A *fithesis3* user guide
for the Faculty of Medicine

BACHELOR'S THESIS

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Typesetting

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1 Introduction

To use the fithesis3 class, you can use an online LaTeX editor, such as Overleaf[1], which allows you to skip the installation described in Section 1.1 completely.

1.1 Installation

1.1.1 Installing a TeX distribution

If you decided not to use a public TeX distribution, you will need to install one locally before proceeding further. A TeX distribution contains tools and packages that are going to help you with preparing and typesetting your LaTeX documents.

The two major TeX distributions that you can install are MikTeX[2], which can be used with the Microsoft Windows operating system, and TeX Live[3], which can be installed on both Unix and Windows operating systems. The advantages of MikTeX over TeXLive include refined graphical user interface and the ability to install new packages on the fly.

Along with MikTeX, you will also need to install a Perl interpreter, such as Strawberry Perl[4]. TeX Live installs a Perl interpreter by default.

1.1.2 Installing packages

In order to function properly, fithesis3 needs the following packages packages to be installed in your TeX distribution: keyval, etoolbox, ifxetex, ifluatex, inputenc, xcolor, graphix, pdfpages, hyperref, microtype, tikz, setspace, geometry, fontspec, unicode-math, mathpazo, tex-gyre-pagella, lm, cmap, fontenc, tabularx, tabu, booktabs, csquotes, biblatex, fithesis.

If you performed a full installation of TeX Live, you should already have all the required packages installed. If you are using a partial installation of TeX Live, you can use the `tlmgr` command-line tool by executing `tlmgr install` ⟨*pkgname*⟩, where ⟨*pkgname*⟩ is the name of the package you wish to install. In some cases, TeX Live may assign a different name to a package. To find out the TeX Live name of a package, open the `http://www.ctan.org/pkg/`⟨*pkgname*⟩ webpage in a web browser. It should contain the following text:

<div align="center">

Contained in TeX Live as ⟨*texlivename*⟩

</div>

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1. Overleaf fithesis3 templates are located at `http://www.overleaf.com/gallery/tagged/muni`.
2. MikTeX can be acquired from `http://miktex.org/2.9/setup`.
3. TeX Live can be acquired from `http://www.tug.org/texlive`.
4. Strawberry Perl can be downloaded from `http://strawberryperl.com/`.

where ⟨*texlivename*⟩ corresponds to the TeX Live name of the package. Use this name instead of ⟨*pkgname*⟩ with `tlmgr`. Alternatively, you can download the packages manually from `http://www.ctan.org/pkg/`⟨*pkgname*⟩ and extract them into the `texmf/` directory located in your user home directory. Mind that the packages themselves may depend on other packages; if you are using a partial installation of TeX Live, you will have to resolve these dependencies manually by inspecting the documentation of each package.

If you use MikTeX and you enabled the *over the air installation of packages* during the installation, MikTeX will automatically download all the required packages, when you first typeset a fibeamer document. If you didn't enable this feature, you will need to enter the MikTeX package manager by running

Start ⟫ MikTeX ⟫ MikTeX Package Manager (Admin)

and download the packages manually through the user interface. In some cases, MikTeX may assign a different name to a package. To find out the MikTeX name of a package, open the `http://www.ctan.org/pkg/`⟨*pkgname*⟩ webpage in a web browser, where ⟨*pkgname*⟩ is the name of the package you wish to install. It should contain the following text:

Contained in MikTeX as ⟨*miktexname*⟩

where ⟨*miktexname*⟩ corresponds to the MikTeX name of the package. If you still can't find the package, try synchronizing the package database by selecting

Repository ⟫ Synchronize

from the menu bar of the MikTeX package manager. Mind that the packages themselves may depend on other packages; if you disabled the over the air installation of packages, you will have to resolve these dependencies manually by inspecting the documentation of each package.

If you wish to use a newer version of fithesis3 than the one that is available in your TeX distribution, you should download a file named `fithesis.tds.zip` containing the version of the package you wish to use and place it in a root directory that is recognized by your TeX distribution. In TeX Live[5], one of such directories is the `texmf/` folder in your user home directory. In MikTeX[6], the list of recognized root directories can be gleaned by running

Start ⟫ MikTeX ⟫ MikTeX Options (Admin) ⟫ Roots

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5. For more information about the TeX Live root directories, see `http://www.tug.org/texlive/doc/texlive-en/texlive-en.html#x1-110002.3`, Chapter 2.3.
6. For more information about the TeX Live root directories, see `http://docs.miktex.org/manual/localadditions.html`.

