

# TeXing Your Thesis at KU

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## 1 Basic Instructions

This file describes one way to format your TeX-prepared thesis or dissertation to meet KU guidelines by using the `kuthesis.cls` L<sup>A</sup>T<sub>E</sub>X class file. This is certainly not the only way to do so, but my goal was to provide a convenient way that would satisfy most people. Of course, under the GNU public license, you may do what you please to any of these files. Please be aware, however, that you use these files at your own risk.

If you're new to TeX, this file isn't for you – yet. Have a look at one of the many free (or non-free) introductions to L<sup>A</sup>T<sub>E</sub>X. Then, read on.

## 1.1 Planning Ahead

You should prepare most of your thesis or dissertation without using the `kuthesis.cls` file, as otherwise you'll probably become annoyed at the waste of paper from the double-spacing, the stupid title pages, and a million other things. However, you will want to plan ahead in a few areas:

- Avoid any and all spacing commands, including, but not limited to, any attempts at setting margins, page size, double-spacing, `\vspace`, `\pagebreak`, or `\linebreak`. To format your thesis to meet the KU guidelines is the job of the class file. Besides, if you really wish to change how your document looks, there is almost always a global way that saves time and avoids inconsistency. Add page and line breaks only at the very end when your text is no longer subject to change.
- Plan for references and cross-references. Learn to use BibTeX and get the code for each reference from MathSciNet. Put a `\label` on all equations, theorems, sections, and the like as you're going along for easy reference later. Using a predetermined naming convention, especially in conjunction with the `prettyref` package (optional), can save much time and trouble. Finally, if you're planning on having an index, learn to use MakeIndex and insert `\index` commands as you go. When you're done typing, you've automatically got your index as well.
- Graphics files must be in PNG, PDF, or JPEG format. If you have files of another type, such as EPS, the department probably has a converter.
- Avoid mathematical symbols in the title of your thesis, as well as in section and chapter titles, and in your abstract. This is good style, but also is required by the electronic submission process, as well as some of the features of PDF, such as bookmarks.

## 1.2 The Basic File

At this point, you should have a significant portion of your thesis or dissertation already typed. If not, work on that, and don't worry about this stuff until you're farther along. Really - if you follow the advice in the previous section, you won't have any problems formatting the final product.

I'll now describe the required elements for the TeX file. Every such file must begin by loading the class, in this case by using

```
\documentclass{kuthesis}
```

if you're doing a dissertation, or

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

for the other possibility. Adding `draft` to the list of options will print a marker for lines that are too long, although this should only be worried

about when the content is not subject to further change. Use `notitlepage` until you're ready for the full blown title pages. Other typical  $\TeX$  options should not be used, as they'll interfere with the formatting.

Next will come the title page information for your document. This will start with

```
\author{YOUR NAME}  
\title{THE TITLE}
```

The class file will automatically generate the title pages for you. If you wish to specify your committee, type either

```
\committee{MEMBER 1}{MEMBER 2}{MEMBER 3}{MEMBER 4}{MEMBER 5}
```

or

```
\committee{MEMBER 1}{MEMBER 2}{MEMBER 3}
```

depending on the committee's size. If you would rather not have the committee member names on the title page, use the command

```
\nocommitteenames
```

Next comes two optional bits of information. The first is a copyright notice. The other is listing any prior degrees you may have received. Neither are required, and to copyright your thesis or dissertation requires payment of an extra fee. Use the commands

```
\copyrightyear{THIS YEAR}  
\previousdegrees{DEGREE, UNIVERSITY, YEAR}
```

as you please.

Next comes optional information that will be embedded in the PDF file itself. These will not appear elsewhere.

```
\keywords{KEYWORD; KEYWORD.}  
\subject{SUBJECT}
```

At this point, you can include any preamble sorts of commands, like loading additional packages. Please see the Features sections for what is already loaded and for my suggestions.

Finally, you need the following six commands, among which you will place your actual text.

```
\begin{document}  
\frontmatter  
\tableofcontents  
\mainmatter  
\backmatter
```

After `\tableofcontents` and before `\mainmatter` belong any chapters that are not to be numbered, such as an abstract. In the `\mainmatter` goes most of your work. The `\backmatter` is for appendices, the bibliography, and an index (if you so desire). Use the typical  $\LaTeX$  book sectioning commands like

```
\chapter{CHAPTER NAME}
\section{SECTION NAME}
\subsection{SUBSECTION NAME}
```

in these areas. In the same place where you found `kuthesis.cls`, you can find a template file containing these commands. I highly recommend you test your version of  $\text{\TeX}$  with the template to make sure you have the required packages before you start customizing. If you're using  $\text{\MikTeX}$  on a Windows machine, and have the options set, all packages will be downloaded for you. If you're missing a package in general, you can find it and installation instructions at [www.ctan.org](http://www.ctan.org).

### 1.3 How to $\text{\TeX}$ It

Your file that uses `kuthesis.cls` must be processed using  $\text{\PDFTeX}$ . This will produce a Pdf file directly as output. There is no need to invoke any conversion program like `dvips`, `ps2pdf`, or `dvipdfm`, or worry about inclusion of or quality of fonts (if you've read about that sort of problem elsewhere).

