

# Introduction to LaTeX

## Beginner's Workshop with Code and Output

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# Outline

- 1 What is LaTeX?
- 2 Document Structure
- 3 Text Formatting
- 4 Text Alignment
- 5 Fonts and Sizes
- 6 Mathematics
- 7 Tables
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- 10 Exercise

# Why LaTeX?

- High-quality typesetting system
- Widely used in scientific and academic writing
- Ideal for:
  - ▶ Mathematical equations
  - ▶ Figures and tables
  - ▶ References and citations
- Open-source and portable

# Basic Document Structure

## Code:

```
\documentclass{report}  
  
\begin{document}  
Hello, world!  
\end{document}
```

## Output:

Hello, world!

# Text Formatting Example

## Code:

```
\textbf{Bold Text}  
\textit{Italic Text}  
\underline{Underlined Text}
```

## Output:

**Bold Text**

*Italic Text*

Underlined Text

# Line Breaks Example

## Code:

```
This is line one. \\
This is line two. \\[0.5cm]
This is line three.
```

## Output:

This is line one.  
This is line two.

This is line three.

# Paragraphs Example

## Code:

```
This is the first paragraph.
```

```
This is the second paragraph.
```

## Output:

This is the first paragraph.

This is the second paragraph.

# Lists Example : itemize

## Code:

```
\begin{itemize}  
  \item First item  
  \item Second item  
\end{itemize}
```

## Output:

- First item
- Second item



# Lists Example : enumerate

## Code:

```
\begin{enumerate}  
  \item First item  
  \item Second item  
\end{enumerate}
```

## Output:

- 1 First item
- 2 Second item

# Center Alignment

## Code:

```
\begin{center}  
This text is centered.  
\end{center}
```

## Output:

This text is centered.

# Left and Right Alignment

## Code:

```
\begin{flushleft}  
This text is left aligned.  
\end{flushleft}
```

```
\begin{flushright}  
This text is right aligned.  
\end{flushright}
```

## Output:

This text is left aligned.

This text is right aligned.

# Justified Text

## Code:

```
\begin{justify}  
This text is justified.  
It spreads across the full width.  
\end{justify}
```

## Output:

This text is justified. It spreads across the full width.

# Changing Font Sizes

## Code:

```
{\tiny Tiny Text}  
{\scriptsize Script Size}  
{\footnotesize Footnote Size}  
{\small Small Text}  
{\normalsize Normal Text}  
{\large Large Text}  
{\Large Larger Text}  
{\LARGE Even Larger Text}  
{\huge Huge Text}  
{\Huge Biggest Text}
```

## Output:

Tiny Text

Script Size

Footnote Size

Small Text

Normal Text

Large Text

Larger Text

Even Larger Text

Huge Text

Biggest Text

# Different Font Families

## Code:

```
\textrm{Roman Family}
```

```
\textsf{Sans Serif Family}
```

```
\texttt{Typewriter Family}
```

## Output:

Roman Family

Sans Serif Family

Typewriter Family

# Inline vs Block Math

## Code:

Inline math: `$E = mc^2$`

Block math:

```
\[  
a^2 + b^2 = c^2  
\]
```

## Output:

Inline math:  $E = mc^2$

Block math:

$$a^2 + b^2 = c^2$$

# Numbered Equations

## Code:

```
\begin{equation}  
F = G \frac{m_1 m_2}{r^2}  
\end{equation}
```

## Output:

$$F = G \frac{m_1 m_2}{r^2} \tag{1}$$



# Labeling and Referring Equations

## Code:

```
\begin{equation}  
E = mc^2 \label{eq:einstein}  
\end{equation}
```

As seen in equation~\ref{eq:einstein},  
energy and mass are related.

## Output:

$$E = mc^2 \tag{2}$$

As seen in equation 2, energy and mass are related.

