



MASARYKOVA UNIVERZITA  
PŘÍRODOVĚDECKÁ FAKULTA  
DEPARTMENT OF COMPUTER GRAPHICS AND DESIGN

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# ***A fithesis3* user guide** **for the Faculty of Science**

Bakalářská práce

**Vít Novotný**

Vedoucí práce: Doc. RNDr. Petr Sojka, Ph.D.

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# 1 Introduction

Fithesis3 is a L<sup>A</sup>T<sub>E</sub>X document class, which aims to streamline the typesetting of mandatory parts of theses and dissertations, so that the author can focus at content alone. Unlike its predecessors, fithesis3 can be used to write theses across the faculties of the Masaryk University. To this end, the class comprises:

- *Style files*, which are unique for each faculty and which encapsulate the look and the arrangement of the final documents
- *Locale files*, which define the strings for the given locale
- *The base class*, which serves as a glue between style files, locale files and the input document

The overarching desing and the interactions between the style files, locale files and the base class are described in the technical documentation of the class [1] distributed along with the class. This guide, on the other hand, only aims to document the selected parts of the public API of the fithesis3 class that bear relevance to the style file of the Faculty of Science. Note that this guide is typeset using the said style file.

## 1.1 Required packages and fonts

In order to be able to use the fithesis3 class, your T<sub>E</sub>X installation needs to include the rapport3 class<sup>1</sup> and the following packages:

- keyval, etoolbox, ifxetex, ifluatex
- inputenc – only when typesetting with T<sub>E</sub>X or pdfT<sub>E</sub>X

In order to be able to use the fithesis3 class with the style files of the Faculty of Science, your T<sub>E</sub>X installation needs to also include the following packages:

- xcolor, graphix, pdfpages, hyperref, keyval, tikz, changepage

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1. See <http://www.ctan.org/pkg/ntgclass>

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- `fontspec`, `unicode-math` – only when typesetting with  $\XeTeX$  or  $\text{LuaTeX}$
- `mathpazo`, `tgpagella`, `lmodern`, `cmap`, `fontenc` – only when typesetting with  $\text{T}\text{E}\text{X}$  or  $\text{pdf}\text{T}\text{E}\text{X}$
- `tabularx`, `booktabs` – only when the `table` option is specified (see Section 2.3)

The  $\text{T}\text{E}\text{X}$  Gyre Pagella<sup>2</sup> and  $\text{T}\text{E}\text{X}$  Gyre Pagella Math<sup>3</sup> OpenType fonts are also required, when typesetting with  $\XeTeX$  or  $\text{LuaTeX}$ . All these are likely to be a part of any reasonably modern  $\text{T}\text{E}\text{X}$  distribution.

## 1.2 Installation

This section covers the installation of the `fithesis3` class. Please note that the installation of the class is fully optional. You can typeset your thesis by either directly editing either the `pdflatex.tex`, `xelatex.tex` or `lualatex.tex` example files distributed along with the class or by pointing your source document to the class as follows:

```
\documentclass{path/fithesis3}
\thesissetup{basepath=path}
% The rest of the document
```

where `path` corresponds to the path of the directory containing the `fithesis3.cls` file.

When installing, first make sure that the `fithesis3` class is not a part of your  $\text{T}\text{E}\text{X}$  distribution already. This can be easily verified by creating the minimal document described in the next section and typesetting it using either the  $\XeTeX$ ,  $\text{LuaTeX}$  or the  $\text{pdf}\text{T}\text{E}\text{X}$  engine, respectively. In case `fithesis3` is not a part of your  $\text{T}\text{E}\text{X}$  distribution, the typesetting will prematurely terminate with the following error:

! LaTeX Error: File ‘fithesis3/fithesis3.cls’ not found.

