}{20pt}
\setlength{\marginparwidth}{47pt}
\setlength{\marginparsep}{7pt}
\setlength{\textheight}{648pt}
\setlength{\textwidth}{432pt}
\setlength{\oddsidemargin}{36pt}
\setlength{\evensidemargin}{36pt}
\setlength{\footskip}{30pt}
%
\setlength{\floatsep}{30pt}
\setlength{\intextsep}{50pt}
%
```

```
\newcommand{\clearemptydoublepage}{\newpage{\pagestyle{empty}%
    \cleardoublepage}}
%
```

`\nddiss` Define the macro `\nddiss` that is the logo used in the titlepage and the stamp in the dissertation document.

```
\DeclareRobustCommand{\nddiss}{%
        \textsf{{\scshape nd}diss}\kern-0.03em%
        2$_\mathsf{\textstyle\varepsilon}$}
%
```

`\work` `\degaward` `\advisor` `\secondadvisor` `\department` `\degdate` Here define new macros for use in the dissertation title page.

```
\renewcommand{\title}[1]{\def\@title{#1}}
\newcommand{\work}[1]{\def\@work{#1}}
\newcommand{\degaward}[1]{\def\@degaward{#1}}
\newcommand{\advisor}[1]{\def\@advisor{#1}}
\ifadvisors@two
```

```
    \newcommand{\secondadvisor}[1]{\def\@secondadvisor{#1}}
\fi
\newcommand{\department}[1]{\def\@department{#1}}
\newcommand{\degdate}[1]{\def\@degdate{#1}}
  \degdate{\ifcase\month\or
    January\or February\or March\or April\or May\or June\or
    July\or August\or September\or October\or November\or December\fi
    \space\number\year}
%
```

As a default, these macros have an empty arguement. Only the `\degdate` macro takes on the current month-year combination in the absence of any assignation.

```
% Defaults are empty except the \degdate
  \title{}
  \author{}
  \work{}
  \degaward{}
  \advisor{}
  \ifadvisors@two \secondadvisor{} \fi
  \department{}
%
```

`\@infopage` Define `\@infopage` macro that will create a page which contains important information about the document and the version of NDdiss2$_\varepsilon$ used etc. for the end-user and the proofreader along with a standard disclaimer and details of where to find documentation for the NDdiss2$_\varepsilon$ class file. This information can be suppressed by specifying the "`noinfo`" option while invoking the NDdiss2$_\varepsilon$ class.

```
\DeclareRobustCommand{\@infopage}{
  \thispagestyle{empty}
  \null\vspace*{\single@skip}
  \begin{center}
    This \@work\space \\ entitled \\ \MakeTextUppercase{\@title} \\
        typeset with \nddiss\ v%
      \dissfileversion\ (\dissfiledate) %
      on \today\space for\\
  \@author\\
  \end{center}

   \normalfont\normalsize\singlespacing

   \noindent This \LaTeXe\space classfile conforms to the
   University of Notre Dame style guidelines as of Fall
   2012. However it is still possible to generate a
   non-conformant document if the instructions in the class
   file documentation are not followed!

   \begin{center}
   \begin{minipage}{0.75\textwidth}
   \noindent Be sure to refer to the published Graduate
   School guidelines at \url{http://graduateschool.nd.edu}
```

```
  as well. Those guidelines override everything mentioned
  about formatting in the documentation for
  this \nddiss\space class file.
  \end{minipage}
  \end{center}

 \noindent\itshape This page can be disabled by
 specifying the ``{\upshape\ttfamily noinfo}'' option to the class invocation.
 \upshape
(i.e.,{\ttfamily{\textbackslash}documentclass[\ldots,noinfo]\{nddiss2e\}}
)
 \begin{center}
   {\bfseries\large\singlespacing This page is \slshape NOT
   \upshape part of the dissertation/thesis. It should be disabled before
  making final, formal submission, but should be included in the version
  submitted for format check.}
 \end{center}
   \normalsize\normalfont
   \nddiss\ documentation can be found at these locations:
 \begin{center}
   \url{http://graduateschool.nd.edu} \\
   \url{https://ctan.org/pkg/nddiss}
 \end{center}

\vfill
\normalfont\normalsize\normalspacing\eject}
%
```

\maketitle Redefine the macro \maketitle to produce the information page as well as the actual title page of the dissertation.

