

# A $\text{\LaTeX}$ Tutorial

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# What is L<sup>A</sup>T<sub>E</sub>X?

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# A $\text{\LaTeX}$ document



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

% remaining preamble goes here

\begin{document}

% content goes here

\end{document}
```

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# Creating a title

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

\title{Automatic Material Classification}
\author{Unal Artan \thanks{Thank you to Natalie \& Johann}}
\date{August 24, 2021}

\begin{document}

\maketitle

...
```

# Automatic Material Classification

Unal Artan \*

August 24, 2021

---

\*Thank you to Natalie & Johann

# Common commands

comments	% ...
<b>bold</b>	\textbf{...}
<i>italic</i>	\textit{...} or \emph{...}
<u>underline</u>	\underline{...}
inline equations	\$...\$
block equations	\$\$...\$\$ or \[...\]
...and many more!	\ldots

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# Layout commands/info

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Command	Description
<code>\vspace{...}</code>	vertical spacing
<code>\hspace{...}</code>	horizontal spacing

Dimension	Description
pt	point, smallest unit of measure
in	inch (72.27 pt)
cm	centimeter
mm	millimeter
em	relative to current point size (e.g., for 11pt font, 1em = 11pt)
en	half the width of em

# Typesetting notes

- Extra spaces between words are ignored
- An empty line starts a new **paragraph**
- Two backslashes (\\\) **forces** a line break, but does not start a new paragraph (i.e., no indent)
- Periods are treated as the **end of a sentence**, unless followed by a comma or backslash (e.g., i.e.\\)
- Tilde (~) inserts **non-breaking whitespace**
- **Opening quotes** are denoted by 1–2 grave accents (` or ``)
- **Closing quotes** are denoted by 1–2 apostrophes (' or ")

# Lists I: Itemize

```
\begin{itemize}
```

```
    \item Lima
```

```
    \item[-] Navy
```

```
    \item Kidney
```

```
\begin{itemize}
```

```
    \item[yes] Bean
```

```
    \item[no] Stone
```

```
\end{itemize}
```

```
\end{itemize}
```

- Lima

- Navy

- Kidney

- yes Bean

- no Stone

# Lists II: Enumerate

```
\begin{enumerate}
    \item One
    \item Two
    \item Three
    \begin{enumerate}
        \item Three Eh
        \item Three Bee
    \end{enumerate}
\end{enumerate}
```

1. One  
2. Two  
3. Three  
3.a Three Eh  
3.b Three Bee

# Tabular

```
\begin{tabular}{ | r | c c | }
```

```
\hline
    & col1 & col2 \\
\hline
row1 & r1c1 &      \\
row2 &      & r2c2 \\
\hline
\end{tabular}
```

	col1	col2
row1	r1c1	
row2		r2c2

# Common Math Syntax

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Description	Code	Output
subscript	<code>x_y</code>	$x_y$
superscript	<code>x^y</code>	$x^y$
grouping	<code>x^{y+z}</code>	$x^{y+z}$
fraction	<code>\frac{x}{y}</code>	$\frac{x}{y}$
square root	<code>\sqrt{x+y}</code>	$\sqrt{x+y}$
greek letters	<code>\alpha \beta \gamma</code>	$\alpha \beta \gamma$
spacing	<code>\; \backslash: \backslash,</code>	contextual

# Equation Environments I

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```
\begin{equation}
\beta(s) = \int^{\infty}_{-\infty} CWT(s, \tau) \; d\tau
\label{eq:CWTint}
\end{equation}
```

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$$\beta(s) = \int_{-\infty}^{\infty} CWT(s, \tau) \; d\tau \quad (1)$$

# Equation Environments II

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```
\begin{equation}
\begin{split}
a_{1, X} = & a_{1,x} \cos{\alpha} \\
& - a_{1,z} \sin{\alpha}
\end{split}
\end{equation}
```

$$a_{1,X} = a_{1,x} \cos \alpha \quad (2)$$
$$- a_{1,z} \sin \alpha$$

# Figures I

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```
\begin{figure}
\includegraphics[height=0.65\textheight]{%
  figures/loader_diagram.png%
}
\caption{The Kubota R520s robotic 1-tonne-capacity wheel
loader that was used for field experiments.}
\label{fig:loader}
\end{figure}
```

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# Figures II



Figure 1: The Kubota R520s robotic 1-tonne-capacity wheel loader that was used for field experiments.

# References

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```\ldots the Kubota Loader in Figure~\ref{fig:loader}''

“...the Kubota Loader in Figure 1”

```see Equation~\ref{eq:CWTint}''

“see Equation 1”

## Markup language for defining bibliography entries

```
@inproceedings{artan2021,
    author      = {Artan, Unal and Fernando, Heshan and Marshall, Joshua A.},
    booktitle   = {2021 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)},
    title       = {Automatic Material Classification via Proprioceptive Sensing and Wavelet Analysis During
                  ↪ Excavation},
    year        = {2021},
    pages       = {612–617},
    doi         = {10.1109/AIM46487.2021.9517696}
}
```

``\ldots due to breakthrough research \cite{artan2021}''

“...due to breakthrough research [1]”

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# Listing bibliography references

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```
\bibliographystyle{ieeetr}  
\bibliography{references.bib}
```

- [1] U. Artan, H. Fernando, and J. A. Marshall, “Automatic material classification via proprioceptive sensing and wavelet analysis during excavation,” in *2021 IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, pp. 612–617, 2021.

# Commands

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```
\renewcommand{cmd}{args} [default]{def}
```

# Environments

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```
\renewenvironment{nam}{args}{default}{begdef}{enddef}
```