The NDdiss2$_\varepsilon$ class*

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Abstract

This NDdiss2$_\varepsilon$ class is based on the standard LaTeX 2$_\varepsilon$ book class and is an extensive rewrite of the earlier NDthesis class file, incorporating changes for LaTeX 2$_\varepsilon$ and pdfLaTeX as well as many other improvements. This class conforms with the requirements of the Graduate School guidelines as of Spring 2013 for the layout of the Ph.D. dissertations and Master's theses. In reading this documentation you will find that we assume that the reader has working knowledge of LaTeX 2$_\varepsilon$.

Contents

*Version 3.2013, dated 2013/04/16.

†Inspiration from an earlier NDThesis class by D. A. Peterson; Updated Spring 2013 by Megan Patnott.

1 Introduction

This document describes the LaTeX 2_ε document class NDdiss2_ε, suitable[1] for producing dissertations and theses according to the Spring 2013 guidelines of the Graduate School at the University of Notre Dame. The latest version of this class and related documentation should be available at `http://www.gsu.nd.edu` or at `http://graduateschool.nd.edu`.

1.1 Disclaimer

It could be thought of as suspicious if we begin with a disclaimer, but it is important for you to keep in mind that only *you* are responsible for the correct formatting of your dissertation/thesis even though use of this class simplifies that task considerably. There are certain formatting things which need to be done manually and are described later in Section 5. As such, this class and its associated documentation *must not* be assumed to be a replacement of the formatting guide from the Graduate School and this or `dteditor@nd.edu` should be consulted, in case of doubt. The Graduate School also supplies an example in their Microsoft Word materials, which is more likely to be up to date than either the LaTeX materials or the official formatting guide. As of Spring 2013, the official formatting guide is out dated.

In short, no one but you (the user) accepts any responsibility for works that do not get approved by the Graduate School. Use of the NDdiss2_ε class file implicitly states acceptance of this policy. Having said that, a document produced by using this class (as described in the following sections) has a pretty good likelihood of being accepted as it is.

1.2 Dependencies and Limitations

This classfile depends on many other packages to be present in either the `TEXMF` tree (system or local) or the LaTeX search path. This is defined by shell variable

[1] In Sameer's opinion, but with no guarantee that you or other users will agree. Sameer shall not be liable for any consequence, good or bad, of anyone's use of this software.

`$TEXINPUTS`, which is probably only helpful to you if you are a Linux user. All of the required packages are available through MiKTeX and TeXLive, and can be downloaded in the usual fashion through those programs. A list of the essential packages is mentioned in section 3.

Although Megan has tested it with LaTeX [2009/09/24], it should be backwards compatible with LaTeX [1995/12/01] and higher as well. It is not possible for us to list the version of each package used within the class file and you might get errors if the package in your `TEXMF` tree is outdated. We do note that the 2013 update makes use of an upate made to the hyperref and natbib packages in about 2010. If the version of hyperref and natbib in your `TEXMF` tree is older than this, you will get many errors. Depending on your system, it may be possible to update only this package or you may have to update everything.

