User Manual

Czech Technical University in Prague

Manual for LaTeX class ctuthesis

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March 2015

Acknowledgements

Děkuji ČVUT, že mi je tak dobrou *alma mater*.

Declaration

Prohlašuji, že jsem předloženou práci vypracoval samostatně, a že jsem uvedl veškerou použitou literaturu.

V Praze, 10. March 2015

Abstract

This manual shows how to use the ctuthesis LaTeX class, what are the requirements, etc.

Keywords: manual, degree project, LaTeX

Abstrakt

Tento mánuál představuje LaTeXovou třídu ctuthesis, její použití, požadavky na systém atd.

Klíčová slova: manuál, závěrečnná práce, LaTeX

Překlad názvu: Manuál ke třídě ctuthesis pro LaTeX

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Chapter 1

Introduction

In this manual, we want to explain how to use the class `ctuthesis`. The manual consists of three main parts:

- basic user guide;
- reference manual;
- guide for template authors.

Students and other 'users' of the class should carefully read the basic user guide (Chapter 2), and visit the reference when needed (Chapter **??**).

Chapter 2
User Guide

2.1 Installing the class

The class comprises the files listed in Table 2.1. The class is build over the LaTeX3 bundle, which is a project under development and new programming features are added regularly. This means that the class works as is only with TeX Live 2014. If you have an eariler version of LaTeX distribution, you have basically two options:

1. Install TeX Live 2014 or newer; it is not difficult and it will save

File name	Description
`ctuthesis.cls`	Class file itself
`ctu_logo_blue.pdf`	Logo of the university; this file is subject to different license and copyright than the rest of the class files
`ctuthesis.ist`	Nicely loooking style for `makeindex`
`latex3-tl2014.zip`	ZIP file containing the "good" version of LaTeX3
`ctuman.pdf`	This manual
`ctuman-*.tex`	Source code to this manual
`ctuth-core.tex`	Core definitions for the class; users do not need to ever load this file manually
`ctuth-pkg.tex`	Package loading code for the class; users do not need to ever load this file manually
`ctuth-names.tex`	Language-dependent part of the class; users should not need to modify this file or load it manually
`ctuth-templates.tex`	Templates for various parts of the document; users may look inside this file and see how things are done; this is discussed in more detail in Chapter **??**

Table 2.1: The files of the class `ctuthesis`.

you all the troubles. The installing guide is on TUG's website at `http://tug.org/texlive/`.

2. Install just the new version of LaTeX3. This is tested to work on TeX Live from version 2010. The bundle is attached as a ZIP file, it is sufficient to extract all the files in the working directory.

2.2 Minimal example

The minimal example of a Bachelor project at the Nuclear Faculty looks like this:

```
\documentclass{ctuthesis}

\ctusetup{
    xdoctype = B,
    xfaculty = F4,
    mainlanguage = english,
    titlelanguage = english,
    title-english = {Planting Uranium},
    title-czech = {Sázení uranu},
    department-english = {Department of Mathematics},
    author = {Lolek Pilný},
    supervisor = {Prof. Krutoš Spravedlivý, CSc.},
    supervisor-address = {Pěstitelský ústav,\\ Zářivá 232,\\
      12000 Praha 2},
    month = 5,
    year = 2330,
}

\ctuprocess

\begin{abstract-english}
We develop \ldots
\end{abstract-english}

\begin{abstract-czech}
Rozvíjíme \ldots
\end{abstract-czech}

\begin{document}

\maketitle

\chapter{Introduction}

Foo bar
```

```
\chapter{Conclusion}

Lorep ipsum \cite{doe}

\begin{thebibliography}{1}

\bibitem{doe} J. Doe. \emph{Book on foobar.} Publisher X, 2300.

\end{thebibliography}

\end{document}
```

At the first sight, it may look complicated, but the basic structure is pretty simple:

```
\documentclass{ctuthesis}
\ctusetup{
    < key = value settings >
}
\ctuprocess

< abstracts and other frontmatter text here,
     and standard preamble contents >

\begin{document}

\maketitle

< the whole text here >

\end{document}
```

2.3 Setting up the class

This section lists all various settings that can be made to the class. The ones marked '⋈' are *always mandatory*. The ones marked '⋈' are *mandatory in almost all cases, with some small exceptions*. For most of them, no errors are issued if they are missing, though.

2.3.1 Options to `\documentclass`

documentclass
ctuthesis
10pt
11pt
12pt
draft
oneside

The class `ctuthesis` itself takes couple optional arguments, namely `10pt`, `11pt` and `12pt` for setting up the basic font size (the default is 11 pt).

Then it takes the option `draft` that sets some draft options (the ones common in LaTeX). It also takes the option `oneside`, which switches to one-sided mode; however, *we strongly advice against using this option.*

2.3.2 Parameters to `\ctusetup`

ctusetup

The parameters can be diveded into several groups.