1.2 Picking a TeX engine

There are several programs, called TeX engines, that you can use to typeset fithesis3 LaTeX source files into displayable pdf documents. The ones we will discuss are pdfTeX and LuaTeX.

PdfTeX is the more conservative choice and most TeX editors use pdfTeX as the default TeX engine. The main advantage LuaTeX over pdfTeX for a fithesis3 user is the ability to use standard OpenType and TrueType fonts installed on your system, whereas pdfTeX is confined to the fonts installed in your TeX distribution.

If the ability to use arbitrary fonts within your documents interests you, Chapter 3 of the fontspec package manual[7] should provide you with the relevant information. If you are only going to use the fonts present in the TeX distribution or if you do not intend to change the preset fithesis3 fonts at all, you can safely use pdfTeX, which is currently also considerably faster than LuaTeX.

1.3 Creating and typesetting a fithesis3 document

Before using the fithesis3 class, it is useful to be familiar with the LaTeX typesetting system. A good way to get started is to read one of the introductory texts in English (*The very short guide to typesetting with LaTeX*, 2013; Cottrell, 1995; Oetiker et al., 2014; *LaTeX*, 2013) or in Czech (Rybička, 2003; Satrapa, 2011). Taking one of the *FI:PB029*, *PřF:M5751*, or *FF:PLIN028* courses taught at the Masaryk University is also helpful.

To become familiar with fithesis3, you are encouraged to inspect the example documents `med-pdflatex.pdf` and `med-lualatex.pdf` as well as their LaTeX source files that are named `med-pdflatex.tex` and `med-lualatex.tex`. The example documents are distributed along with the package inside the `example/` directory[8]. By modifying and by typesetting these LaTeX source files using either the pdfTeX or the LuaTeX engine, you can quickly gain a working knowledge of LaTeX and use these source files as the basis for your thesis.

If you are using an online editor, such as Overleaf [9], LaTeX source files will be typeset automatically, as you edit them. The TeX engine can be selected inside the ⚙project settings.

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7. The fontspec package manual is available at `http://mirrors.ctan.org/macros/latex/contrib/fontspec/fontspec.pdf`.
8. The example fithesis3 documents are also available online at `http://mirror.ctan.org/macros/latex/contrib/fithesis/example/mu`. To typeset the example documents, you need to download the `example.bib` file as well, as it contains the bibliography database used in the examples.
9. Overleaf fithesis3 templates are located at `http://www.overleaf.com/gallery/tagged/muni`.

If you are using a graphical TEX editor, such as TEXworks[10], you can typeset a LATEX source file by opening the source file from within the editor and running either the pdfLATEX or LuaLATEX (depending on your choice of TEX engine) command from the task bar. The command needs to be executed at least twice to produce the table of contents, the list of tables, and the list of figures. Additional commands for the typesetting of the bibliography and the index are described in the example documents.

If you are using the command line, you can typeset LATEX source files by running either the `pdflatex --shell-escape` *`name.tex`* command or the `lualatex` *`name.tex`* command depending on your chosen TEX engine, where *`name.tex`* corresponds to the name of a LATEX source file. In the case of the two aforementioned example files, the corresponding commands would be

`pdflatex --shell-escape med-pdflatex.tex` for pdfLATEX,

and `lualatex med-lualatex.tex` for LuaLATEX.

The command needs to be executed from within the directory, where the LATEX source file is located. In Windows, the command line can be opened in a directory by holding down the Shift key and by clicking the right mouse button while hovering the cursor over a directory. Select the Open Command Window Here option in the context menu that opens shortly afterwards. The command also needs to be executed at least twice.

Beside Overleaf and TEXworks, any text editor can be used to modify LATEX source files. However, it is important to ensure that the text editor saves the LATEX source files in the UTF-8 text encoding. A LATEX file saved in a different text encoding is likely to be either impossible to typeset or to produce unexpected output.

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10. TEXworks can be downloaded from `http://www.tug.org/texworks/`.

2 Configuration

This chapter provides a full list of the settings that can be used to set up and customize the fithesis3 class.