# Online Tools to Make Latex Equations

- **Site 1** : <https://editor.codecogs.com/>
- **Site 2** : <https://latexeditor.lagrida.com/>
- **Site 3** : Use Overleaf Equation Generator or ChatGPT

# Simple Table

## Code:

```
\begin{tabular}{c c}  
A & B \\  
C & D  
\end{tabular}
```

## Output:

A	B
C	D

# Table with Borders

## Code:

```
\begin{tabular}{|c|c|}  
\hline  
Name & Score \\  
\hline  
Alice & 95 \\  
Bob & 88 \\  
\hline  
\end{tabular}
```

## Output:

Name	Score
Alice	95
Bob	88

# Table with Caption and Label

## Code:

```
\begin{table}
\centering
\begin{tabular}{|c|c|}
\hline
Country & Capital \\
\hline
India & New Delhi \\
USA & Washington DC \\
\hline
\end{tabular}
\caption{List of Countries}
\label{tab:countries}
\end{table}
```

## Output:

Country	Capital
India	New Delhi
USA	Washington DC

**Table:** List of Countries

See Table 1 for details.

See Table~\ref{tab:countries} for details.

# Online Tools to Make Tables

- **Site 1** : <https://www.tablesgenerator.com/#>
- **Site 2** : <https://www.latex-tables.com/>
- **Site 3** : Use Overleaf Table Generator or ChatGPT

# Including a Simple Image

## Code:

```
\includegraphics{rcoe-logo.png}
```

## Output:



# Resizing an Image

## Code:

```
\includegraphics[width=0.5\textwidth]{rcoe-logo.png}
```

## Output:





# Image with Caption and Label

## Code:

```
\begin{figure}  
\centering  
\includegraphics[width=0.2\textwidth]{rcoe-logo.png}  
\caption{Sample Figure}  
\label{fig:sample}  
\end{figure}
```

As shown in Figure~\ref{fig:sample},  
this is an example image.

# Image with Caption and Label: Output

**Output:**



Figure: Sample Figure

As shown in Figure 1, this is an example image.

# Adding a Citation

## Code:

```
According to \cite{einstein},  
energy and mass are related.
```

## Output:

According to [1], energy and mass are related.

# Creating a .bib File

## Code in refs.bib:

```
@article{einstein,  
  author   = {Albert Einstein},  
  title    = {Does the Inertia of a Body Depend Upon Its Energy},  
  journal  = {Annalen der Physik},  
  year     = {1905},  
}
```

## Code in main.tex:

```
\bibliographystyle{plain}  
\bibliography{refs}
```

# Output of References

## Output:

According to [1], energy and mass are related.

## References:



Albert Einstein.

Does the Inertia of a Body Depend Upon Its Energy Content?  
*Annalen der Physik*, 1905.

# Summary

- LaTeX is a powerful tool for professional documents
- Topics covered:
  - ▶ Document structure
  - ▶ Text formatting and lists
  - ▶ Mathematical equations
  - ▶ Tables and figures
  - ▶ References
- Practice is key!

# Hands-on Exercise: Build Your Resume

**Task:** Create a one-page resume using  $\text{\LaTeX}$ .

**Include the following:**

- **Name** in large bold font
- **Tagline** (e.g., \*"Student — Developer"\*)
- **Photo** (insert with `\includegraphics`)
- **Short Bio** (3–4 lines)
- **Education** (table or list with degree, year, institution)
- **Projects** (at least 2 with short description)
- **Skills** (list 5–6 skills)

**Bonus:** Use alignment, colors, and formatting to make it professional.

# Shiburaj Pappu

*Dean of Academics*



A post graduate in Engineering from Mumbai University, Prof. Shiburaj P. is passionate about innovation & research. For him his work is of prime importance.

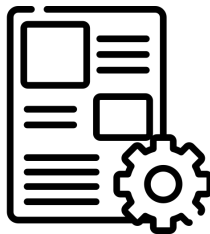
- Degree, Year, Institution
- Project 1: Description - Project 2: Description
- Skill1, Skill2, Skill3



# Questions?



Synopsis Report Template



Project Report Template