Guide for Creating a Monograph using LaTeX with CRC Press v1.1

Contents

1 Purpose

This document will help guide you in constructing your monograph using LaTeX. Ultimately, you will have to produce a pdf file that can be used by a printing press. It is expected that you have some experience with LaTeX and know the basics.

In an interview[1], the creator of LaTeX Leslie Lamport was asked:

> Three LaTeX mistakes that people should stop making?

To which he replied:

> 1. Worrying too much about formatting and not enough about content. 2. Worrying too much about formatting and not enough about content. 3. Worrying too much about formatting and not enough about content.

Unfortunately, it's never quite this simple. Nonetheless, it's best to first worry about structuring the content, using the correct high level commands. If this is done well, then the formatting can be changed at the end without having to go in and tweak the source code all over the place. In this guide we try to focus on how to best structure the content.

2 Template Guide

The template/example included with your style file illustrates how to properly organize the contents of your book. In this section a few of the features are explained in more detail, but you may prefer to just examine the file itself and pick up what to do directly from there.

A book is divided into three parts, the frontmatter, mainmatter, and backmatter. This division is implemented by the corresponding LaTeX commands: `\frontmatter`, `\mainmatter` and `\backmatter`. The format for each part is as follows:

frontmatter This contains everything before the first chapter begins. Pages are indicated by lower case roman numerals. "Chapters" are not numbered.

[1] http://research.microsoft.com/en-us/um/people/lamport/pubs/lamport-latex-interview.pdf

mainmatter This contains the chapters and appendices. Pages are indicated by arabic numerals and start at page 1. Chapters are numbered beginning with 1.

backmatter This contains the bibliography, index and glossary (if it exists.) "Chapters" are not numbered. This command is often not even necessary, as the routines for generating the bibliography and index suppress chapter numbering.

The scare quotes are around "chapters" because LaTeX technically classifies things like the preface, bibliography and so on as chapters. Note that chapters should begin on recto (right-hand side) pages in books. The command `\cleardoublepage` ensures this behavior.

2.1 Frontmatter

The `\frontmatter` command automatically sets the page numbering to lower case roman numerals. The frontmatter contains the following: half-title page, series information, library of congress information (will open on a verso page), title page, dedication, table of contents, foreword, preface, list of figures, list of tables, acknowledgments and list of symbols, preferably in that order Not all of these items are necessary, and it's possible to include other things. Examine the template to see how this is implemented.

The half-title page, title page and library of congress page will be generated by the production department. To set the first page to the appropriate number, use the command `\setcounter{page}{the_page_number}`.

The following commands automatically generate their corresponding sections: `\tableofcontents`, `\listoffigures`, `\listoftables`. For "chapters" like the preface, use the command

```
\chapter*{Preface}
```

The `*` prevents chapter numbering. If the style file doesn't include the Preface in the table of contents, then use the command

```
\addcontentsline{toc}{chapter}{Preface}
```

immediately after the chapter is begun.

2.2 Mainmatter

The `\mainmatter` command automatically sets the page numbering to arabic and begins again at 1. The main matter comprises the chapters, which should be kept in separate tex files, preferably in subdirectories. To place them in your document, simply include them like so,

```
\include{chapters/chapter1/ch1}
\include{chapters/chapter2/ch2}
...
\include{chapters/appendices/a1}
...
```

where chapters/chapter1 is a subdirectory of your current directory, and ch1.tex is the chapter tex file.

2.3 Backmatter

The backmatter should include the bibliography and index, and other things such as a glossary should go here as well. Note that the appendices are part of the main matter.

2.3.1 Bibliography

Use the BibTEX database system for the bibliography, rather than hard-coding the references into the main tex file. No particular bibliography format is required. The default plain style is acceptable, but it's possible to use other reasonable styles. For more detailed information, examine the template or consult the free, online LATEX wikibook `en.wikibooks.org/wiki/LaTeX/Bibliography_Management#BibTeX`.

2.3.2 Index

The index should be be produced with the makeidx package. Place the command `\makeindex` in the preamble, and `\printindex` at the end after the bibliography. As before, for more detailed information, examine the template or consult the free, online LATEX wikibook `en.wikibooks.org/wiki/LaTeX/Indexing`.

3 General LaTeX Matters and Advice

Your file should be in the pdf format, not ps (Postscript) or dvi. The standard LaTeX compiler outputs dvi files, which are then converted to ps and then pdf, or directly to pdf, by auxiliary programs such as dvips, ps2pdf or dvipdfm.

3.1 Alternative Engines

There are a few different LaTeX engines besides the standard one. There is the pdfLaTeX engine, which outputs directly to pdf with no intermediate file formats. This engine is more modern, while still being very stable.