The classfile is limited in the sense that it will produce an acceptable document with the packages that we have tried and included by default. 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[2] 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 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
```

2 Usage

The NDdiss2$_\varepsilon$ document class can be used only with LaTeX 2$_\varepsilon$ native mode or later, by typing `\documentclass[`⟨*options*⟩`]{nddiss2e}` at the beginning of your LaTeX source file. The available options for the use of the class are discussed in section 2.1 below. These have been limited to a small number in order to obtain documents

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

with similar formatting under LaTeX 2_ε using this class, although the NDdiss2_ε class is based on the book class, which has many other options.

2.1 Options

By default, all documents produced using this class are formatted in `letterpaper` size and `onesided`, `doublespaced` mode, as per the requirements of the Graduate School. If you wish to override these restrictions, appropriate changes to the class file would be needed. 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` call in your file.

The most important of the options is `draft`, `review` or `final`. Exactly one of these *must* be used, otherwise you will surely get errors.

`draft` Using the `draft` option enables the *draft* mode of the `book` class, thus making the processing of the document faster. The most visible change that results from using this option is that only the placement boxes of included figures are displayed. An appropriate header is included to indicate that the prepared document is a draft document. The purpose of the `draft` option is to obtain a fast and preliminary document showing the labels for citations, tables, figures etc. and a black solid rule highlighting the horizontal overflows. Such a document would be the one you would prepare for revising your text during writing stages. The NDdiss2_εclass checks for this option if you try to change the font, but otherwise just passes this option down to the `book` class and any loaded packages, several of which do something with it.

`review` 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, along with the labels and keys as in the `draft` option. A document prepared with the `review` option would be the one to personally check for proper formatting and possibly giving to your advisor if (s)he wished to suggest corrections.

`final` The `final` style option produces the document for the production of archival copies of the dissertation for submission to the Graduate School. It is also the style option that you should use when you submit it to the Graduate School for formatting checks. The NDdiss2_εclass itself just passes this option down to the `book` class and any loaded packages, several of which do something with it.

`twoadvisors` If you have two advisors for your project/research, selecting the `twoadvisors` option produces an appropriately formatted title page. The `\secondadvisor` macro command (discussed in Section 4.1) is used to specify the name of the second advisor.

`numrefs` `textrefs` Exactly one of these options – `numrefs` or `textrefs`, should be specified. `numrefs` results in a numbered citation sytle with natbib and the "nddiss2e" or "nddiss2enoarticletitles" citation style file[3]. Using `textrefs` changes the citation

[3] `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

style to be similar to "author-date" style with the same files. If none of these options is specified, the default style of numbered citations (ie. same as if `numrefs` was used) is used.

`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 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, it is *strongly* suggested that you refer to the documentation `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`

The choice of the fontsize is only applicable with the `draft` option used. By default, the document will be prepared in the 10pt size for the `draft` style option. For the `review` and the `final` style options, the document is prepared in the 12pt font size and choosing any other font size option will be ignored.

`noinfo`

Using the `noinfo` option disables the information page produced when the `review` or `final` style options are used. It is recommended that you do not disable the "info" page unless it is the final most copy/copies for submission to the Graduate School (in which case you should disable it).

`twoside`

Using the `twoside` option causes the class file to prepare a document meant to be printed double-sided. Do NOT turn in your document this way to the Graduate School! 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.

`nocenter`

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

`openbib`

Using this 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.

Thus, `\documentclass[draft,12pt]{nddiss2e}` would produce a document in draft format in 12pt font size and
`\documentclass[final,twoadvisors,noinfo]{nddiss2e}` would produce a document (with modified title page) for final submission to the Graduate School.

3 Features

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, xspace, longtable, indentfirst, tabularx, showkeys, enumerate, latexsym. epsfig, color, graphicx, url, setspace[4], amsmath, amssymb, 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, float, 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 layout(s).

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. As per the guide, number of different fonts and font sizes used in the thesis 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.

3.1 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[6] 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. Neither of these packages is part of the required LaTeX distribution, so you may need to download them. The pdflscape package is part of the oberdiek bundle.

Figures must be in pdf, jpeg, png, or gif format, not encapsualted postscript (eps). An easy way to convert your *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.

[4] v6.7[2000/12/01] or above
[5] v8.31[2009/07/16] or above
[6] Needs to have been updated since 2010. Exact oldest verison number allowable unknown.

4 Arrangement of contents

A dissertation or a thesis document must contain the following parts, in the order listed. Only those explicitly marked as optional may be omitted. Again, Sameer wishes to point out that the official guide must be referred and its guidelines override the order listed here.

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

The title page is generated by the standard LaTeX macro `\maketitle` with no arguments. This macro has been modified for providing a title page format required for dissertations/theses.

Prior to invoking it in your document, you should declare:

`\title{}`
- The title of the document, using the `\title` macro. Note: title must be in ALL caps, e.g. `\title{THIS IS A TITLE \\ IN TWO LINES}`. You may use linebreaks within the title, and the title may be up to four lines long. The spacing for titles of five or more lines may be off.

`\author{}`
- Your name (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{}`
- The degree you're aiming for (in full) with the `\degaward` macro, e.g. `\degaward{Doctor of Philosophy}` or `\degaward{Master of Science\\in\\Engineering}`.

`\advisor{}`
- The name of your advisor as argument to the `\advisor` macro.

`\secondadvisor{}`
- The name of your second advisor, if any, with the `\secondadvisor` macro[7].

`\department{}`
- The name of the department in the argument of 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 combination will be automatically used.

