The `uc-dissertation` document class

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To begin using this class immediately, please jump to Section 2: Installation and Quickstart. Happy TEXing! Oh, and good luck on that whole "dissertation" thing... ☺

Contents

1 Purpose and requirements

The purpose of this LATEX class is to provide an all-inclusive user-friendly method for students (especially in mathematics) at the University of Cincinnati to write their dissertations. The University of Cincinnati has some very strict guidelines for preparing the dissertation. The Electronic Thesis and Dissertation (ETD) page has a timeline for completion during the last semester and the various steps along the way. There is also a formatting page that lists a series of requirements, which we reproduce below.

Spacing Double-space all text. Long quotations and footnotes may be single-spaced.

Font 11-point or larger is recommended for readability. No matter what font you choose, all fonts *must* be embedded in your final PDF.

Margins Approximately one inch of white space should be at the top, bottom and sides on each page.

Page Numbers Except for the title page, number all pages in your ETD.

- Number the pages preceding the body of the text with small roman numerals (i, ii, iii, iv, etc.), placed at the bottom center of the page. Remember, the page number for the Title Page (i) should not be visible.
- Number all pages through the body, bibliography, appendices and index with Arabic numerals (1, 2, 3, etc.). All numbering should be in the bottom-center of the page.

Footnotes Recommended placement of footnotes is at the bottom of the appropriate page. It is not advisable to place them at the end of chapters where they are difficult to consult. Please consult with your committee to determine which style is appropriate for your field.

Illustrations May consist of line drawings, graphs, maps, photographs, chemical formulas, or musical scores or passages. All of these should be inserted into the PDF document (not linked to external sources).

Title Do *not* use all capital letters for your title. Capital letters are still appropriate for acronyms, proper nouns, first letter, etc.

The Required Page Order is as follows:

1. Title page
2. Abstract
3. Copyright notice
4. Acknowledgments (O)
5. Table of Contents
6. List of Tables (IF)
7. List of Figures (IF)
8. List of Symbols (IF)
9. Body text
10. Glossary (IF)
11. Bibliography
12. Appendices (IF)
13. Index (IF)
14. Audio/Video

Those items followed by (IF) signify that they should only be included *if needed*. For example, if a student has only one figure throughout his/her entire dissertation, there is no reason to include a List of Figures. If, on the other hand, the student has over twenty figures, it would probably be good practice to include such a list. Use your best judgment for each item. The Acknowledgments page is *optional*, as indicated by the (O) appended to its entry. If a student desires a Dedication in addition to, or instead of, the Acknowledgments, it should be placed either immediately preceding or immediately succeeding the acknowledgments.

There are a few special points that need to be addressed. First and foremost, the abstract must be *500 words or less*, with *no exceptions*. Including tables and figures in the abstract is strongly discouraged. Please check with the Graduate School if you must use tables or figures in your abstract. While the graduate school doesn't specify about the use of symbols (mathematical or otherwise) in the abstract, it is generally poor practice to include such in an abstract. The reason for this is that abstracts are often posted in places where the typesetting is somewhat simplistic and does not easily accommodate the inclusion of symbols. Similarly, because the abstract should be able to be dissociated from the complete dissertation, one should not insert citations using the bibliography in the abstract; the authors last names will suffice for this purpose if necessary.

Another small point is that if the student plans to include video, only `mpeg`, `mp4`, and `avi` files can be inserted directly into the `pdf`. Finally, there are several items which are required to appear on the title page. These are:

1. obviously, the title,
2. author name and date,
3. previous degrees,
4. degree to be conferred,
5. department and college, and
6. name of committee chair

2 Installation and Quickstart

To begin, be sure that you have the following packages installed in your TEX distribution: `xifthen`, `setspace`, `datetime`, `xparse`, `graphicx`, `etoolbox`, and (optionally) `fncychap`, along with the KOMA-script book class: `scrbook` (later than 2013/05/29).

