

LATEX Cheat Sheet

Document classes

Usage: `\documentclass[opt,opt]{class}`

article	journal papers, short reports (No <code>\part</code> or <code>\chapter</code> divisions)
report	longer text with several chapters, e.g. thesis (No <code>\part</code> divisions)
book	books
letter	letters
beamer	slide presentation
beamerposter	conference posters

Common documentclass options

10pt/11pt/12pt	Font size
legalpaper/a4paper	Paper size
onecolumn/twocolumn	Columns
twoside	Printing
landscape	Landscape orientation
draft	Find overfull hboxes

Packages

mathpazo	Loads the font Palatino
amsmath	Provides useful math environments and characters
multicol	Use <i>n</i> columns: <code>\begin{multicols}{<i>n</i>}</code>
xcolor	Use colors
graphicx	Show image: <code>\includegraphics[width=<i>x</i>]{<i>file</i>}</code>
hyperref	Cross-referencing and hyperlinks in pdf: <code>\url{<i>link</i>}</code> and <code>\href{<i>link</i>}{<i>name</i>}</code>

Use before `\begin{document}` Usage: `\usepackage{package}`

Title

<code>\author{<i>text</i>}</code>	Author of document
<code>\title{<i>text</i>}</code>	Title of document
<code>\date{<i>text</i>}</code>	Date

These commands go before `\begin{document}`. The declaration `\maketitle` goes at the top of the document.

Miscellaneous

<code>\pagestyle{empty}</code>	Empty header, footer and no page numbers.
<code>\pagestyle{fancy}</code>	add chapter and section headers to header/footer (requires <code>fancyhdr</code>)

Document structure

<code>\part{<i>title</i>}</code>	<code>\subsubsection{<i>title</i>}</code>
<code>\chapter{<i>title</i>}</code>	<code>\paragraph{<i>title</i>}</code>
<code>\section{<i>title</i>}</code>	<code>\subparagraph{<i>title</i>}</code>
<code>\subsection{<i>title</i>}</code>	

Section commands can be followed with an `*`, like `\section*{title}`, to suppress heading numbers.

`\setcounter{secnumdepth}{x}` suppresses heading numbers of depth > *x*, where chapter has depth 0.

Text environments

<code>\begin{comment}</code>	Comment block (not printed).
<code>\begin{quote}</code>	Indented quotation block.
<code>\begin{quotation}</code>	Like quote with indented paragraphs.
<code>\begin{verse}</code>	Quotation block for verse.

Lists

<code>\begin{enumerate}</code>	Numbered list
<code>\begin{itemize}</code>	Bulleted list
<code>\begin{description}</code>	Description list
<code>\item <i>text</i></code>	Add an item
<code>\item[<i>x</i>] <i>text</i></code>	Use <i>x</i> instead of normal bullet or number. Required for descriptions.

References

<code>\label{<i>marker</i>}</code>	Set a marker for cross-reference, often of the form <code>\label{sec:item}</code> .
<code>\autoref{<i>marker</i>}</code>	Give section/body + number <i>marker</i> (requires <code>hyperref</code>)
<code>\ref{<i>marker</i>}</code>	Give section/body number <i>marker</i>
<code>\pageref{<i>marker</i>}</code>	Give page number <i>marker</i>
<code>\eqref{<i>marker</i>}</code>	Give (number) <i>marker</i> (requires <code>amsmath</code>)
<code>\footnote{<i>text</i>}</code>	Print footnote at bottom of page
<code>\marginpar{<i>text</i>}</code>	Print a note in the margin

Floating bodies

<code>\begin{table}[<i>place</i>]</code>	Add numbered table
or <code>\begin{figure}[<i>place</i>]</code>	Add numbered figure
<code>\centering</code>	Center environment contents
<code>\caption{<i>text</i>}</code>	Caption for the body
<code>\label{<i>text</i>}</code>	Label for cross-referencing

The *place* is a list of valid placements for the body. t=top, h=here, b=bottom, p=separate page, !=place even if ugly. Captions and label markers should be within the environment.