`\maketitle`
After defining the above macro arguments, use `\maketitle` to generate a title page, which includes your entries. All the above macros are required and if missing, they may result in errors in the generation of the title page.

4.2 Copyright page

`\makecopyright` `\makepublicdomain`
The `\makecopyright` macro should be invoked after `\maketitle` to produce a copyright page. 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 explicitely.

`\copyrightholder{}` `\copyrightyear{}`
Prior to calling `\makecopyright`, you may specify a different 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). You should do this with the `\copyrightholder{`⟨*name*⟩`}` and `\copyrightyear{`⟨*year*⟩`}` macros.

4.3 Abstract page(s)

`abstract`
The abstract environment has been modified from the default in the report class to comply with the requirements of the Graduate School. 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 is placed in the top-right header.

`\abstractname{}`
You may use `\abstractname{`⟨*text*⟩`}` to change the abstract caption to `text`. Default name: `Abstract`.

4.4 Dedication

`dedication`
The format of dedication is essentially free, but you may want to use the dedication

[7] this macro is necessary when the twoadvisors option is used while invoking NDdiss2$_\varepsilon$ class

environment for this purpose. This environment will center the text of your dedication vertically on the page. The dedication is optional. `\dedicationname{`⟨*text*⟩`}` may be used to change the title for the dedication page. Default name: `\mbox{}` i.e. an empty title. If a different title is desired, note that the Graduate School requires that it be in all caps, and that ensuring that this is so is your responsibility.

`\dedicationname{}`

4.5 Table of contents and 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 list of figures and tables. Note: the "list of figures" should precede the "list of tables" as per the Graduate School guide, so make sure you call the commands in the correct order!

`\contentsname{}` `\listfigurename{}` `\listtablename{}`

The macros `\contentsname`, `\listfigurename` and `\listtablename` may be used to change the caption for Table of Contents, List of Figures and List of Tables, respectively. By default, they are named as `CONTENTS`, `FIGURES` and `TABLES`. If different titles are desired, note that the Graduate School requires that these be in all caps, and that ensuring that this is so is your responsibility.

4.6 List of symbols

`symbols`

The symbols environment is useful in formatting the list of symbols/abbreviations used in your work. It 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. As earlier, the caption for the list of symbols can be changed by using the `\symbolsname` macro. Default name: `SYMBOLS`. Also as earlier, this title must be capitalized, and it is your responsibility to do this.

`\symbolsname{}`

`\sym{}{}`

Another macro `\sym{`⟨*symbol*⟩`}{`⟨*definition*⟩`}` makes the task of entering the symbols and their meanings in the symbols environment easier. `\sym` takes two arguments - first, a math "object" and second, assumed to be the plain text describing the symbol. Any plain text in the first argument needs to be set with `\mathrm{..}` and any math symbol in the second needs to placed in `$..$`. Example: `\sym{\beta_\mathrm{norm}}{Definition for $\beta$}`

4.7 Preface

`preface`

An environment preface is provided for formatting the preface to the document. The name of this *chapter* may be changed by `\prefacename` macro; as usual, it must be in all caps, and doing this is your responsibility. Default name: `PREFACE`.

`\prefacename{}`

4.8 Acknowledgments

`acknowledgments`

The environment acknowledgments is used to format the acknowledgment *chapter*. As above `\acknowledgename` macro may be used to change the title name; as

`\acknowledgename{}`

usual, it must be in all caps, and doing this is your responsibility. Default name: `ACKNOWLEDGMENTS`.

4.9 Text

`\mainmatter` Use the macro `\mainmatter` at the beginning of the text sections i.e. all text matter should follow this macro as in the book class. The 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 TOC. Don't forget that chapter names should be in all caps!

4.10 Appendix

`\appendix` As in the book class, use the `\appendix` to mark the end of the last chapter in the main section and the start of the appendices. To begin an appendix, using a `\chapter{`⟨*title*⟩`}` macro. Appendices will be automatically "numbered" alphabetically.

4.11 Backmatter

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

4.12 Bibliography

`\bibliography` You may use the `\bibliography{`⟨*bibfile*⟩`}` macro to generate the bibliography with BibTeX. In order to use the BibTeX path for generating the bibliography, you needs to have all the bibliographic data in BibTeX files. You should refer to BibTeX manual for details about making a `.bib` file and format for the entries.

`\bibname{}` The default name for this *chapter* is `BIBLIOGRAPHY`. You may change it by using the macro command `\bibname{`⟨*newbibname*⟩`}`. It must be in all caps, and it is your responsibility to do this.

`thebibliography` Alternatively, you can also make your own bibliography by using 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.

For citing references in the text, the package natbib is included with options: `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. Sameer recommends reading its documentation.

Warning: The packages cite and citation are NOT compatible with the natbib package, and they must not be used.

5 Note for the authors

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

- List of Figures should be *before* List of Tables, i.e. the macro command `\listoffigures` comes before `\listoftables` in the frontmatter.
- Chapter titles need to be written in ALL CAPS.
- Table caption must be *above* the table, but the figure caption should be *below* it. In case of the table environment, this can be achieved by putting `\caption` before you include the table (e.g. in a tabular environment). In the figure environment, `\caption` goes after the `\includegraphics` macro command.
- Table captions need to be in ALL CAPS as well.
- Bibliography is the last section/chapter of the thesis.[8]

5.1 Chapter-wise bibliography

It is now possible to obtain bibliography as a section in each chapter (as is common in some departments esp. humanities) with some minor code implementation in the `.tex` files. To do this you have to load the package chapterbib (without any options) in the preamble of your main tex file and redefine some commands as below -

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

In such a case, you must separate the chapters or sections in which you want individual bibliographies in different files and *include* them in the main file as 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.

[8] Except if you are using *chapter-wise* bibliography

After compiling the main tex file once (with `latex` or `pdflatex`)[9], you would have to run `bibtex` on each of the separate 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 (`natbib.pdf`) in the `TEXMF` tree.

5.2 Tips and suggestions

- It is *strongly* recommended that you compile your document with pdfLaTeX. Compiling to dvi or ps 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 the tables for generating the appropriate horizontal rules. Use of vertical rules to separate columns in tables, is in general, bad style and should be avoided as much as possible.

- Use the longtable environment for handling very long tabular materials. Again, use the vertical rules only if very necessary.

