



# LaTeX Tutorial

# What is LaTeX?

- TeX is a typesetting system designed in 1978 to automate the production of high quality print using any type of computer
- LaTeX is a document markup language used to create documents in TeX.
  - Often formatted as:  $\text{L}^{\text{A}}\text{T}_{\text{E}}\text{X}$

# Assignment overview

- Create a tutorial designed to teach a novice engineering student how to create a document in LaTeX.
- The tutorial itself should be created using LaTeX.
- You should use an IEEE formatting template (from an IEEE class file – more on that later)

# Assignment requirements (1 of 2)

- Introduction
  - Why will this tutorial be helpful?
  - Why should I learn LaTeX?
- Creating a .tex file
  - Environments: `\begin{ }` and `\end{ }`
  - Reserved Characters
    - Why are these reserved?
    - Explain the functions of these characters: `\` , `~` , `\\` , `%`
    - What if you want to display these characters?
  - Preamble
    - `\documentclass[ ]` and class files
    - Packages
    - `\begin{document}` and `\end{document}`
  - Title and Heading Information
    - Title, Author and Date
    - `\maketitle` command

# Assignment requirements (2 of 2)

- Sections
  - Subsections
- Body text: Paragraphs and Content
- Tables
- Figures
- Mathematical formulas
- How to: Acknowledgements
- How to: References
- Conclusion
- Acknowledgements
- References

# Common problems to avoid

- Don't just present examples, explain them.
- Provide a meaningful introduction, consider your audience's perspective.
- Use your own words, do not copy from the sample template.
- Be sure to include all the requirements.
- Spellcheck! (LaTeX doesn't do that automatically)

# Where do I get LaTeX?

- You will need both a LaTeX client and a LaTeX Compiler
- There are many LaTeX clients, but we recommend Texmaker
- Texmaker (LaTeX editor for Windows, Mac, and Linux):
  - <http://www.xm1math.net/texmaker/download.html>
  - Mac users: you may need to adjust your security preferences to allow installation
- LaTeX Compilers:
  - MiKTeX for Windows: <http://miktex.org/download>
  - MacTeX for Mac: <http://tug.org/mactex/>
  - TeX Live for Linux: <https://www.tug.org/texlive/>
- Web-based LaTeX editor: <https://www.sharelatex.com/>
- This may not support the custom class file used for this assignment.

# Finding an IEEE class file

- First, what is a class file?
  - A class file is a set of document specifications such as formatting information, font styles, etc.
- For this assignment, download and unzip:
  - [http://people.ucsc.edu/~gmoulds/latex\\_l85.zip](http://people.ucsc.edu/~gmoulds/latex_l85.zip)



# Using the IEEE class file and template

- After you unzip “latex\_l85.zip”, it should create the folder “latex\_l85”
- Contains files:
  - IEEEtran.cls (class file)
  - latex\_l85\_moulds\_g.tex (.tex starting template)
  - latex\_l85\_moulds\_g.tex (sample PDF)
  - latex\_sample\_packages.tex (packages .tex file)
  - slug.pdf (sample image file)
  - Titration\_Plot.pdf (sample data for graph)
  - CMPE185\_LaTeX\_Requirements.pdf (requirement list)

# Saving and Submitting

- Once you open the .tex file, rename your file:
- latex\_185\_last name\_first initial.tex
- Submit your .tex file and the titration image file
- To: gmoulds@soe.ucsc.edu
- Cc: rbrobins@ucsc.edu, mhovanes@ucsc.edu
- Subject: LaTeX Tutorial CMPE 185

# Table Section

- Explain the difference between  
`\begin{table}` and `\begin{tabular}`
- Explain the following characters/symbols:
  - `l`, `c`, `r`, `|` (vertical bar), `\hline`, `\\`
- Explain how to enter content.
- Use an example table showing how to create a table at least 2 columns wide and 3 rows long.

# Figure Section

- Create a graph using the titration lab data found in the “Titration\_Plot.pdf” file from the zip folder.
- Explain how you included the graph into your tutorial.
  - You can plot the data in any medium: Microsoft Excel, MATLAB, or even LaTeX.

# Figure section (continued)

- Explain `\includegraphics[ ]{ }`
- Include a meaningful caption, explaining the data presented.
  - What conclusions can be made?
  - Don't state the obvious.
  - Why is the image notable?

# Mathematical formulas

- Demonstrate how to create formulas, using examples such as these:

$${}_3F_2\left[\begin{matrix} a & b & c \\ d & e \end{matrix}; z\right] \quad {}_3F_2\left[\begin{matrix} a & b & c \\ d & e \end{matrix}; z\right] \quad {}_3F_2\left[\begin{matrix} a & b & c \\ d & e \end{matrix}; z\right]$$

$$\frac{n!}{k!(n-k)!} = \binom{n}{k}$$

- LaTeX code for the most common formulas:
  - <http://en.wikibooks.org/wiki/LaTeX/Mathematics>

# Mathematical formulas (continued)

- Demonstrate:
  - Equation environments (in-line vs. display)
  - Symbols (example: “\delta”  $\Delta$  )
  - Fractions
  - Superscript and Subscript

# How to: References

- Demonstrate how to set up the `thebibliography` environment
  - Explain how to include each `bibitem`
- Explain the following commands:
  - `\label`
  - `\ref`
  - `\cite`
  - Note: It will be helpful to use a previous figure as an example for `\label` and `\ref`



# How to: Acknowledgements

- Demonstrate how to include this section.
  - Note: this is different from including your own Acknowledgements section
- What is this section for?

# Acknowledgements and References

- For acknowledgements, thank anyone who personally helped you with this assignment.
  - If you read a general tutorial or watched an instructional YouTube video on LaTeX, but didn't specifically reference it, thank the creators.
  - If you received help from a current CMPE 185 student, let us know.
- Anything you do specifically reference should, of course, be cited and included in the References section.