```
\renewcommand{\maketitle}{
  \ifinfo@page\@infopage\else\relax\fi%
  \clearemptydoublepage
  \normalfont\normalsize\normalspacing
```

titlepage The structuring begins with checking the proper macros for obtaining correct formatting for the title page. If any of those are not defined, an error is issued and processing stopped. Most of the code for this was taken from the earlier ndthesis class and hence, the documentation is also picked from there.

```
  \begin{titlepage}%
\ifthenelse{\equal{\@work}{}}{\ClassError{nddiss2e}%
  {The \protect\work\space macro is undefined.\MessageBreak
        The title page may be incorrectly formatted.}%
  {Specify \protect\work\space as Dissertation or Thesis}}{\relax}
\ifthenelse{\equal{\@degaward}{}}{\ClassError{nddiss2e}%
  {The \protect\degaward\space macro is undefined.\MessageBreak
        The title page may be incorrectly formatted.}%
  {Specify \protect\degaward\space. It defines the awarded degree%
         (Ph.D., M.S., etc.)}}{\relax}
\ifthenelse{\equal{\@advisor}{}}{\ClassError{nddiss2e}%
```

```
  {The \protect\advisor\space macro is undefined.\MessageBreak
        The title page may be incorrectly formatted.}%
  {Spepcify \protect\advisor\space It is who signs your walking papers!}}{\relax}
\ifthenelse{\equal{\@department}{}}{\ClassError{nddiss2e}%
  {The \protect\department\space macro is undefined.\MessageBreak
        The title page may be incorrectly formatted.}%
  {Specify which \protect\department\space is awarding your degree?}}{\relax}
\ifadvisors@two
  \ifthenelse{\equal{\@secondadvisor}{}}{\ClassError{nddiss2e}%
  {The \protect\secondadvisor\space macro is undefined.\MessageBreak
            The title page may be incorrectly formatted.}%
  {Use \protect\secondadvisor\space for your second advisor}}{\relax}
\fi
%
```

Now set up some skip registers to hold the inter-data spacing. The initial values will create a two-inch top margin for the title page, provided the title is only one line long. `\skip1` is the primary internal spacing command; `\skip2` is the spacing between the student's name and the line for the first adviser to sign if there are two advisers and `\skip3` is the spacing between the student's name and the line for the adviser to sign if there is only one adviser; `\skip4` controls the top margin. We'll account for titles longer than one line in a bit ...

```
\skip1=2.1\double@skip
\skip2=1.7\double@skip
\skip3=2.7\double@skip
\skip4=36pt
%
```

If the author has two advisors, we need to do a little tweaking to the internal spacing.

```
\ifadvisors@two
  \skip1=1.6\double@skip
\else\relax
\fi
```

The 2012 formatting guidelines require the title to be 2" from the top of page. If it's more than one line long, we need to adjust the internal spacing:

```
\setbox0=\vbox{\MakeTextUppercase{\@title}}
\ifdim \ht0 > 3\double@skip
  \advance \skip1 -.75\double@skip
\else
  \ifdim \ht0 > 2\double@skip
    \advance\skip1 -.5\double@skip
  \else
    \ifdim \ht0 > \double@skip
      \advance\skip1 -.25\double@skip
    \fi
  \fi
\fi
```

Our default assumes a one-line degree field such as

Doctor of Philosophy

but we check to see if it is two or three lines long. If so, we need to remove those extra lines from the internal spacing.

```
\setbox1=\vbox{\@degaward}
\ifdim \ht1 > 2\double@skip
  \advance\skip1 -.5\double@skip
\else
  \ifdim \ht1 > \double@skip
    \advance \skip1 -.25\double@skip
  \else
    \relax
  \fi
\fi
```

If we have two advisers, a three or four line title, and a three line degree field or two advisers, a four line title, and a two line degree field, then we need to remove some spacing between the name and the first adviser and from the top margin, and give that space to the internal spacing.

```
  \ifadvisors@two
    \ifdim \ht0 > 3\double@skip
      \ifdim \ht1 > \double@skip
        \advance \skip4 -.675\double@skip
        \advance \skip2 -.4\double@skip
        \advance \skip1 .25\double@skip
      \else \relax
      \fi
    \else
      \ifdim \ht0 > 2\double@skip
        \ifdim \ht1 > 2\double@skip
          \advance \skip2 -.4\double@skip
          \advance \skip1 .1\double@skip
        \else \relax
        \fi
      \else \relax
      \fi
    \fi
  \else \relax
  \fi
```

Finally we start putting the text in place . . . centered, of course.

