

L^AT_EX for Beginners – Handout

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This is a handout gives an overview over all the commands discussed in the piasta course "L^AT_EX for Beginners". It is in no way a complete LaTeX reference manual. For further information, please consult the list of useful literature and links in the end of this document.

Remember: You don't have to remember all of the commands, just know where to look them up. BUT: After the seminar you MUST exercise to be really able to use LaTeX. Don't give up :)

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1 The Structure of a Document

Document class

`\documentclass[ARGUMENTS]{CLASS}`

Classes:

article, scrartcl – short texts

report, scrreprt – for longer articles, a section level more than for article

book, scrbook – books consisting of chapters

letter, scrletter – letters

beamer – presentations

The `scr_` names are variants from the Koma-Script project. When in doubt use them. In the course we used the class `article`. There are several optional arguments available for this class such as: `a4paper` (for 297 x 210mm), the default is `letterpaper` (fr 279.4 x 215.9mm)

Other arguments:

`10pt` , `11pt` or `12pt`: Standard font size

`titlepage` , `notitlepage` : Title on a page of its own, or not

`oneside` , `twoside` : Choice between a single or double-sided layout. Margins have different sizes (for double-sided symmetrical considering the bond). There is a distinction between left and right headers and footers.

Example: `\documentclass[a4paper, 12pt,oneside]{article}`

2 Commands

General form of a command: `\NameOfCommand[optional Parameter]{Argument}`

Like seen in `\documentclass[a4paper, 12pt,oneside]{article}`

Anatomy of a command:

1. `\` (Backslash) – tells \LaTeX that a command is starting
2. `documentclass` – Name of the command, case-sensitive, `\Textit` \neq `\textit`
3. `[a4paper, 12pt,oneside]` – optional parameters, can always be omitted, what parameters are allowed depends on the command
4. `{article}` – argument, i.e. what the command applies to, between “{”, ”}” (Curly Brackets)

A command could take zero or several argument instead of one. Additional arguments need further pairs of brackets.

Environments

Environments are special commands which contain a larger body of text or other content. They influence the layout and might provide specific commands. To start an environment, type `\begin{environmentName}` and `\end{environmentName}` to close it.

The most basic environment is: the document

```
\begin{document}
The text of the document
\end{document}
```

Other environment covered in this course are: figure, table, tabular, abstract, itemize, enumerate and description

Packages

L^AT_EX is modular. While there are many basic functions, additional packages can be loaded to gain access to additional commands. There are packages for many different tasks, for example, in order to load graphics or to set the encoding used. Packages are loaded in the so-called preamble, i.e. between `\documentclass{...}` and `\begin{document}`.

To load a package, the following command is used:

```
\usepackage[Options of the package]{Name of the package}
```

Several packages can be loaded at once by separating the names by commas:

```
\usepackage{Name1, Name2}
```

No options can be specified this way.

Example:

```
%Preamble
\documentclass{article}

\usepackage{babel}

%Front matter
\title{Test document}
\author{Name Surname}

\begin{document}
\maketitle

%Body

\begin{abstract}
Here is the abstract
\end{abstract}
```

```

\section{Test 1}
....

%Back matter
\bibliography{BIB_FILE}
\bibliographystyle{NAME}
\end{document}

```

When writing non-English text, you should load a language specific package. For German:

```

usepackage[ngerman]{babel}
% activates the German syllable separation
% the n stands for new, i.e. after the latest Rechtschreibreform

\usepackage[utf8]{inputenc} %Allows the use of ''Umlaute'': , , , etc.

```

3 Layout

It does not matter whether you separate the words by one, two or more spaces. In the output the correct space is used. Paragraphs are separated by blank lines. Again, the number of line breaks is not important. The line break is calculated only by LaTeX. It does not matter how the text is arranged in the editor.

The ”%” character is used for comments. Everything after this character (in a row) is omitted.