There are two even newer engines, although not yet as tried and true, XeLaTeX and LuaLaTeX. XeLaTeX was created to better handle font encoding issues. It allows for unicode input encoding and the use of opentype fonts. LuaLaTeX is considered the successor to pdfLaTeX but is still under significant development. It works well with the Lua scripting language.

3.2 Graphics

The standard LaTeX compiler can only include eps (Encapsulated Postscript) figures. Where as pdfLaTeX on its own can't include eps figures, but does include pdf figures, as well as jpg and png raster graphics.

Figures should be placed inside a figure environment so that they may "float." Each figure should have a caption, and should also be referenced elsewhere in the document.

Beware Graphics files are one of the biggest hangups in production. The two toughest issues involve embedding fonts, and color encoding. See section 5 for more information.

3.3 Tables

Tables should be placed inside the table environment so they can be floated like figures. Tables should also have captions and be referenced from within the manuscript. Preferably, there should be no vertical rules in the tables, although it's not unacceptable. If tables are too wide to fit in the margins, they may be rotated clockwise so that they take up the entire page. If tables

are too long to fit on one page, try using the `longtable` package. If tables are too wide, try rotating them sideways with the `rotating` package.

3.4 Tips

Don't hard-code formatting such as spacing, line breaks or page breaks into your manuscript early on. This is a form of "premature optimization." LaTeX determines line and page breaks on its own using a sophisticated algorithm, that nonetheless can occasionally provide a sub-optimal result. Manually coding in line or page breaks should only be done at the end, since any edits may make those choices inappropriate after the text reflows.

Watch out for widows and orphans. There are automated facilites to deal with them, namely `\widowpenalty` and `\clubpenalty`.

Check the .log file for errors, warnings and bad boxes—especially overfull boxes that jut into the margin. Enabling the option draft in the class file can be a useful way to detect overfull boxes. Make sure there are no "multiply-defined labels" warnings so that the references are correct.

3.5 Other Packages

Here are a few useful packages.

fixltx2e Fixes a few minor bugs that may generate warnings.

amsmath, amssymb Standard AMS packages.

graphicx For graphics inclusion.

subcaption Provides facilities for creating subfigures and subcaptions. The packages subfigure and subfig are deprecated.

multicol Allows for more control over table creation.

emptypage Clears page numbering and running heads on otherwise blank pages.

cleveref Improves `\ref` with the new command `\cref`.

microtype Provides advanced typographic features for the pdfLaTeX engine.

fontenc To reduce warnings that LaTeX produces when using the standard Computer Modern fonts, use `\usepackage[T1]{fontenc}` and `\usepackage{lmodern}`. The `lmodern` package provides an updated version of the standard fonts.

mathptmx To get the Times font in the text and in math mode.

The documentation for these packages, and more, can be found at `www.ctan.org`.

3.6 Further Resources

The LaTeX Companion In print, the best and most complete guide.

LaTeX Wikibook `en.wikibooks.org/wiki/LaTeX`

TeX FAQ `www.tex.ac.uk/cgi-bin/texfaq2html?introduction=yes`

CTAN `www.ctan.org`

4 Style and Usage

HERE are some tips on how to typeset the document nicely and consistently with LaTeX. These typographic rules go a long way toward making your book look professional.

- Make sure that the chapter, section, subsection, etc. headers are capitalized consistently, LaTeX doesn't automatically do this for you. Preferably, prepositions should be in lower case, with the rest capitalized. The easiest way to check this is by looking at the table of contents.
- Use en-dashes `--` to indicate a range of values in the text, e.g. `1--10` for 1–10.
- When using an em-dash, do not include space around it—do it like this. Which is typed as `it---do`.
- Use `\dots` for ellipsis... not three periods ...
- Angle brackets are given by $\langle\rho\rangle$ `$\langle\rho\rangle$`, and not $<\rho>$ `$<\rho>$`.

- For absolute values, it's best to use $|-\lambda|$ `$\lvert-\lambda\rvert$`, rather than the vertical bar $|-\lambda|$ `$|-\lambda|$`. Note the spacing around the minus sign. For convenience you may wish to define a macro

  ```
  \newcommand{\abs}[1]{\ensuremath{\lvert#1\rvert}}
  ```

  To be used like so, $|-\lambda|$ `\abs{-\lambda}`.

- There's also a command for the norm, much like the absolute value. It's given by $\|-\lambda\|$ `$\lVert-\lambda\rVert$`, which is better than $||-\lambda||$ `$||-\lambda||$`.