```
  \null\vspace*{\skip4}
  \begin{center}%
    \MakeTextUppercase{\@title} \par%
    \vskip\skip1%
%
```

Now skip the required vertical space, declare that this is for the University of Notre Dame, and list what degree has been earned.

```
    A \@work \par%
    \vskip\skip1%
      Submitted to the Graduate School \\
          of the University of Notre Dame \\
```

```
          in Partial Fulfillment of the Requirements \\
          for the Degree of \par
        \vskip\skip1%
        \@degaward%
        \vskip\skip1%
        by \\%
%
```

Now format the author's name.

```
    \@author
%
```

Now skip the proper space and place the signature line for the advisor with his/her name typeset below it. This is accomplished by essentially centering a box that is twice as long as the required length of the signature line and placing the line in only the right-hand side.

```
    \ifadvisors@two
       \vskip\skip2
       \hspace*{2.75in}\underline{\hspace{2.75in}}\\%
       \hspace*{2.75in}\@advisor, Co-Director\\
    \else
       \vskip\skip3
       \hspace*{2.75in}\underline{\hspace{2.75in}}\\%
       \hspace*{2.75in}\@advisor, Director\\
    \fi%
%
```

If there is a second advisor, place that line here now.

```
\ifadvisors@two %
     \vskip\double@skip%
       \hspace*{2.75in}\underline{\hspace{2.75in}}\\%
       \hspace*{2.75in}\@secondadvisor, Co-Director\\
\fi
%
```

We end with the department and date; the internal spacing is chosen so that these are at the page bottom.

```
  \vskip\skip1%
  Graduate Program in \@department \\%
  Notre Dame, Indiana \\
  \@degdate
  \end{center}
  \end{titlepage}%
}
%
```

`copyrightpage` The environment `copyrightpage` defines the defaults for proper formatting the copyright page (if opted).

```
\newenvironment{copyrightpage}{%
  \clearemptydoublepage
  \typeout{Copyright page}
  \pagestyle{empty}
```

```
  \null\vfil
  \begin{center}\normalspacing}%
{ \end{center}\vfil\null \clearpage }
%
```

`\copyrightholder` `\copyrightyear` Define a few macros for defining the copyright holder and the year desired. By default, they are taken as the current year and the `author` of the dissertation.

```
\newcommand{\@copyrightyear}{\the\year}
\newcommand{\@copyrightholder}{\@author}
\newcommand{\@copyrightlicense}{All Rights Reserved}
\newcommand{\copyrightyear}[1]{\renewcommand{\@copyrightyear}{#1}}
\newcommand{\copyrightholder}[1]{\renewcommand{\@copyrightholder}{#1}}
\newcommand{\copyrightlicense}[1]{\renewcommand{\@copyrightlicense}{#1}}
%
```

`\makecopyright` Finally, the `\makecopyright` macro creates the copyright page as per defined in the `copyrightpage` environment.

```
\newcommand{\makecopyright}{%
  \ifdiss@final
    \begin{copyrightpage}
    \normalfont\normalsize
    \copyright\space Copyright by \\
    \@copyrightholder \\
    \@copyrightyear\\
    \@copyrightlicense \\[10mm]
    \end{copyrightpage}
  \fi
}%
%
```

`\makepublicdomain` Or, if chosen, `\makepublicdomain` macro creates a copyright page (using earlier `copyrightpage` environment) that puts the document in public domain.

```
\newcommand{\makepublicdomain}{%
  \ifdiss@final
    \begin{copyrightpage}
       This document is in the public domain.
    \end{copyrightpage}
  \fi
}%
%
```

Define some new name macros and redefine other name macros as below. These are the names of the respective sections in your dissertation document. If there's a need to change any name, you must use a similar command in the preamble of your document.

```
\providecommand{\abstractname}{Abstract}
\providecommand{\dedicationname}{\mbox{}}
\providecommand{\prefacename}{Preface}
\providecommand{\acknowledgename}{Acknowledgments}
\providecommand{\symbolsname}{Symbols}
\renewcommand{\tablename}{Table}
```

```
\renewcommand{\figurename}{Figure}
\renewcommand{\partname}{Part}
\renewcommand{\chaptername}{Chapter}
\renewcommand{\appendixname}{Appendix}
\renewcommand{\contentsname}{Contents}
\renewcommand{\listfigurename}{Figures}
\renewcommand{\listtablename}{Tables}
\renewcommand{\bibname}{Bibliography}
\renewcommand{\indexname}{Index}
%
```

`abstract` This environment is adapted from the report class since the book class does not have one. Additionally, we add a `\pdfbookmark` for the abstract in the pdf document.