Text properties

Font face

Command	Declaration	Effect
<code>\textrm{<i>text</i>}</code>	<code>{\rmfamily <i>text</i>}</code>	Roman family
<code>\textsf{<i>text</i>}</code>	<code>{\sffamily <i>text</i>}</code>	Sans serif family
<code>\texttt{<i>text</i>}</code>	<code>{\ttfamily <i>text</i>}</code>	Typewriter family
<code>\textbf{<i>text</i>}</code>	<code>{\bfseries <i>text</i>}</code>	Bold series
<code>\textup{<i>text</i>}</code>	<code>{\upshape <i>text</i>}</code>	Upright shape
<code>\textit{<i>text</i>}</code>	<code>{\itshape <i>text</i>}</code>	<i>Italic shape</i>
<code>\textsc{<i>text</i>}</code>	<code>{\scshape <i>text</i>}</code>	SMALL CAPS SHAPE
<code>\emph{<i>text</i>}</code>	<code>{\em <i>text</i>}</code>	<i>Emphasized</i>
<code>\textnormal{<i>text</i>}</code>	<code>{\normalfont <i>text</i>}</code>	Document font
<code>\underline{<i>text</i>}</code>		<u>Underline</u>

The command (`ttt`) form handles spacing better than the declaration (`ttt`) form.

Font size

<code>\tiny</code>	<small>tiny</small>	<code>\Large</code>	Large
<code>\scriptsize</code>	<small>scriptsize</small>	<code>\LARGE</code>	LARGE
<code>\footnotesize</code>	<small>footnotesize</small>		
<code>\small</code>	<small>small</small>	<code>\huge</code>	huge
<code>\normalsize</code>	<small>normalsize</small>		
<code>\large</code>	<small>large</small>	<code>\Huge</code>	Huge

These are declarations and should be used in the form `\small ...`, or without braces to affect the entire document.

Verbatim text

<code>\begin{verbatim}</code>	Verbatim environment.
<code>\begin{verbatim*}</code>	Spaces are shown as <code>_</code> .
<code>\verb!<i>text</i>!</code>	Text between the delimiting characters (in this case '!') is verbatim.

Alignment

Environment	Declaration
<code>\begin{center}</code>	<code>\centering</code>
<code>\begin{flushleft}</code>	<code>\raggedleft</code>
<code>\begin{flushright}</code>	<code>\raggedright</code>

Miscellaneous

`\linespread{x}` changes the line spacing by the multiplier *x*.

Text-mode symbols

Symbols

<code>\ \textbackslash</code>	<code>& \&</code>	<code>_ _</code>	<code>... \ldots</code>
<code>• \textbullet</code>	<code>\$ \</code>	<code>^ \^{} \textasciicircum</code>	<code> \textbar</code>
<code>\ \textbackslash</code>	<code>% \%</code>	<code>~ \~{} \textasciitilde</code>	<code># \#</code>
<code>§ \S</code>			

Accents

<code>ò \`o</code>	<code>ó \'o</code>	<code>ô \^o</code>	<code>õ \~o</code>	<code>ö \=o</code>
<code>ô \.o</code>	<code>ö \"o</code>	<code>q \c o</code>	<code>ö \v o</code>	<code>ő \H o</code>
<code>ç \c c</code>	<code>ç \d o</code>	<code>q \b o</code>	<code>ö \t oo</code>	<code>œ \oe</code>
<code>Œ \OE</code>	<code>æ \ae</code>	<code>Æ \AE</code>	<code>å \aa</code>	<code>Å \AA</code>
<code>ø \o</code>	<code>Ø \O</code>	<code>ł \l</code>	<code>Ł \L</code>	<code>ı \i</code>
<code>ı \j</code>	<code>ı \~</code>	<code>ı ?`</code>		

Delimiters

<code>‘ ’</code>	<code>“ ”</code>	<code>{ \{</code>	<code>[[</code>	<code>((</code>	<code>< \textless</code>
<code>’ ’</code>	<code>” ”</code>	<code>} \}</code>	<code>]]</code>	<code>))</code>	<code>> \textgreater</code>

Dashes

Name	Source	Example	Usage
hyphen	-	X-ray	In words
en-dash	--	1-5	Between numbers
em-dash	---	Yes—or no?	Punctuation

Line and page breaks

<code>\\</code>	Begin new line without new paragraph.
<code>*</code>	Prohibit pagebreak after linebreak.
<code>\kill</code>	Don't print current line.
<code>\pagebreak</code>	Start new page.
<code>\noindent</code>	Do not indent current line.

