

# Slides and Course Notes for Jacobs University\*

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## Abstract

We present a document class from which we can generate both course slides and course notes in a transparent way. Furthermore, we present a set of L<sup>A</sup>T<sub>E</sub>X XML bindings for these, so that we can also generate OMDoc-based course materials, e.g. for inclusion in the ACTIVEMATH system.

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\*Version ? (last revised ?)

# 1 Introduction

This Document class is derived from `beamer.cls` [Tana], specializes it with Jacobs stuff and adds a notes version that is more suited to printing than the one supplied by `beamer.cls`.

## 2 The User Interface

The `mikoslides` class takes the notion of a slide frame from Till Tantau's excellent `beamer` class and adapts its notion of frames for use in the  $\text{\LaTeX}$  and OMDoc. To support semantic course notes, it extends the notion of mixing frames and explanatory text, but rather than treating the frames as images (or integrating their contents into the flowing text), the `mikoslides` package displays the slides as such in the course notes to give students a visual anchor into the slide presentation in the course (and to distinguish the different writing styles in slides and course notes).

In practice we want to generate two documents from the same source: the slides for presentation in the lecture and the course notes as a narrative document for home study. To achieve this, the `mikoslides` class has two modes: *slides mode* and *notes mode* which are determined by the package option.

### 2.1 Package Options

The `mikoslides` class takes a variety of class options:<sup>1</sup>

- `slides` • The options `slidesnd` and `notesnotes` switch between slides mode and notes mode (see Section 2.2).
- `a` • If the option `sectocframes` is given, then special frames with section table of contents are produced headers<sup>2</sup>
- `sectocframes` • `showmeta`. If this is set, then the metadata keys are shown (see [Koh15] for details and customization options).
- `showmeta` • If the option `frameimages` is set, then slide mode also shows the `\frameimage`-generated frames.
- `frameimages`

### 2.2 Notes and Slides

`frame` Slides are represented with the `frame` just like in the `beamer` class, see [Tanb] for details. The `mikoslides` class adds the `note` environment for encapsulating the course note fragments.<sup>1</sup>

 Note that it is essential to start and end the `notes` environment at the start of the line – in particular, there may not be leading blanks – else  $\text{\LaTeX}$  becomes confused and throws error messages that are difficult to decipher.

<sup>1</sup>EDNOTE: leaving out `noproblems` for the moment until we decide what to do with it.

<sup>2</sup>EDNOTE: document the functionality

<sup>1</sup>MK: it would be very nice, if we did not need this environment, and this should be possible in principle, but not without intensive  $\text{\LaTeX}$  trickery. Hints to the author are welcome.

```

\begin{note}
  We start this course with ...
\end{note}

\begin{frame}
  \frametitle{The first slide}
  ...
\end{frame}
\begin{note}
  ... and more explanatory text
\end{note}

\begin{frame}
  \frametitle{The second slide}
  ...
\end{frame}
...

```

**Example 1:** A typical Course Notes File

By interleaving the `frame` and `note` environments, we can build course notes as shown in Figure 1.

Sometimes, we want to integrate slides as images after all – e.g. because we already have a PowerPoint presentation, to which we want to add `STEXnotes`. In this case we can use `\frameimage[⟨opt⟩]{⟨path⟩}`, where `⟨opt⟩` are the options of `\includegraphics` from the `graphicx` package [CR99] and `⟨path⟩` is the file path (extension can be left off like in `\includegraphics`).

`\frameimage`

## 2.3 Header and Footer Lines

## 2.4 Colors and Highlighting

`\textwarning` The `\textwarning` macro generates a warning sign: 

## 2.5 Front Matter, Titles, etc

## 2.6 Miscellaneous

# 3 Limitations

In this section we document known limitations. If you want to help alleviate them, please feel free to contact the package author. Some of them are currently discussed in the `STEXGitHub` repository [sTeX].

1. when option `book` which uses `\pagestyle{headings}` is given and semantic macros are given in the `omgroup` titles, then they sometimes are not defined

by the time the heading is formatted. Need to look into how the headings are made. This is a problem of the underlying omdoc package.