```
\begin{longtable}{lc}
\caption[]{LONG TABLE CAPTION \label{tab:longtable} }
\toprule
Heading 1 & Heading 2 \\
\midrule
\endfirsthead
\caption[]{ \emph{Continued} } \\
\midrule
Heading 1 & Heading 2 \\
\midrule
\endhead
\endfoot
\bottomrule
\endlastfoot
% Now the tabular material %
Long & Table etc. \\
\end{longtable}
```

- If a figure/table is very wide and will not fit normally, 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 must be avoided.

[9] This creates `.aux` files which are needed by `bibtex`

- Usually the width of the figure/table captions is 90% of the textwidth (i.e. `0.9\textwidth`), but if needed can be changed as per 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 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.
- A new macro command `\subsubsection` (self-explanatory) has been defined. It is numbered as `3.2.1.4` in the TOC[10].
- To cite a website in your bibliography[11], 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}",
}
```

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

[10] Megan thinks that this is a standard command in Spring 2013, but is leaving Sameer's original note here in case she is wrong

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

5.3 You found errors?

If you find some errors in formatting of your document, most likely these are NOT due to the NDdiss2$_\varepsilon$ class, but due to either wrongly used commands/macros or conflicting commands/macros in a package that you might have used ie. a mistake from your side. Please verify that before contacting anyone regarding the class file.

Read the manuals for the packages that you might have used and find out if they have macro commands that modify the page-layout, spacing etc. or if they conflict with already defined commands (e.g. packages natbib and cite redefine the same command `\cite` in different ways). Sameer would suggest that you *read the manuals anyway*! It is a good practice.

In the possible scenario that you have found a significant error, please try to find out the source of the error and, even better, a possible alternative, and please report it to the Graduate School's reviewer(s). It would also be great, if you try to find a solution for the problem and inform them of that as well. Please also let them know if you find this documentation confusing or misleading or if any mistakes are present.

Your doing so will ensure that the reviwer(s) are aware of the problem and its possible solutions and they can give better answers to the people who might encounter similar problems. It will also help making the future versions of the class file better.

6 Example

Below is a basic `.tex` sample. A file called `template.tex`[12] is generated from `nddiss2e.ins` which might serve as a guide for your document. The `example` directory contains a mock thesis modified from the ndthesis class file and should also be helpful.