TeX does most of the work for you automatically. Line breaks in the source text are ignored, unless there is a blank line which starts a new paragraph.

Manual line breaks:

- `\par` indicates a paragraph (you can use it instead of adding a blank line).
- `\newline` or `\\` causes a line break without starting a new paragraph, the line is not stretched to span the whole width.
- `\linebreak` – almost the same, the line is set flush.
- `\nolinebreak` prevents the line breaks.
- Empty line – new paragraph

Manual Page Breaks:

- `\samepage` or as environment: `\begin{samepage}` and `\end{samepage}` – a paragraph or a text part does not break between pages.

- `\pagebreak` – page break, where the lower edge is held constant.
- `\nopagebreak` prevents the page break.
- `\newpage` – new page without compensating the bottom.

Commands for the Title-Page

- `\title{Title}` – Here, the title information is defined.
- `\date{Date}` – It is responsible for specifying the date of publication. With the command `\today` you can output the current date. When no date is needed, use `\date{}`
- `\author{Author}` – For several authors, the names separated by `\and`
- `\maketitle` – At the point where this command is used, the title page appears in the document.

Sectioning Commands:

- `\part`
- `\chapter` (not available in the article document class)
- `\section`
- `\subsection`
- `\subsubsection`
- `\paragraph`
- `\subparagraph`

Positioning:

You can use the environments `flushleft`, `center` and `flushright`, for left, center and right, respectively.

More on page layout: http://en.wikibooks.org/wiki/LaTeX/Page_Layout

4 Font formatting

- `\textit` : Italic shape
- `\textbf` : Boldface series
- `\textsl` : Slanted shape
- `\textsc` : Small caps shape
- `\textmd` : Medium series

- `\textup` : Upright shape
- `\textrm` : Roman family
- `\textsf` : Sans serif font family
- `\texttt` : Typewriter font family

There is also the command `\emph` (like *emphasize*), which sets the text as italics, unless the surrounding text already is italics, then it is set to normal again.

Font sizes:

- `\tiny` : tiny
- `\footnotesize` : the size of footnotes
- `\small` : small
- `\normalsize` : normal
- `\large` : large
- `\Large` : larger
- `\LARGE` : even larger
- `\huge` : huge
- `\Huge` : the hugest

Font faces are activated by loading the specific package, e.g. (package name – font name):

- `lmodern` – Latin Modern
- `times` – Times
- `helvet` – Helvetica
- `bookman` – Bookman
- `iwona` – Iwona
- `palatino` – Palatino

5 Other useful Commands

Contents: `\tableofcontents`

List of Figures / Tables: `\listoffigures` and `\listoftables`

Abstract is an environment:

```
\begin{abstract}
TEXT ABSTRACT
\end{abstract}
```

Some symbols have special meanings the compiler. To make them appear in the output document you have to use special commands:

Character	Escape sequence
<code>\</code>	<code>\textbackslash</code>
<code>^</code>	<code>\textasciicircum { }</code>
<code> </code>	<code>\textbar</code>
<code><</code>	<code>\textless</code>
<code>></code>	<code>\textgreater</code>
<code>~</code>	<code>\textasciitilde</code>
<code>{</code> same for <code>}</code> , <code>%</code> , <code>#</code> , <code>&</code> and <code>-</code>	<code>\{</code>

To make the text appear exactly like in the editor, use the *verbatim* environment:

```
\begin{verbatim}
....
\end{verbatim}
```

6 Lists

Lists are environments, basic forms:

1. Enumeration – `enumerate`
2. List with bullets – `itemize`
3. Concept explanation, definition – `description`

Each element in a list is marked with *\item*. For description you have to use the form:
`\item[NAME:] Text of the description`

Example:

```
\begin{enumerate}
\item Tomatoes
\item Apples
```

```
\end{enumerate}
```

```
\begin{description}  
\item[Term] Explanation  
\end{description}
```