- Include a non-breaking space, `~` (tilde,) between words that should not be separated in a line break. For instance, `Archimedes~\cite{Arc10}`, or `Henry~VIII`.

5 Working with Graphics

THIS section covers the requirements for graphics files to be properly included in a manuscript produced with LaTeX. Ensuring that these specifications are met when the graphics are first created will make the production process smoother and result in a higher quality book. Please *remove all extraneous or redundant figure files* from your folders before submission. Keep in mind that graphics on a monitor may appear to be slightly different than graphics which are printed.

5.1 The Ideal File

Ideally, a figure file would meet the following conditions.

- When possible, all figures should be vector graphics. The eps format is preferred, but pdf may also be acceptable. Bitmap (raster) graphics are often of much lower quality and are not scalable.

- If raster graphics must be used, they should be jpg or png files, and have a resolution of at least 300 dpi.

- If a figure is in the pdf format it should be "flattened" and not have any layers or transparencies.

- *All fonts must be embedded.* See section 5.2.1 for more information on this problem.
- The files should use the CMYK or grayscale color modes, rather than RGB. See section 5.2.2 for more information on this problem.

5.2 Common Problems You Might be Asked to Fix

This subsection describes the two most common problems, and why they matter.

5.2.1 Font Embedding

All fonts must be embedded in the pdf. This naturally raises a few questions.

What is font embedding? In order to properly display the fonts that are specified in the pdf file, the pdf viewer must get the font data from somewhere. It can search certain paths on the local computer and if it finds what it needs, it can correctly display the fonts. Pdf files also have the capacity to embed fonts by storing the font information in the pdf itself, so that the files can be shared with other computers that might not have the necessary fonts in their system. This increases the file size, although that issue is less of a concern these days now that bandwidth and memory are more plentiful.

What happens when fonts are not embedded? If you try to view a pdf that has fonts that are not on your computer, and are also not embedded in the pdf, then the pdf viewer will automatically and temporarily substitute in fonts that it believes to be similar to the specified font. Therefore, the file won't necessarily look "broken"—you may not even be aware that the fonts are not embedded. Furthermore, the font substitution not only causes the "look" of the characters to change, it also affects the spacing and layout of the page to a certain extent.

The problem. If fonts are not embedded, then you can't be certain that the file you are viewing looks exactly the same as the file that was originally created. For this reason, printers prefer not to accept such files.

Checking if fonts are embedded. It's possible to check if fonts are embedded, depending on the pdf software. In Adobe Reader X, for instance,

go to File→Properties→Fonts, and check that each font is listed as "Embedded" or "Embedded Subset."

Common problems with other programs. Certain graphics programs do not automatically embed fonts or provide facilities for embedding fonts; or even worse, some specify fonts to be used that do not even exist on the local computer.

Solutions. For fonts to be embedded, in the first place they need to be present and accessible on the local computer. The easiest methods involve the use of premium programs such as Adobe Illustrator. A free program that can be used is Ghostscript, which is usually installed with LaTeX. It can be more difficult to use since it requires some obscure commands on the command line.

Ideally, fonts should be embedded by the graphics generating program at the time the figures are created, and not after the fact.

5.2.2 Color

Most manuscripts will not include color. Any included graphics should preferably be in the grayscale color mode in this case. Some figures may appear to be in black and white but are actually encoded in RGB (red, green and blue.)

If your document includes color, then it should be in CMYK (cyan, magenta, yellow and black) color mode. These are the colors used with the plates for offset printing presses. The RGB color mode is designed for computer monitors. In any event, colors will appear on your monitor slightly differently than they will in print.

It's possible to convert color modes with various programs, but this can often cause distortions of varying severity. Therefore, it's best to set the color mode correctly when graphics are created.

5.3 Working in LaTeX

5.3.1 Font Embedding

LaTeX embeds the fonts that *it* uses by default. Note that it will not necessarily embed the fonts on included graphics. The pdfTeX engine does nothing to embed fonts in graphics that are included with it. The standard LaTeX

engine is typically used with Ghostscript or other conversion utilites (often automatically and behind the scenes,) and it may embed fonts on .eps files when the document is converted to pdf if the fonts are present on the system and Ghostscript can find them. Programs such as ps2pdf are a part of Ghostscript.

Rarely, LaTeX will generate Type 3 fonts when it is asked to render certain fonts that it doesn't have good information for. Type 3 fonts can be problematic, and a proper font encoding scheme should be used to avoid this situation when it occurs.

5.3.2 Color

Simply load the xcolor package with the cmyk option. Note that this only sets the color mode for colors created with LaTeX; it doesn't necessarily do anything to included graphics.

`\usepackage[cmyk]{xcolor}`.