## 2 Features

### 2.1 Page Layout

The overall page layout is set using the `geometry` package to have margins of 1.25 inches on all sides except on the left, where the binding offset requires 1.5 inches. You should not need to change these settings. Spacing is done with the `setspace` package, and is double-spacing except in the `\backmatter`. Any changes to the spacing must be approved by your committee.

### 2.2 Table of Figures

Much like the table of contents, you can add a list of figures and a list of tables using either or both of the commands

```
\listoftables
\listoffigures
```

where you find `\tableofcontents`.

### 2.3 Graphics

External graphic files in PNG, PDF, or JPEG format may be included by using the command

```
\includegraphics{GRAPHICS.FILE}
```

using the `graphicx` package. No other graphics type is permitted. If you have files of another type, for example, EPS, the department has a number of tools to convert graphics from one type to another. The `graphicx` package can rotate, scale, and crop, among other things – see the package documentation.

## 2.4 Fonts

While there are now a few complete font sets (including mathematical symbols) for use with  $\TeX$ , you must get permission from your committee to use anything other than Times New Roman, which along with Helvetica and Courier supply the three main font types using the `mathptmx`, `helvet`, and `courier` packages.

The  $\mathcal{M}\mathcal{S}$  packages `amsmath`, `amssymb`, and `eucal` packages are loaded to provide extra symbols and the following math font options:

<code>\mathcal{A}</code>	<i>ABCDEFGHIJKLMN<sup>o</sup>PQRSTUVWXY<sup>z</sup></i>
<code>\mathbb{A}</code>	<b>ABCDEFGHIJKLMN<sup>o</sup>PQRSTUVWXY<sup>z</sup></b>
<code>\mathfrak{A}</code>	<i><b>ⒶⒷⒸⒹⒺⒻⒼⒽⒿⓀⓁⓂⓃⓄⓅⓆⓇⓈⓉⓂⓎⓏ</b></i>
<code>\mathscr{A}</code>	<i>ABCDEF<sup>g</sup>H<sup>i</sup>JKLMNO<sup>p</sup>QRSTU<sup>v</sup>WXY<sup>z</sup></i>

The `fontenc` and `textcomp` packages are loaded to offer some extra characters, such as the copyright symbol.

## 2.5 Theorem-Like Structures

The `amsthm` package is loaded and defines a typical proof environment, as well as an easy way to define and control numbering of theorem and the like. See the documentation for more details.

## 2.6 Hyperref

The `hyperref` package is automatically loaded and generates hyperlinks within your document. These are set to be the same color as normal text for printing purposes. Any reference, such as in the table of contents, or in citations, gets this treatment. The `hyperref` package also sets some variables of the PDF file, such as the author and title that appear when you look at the document properties. Finally, it also generates bookmarks for navigation. However, mathematical symbols may not appear in any of the bookmarks or PDF variables. This would be unfortunate, but the online submission also requires a non-mathematical title and abstract anyway. Also, it's just good style. If you feel compelled to use a symbol in one of these places, see the `hyperref` manual for workarounds.

Two small add-on packages called `hycap` and `hyperxmp` are loaded if you have them, which fixes a positioning bug in the hyperlinks to figures and tables, and allows more PDF variables to be set.

## 2.7 Microtype

If you have it on your system, the `microtype` package is loaded, which makes justified text look better to the eye by slightly changing the font width for each line and allowing punctuation to hand over the ends of lines. You most likely won't notice the effect unless you have two bodies of text to compare. See the `microtype` manual for such examples.

# 3 Recommended Features

## 3.1 Bibliography

The process of creating a bibliography with  $\text{T}_{\text{E}}\text{X}$  is well-documented elsewhere, but I highly recommend using  $\text{B}_{\text{i}}\text{B}_{\text{T}}_{\text{E}}\text{X}$ , mainly because you can download complete references from MathSciNet in  $\text{B}_{\text{i}}\text{B}_{\text{T}}_{\text{E}}\text{X}$  format, eliminating most of the work.

## 3.2 Index

An index is easy to make – so easy, in fact, it's almost silly. This is done with the `MakeIndex` program, and is well-described elsewhere. If possible, however, add the index markers as you type (every time you type a keyword or put in a definition), and you'll have done all the work required along the way.

## 3.3 Citations and References

Citations can be made to look better by using the `breakcites` package, which allows lists of citations to break across lines, and/or the `cite` package, which condenses and sorts long lists of citations. The `cite` package automatically enforces a space before a citation, which may not be what you want if you're doing any parenthetical citations ([1] – like this one), so use the `noadjust` option. Also, `cite` must be loaded after `breakcites`.

The `prettyref` package goes a long way towards standardizing all of your cross-references, and makes sure you don't accidentally call a theorem a lemma.

If you're having trouble finding or remembering the labels of your equations, bibliography items, or the like, using the `showkeys` package will cause the labels to be printed in the PDF file for editing purposes.

## 3.4 Presentations

There are many options for preparing slides using  $\text{L}_{\text{A}}\text{T}_{\text{E}}\text{X}$ , and a few for PowerPoint-like presentations. `Beamer` is an excellent choice for the latter, and the department has its own style files.