```
\newenvironment{abstract}{%
  \ifboolexpr{bool{pdf} or bool{xetex} or bool{luatex}}{%
     \pdfbookmark[0]{\abstractname}{abstract}%abstract.0
  }{}
  \typeout{Abstract page(s)}
  \renewcommand{\@oddfoot}{\@empty}
  \renewcommand{\@evenfoot}{\@empty}
```

If the abstract extends to a second page, place the author's name in top right corner of that page. Make sure it's upright, as required by the University and that this appears at $0.75''$ from the top.

```
  \let\@evenhead\@oddhead
  \renewcommand{\@oddhead}{\hfil{\upshape\@author}}
  \titlepage
  \null
  \begin{center}
  \vspace*{36pt}
  {\normalsize\mdseries \normalspacing
     \MakeTextUppercase{\@title} \\[3.5ex]
     \normalsize\abstractname \\ by \\ \@author\space}%
   \@endparpenalty \@M
   \end{center}\par}%
{\par\vfil\null\endtitlepage}
%
```

`dedication` The dedication environment is similar to the abstract environment. This page is numbered 2 and the subsequent pages are numbered accordingly. A pdfbookmark is not created because of a reported issue that Adobe products have with pdfbookmarks containing an `\mbox`.

```
\newenvironment{dedication}{%
  \global\diss@dedicationtrue
  \typeout{Dedication page}
  \chapter*{\dedicationname}%
  \thispagestyle{plain}
  \setcounter{page}{2}
  \null\centering}
{\par\null\clearpage}%
%
```

\tableofcontents The \tableofcontents macro is redefined to begin at page 2 if the dedication environment does not exist. It is single-spaced.

```
\renewcommand\tableofcontents{%
  \ifdiss@dedication\relax\else\setcounter{page}{2}\fi
  \chapter*{\contentsname}%
  \ifboolexpr{bool{pdf} or bool{xetex} or bool{luatex}}{%
      \pdfbookmark[0]{\contentsname}{contents}%contents.0
  }{}
  \singlespacing
  \@starttoc{toc}%
  \normalspacing
  }
%
```

\listoffigures \listoftables These macros are modified to add the \listfigurename and \listoftables to the Table of Contents. Both of these are also single spaced. The inter-entry spacing is changed by adding a \vskip after each entry. This is done in the figure and table environments later.

```
\renewcommand\listoffigures{%
    \chapter*{\listfigurename}%
    \addcontentsline{toc}{chapter}{\listfigurename}%
    \typeout{List of figures - \listfigurename}
    \singlespacing
    \@starttoc{lof}%
    \normalspacing
}
%
\renewcommand\listoftables{%
    \chapter*{\listtablename}%
    \addcontentsline{toc}{chapter}{\listtablename}%
    \typeout{List of tables - \listtablename}
    \singlespacing
    \@starttoc{lot}%
    \normalspacing
}
%
```

preface acknowledgement These environments are similar to the dedication environment. They are defined as \chapter*{} so they are not numbered and not added to Table of Contents and so, add that manually by using \addcontentsline.

```
\newenvironment{preface}{%
  \typeout{Preface page}
  \chapter*{\prefacename}
  \addcontentsline{toc}{chapter}{\prefacename}%
}%
{\par\null\clearpage}%
%
\newenvironment{acknowledge}{%
  \typeout{Acknowledgment page}
  \chapter*{\acknowledgename}
```

```
  \addcontentsline{toc}{chapter}{\acknowledgename}%
}%
{\par\null\clearpage}%
%
```

`\unnumchapter` Allows the user to create unnumbered chapters that appear in the TOC.

```
\newcommand\unnumchapter[1]{%
  \chapter*{#1}%
  \addcontentsline{toc}{chapter}{#1}}
```

`symbols` `\sym` Define symbols environment which lays out it as a `\chapter*` and adds `\symbolsname` to the TOC. The environment is actually a horizontally centered longtable environment. To aid entry of a *symbol* and its definition, `\sym` macro command is also defined.

```
\newcommand{\sym}[2]{\ensuremath{#1} & #2 \\}
\newenvironment{symbols}[1][rl]{%
  \typeout{Symbols page}
  \chapter*{\symbolsname}%
  \addcontentsline{toc}{chapter}{\symbolsname}%
  \begin{center}\begin{longtable}{#1}}%
{\end{longtable}\end{center}\par\null}
%
```

Modify chapter definition in `\@chapter` to put the word "Chapter" (`\@chapapp`) in the Table of Contents. That is, now the TOC will contain "Chapter 1: First chapter" rather than "1. First chapter." The rest of the format code is essentially the same as that in the book class.

