



WRITING A THESIS IN LATEX

*** Draft ***

PLEASE DO NOT DISTRIBUTE

Joseph Timothy Foley

Final Project Reports, Thesis, and Dissertations

December 2018

School of Science and Engineering & School of Computer Science

Reykjavík University

Project report

Contents

Contents	ii
List of Figures	iii
List of Tables	iv
1 Getting started	2
1.1 Introduction	2
1.1.1 Fonts	2
1.2 Citing properly	3
1.3 Document Structure	3
1.3.1 Reports for classes	4
2 L^AT_EX techniques	5
2.1 Fitting things on the page	5
2.2 FixMe reminders	5
2.2.1 Indexes, glossaries, and abbreviations	6
2.2.2 Examples	6
2.2.2.1 Equations and references	6
2.2.2.2 Chemical Formulas	7
2.2.2.3 Tables	7
2.2.3 Multilingual support	7
2.2.4 URLs and paths	8
2.2.5 Hints	8
2.2.6 Debugging	9
Bibliography	10
Index	11

List of Figures

2.1	The logo of Reykjavík University	6
-----	--	---

List of Tables

2.1 Listing of real name to username	7
--	---

List of Corrections

Note: This is a note. It will disappear in final mode, which makes it a safe place to put reminders.	5
Warning: This is something more important that needs to be corrected, but will also disappear in final mode.	5
Error: This is something very important to be fixed. This note will disappear in final mode.	5

Chapter 1

Getting started

1.1 Introduction

Before using the template in `DEGREE-NAME-YEAR.tex`, the author recommends reading the (in progress) guide to successful projects, including L^AT_EX at <http://afs.rnd.ru.is/project/htgaru/trunk/how-to-get-around-projects.pdf>. Full instructions on setting up L^AT_EX and SubVersion are there. Additionally, as issues are discovered, they are added to the Frequently Asked Questions section in that document.

Text will be double spaced when in draft mode so that there is room for reviewers to write comments. Extra blank pages are also removed. If you want to check formatting in a more final form, switch to proofing mode. This text in gray will disappear when you are not in draft mode. It is better to use FiXme's as a reminder mechanism, though. See Section 2.2

WARNING It is very very important that you print the generated PDF at 100% scaling. On many computers, printing is set to adjust the size to fit the page. Do not do this, because it will mess up the sizes of the font and the placement of the letters.

1.1.1 Fonts

The specified font in the MSc rules is Times or Times New Roman. If you are in ubuntu linux and wish to use TNR, you will need to: `sudo apt install ttf-mscorefonts-installer`

DRAFT

1.2 Citing properly

Any content from external sources must be properly cited. If any part of this document is plagiarized (from another group, the internet, or anywhere else) or your references are not properly cited, you will be in a lot of trouble.

This is in compliance with Reykjavík University's Code of Ethics^{1 2 3}. For your reference, here is a link to guidelines defining plagiarism and discussing how to avoid it (from the University of Oxford):

<http://www.ox.ac.uk/students/academic/goodpractice/about/>

This template uses BibLaTeX and Biber to produce the Bibliography. This is because they have better support for accented and Icelandic characters in UTF-8. They also do more checking on the bibliography to look for problems. Unfortunately, this means that if you have a semi-broken references.bib, Biber will refuse to produce a Bibliography. This is a feature because it is telling you that you need to fix the problems. BibTeX will also give errors, but will continue to generate a Bibliography. This can cause problems later. For more information read <http://afs.rnd.ru.is/project/htgaru/trunk/how-to-get-around-projects.pdf>.

1.3 Document Structure

The default document structure is the style called IMRAD: Introduction, Methods, Research, And, Discussion. This is also known as the American Psychological Association (APA) format and is commonly used in the sciences.[1]. The template's current editor believes that this format is a good starting point, but may not be appropriate for some engineering works. In those cases, following a more technical report style may be easier: Introduction, Background, Design, Implementation, Analysis, Conclusion. For some works, this is still too confining. In those cases, the editor recommends the

¹<http://en.ru.is/the-university/ru-code-of-ethics/> – see Item 8 and General Rules on Study and Examinations

²<http://en.ru.is/studies/study--and-examination-rules/> – see Article 4.5

³see also the document "Your Work - Your Contribution" <http://www.ru.is/hugverk>, available only in Icelandic

Introduction, Body, Conclusion (IBC) format where the body is a series of IMRAD or other structures. Each section of the body should ask a question and answer it relating to the topic. If you are writing a thesis that is primarily a collection of papers, then the body section would consist of these papers.

1.3.1 Reports for classes

If you are writing a report for a class using this template, you probably want to get rid of a lot of the extra pages. The set used in these instructions are a good place to start. See the file `minimal-document.tex` for a simpler example.

Chapter 2

L^AT_EX techniques

2.1 Fitting things on the page

If you see little black boxes on the right in draft mode, this is L^AT_EX trying to tell you that it couldn't make it fit nicely.