## 4 The Implementation

### 4.1 Class and Package Options

We define some Package Options and switches for the mikoslides class and activate them by passing them on to beamer.cls and omdoc.cls and the mikoslides package.

```

1 <*cls>
2 \newif\ifnotes\notesfalse
3 \DeclareOption{notes}{\notestruel\PassOptionsToPackage{\CurrentOption}{mikoslides}}
4 \DeclareOption{slides}{\notesfalse\PassOptionsToPackage{\CurrentOption}{mikoslides}}
5 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{omdoc}
6                                     \PassOptionsToClass{\CurrentOption}{beamer}
7                                     \PassOptionsToPackage{\CurrentOption}{mikoslides}}
8 \ProcessOptions
9 </cls>

```

now we do the same for the mikoslides package. Note that we also have to define the same switches<sup>3</sup>, since we might use mikoslides.sty in a different class.

```

10 <*package>
11 \newif\if@mikoslides@mh@\@mikoslides@mh@false
12 \DeclareOption{mh}{\@mikoslides@mh@true
13   \PassOptionsToPackage{\CurrentOption}{stex}
14   \PassOptionsToPackage{\CurrentOption}{smglom}
15   \PassOptionsToPackage{\CurrentOption}{tikzinput}}
16 \newif\ifnotes\notesfalse
17 \DeclareOption{notes}{\notestruel
18 \DeclareOption{slides}{\notesfalse}
19 \newif\ifsectocframes\sectocframesfalse
20 \DeclareOption{sectocframes}{\sectocframestruel
21 \newif\ifframeimages\frameimagesfalse
22 \DeclareOption{frameimages}{\frameimagestruel
23 \newif\if@part\@partfalse
24 \DeclareOption{report}{\@parttrue\PassOptionsToPackage{\CurrentOption}{omdoc}}
25 \DeclareOption{book}{\@parttrue\PassOptionsToPackage{\CurrentOption}{omdoc}}
26 \newif\ifproblems\problemstruel
27 \DeclareOption{nopproblems}{\problemsfalse}
28 \DeclareOption*{\PassOptionsToPackage{\CurrentOption}{stex}
29                                     \PassOptionsToPackage{\CurrentOption}{smglom}
30                                     \PassOptionsToPackage{\CurrentOption}{tikzinput}}
31 \ProcessOptions
32 </package>

```

Depending on the options, we either load the article-based omdoc or the beamer class. In the first case, we also have to make the beamer-specific things

<sup>3</sup>EdNOTE: MK: we may think about making all of them internal

available to `article` via the `beamerarticle` package. We use options to avoid loading theorem-like environments, since we want to use our own from the `STEX` packages. On the `LATEX`ML side we just load the `omdoc` class and provide the `\usetheme` macro that would otherwise from the `beamer` class.

```

33 <*cls>
34 \ifnotes
35   \LoadClass{omdoc}
36   \RequirePackage{a4wide}
37   \RequirePackage{marginnote}
38   \RequirePackage{mdframed}
39   \RequirePackage[notheorems,noamsthm,noxcolor]{beamerarticle}
40 \else
41   \LoadClass[notheorems,noamsthm,10pt]{beamer}
42   \newcounter{Item}
43   \newcounter{paragraph}
44   \newcounter{subparagraph}
45   \newcounter{Hfootnote}
46   \usetheme{Jacobs}
47 \fi
48 \RequirePackage{mikoslides}
49 </cls>

```

now, we load the remaining packages for both versions.

```

50 <*package>
51 \if@mikoslides@mh\RequirePackage{mikoslides-mh}\fi
52 \RequirePackage{stex}
53 \RequirePackage{smglom}
54 \RequirePackage{tikzinput}
55 \RequirePackage{amssymb}
56 \RequirePackage{amsmath}
57 \RequirePackage{comment}
58 \RequirePackage{textcomp}
59 \RequirePackage{url}

```

## 4.2 Notes and Slides

We define the sizes of slides in the notes. Somehow, we cannot get by with the same here.

```

60 \newcounter{slide}
61 \newlength{\slidewidth}\setlength{\slidewidth}{12.8cm}
62 \newlength{\slideheight}\setlength{\slideheight}{9cm}

```

**note** The `note` environment is used to leave out text in the `slides` mode. It does not have a counterpart in `OMDoc`. So for course notes, we define the `note` environment to be a no-operation otherwise we declare the `note` environment as a comment via the `comment` package.

```

63 \ifnotes%
64   \renewenvironment{note}{\ignorespaces}{}%

```

```

65 \else%
66   \excludecomment{note}%
67 \fi%

```

We start by giving the L<sup>A</sup>T<sub>E</sub>X binding for the `frame` environment from the `beamer` class. We first set up the slide boxes in `article` mode. We set up sizes and provide a box register for the frames and a counter for the slides.

```

68 \ifnotes
69   \newlength{\slideframewidth}
70   \setlength{\slideframewidth}{1.5pt}