Text fields. Some of the fields — like the theses title — are language-dependent. They are marked `key-<lang>` below, and it means that multiple keys exist: `key-english`, `key-czech` and `key-slovak`.

author
- ⋈ `author` — author's name, including titles.

supervisor
- ⋈ `supervisor` — supervisor's name, including titles.

supervisor-address
- ⋈ `supervisor-address` — supervisor's affiliation and address; use `\\` to format it with linebreaks.

year
month
day
- ⋈ `year`, ⋈ `month`, `day` — numerical values of the date of theses publishing.

title-<lang>
- ⋈ `title-<lang>` — title of the thesis.

subtitle-<lang>
- `subtitle-<lang>` — subtitle.

university-<lang>
- `university-<lang>` — name of the university (is preset for CTU).

university-endl-<lang>
- `university-endl-<lang>` — name of the univesity broken in 4 lines using `\\`.

faculty-<lang>
- `faculty-<lang>` — name of the faculty (set up automatically, see `xfaculty` below).

facultynum
- `facultynum` — standard number of the faculty (set up automatically, see `xfaculty` below).

doctype-<lang>
- `doctype-<lang>` — type of the document/thesis (set up automatically, see `xdoctype` below).

department-<lang>
- ⋈ `department-<lang>` — name of the department.

fieldofstudy-<lang>
subfieldofstudy-<lang>
- ⋈ `fieldofstudy-<lang>`, `subfieldofstudy-<lang>` — field of study.

keywords-<lang>
- ⋈ `keywords-<lang>` — comma-separated list of keywords.

General fields.

mainlanguage
- ⋈ `mainlanguage` — main language of the thesis; the choices are `czech`, `english` and `slovak`.

titlelanguage
- `titlelanguage` — language in which the title pages are typeset (defaults to `mainlanguage`).

secondlanguage
- `secondlanguage` — language of the second abstract (set up automatically so that two abstracts appear: one in English and one in Czech, unless the thesis is in Slovakian, in which case the two abstracts are in English and in Slovakian).

- `otherlanguages` — allows more languages to be loaded by `babel` package, accepts a comma-separated list. otherlanguages
- ⋈ `xfaculty` — takes values `F1`, `F2`, ..., `F8` and sets up the faculty name and number automatically. xfaculty
- ⋈ `xdoctype` — takes values `B` (bachelor), `M` (master) or `D` (dissertation) and sets up the document type automatically; for non-thesis-like documents, use `doctype-<lang>`. xdoctype
- ⋈ `specification-file` — the path to the specification file (usually something like `zadani.pdf`, the current directory is searched for the file of course). specification-file
- `front-specification` — if set to true, the specification will appear just after the titlepage (defaults to `false`). front-specification
- `front-list-of-figures`, `front-list-of-tables` — says whether the list of figures/tables will be set in the frontmatter (default to `true`) front-list-of-figures front-list-of-tables
- `monochrome` — switches to optimized monochrome setup, in case the work will not be printed in colour. monochrome
- `savetoner` — disables background and other too dark things to save toner while printing drafts. savetoner

Default package loading. The class attempts to set up some packages nicely if the user wants to use them. So for instance, the package `listings` can be pre-set to include the blue background of all listings. In order to leave the user the chance to mess with things "his own way", options are offered to enable or disable certain packages. The format of the option name is always `pkg-<packagename>` and it accepts either `true` or `false`

- `pkg-hyperref` (default: `true`) — sets up all the fields of the PDF document. pkg-hyperref
- `pkg-listings` (default: `false`) — sets up `\ttfamily` font for all listings, and adds a background to all display listings. For inline listings, this is a bit more complicated; we rather implemented a new macro `\ctulst(color)[settings]!<text>!` that behaves exactly like `\lstinline!<text>!`, but applies the background; the color is an optional argument (in parentheses `()`) and defaults to the blue background color seen in this manual. Any printable symbol but one of `[({}` can be used in place of `!`. pkg-listings ctulst
- `pkg-amsthm` (default: `true`) — sets up nicely the basic styles for theorems, but does not set up the theorem environment themselves. More information is in Section **??** pkg-amsthm
- `pkg-biblatex` (default: `false`) — more details in Section **??**. pkg-biblatex

2.3.3 Text environments used in the preamble

There is a small number of environments that should be used in the preamble in order to set up various text fields, mostly used in the front matter.

abstract-<lang>
- `{abstract-<lang>}` — abstract; the language has to be always specified.

thanks
- `{thanks}` — acknowledgements; can be used for both personal and grant ackowledgements.

declaration
- `{declaration}` — students are oblidged to declare that the works is their works, and maybe some more things, depending on the faculty's or deparment's regulations.

2.4 Various parts of the document

2.4.1 Frontmatter

maketitle
mainmatter
frontmatter

Typically, the frontmatter will be only one command: `\maketitle`. This typesets the titlepage, the acknowledgements, the declaration, the two abstracts, the table of contents, and possibly the lists of figures and tables. Afterwards, it immediately switches to `\mainmatter`.