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2. See <http://www.ctan.org/pkg/tex-gyre-pagella>

3. See <http://www.ctan.org/pkg/tex-gyre-math-pagella>

If the `fithesis3` class is not a part of your distribution, you can proceed to the installation. This can be achieved by extracting the `fithesis3.tds.zip` archive distributed along with the class into one of the  $\text{\TeX}$  directory structure trees within your  $\text{\TeX}$  distribution. If you are using  $\text{\TeX}$ Live<sup>4</sup>, this can be achieved by creating a `texmf/` directory within your user home directory and by extracting the `fithesis3.tds.zip` archive into it. For  $\text{\MiKTeX}$ , see the online documentation<sup>5</sup>.

### 1.3 A minimal document

Before using the `fithesis3` class, you should be familiar with the  $\text{\LaTeX}$  typesetting system. A good way to get started is to read one of the introductory texts in English [2–5] or in Czech [6, 7]. We will start by creating a plain text document named `helloworld.tex` in the UTF-8 encoding with the following content:

```
\documentclass{fithesis3}
\thesissetup{faculty=sci}
\begin{document}
  Hello world
\end{document}
```

Now, typeset the document using either the  $\text{\XeTeX}$ ,  $\text{\LuaTeX}$  or the  $\text{\XeTeX}$  engine with the  $\text{\LaTeX}$  format. If everything is set up correctly, you should end up with a document containing all the mandatory parts of a thesis and one page of the main matter containing a `Hello world` paragraph. You should notice that the document is implicitly typeset in English and that it contains lots of placeholder strings for missing metadata (see Figure 1.1). In the next chapter, we are going to address that.

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4. See <http://www.tug.org/texlive/doc.html>, Chapter 2.3

5. See <http://docs.miktex.org/manual/localadditions.html>

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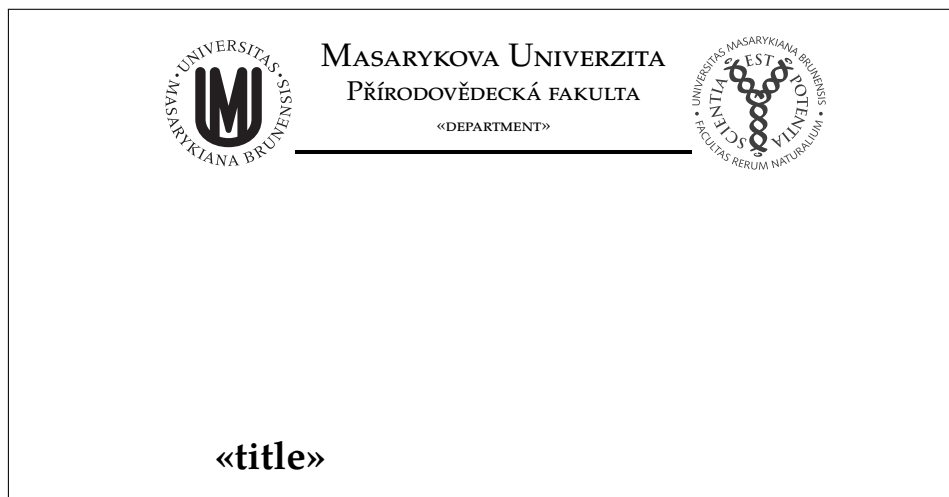


Figure 1.1: The placeholder strings in the minimal document

## 2 Configuring the class

In this chapter, we will configure the class to use the correct locale, to insert the correct metadata into the output document and to be laid out in a meaningful way.

### 2.1 Setting the locale

First, we are going to set the locale of the document class. This affects the locale of the mandatory parts of thesis. To see what locales are available, list the contents of the `fithesis3/locale/` directory. It should contain several `locale.dtx` files. Each of these *locales* can be loaded by inserting the `\thesissetup{locale=locale}` command into the preamble of the document.