```
\def\@chapter[#1]#2{
  \ifnum \c@secnumdepth >\m@ne
  \if@mainmatter
    \refstepcounter{chapter}%
    \typeout{\MakeTextUppercase{\@chapapp\space\thechapter.}}%
    \addcontentsline{toc}{chapter}%
      {{\@chapapp\ \thechapter: #1}}%
    \else
      \addcontentsline{toc}{chapter}{#1}%
    \fi
  \else
     \addcontentsline{toc}{chapter}{#1}%
  \fi
  \chaptermark{#1}%
  \addtocontents{lof}{\protect\addvspace{10\p@}}%
  \addtocontents{lot}{\protect\addvspace{10\p@}}%
  \@makechapterhead{\MakeTextUppercase{#2}}%
  \@afterheading }%
%
```

Modify part definition in `\@part` and `\@spart` to keep the font size for part headings `\normalsize` and `\mdseries`. It is otherwise the same as in the book class.

```
\def\@part[#1]#2{%
  \ifnum \c@secnumdepth >-2\relax
```

```
    \refstepcounter{part}%
    \addcontentsline{toc}{part}{\thepart\hspace{1em}#1}%
  \else
    \addcontentsline{toc}{part}{#1}%
  \fi
  \markboth{}{}%
  {\centering
   \interlinepenalty \@M
   \normalfont
   \ifnum \c@secnumdepth >-2\relax
     \normalsize\mdseries \partname\nobreakspace\thepart
     \par
     \vskip 20\p@
   \fi
  \normalsize\mdseries \MakeTextUppercase{#2}\par}%
  \@endpart}
\def\@spart#1{%
    {\centering
     \interlinepenalty \@M
     \normalfont
     \normalsize\mdseries #1\par}%
    \@endpart}
%
```

Now format section headings to conform to the official guidelines.

`\@makechapterhead` First, modify the chapter heading label to be normalsize'd and centered. Instead of the bold-faced heading label, also make it `\mdseries`. If we are in the `\mainmatter`, we add "CHAPTER" and chapter number before actually putting the chapter name otherwise only the "chapter name" is put. Note that chapter/section headings must all be double-spaced.

```
\renewcommand{\@makechapterhead}[1]{%
  \vspace*{30pt}%
  {\parindent \z@ \raggedright
    \ifnum \c@secnumdepth >\m@ne
      \normalfont\normalsize%
      \if@mainmatter
        \ifcentered@chaptitle\center\else\relax\fi%
        \MakeTextUppercase{\@chapapp{} \thechapter}\par\nobreak
      \fi
    \fi
    \interlinepenalty\@M
    \ifcentered@chaptitle\center\else\relax\fi%
    \mdseries{#1}\par\nobreak
    \vskip 30\p@
  }}
%
```

`\@makeschapterhead` Make the TOC, LOF, LOT and other `\chapter*` headings in normal size, and `\mdseries` by modifying the macro `\@makeschapterhead`. Although these heading labels usually fit

in a single-line, we copy the formatting for the chapter heading label (single-spacing) and make the spacing double again for the text.

```
\renewcommand{\@makeschapterhead}[1]{%
  \vspace*{30pt}%
  {\parindent \z@ \raggedright
     \normalfont\normalsize%
     \interlinepenalty\@M
     \ifcentered@chaptitle\center\else\relax\fi
     \mdseries{\MakeTextUppercase{#1}}\par\nobreak
     \vskip 30\p@
  }}
%
```

Now, set the section labels to `\mdseries` rather than bold-faced. We also make sure that these are set in normal spacing, font and size. This is done for each of `\section`, `\subsection`, `\subsubsection`, `\subsubsubsection`, `\paragraph` and `\subparagraph`.