Next, place the class file somewhere in your TEX path, preferably in your local directory tree. In general this belongs to the variable `TEXMFHOME`. The location of your local directory tree varies by system, but is generally:

TEX Live: `~/texmf/`

MacTEX: `Users/`⟨*username*⟩`/Library/texmf/`
The Library folder is hidden by default on recent versions of OS X (≥ Lion). This can be permenantly unhidden by issuring the command:
`chflags nohidden ~/Library`
at a Terminal prompt. On Mavericks, this can be accomplished alternatively by accessing the `Finder` menu item `View` ≫ `Show View Options` and checking the box `"Show Library Folder"`

MikTEX: Your local directory tree can be any folder you like, as long as you then register it as a user-managed texmf directory (see `http://docs.miktex.org/manual/localadditions.html#id573803`)

Within this local directory tree, assuming your TeX installation conforms to the TEX Directory Structure (TDS), which most modern distributions do, you should place the class file in `$TEXMFHOME/tex/latex/base/`

After installing the class file in the appropriate directory, it is important to check that your installation of TEX can use the class file. If you have `kpsewhich` installed, this is as simple as entering:
`kpsewhich uc-dissertation.cls`
in a shell. Otherwise, you can copy and paste the text below into an empty `tex` file and try to compile it.

A minimal working example

```
\documentclass{uc-dissertation}
\begin{document}
Hello World!
\end{document}
```

If this doesn't compile properly, try to figure out why. It could be that TEX doesn't know where to find the `uc-dissertation.cls` file, or it could be because your distribution of TEX does not have the required dependencies.

Assuming the minimal working example compiles properly, you are ready to move on to the template. For instructions on how to use the template, consult the `dissertation.tex` file within the `template/` directory. You probably want to make a copy of this directory and start using the copy as the working directory for your dissertation.

3 Provisions and user input

3.1 Class base and options

The `uc-dissertation` class is based on the KOMA-Script book class `scrbook`. As a result, you may pass any options of the `scrbook` class; however, those relating to elements redefined by `uc-dissertation` may not work as expected, especially those pertaining to the title page.

The option `comply` tries to adhere to all the formatting guidelines of the University of Cincinnati graduate school. In particular it passes the options `oneside`, `11pt`, `toc=listofnumbered` to the underlying KOMA-Script `scrbook` class. It also redefines the `\mainmatter` command to so that this portion of the document is double-spaced (similarly for the `\mainmattertwo` command defined by `uc-dissertation` which differs only in that it doesn't reset the page numbers). Spacing is thus achieved via the `setspace` package. However, the `\frontmatter` and `\backmatter` remain single-spaced. Unfortunately, I can't seem to pass the option `bibliography=totoc` to `scrbook` from the class file, so you will have to do it manually.

```
\documentclass[comply,bibliography=totoc]{uc-dissertation}
```

To save on printing costs (and aesthetics) without disrupting the other required formatting, we provide the option `comply-nospace` which implements the same things as `comply` except for the double-spacing of `\mainmatter` and `\mainmattertwo`.

Finally, the option `chap` is provided in order to spruce up the chapter headings. All this option really does is to load the `fncychap` package with the option `Lenny` and then modifies the font so as to be consistent with the KOMA-Script style.

3.2 Title page

In Figure 1, the various commands defined for user input on the titlepage are displayed with their relative position. We describe the syntax of these commands below in the following format:

```
\command[⟨optional⟩]{⟨mandatory⟩}
```

where `\command` is the prescribed control sequence, ⟨*optional*⟩ is any optional argument, and ⟨*mandatory*⟩ is a mandatory argument.

The title and subtitle commands are exactly the same as those defined by `scrbook`. In particular, they each take a single mandatory argument that can accept line breaks with a double-backslash `\\` newline command.

```
\title{⟨title⟩}
\subtitle{⟨subtitle⟩}
```

The `\degreetoconfer` command takes a single mandatory argument which is preferably a single line, but there is nothing to prevent the use of `\\` to produce a newline.

```
\degreetoconfer{⟨degree−name⟩}
```

If this command is not called it defaults to 'Doctor of Philosophy'. The user should *not* abbreviate the name of the degree in this instance, e.g. do not use Ph.D. in place of the above text.