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

\begin{document}

\frontmatter

\title{}
\author{}
\work{Dissertation}
\degaward{Doctor of Philosophy}
\advisor{}
\department{}
\maketitle
\makepublicdomain
```

[12]Most likely present in the same directory as `nddiss2e.cls` e.g. in `TEXMF/tex/latex/nddiss2e/`

```
\begin{abstract}
Abstract here
\end{abstract}
\renewcommand{\dedicationname}{\mbox{}}% Empty dedication title
\begin{dedication}
For Someone
\end{dedication}

\tableofcontents
\listoffigures
\listoftables

\begin{preface}
Preface here
\end{preface}
\begin{acknowledge}
Thanks to everyone
\end{acknowledge}
\begin{symbols}
\sym{a}{definition of a}
\end{symbol}

\mainmatter

\chapter{One} % Chapter 1
All the text ...

\appendix
\chapter{Additional data} % Appendix A

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

\end{document}
```

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}
    [2013/04/16 v3.2013^^J%
     Notre Dame Dissertation document class by Sameer Vijay and updated by Megan Patnott^^J]
%
```

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

```
\providecommand{\dissfileversion}{3.2013}
\providecommand{\dissfiledate}{2013/04/16}
%
```

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
%
```

`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, ifpdf, 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}
\RequirePackage{ifpdf}
\RequirePackage{longtable}
\RequirePackage{xspace}
```

```
\RequirePackage{indentfirst}
\RequirePackage{tabularx}
\RequirePackage{enumerate}
\RequirePackage{latexsym}
%
```

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.

```
\ifpdf
  \RequirePackage[pdftex]{epsfig}
  \RequirePackage[pdftex]{color}
  \RequirePackage[pdftex]{graphicx}
  \AtBeginDocument{
  \pdfadjustspacing=1
  }
\else
  \RequirePackage[dvips]{epsfig}
  \RequirePackage[dvips]{color}
  \RequirePackage[dvips]{graphicx}
\fi
%
```

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, amssymb, float, lscape, 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,amssymb}
\RequirePackage{float}
```

```
\RequirePackage{lscape}
\RequirePackage{booktabs}
\RequirePackage{rotating}
\RequirePackage{url}
\RequirePackage[doublespacing]{setspace}[2000/12/01]
\ifpdf
\RequirePackage{pdflscape}
  \RequirePackage[pdftex,
   plainpages=false,
   pdfpagelabels,
             bookmarks=true,%
             bookmarksnumbered=true,%
             linktocpage=true,%
             breaklinks=true,%
             bookmarkstype=toc,%
             colorlinks=false,%
             pdfpagemode=UseOutlines]{hyperref}
\fi
}
%
```

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{1.0}
\newcommand\double@baselinestretch{1.66}
\newlength{\single@skip}
\setlength{\single@skip}{\single@baselinestretch em}
\newlength{\double@skip}
\setlength{\double@skip}{\double@baselinestretch em}
\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 \\ \@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 It is YOUR responsibility to ensure that the Chapter titles
   and Table caption titles are put in CAPS LETTERS. This classfile does
   {\em NOT\space} do that! \\

  \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://www.gsu.nd.edu}\\
    \url{http://graduateschool.nd.edu}
  \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{\@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}%
    \@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}{\year}
\newcommand{\@copyrightholder}{\@author}
\newcommand{\copyrightyear}[1]{\renewcommand{\@copyrightyear}{#1}}
\newcommand{\copyrightholder}[1]{\renewcommand{\@copyrightholder}{#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\\
    All Rights Reserved \\[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}{%
  \ifpdf
     \pdfbookmark[0]{\abstractname}{abstract}%abstract.0
  \fi
  \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
   \@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}%
  \ifpdf
      \pdfbookmark[0]{\contentsname}{contents}%contents.0
  \fi
  \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{\@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{#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 #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%
        \@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{#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}{%
   \setlength{\abovecaptionskip}{\abovetableskip}
   \setlength{\belowcaptionskip}{\belowtableskip}
   \singlespacing
   \renewcommand{\arraystretch}{\double@baselinestretch}
   \let\@makecaption\@maketablecaption
   \@float{table}}%
   {%
   \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}
    \parbox{\capwidth}{
    \centering\normalspacing
    {#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
   \@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
    #1{#2 }\\[\single@skip]
    {#3}\par
  \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 NDdiss2$_\varepsilon$ 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\ifpdf pdf\LaTeX\else\LaTeXe\fi\itshape , and
    formatted with \upshape\nddiss\xspace\itshape classfile
    (v\dissfileversion [\dissfiledate]) provided by Sameer Vijay and
    updated by Megan Patnott.
    \end{minipage} }
    \clearpage}
\else\relax\fi
%
% \endinput
% End of file `nddiss2e.cls'.
```