```
\renewcommand\section{\suppressfloats[t]%
    \@startsection {section}{1}{\z@}%
    {-4.2ex \@plus -1ex \@minus -.2ex}%
    {1.8ex \@plus.2ex}%
    {\normalfont\normalsize\mdseries} }
\renewcommand\subsection{\suppressfloats[t]%
    \@startsection{subsection}{2}{\z@}%
    {-3.9ex\@plus -1ex \@minus -.2ex}%
    {1.2ex \@plus .2ex}%
    {\normalfont\normalsize\mdseries} }
\renewcommand\subsubsection{\suppressfloats[t]%
    \@startsection{subsubsection}{3}{\z@}%
    {-3.9ex\@plus -1ex \@minus -.2ex}%
    {1.2ex \@plus .2ex}%
    {\normalfont\normalsize\mdseries} }
\renewcommand\paragraph{%
    \@startsection{paragraph}{4}{\z@}%
    {3.9ex \@plus1ex \@minus.2ex}%
    {-1em}%
    {\normalfont\normalsize\mdseries} }
\renewcommand\subparagraph{%
    \@startsection{subparagraph}{5}{\parindent}%
    {3.9ex \@plus1ex \@minus .2ex}%
    {-1em}%
    {\normalfont\normalsize\mdseries} }
%
```

`\l@part` Modify the macro `\l@part` that formats part titles in the contents-like files (`.toc`, `.lof` and `.lot`) by adding a `\@dottedtocline` macro. The indent width is set to 1.5em - to line up a continued line with the section number below it. We also leave less space between each part and the last section entry than the default and don't change the font.

```
\renewcommand*\l@part[2]{%
  \ifnum \c@tocdepth >-2\relax
    \addpenalty{-\@highpenalty}%
```

```
    \setlength\@tempdima{1.5em}%
    \begingroup
      {\leavevmode
       \@dottedtocline{1}{0pt}{\@tempdima}{#1}{#2}
      }\par
       \nobreak
         \global\@nobreaktrue
         \everypar{\global\@nobreakfalse\everypar{}}%
    \endgroup
  \fi}
%
```

`\l@chapter` Modify the macro `\l@chapter` that formats chapter titles in the contents-like files (`.toc`, `.lof` and `.lot`) by adding a `\@dottedtocline` macro. The indent width is set to 1.5em - to line up a continued line with the section number below it. We also leave less space between each chapter and the last section entry than the default.

```
\renewcommand*{\l@chapter}[2]{%
  \addpenalty{-\@highpenalty}%
  \setlength\@tempdima{1.5em}%
  \begingroup \leavevmode
  \@dottedtocline{1}{0pt}{\@tempdima}{#1}{#2}
  \par
  \penalty\@highpenalty
  \endgroup
}
%
```

`\thesubsubsection` We increase the number of section-depth by 1 and force subsubsection entry in the TOC by increasing the `\tocdepth`. In addition, the label number of `\subsubsection` is defined to be similar to that for `\subsection` i.e. all arabic numerals.

```
\addtocounter{secnumdepth}{1}
\addtocounter{tocdepth}{1}
\renewcommand{\thesubsubsection}{%
   \thesubsection.\arabic{subsubsection}}
%
```

`quote` Redefine the `quote` environment to be single-spaced instead of being same as the rest of the text.

```
\renewenvironment{quote}
               {\list{}{\rightmargin\leftmargin}%
                 \singlespacing
               \item\relax}
               {\endlist}
%
```

`itemize` Redefine the `itemize` environment so that each item is single-spaced, but with a line of space between each item.

```
\let\realitemize\itemize
\let\endrealitemize\enditemize
\renewenvironment{itemize}
```

```
          {\realitemize
            \singlespacing}
          {\endrealitemize
            \doublespacing}
```

itemize

`enumerate` Redefine the `enumerate` environment so that each item is single-spaced, but with a line of space between each item. Note we need the optional argument in order to be compatible with the `enumerate` package

```
\let\realenumerate\enumerate
\let\endrealenumerate\endenumerate
\renewenvironment{enumerate}[1][1.]
          {\realenumerate[#1]
            \singlespacing}
          {\endrealenumerate
            \doublespacing}
```

enumerate

`description` Redefine the `description` environment so that each item is single-spaced, but with a line of space between each item.

```
\let\realdescription\description
\let\endrealdescription\enddescription
\renewenvironment{description}
          {\realdescription
            \singlespacing}
          {\endrealdescription
            \doublespacing}
```

description Set some lengths that are used in the `table` and the `figure` environments. Note that we set the caption width (`\capwidth`) to be 90% of the `\textwidth`.

```
\setlength\abovecaptionskip{20\p@}
\newlength\capwidth
\setlength{\capwidth}{0.90\textwidth}
\newlength\abovetableskip
\newlength\belowtableskip
\newlength\abovefigureskip
\newlength\belowfigureskip
\setlength\abovetableskip\belowcaptionskip
\setlength\belowtableskip\abovecaptionskip
\setlength\abovefigureskip\abovecaptionskip
\setlength\belowfigureskip\belowcaptionskip
%
```

`figure` For the `figure` environment, first some skip lengths are set, then use `\@makefigurecaption` to format the captions instead of the default `\@makecaption`, since the layout is different for `figure` and the `table` environment. Further add a `\vskip` to each entry in `.lof` file so that the inter-caption spacing seems double-spaced.