The following commands each take a single mandatory argument as well. The default values are shown commented out. If necessary, newlines may be inserted.

```
\department{⟨department−name⟩} % Mathematical Sciences
\college{⟨college−name⟩} % McMicken College of Arts and Sciences
\university{⟨university−name⟩} % University of Cincinnati
```

The `\date` command has been redefined to take two mandatory arguments as follows.

```
\date{⟨month⟩}{⟨year⟩}
```

The ⟨*month*⟩ argument should be the two-digit numeric month, and the ⟨*year*⟩ should be the four-digit year. This command will be passed to a command defined by the `datetime` package. If the user chooses not to set the `\date`, then it defaults to `\today`, which will use the current month and year.

The remaining four commands that apply to the title page are set within two tabular environments. Therefore, it is important not to place extraneous newline symbols `\\` or alignment characters `&` in their arguments.

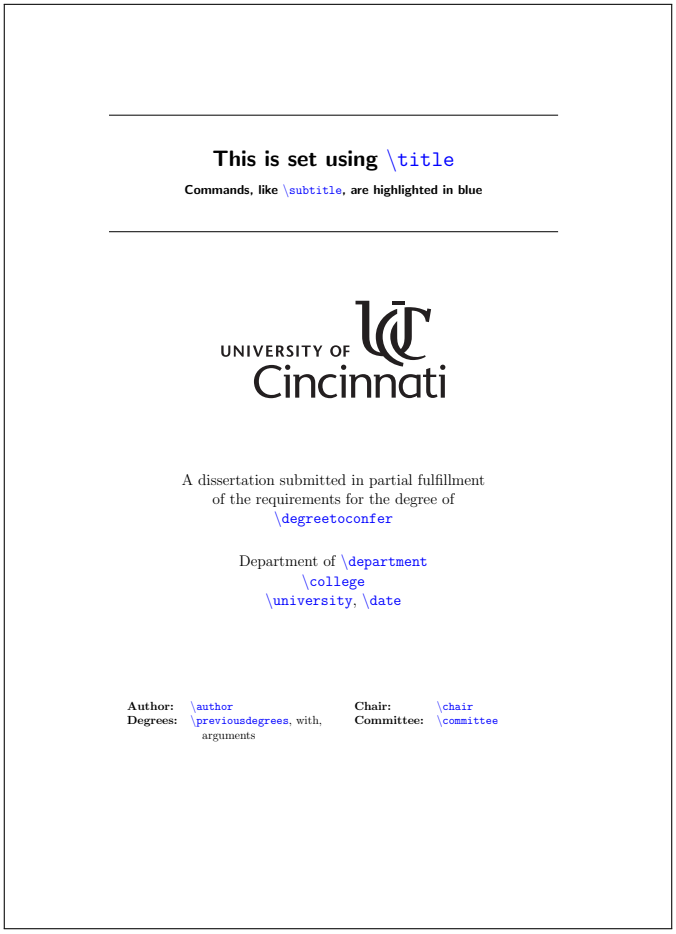

Figure 1: User input and the title page

The author command also takes a single mandatory argument, but this should consist only of alphabetic characters, accents, whitespace, and possibly punctuation. No line break characters should be present since it will be placed in a `tabular` environment with multiple columns.

`\author{`⟨*author−name*⟩`}`

Punctuation is acceptable if needed. For example, `\author{Henry Jones, Jr.}` is a valid use of the command. However, while usage that includes titles, such as `\author{Henry Jones, Jr., Ph.D.}`, will not produce errors, such usage is not recommended because a list of the degrees earned will also appear on the title page. On the other hand, if you are a knight in the Order of the British Empire, you may place 'KBE' at the end of your name in order to sound pretentious.

In order to include a list of the previous degrees earned on the title page, the command `\previousdegrees` is included, which takes one optional and three mandatory arguments.