Another option, which should be used only in special cases, is to start the frontmatter with `\frontmatter`, include whatever material should be there and close it by `\mainmatter`. This is discussed in detail in Chapter **??**.

2.4.2 Mainmatter and backmatter. Sectioning

chapter
section
subsection
subsubsection
paragraph
subparagraph
part

Standard sectioning commands are suported, they are `\chapter`, `\section`, `\subsection`, `\subsubsection`. These ought to follow the hierarchy from top to bottom. There is also `\paragraph` and `\subparagraph` which can be used as lowest-level sectioning commands. Long works can be divided into parts using `\part`; its numbering is independent of the other ones. All these commands take standard optional argument and star; however, we advice against using starred sections.

appendix

The appendices are introduced by command `\appendix`. Then, each appendix is a chapter, so the standard `\chapter` command ought to be used. In appendix, even chapters started by `\chapter*` such as the bibliography and the index are numbered. (In a document without appendices, these should be unnumbered. Once appendices are used, all indexes and alike should be standard numbered appendices.) For unnumbered appendices, `\chapter**` can be used.

appendix*
appendix**

If the document is divided into parts, the appendices are introduced by a part-like title "Appendices", both in the document and in the table of contents. This can be suppressed by using `\appendix*` (keeps the line in the table of contents) or `\appendix**`.

specification as chapter

If the project specification is to be included as an appendix, it can be

done by `\ctutemplate{specification as chapter}`.

There is no true backmatter behaviour defined in the class. The only thing that would belong to the backmatter is the colophon (‘*tiráž*’). Users are advised to use `\cleardoublepage* \thispagestyle{empty}` and then typeset the colophon to their liking.

2.4.3 Bibliography

There are three ways how to include the bibliography:

1. Using Biblatex. In that case, setting up `pkg-biblatex = true` is recommended. The bibliography is then included using `\addbibresource` and `\printbibliography`.
2. Using BibTeX. No special setting is needed, and the bibliography is included using `\bibliographystyle` and `\bibliography`.
3. By direct input. The standard environment `{thebibliography}` can be used for this.

We kindly ask users to consult the manuals to the specific packages for their usage.

2.4.4 Index

To generate the index, use `pkg-makeidx = true`, and put `\printindex` where the index should appear. We provide an in-house style for the index called `ctuthesis.ist`. The index generation is dependent on calling the external tool `makeindex`, in a similar way in which the bibliography generation depends on `bibtex` or `biber`. The proper way how to call this tool is the following:

makeidx
makeindex
printindex

```
makeindex -s ctuthesis.ist <filename>
```

where `<filename>` is the root name of your main project file (without `.tex`).

ctuthesis.ist

2.4.5 List of notation. Nomenclature

We do not preset any special environment for typesetting appendices such as list of notation or nomenclature. One of the possible standard way how to do it is with the help of the packages `tabularx`, `array` and `booktabs` as follows:

tabularx
array
booktabs

```
\documentclass{ctuthesis}
\ctusetup{ mainlanguage = english }
\ctuprocess
\usepackage{tabularx, array, booktabs}
\begin{document}

\appendix
```

```
\chapter*{List of Notation}

\noindent
\begin{tabularx}{\linewidth}
  { l >{\raggedright\arraybackslash}X }
\bfseries Symbol & \bfseries Meaning \\\Midrule
$\alpha$ & The angle of attack \\
$\mathbb{R}$ & The real numbers \\
\end{tabularx}

\end{document}
```

ltxtable ltablex

In the case the notation is longer than one page, the package `ltxtable` or `ltablex` can be used.

2.4.6 Floating objects: Figures and tables

figure table

Float introduction. Floats are input either as `{figure}` or `{table}` environment. All floats are automatically typeset centered, so a typical code for a figure is the following:

```
\begin{figure}
\includegraphics[width=0.8\linewidth]{mygraphicfile.pdf}
\caption{We depict a foo-bar here.}
\label{fig:foobar}
\end{figure}
```

For a table, it is the following:

```
\begin{table}
\begin{ctucolortab}
\begin{tabular}{cc}
\bfseries Foo & \bfseries Bar \\\Midrule
foo1 & bar1 \\
foo2 & bar2
\end{tabular}
\end{ctucolortab}
\caption{Table of foo-bar.}
\label{tab:foobar}
\end{table}
```

ctucolortab Midrule midrule

Note the usage of the environment `{ctucolortab}` to make the table get a blue background, and the usage of `\Midrule` to get a horizontal line in the table (a thinner line can be obtained using `\midrule`). Also note the deliberate absence of verical rules.

2.4.7 Mathematics

All standard concepts for typesetting mathematics are working as in any other LaTeX class.

2.4.8 Colors

The class uses internally many named colors. For the general use, two non-standard colors are provided: `ctublue` `ctublue` and `ctulightblue` `ctulightblue`. The colours are used for the headers, rules in the titles, title texts, backgrounds for listings and tables etc.

ctublue
ctulightblue

Appendix A

Index

Symbols

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Appendix B

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