

L^AT_EX101

Basics for Graduate Students

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April 14, 2025

1.a. Default, Barebones Document

```
% example_article.tex
\documentclass{article}
\begin{document}
  Hello, world! This is a
  barebones \LaTeX{} article.
\end{document}
```

Hello, world! This is a barebones LaTeX article.

1.b. Lorem Ipsum Document

Source: example_lorem.tex

Output:

```
% example_lorem.tex
\documentclass{article}
\usepackage{lipsum}
\begin{document}
\lipsum[1-2]
\end{document}
```

The Preamble and some *Lorem Ipsum*

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1.c. Journal Template Example

Source: `example_journal.tex`

Output:

```
% example_journal.tex
\documentclass[twocolumn]{revtex4-2}
\begin{document}
\title{A Sample Journal Article}
\author{Author Name}
\date{\today}
\maketitle
\begin{abstract}
This is a sample abstract for a journal article.
\end{abstract}
\section{Introduction}
Sample text here.
\end{document}
```

1.d. Thesis Template Example

Source: example_thesis.tex

Output:

```
% example_thesis.tex
\documentclass[12pt]{report}
\begin{document}
\title{A Sample Thesis Title}
\author{Your Name}
\date{\today}
\maketitle
\chapter{Introduction}
This is the introduction.
\chapter{Literature Review}
Here is the literature review.
\end{document}
```

2. Core Structures: Titles, Sections, Lists, and More

Source:

Output:

`example_core_structures.tex`

```
% example_core_structures.tex
\documentclass{article}
\begin{document}
\title{Core Structures Example}
\author{Author}
\date{\today}
\maketitle
```

```
\section{Sections}
```

This is a section.

```
\subsection{Subsection}
```

This is a subsection.

```
\section{Lists}
```

```
\begin{itemize}
```

3. Core Math: Symbols, Operators, Matrices, Cases

Source:

example_core_math.tex

Output:

```
% example_core_math.tex
\documentclass{article}
\usepackage{amsmath,amssymb}
\begin{document}
\section{Math Examples}
```

Inline math: $\alpha, \beta, \Gamma, \delta$.

Display math:

```
\[
\lim_{x \rightarrow \infty} \frac{1}{x} = 0.
\]
```

Matrix:

```
\[
\begin{matrix}
```

4. Use in Other Contexts

Jupyter Markdown Example (example_jupyter.md)

```
<!-- example_jupyter.md -->  
# Jupyter Markdown with LaTeX
```

Inline math: $a^2+b^2=c^2$

Displayed math:

```
$$  
\sum_{n=1}^{\infty}\frac{1}{n^2}=\frac{\pi^2}{6}  
$$
```

Other:

Word / Canvas Equations: In Word or Canvas, you can often insert LaTeX-like equations using built-in editors. For example, type $E=mc^2$ to render an equation.

Notes:

In Jupyter, this Markdown renders math using MathJax.

5. Presentations: Poster Example

Source: `example_poster.tex`

Output:

```
% example_poster.tex
\documentclass{tikzposter}
\begin{document}
\title{Sample Poster Title}
\author{Your Name}
\maketitle
\block{Introduction}{
This is the introduction block of the poster.
}
\end{document}
```