```
\renewenvironment{figure}{%
   \setlength{\abovecaptionskip}{\abovefigureskip}
```

```
    \setlength{\belowcaptionskip}{\belowfigureskip}
    \let\@makecaption\@makefigurecaption
    \@float{figure}}%
    {%
    \addtocontents{lof}{ {\vskip 0.4em} }%
    \end@float%
}
%
```

`\@makefigurecaption` The `\@makefigurecaption` is defined to format the caption in a parbox with width equal to `\capwidth` and is formatted in single-spacing. The interline-spacing is then changed to double after the caption.

```
\long\def\@makefigurecaption#1#2{%
  \vskip\abovecaptionskip
  \begin{center}
  \parbox{\capwidth}{
    \centering\singlespacing
    {#1}. {#2}%\par
  \vskip\belowcaptionskip\normalspacing }%
  \end{center}
}%
%
```

`table` After setting the above and below skip lengths, the `table` environment is set to be single spaced. However, to obtain double-spacing between the entries, redefine the `\arraystretch` to be equivalent to the `\double@baselinestretch`. This way, while there are double-spaced entries, the entry itself is single-spaced. Similar to that in `\@makefigurecaption`, a `\vskip` is added to each entry in the `.lot` file.

```
\renewenvironment{table}[1][tbp]{%
    \setlength{\abovecaptionskip}{\abovetableskip}
    \setlength{\belowcaptionskip}{\belowtableskip}
    \renewcommand{\arraystretch}{\double@baselinestretch}
    \let\scaption\caption%
    \renewcommand*{\caption}[2][\shortcaption]{%
      \def\shortcaption{##2}%
      \scaption[\shortcaption]{\MakeTextUppercase{##2}}%
    }%
    \let\@makecaption\@maketablecaption
    \@float{table}[#1]%
    \singlespacing%
    }%
    {%
    \addtocontents{lot}{ {\vskip 0.4em} }%
    \end@float%
}
%
```

`\@maketablecaption` The `\@maketablecaption` is defined similarly to `\@makefigurecaption` to have the table label and caption in separate lines and with normal-spacing (double-spaced).

```
\long\def\@maketablecaption#1#2{
```

```
  \vskip\abovecaptionskip
  \begin{center}
    \makebox[\linewidth]{
      \parbox{\capwidth}{
      \centering\normalspacing
      \MakeTextUppercase{#1}\\[\single@skip]
      {#2}%\par
    \vskip\belowcaptionskip }%
    }%
  \end{center}
}
%
```

`\longtable` Similar to the `table` environment, the `longtable` environment is made singly-spaced but the `\arraystretch` is made equal to double the `baselinestretch`.

```
\renewcommand\longtable{%
   \singlespacing
   \renewcommand{\arraystretch}{\double@baselinestretch}
   \begingroup
   \@ltfirstcaptiontrue
   \@ifnextchar[\LT@array{\LT@array[x]}}
%
```

`\endlongtable` This bit is taken from `longtable.sty`. In order to obtain double-spacing in the list of tables, a `\vskip` of 0.4em is added to `.lot` file.

```
\renewcommand\endlongtable{%
  \crcr
  \noalign{%
    \let\LT@entry\LT@entry@chop
    \xdef\LT@save@row{\LT@save@row}}%
  \LT@echunk
  \LT@start
  \unvbox\z@
  \LT@get@widths
  \if@filesw
    {\let\LT@entry\LT@entry@write\immediate\write\@auxout{%
      \gdef\expandafter\noexpand
        \csname LT@\romannumeral\c@LT@tables\endcsname
          {\LT@save@row}}}%
  \fi
  \ifx\LT@save@row\LT@@save@row
  \else
    \LT@warn{Column \@width s have changed\MessageBreak
             in table \thetable}%
    \LT@final@warn
  \fi
  \endgraf\penalty -\LT@end@pen
  \addtocontents{lot}{ {\vskip 0.4em} }%
  \endgroup
  \global\@mparbottom\z@
```

```
  \pagegoal\vsize
  \endgraf\penalty\z@\addvspace\LTpost
  \ifvoid\footins\else\insert\footins{}\fi
}
%
```

\LT@makecaption For the `longtable` environment, the `\LTcapwidth` is set equal to `\capwidth`. In order to obtain consistent table captions, the command `\LT@makecaption` is modified in a similar manner as `\maketablecaption`.