```

`frame` We first define the keys.

```

71   \addmetakey{frame}{label}
72   \addmetakey[yes]{frame}{allowframebreaks}
73   \addmetakey{frame}{allowdisplaybreaks}
74   \addmetakey[yes]{frame}{fragile}
75   \addmetakey[yes]{frame}{shrink}
76   \addmetakey[yes]{frame}{squeeze}

```

We redefine the `itemize` environment so that it looks more like the one in `beamer` with `Jacobs` theme. We create the box with the `mdframed` environment from the `equinymous` package. Then we define the environment, read them, and construct the slide number and label.

```

77   \renewenvironment{frame}[1][]{%
78     \metasetkeys{frame}{#1}%
79     \stepcounter{slide}%
80     \def\@currentlabel{\theslide}%
81     \ifx\frame@label\@empty%
82       \else%
83         \label{\frame@label}%
84       \fi%

```

We redefine the `itemize` environment so that it looks more like the one in `beamer` with `Jacobs` theme.

```

85     \def\itemize@level{outer}%
86     \def\itemize@outer{outer}%
87     \def\itemize@inner{inner}%
88     \renewcommand\newpage{}%
89     \renewcommand\metakeys@show@keys[2]{\marginnote{\scriptsize ##2}}%
90     \renewenvironment{itemize}{%
91       \ifx\itemize@level\itemize@outer%
92         \def\itemize@label{\$ \rhd$}%
93       \fi%
94       \ifx\itemize@level\itemize@inner%
95         \def\itemize@label{\$ \scriptstyle \rhd$}%
96       \fi%
97       \begin{list}%
98         {\itemize@label}%
99         {\setlength{\labelsep}{.3em}%
100          \setlength{\labelwidth}{.5em}%

```

```

101     \setlength{\leftmargin}{1.5em}%
102     }%
103     \edef\itemize@level{\itemize@inner}%
104     }{%
105     \end{list}}%
106     }%

```

We create the box with the `mdframed` environment from the `equinymous` package.

```

107     \begin{mdframed}[linewidth=\slideframewidth,skipabove=1ex,skipbelow=1ex,userdefinedwidth=\s
108     ]{%
109     \medskip\miko@slidelabel\end{mdframed}%
110     }%

```

Now, we need to redefine the `frametitle` (we are still in course notes mode).

```

\frametitle
111 \renewcommand{\frametitle}[1]{\Large\bf\sf\color{blue}{#1}}\medskip}%
112 \fi %ifnotes

```

`\frameimage` We have to make sure that the width is overwritten, for that we check the `\Gin@ewidth` macro from the `graphicx` package<sup>4</sup>

```

113 \newrobustcmd\frameimage[2][{}]{%
114 \stepcounter{slide}%
115 \ifframeimages%
116 \def\Gin@ewidth{}\setkeys{Gin}{#1}%
117 \ifnotes%
118 \else%
119 \vfill%
120 \fi%
121 \ifx\Gin@ewidth\empty%
122 \mycgraphics[width=\slidewidth,#1]{#2}\else\mycgraphics[#1]{#2}%
123 \fi%
124 \par\strut\hfill{\footnotesize Slide \arabic{slide}}}%
125 \ifnotes%
126 \else%
127 \vfill%
128 \fi%
129 \fi%
130 }% \ifframeimages

```

### 4.3 Header and Footer Lines

Now, we set up the infrastructure for the footer line of the slides, we use boxes for the logos, so that they are only loaded once, that considerably speeds up processing.

`\setslidelogo` The default logo is the logo of Jacobs University. Customization can be done by `\setslidelogo{<logo name>}`.