If you use the `babel` or the `polyglossia` package to load the hyphenation patterns for your locale, you don't need to set the locale at all, `fithesis3` will use the main language of `babel` or `polyglossia`.

```
\documentclass{fithesis3}
\thesissetup{faculty=sci}
% Using the babel package:
\usepackage[czech]{babel}
\begin{document}
  The mandatory parts of the thesis
  are going to be typeset in Czech.
\end{document}
```

```
\documentclass{fithesis3}
\thesissetup{faculty=sci}
% Using the polyglossia package:
\usepackage{polyglossia}
\setmainlanguage{czech}
\begin{document}
  The mandatory parts of the thesis
  are going to be typeset in Czech.
\end{document}
```

At the time of writing this text, `polyglossia` can only be used with  $\text{\LaTeX}$ ,

whereas `babel` can be used with `pdfTeX`, `XYTeX` and `LuaTeX`. On the other hand, the `babel` package can only be used with Latin scripts, while the `polyglossia` package supports non-Latin scripts as well. You are advised to use one of them, depending on your choice of `TeX` engine and requirements.

## 2.2 Inserting metadata

Next, we are going to insert some metadata into the document using the `\thesissetup` command. This command accepts a comma-delimited *key=value* list. The placeholder strings in our minimal document map directly into the *keys*, so to change the «*author*» placeholder into *Jane Doe*, simply insert the `\thesissetup{author=Jane Doe}` command into the preamble of your document.

Note, however, that some keys can not be deduced directly from the output document. The `thanks` key, for example, is invisible by default, since the acknowledgement is not a mandatory part of the thesis and it only gets inserted into the document, when the `thanks` key is defined. Some other *keys*, like the `abstract` key, can also span multiple paragraphs, in which case they need to be set using the `\thesislong{key}{value}` command as follows:

```
\documentclass{fithesis3}
\thesissetup{
  faculty=sci,
  author=Jane Doe}
\thesislong{abstract}{
  In this document, I am going to
  explore the craft of creating
  abstracts \ldots

  \ldots that span multiple
  paragraphs.}
\begin{document}
  Hello world!
\end{document}
```

If the *value* of a *key* contains a comma, the `\thesissetup{key=value}`



command would erroneously interpret it as a delimiter. To prevent this behaviour, enclose the *value* in curly braces as follows:

```
\documentclass{fithesis3}
\thesissetup{
  faculty=sci,
  author=Jane Doe,
  advisor={RNDr. \ John Doe, Ph.D.},
  keywords={keyword1, keyword2}}
\begin{document}
  Hello world!
\end{document}
```

The complete list of *keys* and their effects can be found in the technical documentation of the class [1, chapter *Public API*] distributed along with the class.

## 2.3 Style options

The look of the resulting document can be affected by *options* passed to the style file using the `\documentclass[options]{fithesis3}` syntax. The complete list of options for the style files of the Masaryk University can be found in the technical documentation of the class [1, chapter *Style files*] distributed along with the package. Some of the more important options are listed in Table 2.1 for your convenience.

<i>Name</i>	<i>Description</i>
oneside	Enables one-sided typesetting. This 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.
twoside	Enables double-sided typesetting. Double-sided typesetting consumes less paper, is generally regarded as more visually pleasing and is enabled by default. Use at least 120 grams per square meter paper to prevent show-through.
color	Enables 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 e-version.
monochrome	Disables colors. Disabling colors is generally discouraged, unless you don't have access to a color printer.
cover	Typesets the cover of the thesis. Should be generally used in the e-version.
nocover	Forbids the typesetting of the thesis cover. Use, if you're typesetting the printed version and have no desire to have a cover made for your thesis. This option is the default.
table	Redefines the tabular and tabularx environments to use alternating colors for odd and even rows like this table does.
oldtable	Instructs the style not to redefine the tabular and tabularx environments. This option is the default.

Table 2.1: A non-exhaustive list of basic options accepted by the styles of the Masaryk University

## 3 Advanced usage

This chapter is dedicated to those users, who wish to customize the class to better suit their needs.

### 3.1 Troubleshooting option clashes

When a package is required twice, each time with different options, an option clash error occurs:

! LaTeX Error: Option clash for package hyperref

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, prepend the `\PassOptionsToPackage{options}{package}` command before the `\documentclass{...}` statement. If you need to configure the *package*, you can do that anywhere within the document preamble.