2.1 Setting the class options

At the beginning of a fithesis3 LaTeX source file, the command

```
\documentclass[option1, option2, ..., optionN]{fithesis3}
```

is used. The following list summarizes the options that are supported by the fithesis3 class and their meaning. Options that are enabled by default are ***set in italics***.

digital This option sets the options that are the default for the digital version of a thesis. These options are ***set in red***.

printed This option sets the options that are the default for the printed version of a thesis. These options are ***set in blue***.

10pt, 11pt, *12pt* These options set the font size of the main text to either 10 pt, 11 pt, or 12 pt, respectively. Using the 12 pt font size with the preset fonts results in the excessive line width of approximately 86 characters, which wears the eye of the reader, but is required by the page geometry specified by the formal requirements of the Faculty of Medicine. With two-column typesetting, the 11 pt font size yields approximately the optimal 45 characters per line.

oneside This option enables one-sided typesetting. One-sided typesetting and printing is generally discouraged. Use only if you don't have access to a double-sided printer, or if one-sided typesetting is a formal requirement at your faculty.

twoside This option enables double-sided typesetting. Double-sided typesetting is generally regarded as more visually pleasing and double-sided printing consumes less paper. Use at least 120 grams per square meter paper to prevent show-through.

*You may feel compelled to use **twoside** for the printed version of the thesis and **oneside** for the digital version to reduce the number of blank pages. This will, however, cause the page numbers to differ between the printed and the digital version, which will make it difficult to cite your work. Do not do it.*

onecolumn This option causes the main text of the thesis to be set in one column.

twocolumn This option causes the main text of the thesis to be set in two columns. The two-column format is unconventional in theses, although it is more readable and uses the page more effectively in the case of the Faculty of Medicine; you should consult its use with your thesis advisor. If you decide to use the two-column format, remember that you also need to change the font size option (**10pt**, **11pt**, **12pt**).

draft This option replaces any images with blank rectangles and marks all overfull lines with black boxes. Other packages that you use may behave differently[1] with the **draft** option specified. This can be useful, if you are going to print and proofread a draft of your document.

final Unlike the **draft** option, this option typesets the release version of the document.

palatino This option sets the roman text font family and the mathematical font family to Palatino.

nopalatino This option prevents fithesis3 from setting up the fonts. The user must set the fonts manually in the preamble of the document.

color This option enables the use of colors. A colorful version of the document is more visually pleasing, but shouldn't be used in a printed version, if you don't have access to a color printer. Unless you have a compelling reason not to, always use this option in the electronic version that you are going to publish online.

monochrome This option disables colors. Disabling colors is generally discouraged, unless you don't have access to a color printer. However, due to the prevalence of monochrome printing, this option is the default.

microtype This option sets up microtypographic extensions[2], which results in visually more pleasing paragraphs of text.

nomicrotype This option prevents fithesis3 from setting up microtypographic extensions.

table This option redefines some of the LaTeX table environments (`tabular`, `tabularx`, and `tabu`) to use alternating colors for odd and even rows. This option only works, if the **color** option is enabled.

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1. For more information about the effects of the draft option on various packages, see `http://tex.stackexchange.com/a/49369/70941`.
2. For more information about the TeX engine microtypographic extensions, see `http://mirrors.ctan.org/macros/latex/contrib/microtype/microtype.pdf`.

oldtable This option instructs the style not to redefine any table environments.

lot This option causes the list of tables to be included in the front matter of the thesis.

nolot This option removes the list of tables from the front matter of the thesis.

lof This option causes the list of figures to be included in the front matter of the thesis.

nolof This option removes the list of figures from the front matter of the thesis.

cover This option instructs the class to typeset the cover of the thesis on the first pages of the resulting document. A cover should be generally present in the electronic version of the document for completeness. The cover should not appear inside the printed document and should only serve as a template for the text imprinted on the front cover of the thesis cover.

nocover This option forbids the typesetting of the thesis cover. Use, if you are typesetting the printed version of a thesis and you are not going to have a cover made for your thesis.