`\previousdegrees[`⟨*#degrees*⟩`]{`⟨*degrees*⟩`}{`⟨*years*⟩`}{`⟨*schools*⟩`}`

In the above, ⟨*degrees*⟩, ⟨*years*⟩, and ⟨*schools*⟩ are semicolon separated lists, and ⟨*#degrees*⟩ is the number of previous degrees earned (default: 1). The information stored is carefully formatted to be placed inside a `tabular` environment and so should not contain an extraneous characters. I suspect that `\previousdegrees` will be the first command to cause serious problems with the layout of the title page for various people since it is the command which manipulates the most information and tries to typeset it in a rather small area.

The `\chair` command takes as its sole mandatory argument the name (and title) of your dissertation committee chair.

`\chair{`⟨*advisor*⟩`}`

This person should be your advisor. Note that unlike in the `\degreetoconfer` command, it is important to abbreviate titles. For example, correct usage of this command could be: `\chair{Random Advisor, PhD}`. Unlike the way I have been abbreviating degree names elsewhere in this documentation, the University of Cincinnati style guidelines stipulate that such abbreviations should *not* include periods. If your advisor holds multiple degrees, consult them on the appropriate way to reference them on the title page (but undergraduate degrees are not relevant here).

The last command, `\committee` takes one optional and one mandatory argument. Its purpose is to list the members of your dissertation committee *other than the committee chair*.

`\committee[`⟨*#members*⟩`]{`⟨*members*⟩`}`

The optional argument ⟨*#members*⟩ is simply the number of members on the committee, while the mandatory argument ⟨*members*⟩ is a semicolon separated list of their names (and titles). An example of appropriate usage of this command is

```
\committee[2]{First Member, PhD; Second Member, PhD}
```

Note that there is no problem with the space prior to `Second` in the above example; such spaces should be trimmed prior to insertion in the title page.

Finally, for students outside of the University of Cincinnati who wish to use this class, you may want to use another logo. This can be achieved through the `\logo` command. This takes one optional and one mandatory argument, both of which are passed directly to the `\includegraphics` command. Obviously, the inclusion of the logo at all, whether UC or otherwise, requires `graphicx` package. Since `graphicx` does not declare any file formats in the class file, you must either do this yourself or use an encapsulated post-script (`eps`) image. A note to UC students: please don't change the size of the logo using the `\logo` command; UC has very strict branding standards regarding usage of the logo.

The current size, relative position, and spacing of the logo meet these standards, but increasing or decreasing the size, aspect ratio, or position may violate them.

4 Authoring a dissertation with LaTeX

4.1 Separation of form and content

Finally, we should make some sort of note about writing long documents (including dissertations and books with LaTeX. One of the tremendous features of LaTeX is the ability to separate *form* from *content*. This takes place on two levels: the class definition and the authored files. The class defines things like the format of titles, section headings, header and footer material, *et cetera*. Then, when the author issues commands like `\maketitle` or `\section`, he need not worry about how it will *look*, only what he must *say*. Of course, if the author has any quibbles with the nuts and bolts of the formatting the class file implements, he may always modify these items to his liking. He does this, however, on a project-wide scale instead of locally, at each occurrence of a section heading.

For many projects, such as research articles submitted to peer-reviewed journals, this mild separation of form from content is generally sufficient, and the author may content himself to create a single `tex` file perhaps along with a `bib` BibTeX file for the references.

For large projects, however, it is desirable to have more modularity. In particular, it is helpful for the author to create a single *master* file which takes care of the general formatting such as: where to place the table of contents, what constitutes front matter, main matter and back matter, where to place the bibliography, glossary, index, *et cetera*, and the design of each. This master project file then has many *children*, each of which consists somehow of the main content of the document. These children are then inserted into the master using either the `\input` or `\include` commands. For a good discussion of the differences between these two commands see this TeX.SX question.

The template dissertation included with the `uc-dissertation` document class aims to be as modular as is reasonably helpful. Chapters have their own `tex` files and are inserted into the master file `dissertation.tex` via `\include`. Other items, such as the glossary definitions, also have their own file which is inserted via `\input`. We highlight this further in what follows. For more information on the modular abilities afforded by LaTeX, please see the LaTeX Wikibook.

4.2 The `uc-disseration` template

We describe the (simplified) contents of the master file `dissertation.tex` below. The preamble is short, calling only the necessary packages and using the few commands necessary.