Spaces

<code>~</code>	hard space, disallow linebreak (W.J.~Clinton).
<code>_</code>	normal space
<code>\,</code>	small space
<code>\quad</code>	horizontal space
<code>\hspace{2cm}</code>	
<code>\medskip</code>	vertical space
<code>\bigskip</code>	
<code>\vspace{2cm}</code>	

Miscellaneous

<code>\today</code>	prints actual date
<code>\sim\$</code>	Prints ~ instead of \~, which makes ~.
<code>\@.</code>	Indicate that the . ends a sentence when following an uppercase letter.
<code>\rule{w}{h}</code>	Line of width <i>w</i> and height <i>h</i> .

Tabular environments

tabbing environment

`\=` Set tab stop. `\>` Go to tab stop.
 Tab stops can be set on “invisible” lines with `\kill` at the end of the line. Normally `\` is used to separate lines.

tabular environment

`\begin{array}[pos]{cols}`
`\begin{tabular}[pos]{cols}`
`\begin{tabular*}{width}[pos]{cols}`

tabular column specification

`l` Left-justified column.
`c` Centered column.
`r` Right-justified column.
`p{width}` Same as `\parbox[t]{width}`.
`@{decl}` Insert *decl* instead of inter-column space.
`|` Inserts a vertical line between columns.

tabular elements

`\hline` Horizontal line between rows.
`\cline{x-y}` Horizontal line across columns *x* through *y*.
`\multicolumn{n}{cols}{text}`
 A cell that spans *n* columns, with *cols* column specification.

Math mode

`...$` for inline mathematics
`\begin{equation}` for displayed mathematics with numbering
`... \end{equation}`
`[\dots]` for mathematics without numbering

Sub- and Superscripts

Superscript ^{<i>x</i>}	<code>^{x}</code>	Subscript _{<i>x</i>}	<code>_{x}</code>
$\frac{x}{y}$	<code>\frac{x}{y}</code>	$\sum_{k=1}^n$	<code>\sum_{k=1}^n</code>
$\sqrt[n]{x}$	<code>\sqrt[n]{x}</code>	$\prod_{k=1}^n$	<code>\prod_{k=1}^n</code>

Differentiation and Integration

$\frac{d}{dx}$	<code>\frac{d}{dx}</code>
$f'(x)$	<code>f'(x)</code>
$\frac{\partial}{\partial x}$	<code>\frac{\partial}{\partial x}</code>
$\int f(x) dx$	<code>\int f(x)\, dx</code>
$\int_b^a f(x) dx$	<code>\int^a_b f(x)\, dx</code>
$\int_b^a f(x) dx$	<code>\displaystyle\int^a_b f(x)\, dx</code>
$\oint_C f(x) dx$	<code>\oint_C f(x)\, dx</code>

Trigonometry

$\cos \theta$	<code>\cos \theta</code>	$\sin \theta$	<code>\sin \theta</code>
$\tan \theta$	<code>\tan \theta</code>	$\sec \theta$	<code>\sec \theta</code>
$\sin^2 \theta$	<code>\sin^2 \theta</code>	$\sin 30^\circ$	<code>\sin 30^\circ</code>

Matrices and Vectors (using `amsmath`)

$\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}$	<code>\begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix}</code>
$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$	<code>\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}</code>
$\begin{Bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{Bmatrix}$	<code>\begin{Bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{Bmatrix}</code>
$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}$	<code>\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix}</code>
$\begin{matrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{matrix}$	<code>\begin{matrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{matrix}</code>