2.2 Filling out the metadata

Beside the class options, you can also fill out information about your thesis by inserting the command

```
\thesissetup{
  key1 = {value1},
  key2 = {value2},
      ...
  keyN = {valueN},
}
```

into the preamble of your thesis. The following list summarizes the keys and values that are recognized by the fithesis3 class and are meaningful for the Faculty of Medicine.

title This key can be used to specify the title of the thesis. The value will be stored as one of the properties of the output PDF file; do not use any LaTeX formatting commands within the value.

TeXtitle This key can be used to specify the title of the thesis. The value will be typeset on the title page of the resulting PDF document, so you can use LaTeX formatting

141

commands within the value. If the value of the key is unspecified, the value of the **title** key will be used instead.

author This key can be used to specify the full name of the author.

keywords This key can be used to specify a list of keywords for your thesis. The value will be stored as one of the properties of the output PDF file; do not use any LaTeX formatting commands within the value.

TeXkeywords This key can be used to specify a list of keywords for your thesis. The value will be typeset in the resulting PDF document, so you can use LaTeX formatting commands within the value. If the value of the key is unspecified, the value of the **keywords** key will be used instead.

keywordsEn This key can be used to specify a list of English keywords for your thesis. Do not use any LaTeX formatting commands within the value. If you are typesetting your thesis in English, this value does not need to be specified.

TeXkeywordsEn This key can be used to specify a list of English keywords for your thesis. The value will be typeset in the resulting PDF document, so you can use LaTeX formatting commands within the value. If you are typesetting your thesis in English, this value does not need to be specified.

advisor This key can be used to specify the full name of the thesis advisor.

gender This key can be used to specify the gender of the author. It is used to determine the suffixes employed in the Czech and Slovak locales. If you are typesetting your document in English, you don't need to specify this information. The valid values include:

   m Male

   f Female

type This key can be used to specify the type of the thesis. The recognized types of theses include:

   bc Bachelor's thesis

   mgr Master's thesis

   d Doctoral thesis

   r Rigorous thesis

faculty This key can be used to set the faculty at which the thesis is going to be defended. To choose the Faculty of Medicine, use **med** as the value.

department This key can be used to specify the name of the department at which the thesis is going to be defended.

field This key can be used to specify the name of the author's field of study.

date This key can be used to specify the date of the thesis submission in the YYYY/MM/DD format, where YYYY stands for the full year, MM stands for the month, and DD stands for the day of month.

bib This key can be used to specify a list of BIB files containing the bibliography databases. The list should be in the following format:

```
path/to/first/file.bib, path/to/second/file.bib, ...
```

When this key is specified, the fithesis3 class will automatically typeset a bibliography section[3]. If you want more control over where and how the bibliography is typeset, use the `\printbibliography[bibintoc]` command.

When this key is not specified, no bibliography will be produced, which provides the opportunity for the advanced user to set up their bibliography management manually.

abstract This key can be used to specify the abstract of the thesis.

abstractEn This key can be used to specify the English abstract of the thesis. If you are typesetting your thesis in English, this value does not need to be specified.

thanks This key can be used to specify the text of the acknowledgement.

declaration This key can be used to specify the text of the declaration. If the value of the key is unspecified, the following text is going to be used instead in the English locale: "*Hereby I declare that this paper is my original authorial work, which I have worked out on my own. All sources, references, and literature used or excerpted during elaboration of this work are properly cited and listed in complete reference to the due source.*"

The complete list of metadata keys can be found in Section 2.2 of the technical documentation of the fithesis3 class Novotný et al., 2015.

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3. The bibliography will be typeset according to the ISO 690:2010 standard using the `biblatex-iso690` bibliography style. For more information, see `https://www.ctan.org/pkg/biblatex-iso690`.

3 Advanced usage

This chapter contains a couple of tips for the advanced user, who may wishe to configure the class beyond what the class options and the metadata settings offer. An understanding of how the main routine of fithesis3 works is beneficial. The main routine is documented in Section 2.4 of the technical documentation of the fithesis3 class Novotný et al., 2015.

3.1 Throubleshooting option clashes

If you need to load a package with a specific set of options and the package happens to be required by the fithesis3 class, as specified in Section 1.1.2, you may experience an option clash error. If this problem occurs, prepend **\PassOptionsToPackage**{options}{package} before the **\documentclass**[...]{fithesis3} command. If you need to configure the package, you can do that anywhere after the document preamble. If the package needs to be configured within the preamble, you can load the fithesis3 style files prematurely using the **\thesisload** command as follows:

```
\documentclass[...]{fithesis3}
%% The preamble
\thesisload
%% Here goes the package configuration.
\begin{document}
  %% The document
\end{document}
```

Note that only a small portion of the packages loaded by fithesis3 is loaded with a specific set of options. The rest of the packages is *lazy-loaded* (loaded only if the user hasn't already loaded them), in which case no clash is possible.