```
\setlength{\LTcapwidth}{\capwidth}
\renewcommand\LT@makecaption[3]{%
  \LT@mcol\LT@cols c{\hbox to\z@{\hss\parbox[t]\LTcapwidth{%
  \vskip\abovetableskip%
    \centering\normalspacing
    \if@ltfirstcaption
    #1{\MakeTextUppercase{#2} }\\[\single@skip]
    \MakeTextUppercase{#3}\par
    \else%
    #1{\MakeTextUppercase{#2 (continued)} }\par
    \fi
  \global\@ltfirstcaptionfalse
  \endgraf\vskip\belowtableskip}%
  \hss}}}
%
```

\timenow This macro is used in making the `\draftheader` and `\reviewheader` below. It outputs time in `HH:MM` format.

```
\newcommand\timenow{%
  \@tempcnta=\time \divide\@tempcnta by 60 \number\@tempcnta:\multiply
  \@tempcnta by 60 \@tempcntb=\time \advance\@tempcntb by -\@tempcnta
  \ifnum\@tempcntb <10 0\number\@tempcntb\else\number\@tempcntb\fi}
%
```

\diss@header This header is used in the dissertation document when the `draft` or `review` option is used. These headers serve as a note for the date and time of the document compilation.

```
\newcommand{\diss@header}{%
    \ifdiss@review Review \else Draft \fi document [\today\/ at \timenow\/]
    }%
%
```

The header prepared above is put in the document by modifiying the *plain* and *empty* pagestyles except when the `final` option is chosen.

```
\ifdiss@final
    \renewcommand{\ps@plain}{
        \renewcommand{\@oddhead}{\@empty}
        \renewcommand{\@oddfoot}{\hfil\thepage\hfil}
        \let\@evenhead\@oddhead
        \let\@evenfoot\@oddfoot
    }%
\else
```

```
    \renewcommand{\ps@plain}{
        \renewcommand{\@oddhead}{\framebox[\textwidth]{
           \centering\footnotesize\tt\diss@header}}%
        \renewcommand{\@oddfoot}{\hfil\textrm{\thepage}\hfil}
        \let\@evenhead\@oddhead
        \let\@evenfoot\@oddfoot
    }%
    \renewcommand{\ps@empty}{
        \renewcommand{\@oddhead}{\framebox[\textwidth]{
           \centering\footnotesize\tt\diss@header}}%
        \renewcommand{\@oddfoot}{\@empty}
        \let\@evenhead\@oddhead
        \let\@evenfoot\@oddfoot
    }%
\fi
%
```

`\bibsection` By redefining `\bibsection` macro, add the `\bibname` to the table of contents and as a chapter heading for the bibliography.

```
\renewcommand{\bibsection}{
  \chapter*{\bibname}%
  \addcontentsline{toc}{chapter}{\bibname}%
}%
%
```

`\bibfont` Changed the `\bibfont` macro to obtain single-spacing within each bibliographic entry. Between different entries, it is still `\normalspacing`. In addition, when the `numrefs` option is selected, the `\@biblabel` is redefined to number the bibliographic entries as `1. xxxx` instead of the default `[1] xxxx`.

```
\renewcommand{\bibfont}{\singlespacing}
\ifnum@refs
  \renewcommand{\@biblabel}[1]{\hfill#1.\hfill}
\fi
%
```

Lastly, after the bibliography in the final document, add a framed box which contains a blurb about the typesetting program and NDdiss2ε version used for preparing the dissertation document.

```
\ifdiss@final
\AtEndDocument{
    \vfill
    \centering\singlespacing
    \framebox[0.85\textwidth]{
    \begin{minipage}{0.80\textwidth}\footnotesize%
    \centering \itshape This document was prepared \& typeset with
    \upshape
    \ifluatex
      \LuaLaTeX
    \else\ifxetex
      \XeLaTeX
```

```
    \else\ifpdf
      pdf\LaTeX
    \else
      \LaTeXe
    \fi\fi\fi
    \itshape , and
    formatted with \upshape\nddiss\xspace\itshape classfile
    (v\dissfileversion [\dissfiledate])
    \end{minipage} }
    \clearpage}
\else\relax\fi
%
% \endinput
% End of file `nddiss2e.cls'.
```

Change History