If you need to load a *package* with a specific set of *options* and the *package* happens to be required by the style files of the Masaryk University, as specified in Section 1.1, insert the `\PassOptionsToPackage{options}{package}` command anywhere within the document preamble. If you need to configure the *package*, you can do that anywhere after the document preamble. If you need to configure the *package* within the preamble, you can load the style files prematurely using the `\thesis@load` command as follows:

```
\documentclass{fithesis3}
% Preamble
\makeatletter\thesis@load\makeatother
% The package configuration goes here
\begin{document}
\end{document}
```

Note that only a small portion of the packages required by the style files needs to be loaded with a specific set of options, so clashes should be relatively rare.

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

Figure 3.1: A document with disabled autoLayout

## 3.2 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` meta-data key:

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

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

```
\documentclass{fithesis3}
\thesissetup{
  faculty=sci,
  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}
```

This alone would be a useless exercise, as we're now back to the original document. However, instead of inserting the `\thesis@preamble` and `\thesis@postamble` commands into the document, we can insert only certain sections of the document preamble and postamble to which these commands expand. `\thesis@preamble` expands to the following commands:

```
{\def
\thesis@locale
{czech}\thesis@blocks@cover
\thesis@blocks@frontMatter
\thesis@blocks@titlePage
\thesis@blocks@clearRight
\thesis@blocks@bibEntry
\thesis@blocks@bibEntryEn
\thesis@blocks@abstract
\thesis@blocks@abstractEn
\thesis@blocks@assignment
\thesis@blocks@thanks
\thesis@blocks@declaration
\thesis@blocks@tables
}\thesis@blocks@mainMatter
```

and `\thesis@postamble` expands to the following commands:

*`\empty`*

To create a document, which only contains the thesis cover prior to the text, we would use the following:

```
\documentclass{fithesis3}
\thesissetup{
  faculty=sci,
  autoLayout=false}
\begin{document}
  \makeatletter
    \thesis@blocks@cover
    \thesis@blocks@mainMatter
  \makeatother
  A document which contains only the cover
  of the thesis and the main matter.
\end{document}
```

The available blocks are documented in the technical documentation of the class [1, chapter *Style files*] distributed along with the package.



## Bibliography

- [1] Vít Novotný et al. *The fithesis3 class for the typesetting of theses written at the Masaryk University in Brno*. 2015.
- [2] *The very short guide to typesetting with L<sup>A</sup>T<sub>E</sub>X*. Silmaril Consultants, Jan. 2013. URL: <http://tug.ctan.org/info/latex-veryshortguide/veryshortguide.pdf> (visited on 05/03/2015).
- [3] Allin Cottrell. *A short introduction to L<sup>A</sup>T<sub>E</sub>X*. Dec. 1995. URL: [http://ricardo.ecn.wfu.edu/~cottrell/ecn297/latex\\_tut.pdf](http://ricardo.ecn.wfu.edu/~cottrell/ecn297/latex_tut.pdf) (visited on 05/03/2015).
- [4] Tobias Oetiker et al. *The Not So Short Introduction to L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> L<sup>A</sup>T<sub>E</sub>X 2<sub>ε</sub> in 157 minutes*. Oct. 2014. URL: <http://tobi.oetiker.ch/lshort/lshort.pdf> (visited on 05/03/2015).
- [5] L<sup>A</sup>T<sub>E</sub>X. Wikibooks.org, March 2013. URL: <http://en.wikibooks.org/wiki/LaTeX> (visited on 05/03/2015).
- [6] Jiří Rybička. *L<sup>A</sup>T<sub>E</sub>X pro začátečníky*. 3rd ed. Konvoj, 2003. ISBN: 80-7302-049-1.
- [7] Pavel Satrapa. *L<sup>A</sup>T<sub>E</sub>X pro pragmatiky*. June 2011. URL: <ftp://ftp.tex.ac.uk/tex-archive/info/czech/latex-pro-pragmatiky/latex-pro-pragmatiky.pdf> (visited on 05/03/2015).