The `makeidx` and `glossaries` packages are necessary for, you guessed it, the index and the glossary (the glossaries package is also what we use to create

the Notation, or List of Symbols, page via the \newglossary command). The \makeindex and \makeglossaries commands are used to create the auxiliary files LaTeX uses. These must be built with the makeindex (or xindy or texindy) and makeglossaries engines. Note how we use modularity to our advantage by putting the definitions of the glossary terms in their own file and then just insert this file into the document with the command

```
\input{glossary-definitions}
```

If you have no need of these items in your dissertation, you are welcome to get rid of them and the commands used later to insert them into the document (\printglossary and \printindex).

The biblatex package is used to typeset the bibliography. Note that this package isn't strictly *necessary*, but it is often preferred (over simple BibTeX) for its ease of customization. If you decide to use BibTeX, you should run the bibtex8 engine on your document, and if you use BibLaTeX then it is recommended that you use biber. The main downside of BibLaTeX as opposed to BibTeX is a lack of support from publishers. This is only a downside for documents you plan to submit to a publisher, but your dissertation is probably not among such documents. For more discussion about the difficulties of submitting an article using BibLaTeX to a journal, please consult this answer and the resulting comments on TeX.SX.

The dissertation.tex preamble

```
\documentclass[chap,comply,bibliography=totoc]{uc-dissertation}

\usepackage[style=alphabetic,firstinits=true,maxnames=10]
  {biblatex}
% For glossary, index and list of symbols
\usepackage{makeidx}
\usepackage[toc]{glossaries}
% For reformatting the ToC, LoF, LoT
\usepackage{tocstyle}
\usetocstyle{standard}

%%%%% Set bibliography file(s)
\addbibresource{references.bib}

%%%%% Add symbol list
\newglossary[sbg]{symbol}{sbi}{sbo}{Notation}

%%%%% Make glossary, index and symbol list
\makeindex
\makeglossaries

%%%%% Add the glossary definition file
\input{glossary-definitions}
```

`dissertation.tex` main body

```
\begin{document}

\frontmatter
\input{titlepage-info}
\maketitle
\input{abstract}
\abstractpage
\copyrightpage
\input{acknowledgments}
\acknowledgmentspage
\tableofcontents
\listoftables
\listoffigures
\printglossary[type=symbol]

\mainmatter
\include{introduction}
\include{background}
\include{results}

\backmatter
\printglossary
\printbibliography

\mainmattertwo
\appendix
\include{prerequisite-material}

\backmatter
\cleardoublepage
\addcontentsline{toc}{chapter}{Index}
\printindex

\end{document}
```

After the preamble, we have the main body of the document. Notice how short is this master file. That is because all the content has been stripped out and placed in other files, and then is simply inserted via `\input` or `\include`.

The primary chapters are `introduction`, `background`, `results` and the appendix `prerequisite-material`. These are inserted into the document via the `\include` command because using this has the option of also calling `\includeonly`, which saves time when compiling the document if you are only working on a certain part of the document. The `\include`'d files also have their own `aux` files, which shouldn't be necessary for things like the title page, abstract or acknowledgments pages.

5 Suggestions

The KOMA-Script book class `scrbook.cls` (and hence also `uc-dissertation.cls`) typesets section headings in a bold sans serif typeface. The author may wish to have a coherent style throughout their dissertation and thus would desire to typeset the titles/headings to theorem-like environments in the same way. This can be achieved by means of the `thmtools` package. Among many other things, this package allows for the definition and customization of various theorem environment styles. Below we create an example style which forces the title of the theorem, as well as any accompanying note, to be typeset boldface and san serif. The other parameters are just included to make it look nice overall. See the documentation of the `thmtools` package for more details.

`thmtools` theorem style definition: sans serif

```
\declaretheoremstyle[
  spaceabove=6pt,
  spacebelow=6pt,
  headfont=\sffamily\bfseries,
  notefont=\sffamily\bfseries,
  notebraces={(}{)},
  bodyfont=\itshape,
  postheadspace=1em
]{theorem}
```