

UNIVERSITY OF FRIBOURG

BACHELOR THESIS

Thesis Title

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Abstract

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Thesis Title

Write the thesis abstract here. Should be between half-a-page and one page of text, no newlines.

Keywords: keywords, list, here

Contents

Abstract	iii
1 Chapter Title Here	1
1.1 References	1
1.1.1 A Note on bibtex	1
1.2 Tables	1
1.3 Figures	2
1.4 Typesetting mathematics	3
1.5 Sectioning and Subsectioning	3
1.6 In Closing	3
Bibliography	5

List of Figures

1.1	Electron	2
-----	--------------------	---

Chapter 1

Chapter Title Here

This introductory file has been edited. Please find the complete version on <http://www.latextemplates.com>.

Remember to keep your editor's spell checker always on. The preferred spelling is American English; using British English word spelling is accepted only if consistent throughout the thesis.

An invaluable resource when grasping for words is www.thesaurus.com. If a sentence comes more natural in another language, consider using www.deepl.com for translation as the result is typically of higher quality than Google Translate.

1.1 References

The biblatex package is used to format the bibliography and inserts references such as this one (Hawthorn, Weber, and Scholten, 2001). Use `\citet` for textual citations and `\citep` to wrap them in parenthesis (check the source for this text). Multiple references are separated by semicolons (e.g. Wieman and Hollberg (1991) and Hawthorn, Weber, and Scholten (2001)) and references with more than three authors only show the first author with *et al.* indicating there are more authors (e.g. Arnold et al. (1998)). This is done automatically for you.

Scientific references should come *before* the punctuation mark if there is one (such as a comma or period). The same goes for footnotes¹.

1.1.1 A Note on bibtex

The bibtex backend used in the template by default does not correctly handle unicode character encoding (i.e. "international" characters). You may see a warning about this in the compilation log and, if your references contain unicode characters, they may not show up correctly or at all. The solution to this is to use the biber backend instead of the outdated bibtex backend. This is done by finding this command: `backend=bibtex` and changing it to `backend=biber`. You will then need to delete all auxiliary BibTeX files and navigate to the template directory in your terminal (command prompt). Once there, simply type `biber main` and biber will compile your bibliography. You can then compile `main.tex` as normal and your bibliography will be updated. An alternative is to set up your LaTeX editor to compile with biber instead of bibtex, see [here](#) for how to do this for various editors.

1.2 Tables

Check the source for an example of the required table style.

¹Such as this footnote, here down at the bottom of the page.

TABLE 1.1: **Caption.** After a useful title, the caption should describe the figure by itself. A reader should know everything about this table (or figure) without having to look for its description in the text.

	longer one	short	short	short	bold
# label 1	~3034	~650	~650	~650	~18
# longer label	2	3	3	3	0
# label 3	~906k	~436k	~436k	~436k	~3k

You can reference tables with `Table~\ref{<label>}` where the label is defined within the table environment, see source of Table 1.1.

1.3 Figures

Same as Tables, check source for example. Keep all figures in the `figures` folder. Strongly prefer vectorial image types (e.g. SVG) embedded into PDFs, over high-resolution lossless (e.g. PNG), over very-high-resolution lossy (e.g. JPG).



FIGURE 1.1: **An electron.** Artist's impression.

Sometimes figures don't always appear where you write them in the source. The placement depends on how much space there is on the page for the figure. Sometimes there is not enough room to fit a figure directly where it should go (in relation to the text) and so \LaTeX puts it at the top of the next page. Positioning figures is the job of \LaTeX and so you should only worry about making them look good!

Figures should have captions (such as in Figure 1.1). The `\caption` command contains two parts, the first part, inside the square brackets is the title that will appear in the *List of Figures*, and so should be short. The second part in the curly brackets should contain the longer and more descriptive caption text.

The `\decoRule` command is optional and simply puts an aesthetic horizontal line below the image. Avoid if possible, consider wrapping the image in a `\mbox` for borders instead

1.4 Typesetting mathematics

The “Not So Short Introduction to L^AT_EX” (available on [CTAN](#)) should tell you everything you need to know for most cases of typesetting mathematics. If you need more information, a much more thorough mathematical guide is available from the AMS called, “A Short Math Guide to L^AT_EX” and can be downloaded from: <ftp://ftp.ams.org/pub/tex/doc/amsmath/short-math-guide.pdf>

There are many different L^AT_EX symbols to remember, luckily you can find the most common symbols in [The Comprehensive L^AT_EX Symbol List](#).

You can write an equation, which is automatically given an equation number by L^AT_EX like this:

```
\begin{equation}
E = mc^2
\label{eqn:Einstein}
\end{equation}
```

This will produce Einstein’s famous energy-matter equivalence equation:

$$E = mc^2 \tag{1.1}$$

All equations you write (which are not in the middle of paragraph text) are automatically given equation numbers by L^AT_EX. If you don’t want a particular equation numbered, use the unnumbered form:

```
\[ a^2=4 \]
```

1.5 Sectioning and Subsectioning

You should break your thesis chapters into useful sections and subsections. L^AT_EX automatically builds a table of Contents by looking at all the `\chapter{}`, `\section{}` and `\subsection{}` commands you write in the source.

1.6 In Closing

For the final submission, generate the pdf then search it for question marks (?). Sometimes latex misses a reference or citation and adds a question mark to fill it. Make sure to fix them all before your submission.

Good luck and have fun!

Guide written by —
Sunil Patel: www.sunilpatel.co.uk
Vel: LaTeXTemplates.com

Bibliography

- Arnold, A. S. et al. (Mar. 1998). "A Simple Extended-Cavity Diode Laser". In: *Review of Scientific Instruments* 69.3, pp. 1236–1239. URL: <http://link.aip.org/link/?RSI/69/1236/1>.
- Hawthorn, C. J., K. P. Weber, and R. E. Scholten (Dec. 2001). "Littrow Configuration Tunable External Cavity Diode Laser with Fixed Direction Output Beam". In: *Review of Scientific Instruments* 72.12, pp. 4477–4479. URL: <http://link.aip.org/link/?RSI/72/4477/1>.
- Wieman, Carl E. and Leo Hollberg (Jan. 1991). "Using Diode Lasers for Atomic Physics". In: *Review of Scientific Instruments* 62.1, pp. 1–20. URL: <http://link.aip.org/link/?RSI/62/1/1>.