---

<sup>4</sup>EDNOTE: MK@DG; we need to do that in the LaTeXML binding as well!

```

131 \newlength{\slidelogoheight}
132 \ifnotes%
133   \setlength{\slidelogoheight}{.4cm}%
134 \else%
135   \setlength{\slidelogoheight}{1cm}%
136 \fi%
137 \newsavebox{\slidelogo}%
138 \sbox{\slidelogo}{\includegraphics[height=\slidelogoheight]{jacobs-logo}}%
139 \newrobustcmd{\setslidelogo}[1]{%
140   \sbox{\slidelogo}{\includegraphics[height=\slidelogoheight]{#1}}%
141 }%

\setsource \source stores the writer's name. By default it is Michael Kohlhase since he is
the main user and designer of this package. \setsource{<name>} can change the
writer's name.

142 \def\source{Michael Kohlhase}% customize locally
143 \newrobustcmd{\setsource}[1]{\def\source{#1}}%

\setlicensing Now, we set up the copyright and licensing. By default we use the Creative
Commons Attribution-ShareAlike license to strengthen the public domain. If
package hyperref is loaded, then we can attach a hyperlink to the license logo.
\setlicensing[<url>]{<logo name>} is used for customization, where <url> is op-
tional.

144 \def\copyrightnotice{\footnotesize\copyright:\hspace{.3ex}{\source}}%
145 \newsavebox{\cclogo}%
146 \sbox{\cclogo}{\includegraphics[height=\slidelogoheight]{cc_somerights}}%
147 \newif\ifcchref\cchreffalse%
148 \AtBeginDocument{%
149   \ifpackageloaded{hyperref}{\cchreftrue}{\cchreffalse}
150 }%
151 \def\licensing{%
152   \ifcchref%
153     \href{http://creativecommons.org/licenses/by-sa/2.5/}{\usebox{\cclogo}}%
154   \else%
155     {\usebox{\cclogo}}%
156   \fi%
157 }%
158 \newrobustcmd{\setlicensing}[2][ ]{%
159   \def\@url{#1}%
160   \sbox{\cclogo}{\includegraphics[height=\slidelogoheight]{#2}}%
161   \ifx\@url\@empty%
162     \def\licensing{{\usebox{\cclogo}}}%
163   \else%
164     \def\licensing{%
165       \ifcchref%
166         \href{#1}{\usebox{\cclogo}}%
167       \else%
168         {\usebox{\cclogo}}%
169       \fi%

```



```

170 }%
171 \fi%
172 }%

```

EdN:5

```

\slidelabel Now, we set up the slide label for the article mode.5
173 \newrobustcmd\miko@slidelabel{%
174   \vbox to \slidelogoheight{%
175     \vss\hbox to \slidewidth%
176       {\licensing\hfill\copyrightnotice\hfill\arabic{slide}\hfill\usebox{\slidelogo}}%
177   }%
178 }%

```

## 4.4 Colors and Highlighting

Now, we set up an infrastructure for highlighting phrases in slides. Note that we use content-oriented macros for highlighting rather than directly using color markup. The first thing to do is to adapt the green so that it is dark enough for most beamers

```

179 \AtBeginDocument{%
180   \definecolor{green}{rgb}{0,.5,0}%
181   \definecolor{purple}{cmyk}{.3,1,0,.17}%
182 }%

```

We customize the `\defemph`, `\notemph`, and `\stDMemph` macros with colors for the use in the `statements` package. Furthermore we customize the `\@@lec` macro for the appearance of line end comments in `\lec`.

```

183 % \def\STpresent#1{\textcolor{blue}{#1}}
184 \def\defemph#1{\textcolor{magenta}{#1}}
185 \def\notemph#1{\textcolor{magenta}{#1}}
186 \def\stDMemph#1{\textcolor{blue}{#1}}
187 \def\@@lec#1{\textcolor{green}{#1}}

```

I like to use the dangerous bend symbol for warnings, so we provide it here.

`\textwarning` as the macro can be used quite often we put it into a box register, so that it is only loaded once.

```

188 \pgfdeclareimage[width=.9em]{miko@small@dbend}{dangerous-bend}
189 \def\smalltextwarning{%
190   \pgfuseimage{miko@small@dbend}%
191   \xspace%
192 }%
193 \pgfdeclareimage[width=1.5em]{miko@dbend}{dangerous-bend}
194 \newrobustcmd\textwarning{%
195   \raisebox{-.05cm}{\pgfuseimage{miko@dbend}}%
196   \xspace%
197 }%
198 \pgfdeclareimage[width=2.5em]{miko@big@dbend}{dangerous-bend}%
199 \newrobustcmd\bigtextwarning{%

```

---

<sup>5</sup>EdNOTE: see that we can use the themes for the slides some day. This is all fake.

```

200 \raisebox{-.05cm}{\pgfuseimage{miko@big@dbend}}}%
201 \xspace%
202 }%