Math-mode symbols

\leq	<code>\leq</code>	\geq	<code>\geq</code>	\neq	<code>\neq</code>	\approx	<code>\approx</code>
\times	<code>\times</code>	\div	<code>\div</code>	\pm	<code>\pm</code>	\cdot	<code>\cdot</code>
$^\circ$	<code>^\circ</code>	\circ	<code>\circ</code>	$'$	<code>'</code>	\cdots	<code>\cdots</code>
∞	<code>\infty</code>	\neg	<code>\neg</code>	\wedge	<code>\wedge</code>	\vee	<code>\vee</code>
∞	<code>\infty</code>	\forall	<code>\forall</code>	\in	<code>\in</code>	\rightarrow	<code>\rightarrow</code>
\subset	<code>\subset</code>	\exists	<code>\exists</code>	\notin	<code>\notin</code>	\Rightarrow	<code>\Rightarrow</code>
\cup	<code>\cup</code>	\cap	<code>\cap</code>	$ $	<code> </code>	\Leftrightarrow	<code>\Leftrightarrow</code>
\dot{a}	<code>\dot{a}</code>	\hat{a}	<code>\hat{a}</code>	\bar{a}	<code>\bar{a}</code>	\tilde{a}	<code>\tilde{a}</code>
α	<code>\alpha</code>	β	<code>\beta</code>	γ	<code>\gamma</code>	δ	<code>\delta</code>
ϵ	<code>\epsilon</code>	ζ	<code>\zeta</code>	η	<code>\eta</code>	ϵ	<code>\epsilon</code>
θ	<code>\theta</code>	ι	<code>\iota</code>	κ	<code>\kappa</code>	ϑ	<code>\vartheta</code>
λ	<code>\lambda</code>	μ	<code>\mu</code>	ν	<code>\nu</code>	ξ	<code>\xi</code>
π	<code>\pi</code>	ρ	<code>\rho</code>	σ	<code>\sigma</code>	τ	<code>\tau</code>
υ	<code>\upsilon</code>	ϕ	<code>\phi</code>	χ	<code>\chi</code>	ψ	<code>\psi</code>
ω	<code>\omega</code>	Γ	<code>\Gamma</code>	Δ	<code>\Delta</code>	Θ	<code>\Theta</code>
Λ	<code>\Lambda</code>	Ξ	<code>\Xi</code>	Π	<code>\Pi</code>	Σ	<code>\Sigma</code>
Υ	<code>\Upsilon</code>	Φ	<code>\Phi</code>	Ψ	<code>\Psi</code>	Ω	<code>\Omega</code>

Bibliography and citations

When using BibTeX, you need to run `latex`, `bibtex`, and `latex` twice more to resolve dependencies.

Citation types

<code>\cite{key}</code>	Numbered reference
<code>\citet{key}</code>	Textual citation: Watson and Crick (1953) (requires <code>natbib</code>)
<code>\citep{key}</code>	Paraphetical citation: (Watson and Crick, 1953) (requires <code>natbib</code>)

BibTeX entry types

<code>@article</code>	Journal or magazine article.
<code>@book</code>	Book with publisher.
<code>@conference</code>	Article in conference proceedings.
<code>@inbook</code>	A part of a book and/or range of pages.
<code>@incollection</code>	A part of a book with its own title.
<code>@misc</code>	If nothing else fits.

BibTeX fields

<code>author</code>	Names of authors, of format
<code>booktitle</code>	Title of book when part of it is cited.
<code>chapter</code>	Chapter or section number.
<code>edition</code>	Edition of a book.
<code>editor</code>	Names of editors.
<code>journal</code>	Journal name.
<code>key</code>	Used for cross ref. when no author.
<code>organization</code>	Organization that sponsors a conference.
<code>pages</code>	Page range (2,6,9--12).
<code>publisher</code>	Publisher's name.
<code>title</code>	Title of work.
<code>volume</code>	Volume of a journal or book.
<code>year</code>	Year of publication.

Not all fields need to be filled. See example below.

BibTeX example

The BibTeX database goes in a file called `file.bib`, which is processed with `bibtex file`.

```
@B00K{Shah1979,
  title = {Gas--liquid--solid reactor design},
  author = {Y. T. Shah},
  publisher = {McGraw-Hill},
  year = {1979}
}
```

Sample LaTeX document

```
\documentclass[10pt]{article}
\title{Sample document}
\author{My name}
\date{\today}

\begin{document}
\maketitle
\section{Introduction}
This is my \emph{first} document, created on \today.
I like cookies, Pizza, and chocolate. The Taylor
expansion of  $f(x)$  in  $x=a$  is
\begin{equation}
f(x)=\sum_{n=0}^{\infty} \frac{f^{(n)}(a)}{n!}(x-a)^n
\end{equation}
\end{document}
```