7 Tables

Example:

```
\begin{table}[htbp]  
\centering  
\begin{tabular}{|l|c|r|}  
  
\hline  
Column 1 & \multicolumn{2}{|c|}{multicolumn} \\ \hline  
1 & Value 1 & Value 2 \\ \hline  
2 & 3 & 4 \\ \hline  
\end{tabular}  
\caption{NAME}  
\label{tab: Name}  
\end{table}
```

results in:

Column 1	multicolumn	
1	Value 1	Value 2
2	3	4

Table 1: NAME

Possible values for alignment:

- c= center
- l= left
- r= right
- |= vertical line

Possible parameters for positioning:

- h= Here, don't move it

- t= Top, at the top of a page
- b= Bottom, at the bottom of a page
- p= Page, on a page just for figures

You can use "!" to allocate more space for a specific item, e.g. `\begin{table}{!t}`
 Several columns: `\multicolumn{number}{Alignment}{Text}`, Package needed: multi-col

8 Figures

You will need the package **graphicx**

`\usepackage{graphicx}`

Add it in the preamble.

To add figures, save the pictures locally in a folder where your `.tex` file is located

```
\begin{figure}[htbp]
\centering
\includegraphics[ARGUMENTE]{Path/NAME.jpg}
\caption{NAME}
\label{fig:Name}
\end{figure}
```

Useful arguments and values (there are tons more):

- width=`\textwidth`
- scale=1.5
- height=2cm
- angle=-90 etc.

Supported picture formats: pdf, jpg / jpeg, png, mps (metapost)

More information about floats and how to arrange them:

<http://people.cs.uu.nl/piet/floats/node1.html>

9 Cross-References, Links

You can make references to elements that are associated with labels set at the point of the document you want to refer to. Use `\label{LabelName}` to set the label (will not appear in the output), and `\ref{LabelName}` to set the reference. You can make references to tables, figures, chapters, sections, etc.

`\url{LINK}` sets a clickable link. You will need the package **url** (`\usepackage{url}`).

10 Bibliography

```
\bibliography{NAME_FILE}
\bibliographystyle{NAME}
```

Possible styles: apa (together with the package natbib), alpha, abbrev, plain, acm, apalike, and many more They differ in order of the entries (could be alphabetically or as cited in the text) and the way the citation appears in the text (number, author+year, etc.). More on natbib: <http://merkel.zoneo.net/Latex/natbib.php>

Examples:

Plain: [1] Name Surname. Title. In Proceedings, pages 34–45, 2010.

Apalike: [Surname, 2009] Surname, N. (2009). Title2. In Proceedings, pages 30–41.

You can cite using the command: `\cite{LABEL}`

The entries in the BIB File are of this form:

```
@REFERENCE_TYPE{LABEL,
FIELD1={VALUE},
FIELD2={VALUE},
...
}
```

Example:

```
@Inproceedings{name09,
author = {Name Surname},
title = {Title2},
year = {2009},
pages = {30-41},
booktitle = {Proceedings ....}
}
```

This would be cited via `\cite{name09}`

Instead of writing .bib files manually, it is advisable to use JabRef or another reference-Manager program, such as EndNote or Zotero. A comparison between such software you can find at http://en.wikipedia.org/wiki/Comparison_of_reference_management_software If you already use another program to manage your literature, check whether it is able to export/import the BIBTEX format.

