

Introductory workshop on L^AT_EX

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What this workshop is NOT about?

- \LaTeX in Windows or Mac.
- History of \LaTeX (who developed it, when was it developed and for whom it was developed).
- Where to find and install \LaTeX , and other packages (see Recommended Links section).
- List of options for different packages and demonstrate what each one does.
- Executing one command at a time and showing you the output.
- Details about what happens behind the scenes in \LaTeX (because I don't have much understanding of those concepts myself!).

What this workshop is all about?

- \LaTeX in Linux.
- Basic introduction to \LaTeX (how to write equations, insert graphics, insert tables etc. and referencing them throughout the document).
- Making presentations and posters with the beamer package. Will go over the .tex file used to make this presentation!
- References and bibliography.
- Tips, tricks and good practices when using any form of \LaTeX .
- Slides containing links that I personally recommend for beginners, intermediates and pros alike!

Expectation vs. Reality

Level of experience	Expectation
Beginner	Understand the basics of \LaTeX Grasp concepts, ask questions
Intermediate	Learn cool new stuff Be amazed at the limits of \LaTeX
Pro	Learn how to do something better or new Give valuable inputs here and there

Expectation vs. Reality

Level of experience	Reality
Beginner	Stare off into the infinity and contemplate the meaning of life, universe and beyond
Intermediate	Aww man! I wasted a Friday evening for this?! Seriously dude! I can make better documents on my grandma's typewriter
Pro	Hahahaha.., noob he totally misplaced that comma

What is \LaTeX ?

- Within the scientific community, \LaTeX is a tool using which we can create “professional-looking” documents like journal articles, books, flyers, leaflets, PhD theses, posters, presentations, résumés etc.
- Once you learn how to use \LaTeX it is really easy to make such documents because it not only takes care of all the little annoying things but also offers many many features which would be quite difficult using conventional tools (like MS Word or LibreOffice Writer, for instance).
- Simply put, its a miracle!

Why should I use it?

- Having to update the table of contents every time you add/delete a section from your thesis; dealing with figures moving all over the place and messing up the flow of text; updating cross-references, footnotes, etc.
- Having to manually align bullet lists/text/figures/tables in different slides/pages of the document.
- Automatically numbering equations, figures, tables and references; custom bibliography styles suited for different journals, posters, presentations etc.
- My personal favorite: not having to worry about using the right line spacing/font/font size/indentation/margin size/equation number placement ...

Let's jump right in!

- Open any text editor and create a new file “example.tex”

```
\documentclass{article}
\begin{document}
Hello World!
\tiny{tiny} ... \huge{huge}
\end{document}
```

Hello World! tiny ... **huge**

- Save and exit
- Open a terminal, go to the directory containing the file and type “pdflatex example.tex”
- Et voilà!

Lists and equations

```
\begin{itemize}
\item Inline equation:  $z^2 = \lim_{x \rightarrow 1} \frac{1+x}{1-x}$ 
\item Centered equation: 
$$z^2 = \lim_{x \rightarrow 1} \frac{1+x}{1-x}$$

\item \begin{enumerate} \item One \item Two \end{enumerate}
\end{itemize}
```

- Inline equation: $z^2 = \lim_{x \rightarrow 1} \frac{1+x}{1-x}$

- Centered equation:

$$z^2 = \lim_{x \rightarrow 1} \frac{1+x}{1-x}$$

- 1. One
 2. Two

```
\begin{equation}
x^2 + y^2 = z^2
\end{equation}
```

$$x^2 + y^2 = z^2 \quad (1)$$

Aligned and unnumbered equations

```
\begin{align}
ax^2 + bx + c &= 0 \nonumber\\
\Rightarrow x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}
\end{align}
```

$$ax^2 + bx + c = 0$$

$$\Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad (2)$$

```
\begin{equation*}
x^2 + y^2 = z^2
\end{equation*}
```

$$x^2 + y^2 = z^2$$

Labels, figures and referencing

```
\begin{figure}  
\centering  
\includegraphics[keepaspectratio,scale=0.2]{image1.png}  
\caption{UB logo Google search}\label{logo}  
\end{figure}
```

UB logo (Fig: \ref{logo}) can be referenced like this.