2.2 FixMe reminders

FixMe Note: This is a note. It will disappear in final mode, which makes it a safe place to put reminders. **FixMe Warning:** This is something more important that needs to be corrected, but will also disappear in final mode. **FixMe Error:** This is something very important to be fixed. This note will disappear in final mode. If any of these still exist except for `\fxnote` when we are not in draft mode, L^AT_EX will have warnings during processing. If the Fatal error is still there, L^AT_EX will give errors while producing the document¹. Unfortunately, many L^AT_EX UI's have processing set to continue no matter what the error status, so you may only notice this in a little window where the log is displayed. The Fatal error has been commented out in this document so that we can successfully generate documents but it can be seen in the document's source.

¹This is a *feature* so that you don't submit the document without fixing really important issues.



Figure 2.1: The logo of Reykjavík University

2.2.1 Indexes, glossaries, and abbreviations

This section demonstrates indexes. Currently, the glossary capability is not working — *Do not use it!* Note that you may get errors in this section if you turn the index options off.

2.2.2 Examples

Some examples of how to use features of L^AT_EX follow.

2.2.2.1 Equations and references

Figures and Tables need to be properly formatted and referenced in the text. Number figures/tables consecutively, include captions, and refer to the figures/tables in the text e.g. Figure 2.1. Equations need to be numbered consecutively as well. Equations need to have each of their variables defined when they are first used or redefined. If you need to refer to particular places in the document, use numbered references. Note that the `\ref{BLAH}` and the `\label{BLAH}` must match. When using `\label{}`, it has to be AFTER the item you are trying to point to without spaces or inside of its declaration. It is often safest to put inside e.g.:

```
\caption{This is a caption\label{fig:mycaption}}
```

If you are wondering why the graphics are missing in your document, you should see if you are in draft mode. L^AT_EX speeds up processing in draft mode by just putting boxes so you can focus on the layout and text first. The `rureport.cls` file defines an option `forcegraphics` that can force most included graphics and elements to be enabled even in draft mode.

Table 2.1: Listing of real name to username

Firstname	Lastname	username
Joseph	Foley	foley

As an example of an equation, in Equation 2.1 is the relationship between angular frequency and hertz:

$$f = \frac{1}{T} = \frac{1}{2\pi\omega} \quad (2.1)$$

where f is frequency in Hz, T is period in s, and ω is angular frequency in rads^{-1} . Resistance is in units of Ω . This example uses `\si` from the `siunitx` package to format the units correctly. If you want to format it with a value, it uses `\SI{value}{unit}` e.g.: `\SI{2.99E8}{\meter\per\second}` becomes $2.99 \times 10^8 \text{ m s}^{-1}$

As an example of referring to a particular part of the document, see Section 2.1 on page 5 for information on how to fit text on a page.

2.2.2.2 Chemical Formulas

Chemical formulas are best formatted by the `mhchem` package (included in the `custom.sty` by default). Click here for the documentation.

Here is an example in reaction C 2.1:



2.2.2.3 Tables

When making tables, there are some very important rules for making them look professional. See <http://ctan.uib.no/macros/latex/contrib/booktabs/booktabs.pdf> For an example of a simple table, see Table 2.1. Some general rules are to always avoid `\hrule` and vertical separator lines.

2.2.3 Multilingual support

In the main file, you have already seen the ML macros used to create multi-lingual documents. You may want to read more about the `babel` and `polyglossia` packages

to do even more. Quotation marks can be made smart by using “encite”. This will change the quotation marks to follow whatever the current language is set to. The Context Sensitive Quotes (csquote) package is full of useful macros of this sort. One caveat: don’t use the shortcut “ and ’ in the macros nor in the text². It doesn’t work due to interactions with the multilanguage macros. If you need to use those quotes, you can switch languages temporarily, „Like this”

2.2.4 URLs and paths

URLs are easy to use in both the bibliography and text. In your .bib file, make sure that you only put URLs into the url field. Putting it anywhere else is likely to cause it to go off the page. If you are using the hyperref package, then these will be clickable. You can put links in the text with \url like this: `http://www.ru.is`. If you need to specify a location of a file, use the \path similarly: `C:\Documents and Settings\ .` The only difference is that paths are not clickable.

2.2.5 Hints

When placing tables and figures, *do not* force L^AT_EX to place them in a given place. Doing so almost always causes problems later. It is better to give hints [htb] than to force it !h].

Add linebreaks at least at the end of every sentence. This is especially important if you are using SVN or collaborating with others. Everything is done by line number, so if an error or issue is on line 5 which happens to be a page of text, good luck finding the problem.

Along those same lines, if you are not storing your thesis in version control (SVN, git, etc) or on a backed up drive, you are asking for trouble.

²This is the shortcut for German style quotations, which is the same as Icelandic.

2.2.6 Debugging

When things go wrong, it is sometimes hard to figure out what to do. The first step is always to go look at the log file. If you are making changes and they are not showing up, it is likely that you are viewing an old file. Delete the `.pdf` and `.aux` and try again. On some platforms, the package manager can get out of date. Make sure you have updated/synchronized before running `pdflatex` again.

Bibliography

- [1] *The IMRAD research paper format*, Jan. 2013. [Online]. Available: <http://www15.uta.fi/FAST/FIN/RESEARCH/imrad.html>.

Index

index, 6



School of Science and Engineering & School of
Computer Science
Reykjavík University
Menntavegur 1
101 Reykjavík, Iceland
Tel. +354 599 6200
Fax +354 599 6201
www.ru.is

DRAFT