

Workshop On LaTeX for Scientific Writing

Activity 1: LaTeX Hello word

1. Create a new file in TexStudio say Activity.tex, that contains the following text and \LaTeX commands:

```
\documentclass{article}

\begin{document}

Hello world ! % This is your content

This is a simple example to start with \LaTeX.

\end{document}

The first task.
```

2. Run quick build.

Activity 2: Document class

1. Change the document class of Activity.tex from article into beamer.

```
\documentclass{beamer}
```

2. Run quick build. What do you see?

Activity 3: Document Tittle

1. Change the document class of Activity.tex from beamer into article class with the a4paper and 12pt options.

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

2. Create the title of your article and put two authors and date.

3. Add `\maketitle` just after `\begin{document}`

4. Run quick build. What do you see?.

5. Use geometry packages to set document margin.

```
\usepackage[top=1in,bottom=1in,left=1in,right=1in]{geometry}
```

6. Try to change the margin to different numbers, run quick build. What do you see?

7. Try to change the margin to different unit such as centimetres (e.g `top=2.5cm`), run quick build. What do you see?

Activity 4: Sections

1. Open the Activity.tex and create a section structure like shown below:

1. Introduction

Hello world ! This is a simple example to start with \LaTeX .

2. Methods

2.1 Model

2.1.1 Model Assumption

3. Results

4. Conclusion

2. Run quick build. What do you see?

3. What happens if you use the *-version e.g `\subsection*{Results}`.

4. Why is it not possible to use `\section`, in this document?.

Activity 5: Text Formatting

1. Bold the title of your Activity.tex and the font size to `\Large`.
2. Change the font style of author names to italic, use `\textit{text}`
3. Change the text color of date to green. First add `\usepackage{xcolor}` and then use `\textcolor{green}{text}`
4. Produce the following text in the Introduction section. **Hint:** in the itemize environment you can specify what character to use as bullet: `\item[<optional character>]`

Hello, this is my first attempt at writing in LaTeX. I'm hoping that once I've mastered LaTeX 100%, everyone will be so in awe of my beautiful papers & books that they'll publish them straight away without all that *boring nonsense with referees*. I haven't written very much yet but I think I'm starting to get the hang of it. And this is what I plan to do:

- Practise LaTeX in:
 - * Teaching
 - * Writing books
 - * etc

Activity 6: Cross-reference section

Experiment with the section cross-reference in the Activity.tex

Activity 7: Math typesetting

Open the Activity.ex file and type the following under Model assumption subsection:

1. In this work we demonstrate that $\alpha^2 + \beta^2 \gg \frac{\pi}{4}$ is only correct if the Euler condition $\nabla x = 0$ is satisfied. **Hint:** To typeset \gg use `\gg` command.

2. We propose a new numerical approach to solve the time-dependent Schrödinger equation as shown in (1);

$$i\hbar \frac{\partial \Psi(t)}{\partial t} = H(t)\Psi(t) \quad (1)$$

where i is the imaginary unit, \hbar is the reduced Planck constant, the symbol $\frac{\partial}{\partial t}$ indicates a partial derivative with respect to time t . **Hint:** To typeset symbols \hbar and Ψ use the following commands, `\hbar` and `\Psi` respectively. To typeset ancient symbol \circ use `\"o` command.

3. The relation between the golden ratio and the Fibonacci series is given by (2).

$$\phi = 1 + \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{F_n F_{n+1}} \quad (2)$$

where the golden ratio $\phi = \frac{1}{2}(1 + \sqrt{5})$

4. What happens if you use `\ref{key}` instead of `\eqref{key}` to reference an equation.
5. What happens if you use the *-version of equation environment

`\begin{equation*} \dots \end{equation*}`

Activity 8: Math typesetting

Open the Activity.ex file and type the following under Model subsection:

1. Consider a narrowband point-to-point communication system of M_t transmit and M_r receive antennas. The received signal vector y can be represented by the following discrete time model.

$$\begin{bmatrix} y_1 \\ \vdots \\ y_{M_r} \end{bmatrix} = \begin{bmatrix} h_{11} & \dots & h_{1M_t} \\ \vdots & \ddots & \vdots \\ h_{M_r 1} & \dots & h_{M_r M_t} \end{bmatrix} \begin{bmatrix} x_1 \\ \vdots \\ x_{M_t} \end{bmatrix} + \begin{bmatrix} n_1 \\ \vdots \\ n_{M_r} \end{bmatrix}$$