3.2 Overriding changes made by style and locale files

The fithesis3 style files are loaded immediately before the beginning of your document and may change values you would like to set by yourself, such as the LaTeX tocdepth and secnumdepth counters. Locale files are also loaded immediately before your document, which prevents you from changing locale strings from within the preamble of your document.

To overcome this limitation, you can load the style and locale files prematurely using the **\thesisload** command as follows:

```
\documentclass[...]{fithesis3}
%% The preamble
\thesisload
%% Here go your changes.
\begin{document}
  %% The document
\end{document}
```

Although you can use the **\thesisload** command anywhere in the preamble, using the macro before the metadata configuration will load the default style and locale files not taking into account your faculty and locale settings.

The **\thesisload** command also loads the hyperref package, which adds hyperlinks and PDF metadata into the resulting PDF document. This package is rather delicate, as it needs to be loaded after most other packages. Loading additional packages after **\thesisload** may therefore cause problems.

3.3 Changing the layout

If you are unsatisfied with the automatic arrangement of the mandatory parts of the thesis, you can disable it using the autoLayout metadata key:

```
\documentclass[...]{fithesis3}
\thesissetup{
  faculty=med,
  autoLayout=false}
\begin{document}
  A document which, except for this line,
  is completely empty.
\end{document}
```

This results in a document that only consists of the main matter of the thesis (see Figure 3.1). You can now manually insert the preamble and the postamble:

```
\documentclass[...]{fithesis3}
\thesissetup{
  faculty=med,
```

> A document which, except for this line, is completely empty.

Figure 3.1: A document with disabled `autoLayout`

```
  autoLayout=false}
\begin{document}
  \makeatletter\thesis@preamble\makeatother
  A document which once again contains all
  the mandatory parts of a thesis.
  \makeatletter\thesis@postamble\makeatother
\end{document}
```

We are now back to the original document. Instead of inserting the \thesis@preamble and \thesis@postamble commands into the document, we can insert only certain sections at the beginning and at the end of the document.

The \thesis@preamble and \thesis@postamble commands set up the proper environment and execute the \thesis@blocks@preamble and \thesis@blocks@postamble commands. To change the layout, it is sufficient to redefine \thesis@blocks@preamble and \thesis@blocks@postamble.

To create a document that only contains the title page at the beginning of the document and the list of tables at the end of the document, we would use the following code:

```
\documentclass[...]{fithesis3}
\thesissetup{
  faculty=med,
  autoLayout=false}
\begin{document}
  \makeatletter
    \def\thesis@blocks@preamble{\thesis@blocks@titlePage}
    \thesis@preamble
  \makeatother
  A document that only contains the title page and the
  list of tables.
  \makeatletter
    \def\thesis@blocks@postamble{\thesis@blocks@lot}
    \thesis@postamble
```

```
  \makeatother
\end{document}
```

The available blocks are documented in Section 3.6 of the technical documentation of the fithesis3 class Novotný et al., 2015.

3.4   Replacing the backend

Fithesis3 operates on top of the rapport3 class, which defines much of the document design. To change the backend class, you need to redefine the value of `\thesis`@backend from the default value of

$$[\texttt{a4paper}]\{\texttt{rapport3}\}$$

to a different value. This assignment needs to be performed prior to the `\documentclass` command. If you wanted to change the backend class of fithesis3 to the KOMA-Script screprt with the a4paper option, your document would start as follows:

```
\let\ChapFont\bfseries
\let\PageFont\bfseries
\makeatletter
  \def\thesis@backend{[a4paper]{scrreprt}}
\makeatother
\documentclass[...]{fithesis3}
%% Here goes the rest of the document.
```

The `\ChapFont` and `\PageFont` commands are provided by the rapport3 class, but not by the scrreprt class, which is why we needed to define them manually. Inconsistencies between different backend classes need to be resolved on a case-by-case basis.

Bibliography

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