11 Formulas

In the math environment other commands are available and layouting is done differently. Packages for basic math commands: `\usepackage{amssymb,amsmath}` There are several ways to enter the math environment, that differ in whether the formula gets its own line and number:

```

\ ( . . . \ ) % or
$ . . . $ % inline

\[... \] own line, unnumbered

\begin{equation}
. . .
\end{equation}
%Automatically numbered

```

Some usefull math commands:

- `_` for subscript: A_1
- `^` for superscript: A^1
- for more than one character: A_{long}
- `\frac` for fractions: $\frac{a+b}{a b}$
- multiplication: $X \cdot Y$
- greek letters: $\alpha \Omega$
- arrows: `\rightarrow` for \rightarrow

very useful link: <http://web.ift.uib.no/Teori/KURS/WRK/TeX/symALL.html>

Spaces in formulas

- `\`, small space
- `\:` medium space
- `\;` large space
- `\!` negative space

12 Useful links and books

Most important link: <http://en.wikibooks.org/wiki/LaTeX>

Books:

"Der Latex Wegweiser", Christiane Detig, Internat. Thomson Publ., 1997, ISBN 3-8266-0256-0 (German) used for this Hand-out

"Der Latex-Begleiter", Frank Mittelbach, Michel Goossens, Johannes Braams, David Carlisle, Chris Rowley, 2. Auflage, ISBN 3-8273-7166-X (German)

"Latex, A Document Preparation System", Leslie Lamport, 2nd edition, ISBN 0-201-52983-1

"The Latex Companion", Frank Mittelbach, Michel Goossens, Johannes Braams, David Carlisle, Chris Rowley, 2nd edition, Addison Wesley, 2004, ISBN 0-201-36299-6

"Guide to Latex", Helmut Kopka, Patrick W. Daly, 4th edition, Addison Wesley, 2003 ISBN 0321173856

"The TeXbook", Donald Knuth, Addison Wesley, 1994, ISBN 0201134489

Slides:

LATEX-Workshop Dissertationen mit LATEX, von Joanna Ludmia Rycko Hermann Schwarz, HU Berlin, CMS, Arbeitsgruppe Elektronisches Publizieren, 9. Oktober 2006 used for this Hand-out

Collection of links:

Latex on Wikipedia (<http://en.wikipedia.org/wiki/LaTeX>)

A Latex Encyclopedia (<http://tex.loria.fr/>)

Installing Latex (<http://www.stat.pitt.edu/stoffer/freetex.html>)

Some examples (<http://www.math.duke.edu/computing/tex/templates.html>)

Latex: from beginner to Texpert (<http://generaldisarray.wordpress.com/2006/04/20/latex-from-beginner-to-texpert/>)

Latex Tutorial (http://www.artofproblemsolving.com/LaTeX/AoPS_L_GuideLay.php)

Software (<http://ctan.tug.org/>)

Help: Tex User's Group (<http://www.tug.org/>)

LaTeX on Windows (<http://www.pinteric.com/miktex.html>)

Word vs. LaTeX (http://openwetware.org/wiki/Word_vs._LaTeX)

Jabref (<http://jabref.sourceforge.net/>) - open source bibliography reference manager

LaTeX Resources (<http://www.tug.org/interest.html>)

Editors (<http://www.latex-community.org/viewtopic.php?f=28&t=208>)

Miktex (<http://miktex.org/>), Texnic Center (<http://www.toolscenter.org/>)

The comprehensive TEX archive network: www.ctan.org

BibTeX (<http://www.bibtex.org/>)

Materials in German / for German: DANTE - Deutsch (<http://www.dante.de/>)

DANTE - FAQ (<http://www.dante.de/faq/de-tex-faq/html/de-tex-faq.html>)

LaTeX - Deutsch (<http://www.abbyter.de/latex.htm>)

Latex2rtf: Convert Latex to rtf (<http://www.ctan.org/tex-archive/support/latex2rtf/>)

LaTeX Convertors (<ftp://ftp.tu-chemnitz.de/pub/tex/help/wp-conv/pc2txtbl.html>)

Winshell: Convert DOC to TEX. (<ftp://ftp.dante.de/pub/tex/support/word2latex/wsW2LTXGUI.exe>)

FAQ - List of converters and more.... (<http://www.dante.de/faq/de-tex-faq/txt/faq.11.txt>)

www.texify.com - Write LaTeX Formulas for Web