Figure 1: UB logo Google search

UB logo (Fig: 1) can be referenced like this.

Tables

```

\centering
\begin{table}
\begin{tabular}{|l||c| }
\hline
Name & Age\\
\hline
Jane & 30\\
\hline
John & 14\\
\hline
\end{tabular}
\end{table}

```

Name	Age
Jane	30
John	14

How to create a bibliography file and add references

Go to the directory where your “.tex” file exists. Open any text editor and create the file “references.bib”

```
@article{Lepage1972,
author = "G Peter Lepage",
title = "A new algorithm for adaptive multidimensional integration"
journal = "Journal of Computational Physics",
shortjournal = "J. Comp. Phys.",
year = "1972",
volume = "27",
number = "2",
pages = "192 -- 203"
}
```

```
@articleLepage1972, author = " G Peter Lepage", title = " A new algorithm
for adaptive multidimensional integration", journal = " Journal of Com-
putational Physics", shortjournal = " J. Comp. Phys.", year = "1972",
volume = "27", number = "2", pages = "192 – 203"
```

How to cite references

```
\documentclass{article}  
\begin{document}  
\usepackage[backend=bibtex,bibstyle=numeric-comp]{biblatex}  
From Ref\cite{Lepage1972}, we know that ...  
\bibliography{references}  
\end{document}
```

From RefLepage1972, we know that ...

Compiling the references

- “pdflatex example.tex”
- “bibtex example.aux”
- “pdflatex example.tex”
- “pdflatex example.tex”

Making presentations with the beamer class

- Slides are referred to as 'frames' within beamer.
- Tons of themes available to choose from (see Recommended links). Customization possible for any theme.
- Overlays are powerful and, if used properly, can be very effective in conveying the right message.
- Let us look at a simple example before we can look at the .tex file for this presentation.

Good practices/tips/tricks

- When dealing with fractions, use the right size brackets:

`$(\displaystyle\frac{1}{2})$`

`$(\bigg(\displaystyle\frac{1}{2}\bigg))$`

$$\left(\frac{1}{2}\right) \quad \left(\frac{1}{2}\right)$$

- Finding the exact source of the error might be a problem. Always start with a Minimum Working Example (MWE). If need be, delete recently added lines and compile as often as possible. Refer to the documentation file associated with packages as they are extremely useful.
- When inserting figures, it is generally advisable to use the “keepaspectratio” option to avoid pixelated look.
- If you want to comment out multiple lines, use `\iffalse .. \fi` instead of using `%` symbol before start of each line.
- Get acquainted with the `\newcommand` so you can cater exactly according to your needs (Remember: with great power comes great responsibility!).

Good practices/tips/tricks

- Maintain a master bibliography file containing all the references and keep updating it as and when you find a new paper.
- Proper indentation of your source (.tex) file will save you many hours of trying to find the missing \$ (if you know what I mean).
- Treat your \LaTeX file just like you would, your python script. Never start from scratch, copy paste some code from the web (feel free to use this file!) and build on it and customize it.
- Best way to learn \LaTeX : experimentation!

- Download L^AT_EX(TeX Live) [here](#). Tex Live comes with most commonly used packages and it is extremely easy to download and install any new packages that aren't part of it. (Highly recommended!)
- Basics:
 1. An excellent place to start - [Art of problem solving](#)
 2. A good source with a lot of examples - [Wiki books](#)
 3. An extensive beamer [tutorial](#)
- Advanced:
 1. How to create [custom bibliography style](#) for different journals. One makebst command to rule them all!
 2. Avoiding jumping frames in beamer, a common problem one might face when using beamer. [Explained here](#)
- Templates: An exhaustive list can be found [here](#)
- Questions: chances are, someone else would have ran into the same problem that you did. Check [here](#) first to see if it has been solved and save yourself a lot of time!