```

## 4.5 Front Matter, Titles, etc

We need to redefine the frontmatter macros inherited from the `beamer` class for LaTeXML, since there they take an optional argument.

```

203 %      Must be first command on slide to make positioning work.
204 \newrobustcmd\putgraphicsat[3]{%
205   \begin{picture}(0,0)\put(#1){\includegraphics[#2]{#3}}\end{picture}%
206 }%
207 \newrobustcmd\putat[2]{%
208   \begin{picture}(0,0)\put(#1){#2}\end{picture}%
209 }%

```

## 4.6 Sectioning

If the `sectocframes` option is set, then we make section frames. We first define a set of counters

```

210 \ifsectocframes%
211   \if@part%
212     \newcounter{mpart}%
213     \newcounter{mchapter}%
214     \newcounter{msection}[mchapter]%
215   \else%
216     \newcounter{msection}%
217   \fi%
218   \newcounter{msubsection}[msection]%
219   \newcounter{msubsubsection}[msubsection]%
220   \newcounter{msubsubsubsection}[msubsubsection]%
221 \fi% ifsectocframes

```

and then

```

222 \ifnotes\else% only in slides
223 \renewenvironment{omgroup}[2][]{%
224   \metasetkeys{omgroup}{#1}\sref@target%
225   \advance\section@level by 1%
226   \ifsectocframes%
227   \begin{frame}%
228   \vfill\Large\centering%
229   \red{%
230     \ifcase\section@level\or%
231       \stepcounter{mpart}Part \Roman{mpart}\or%
232       \stepcounter{mchapter}Chapter \arabic{mchapter}\or
233       \stepcounter{msection}\if@part\arabic{mchapter}.\fi\arabic{msection}\or
234       \stepcounter{msubsection}\if@part\arabic{mchapter}.\fi\arabic{msection}.\arabic{msubsec
235       \stepcounter{msubsubsection}\if@part\arabic{mchapter}.\fi\arabic{msection}.\arabic{msub
236       \stepcounter{msubsubsubsection}\if@part\arabic{mchapter}.\fi\arabic{msection}.\arabic{m

```

```

237     \fi% end ifcase
238     \quad #2%
239   }%
240   \vfill%
241   \end{frame}%
242   \fi %ifsectocframes
243 }
244 {\advance\section@level by -1}%
245 \fi% ifnotes

```

## 4.7 Miscellaneous

The following fixes an error I do not understand, this has something to do with beamer compatibility, which has similar definitions but only up to 1.

```

246 \expandafter\def\csname Parent2\endcsname{}
247 % \begin{macrocode}
248 %
249 % We need to disregard the columns macros introduced by the |beamer| class
250 % \begin{macrocode}
251 \ifnotes%
252   \renewenvironment{columns}{%
253     \par\noindent%
254     \begin{minipage}%
255       \slidewidth\centering\leavevmode%
256   }{%
257     \end{minipage}\par\noindent%
258   }%
259   \newsavebox\columnbox%
260   \renewenvironment{column}[1]{%
261     \begin{lrbox}{\columnbox}\begin{minipage}{#1}%
262   }{%
263     \end{minipage}\end{lrbox}\usebox\columnbox%
264   }%
265 \fi%

```

Now, some things that are imported from the `pgf` and `beamer` packages:

```

266 \ifproblems%
267   \newenvironment{problems}{}{}%
268 \else%
269   \excludecomment{problems}%
270 \fi%
271 \</package>

```

## References

- [CR99] David Carlisle and Sebastian Rathz. *The graphicx package*. Part of the T<sub>E</sub>X distribution. The Comprehensive T<sub>E</sub>X Archive Network. 1999. URL: <https://www.tug.org/texlive/devsrc/Master/texmf-dist/doc/latex/graphics/graphicx.pdf>.
- [Koh15] Michael Kohlhase. *metakeys.sty: A generic framework for extensible Metadata in L<sup>A</sup>T<sub>E</sub>X*. Tech. rep. Comprehensive T<sub>E</sub>X Archive Network (CTAN), 2015. URL: <http://www.ctan.org/tex-archive/macros/latex/contrib/stex/metakeys/metakeys.pdf>.
- [sTeX] *KWARC/sTeX*. URL: <https://svn.kwarc.info/repos/stex> (visited on 05/15/2015).
- [Tana] Till Tantau. *beamer – A L<sup>A</sup>T<sub>E</sub>X class for producing presentations and slides*. URL: <http://www.ctan.org/pkg/beamer> (visited on 01/07/2014).
- [Tanb] Till Tantau. *User Guide to the Beamer Class*. URL: <http://www.ctan.org/tex-archive/macros/latex/contrib/beamer/doc/beameruserguide.pdf>.