Latex Style Guideline For Design For Electrical and Computer Engineers

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Contents

Chapter 1

LaTeX Usage For Design For ECE

The journey of a thousand miles begins with one step.

I can't be the only one. I say this as I struggle to convert a textbook written in Microsoft Word to LaTeXand post it on GitHub. There must be other faculty members who have created quality content they want to share. So this text is an Open Education Resources, free to use under the Creative Commons license. But how can we take advantage of deep reservoir of knowledge the community of senior design faculty have created over the years. In taking this particular project on, I want to move a step towards the solution.

By hosting this textbook on Github, I want to encourage others to contribute their insights and ideas into our text. For example, some of the processes in this text are outdated. If that annoys you, then go to
https://github.com/coulston/Design-For-Electrical-and-Computer-Engineering
,the textbook repository, fork, clone, make a branch, make your changes and then do a pull request to merge them into the existing text. If that sounds a bit overwhelming, don't worry, I plan on writing a chapter 2 to this how-to to walk you through it. The world is an imperfect place, I want you to be empowered to make it better.

Learning Objectives

By the end of this chapter, the reader should:

- Understand some of my motivations in this project.
- Understand the general philosophy of writing LaTeXfor this text.
- Know how to create common structures like table, figure, examples.
- Know how to use the Example environment.
- Know how to create references to structures.

1.1 Tables

When deciding on a methodology to implement some text formatting question, my preference is to work with the existing LaTeXpackages before adding new packages because every additional package adds additional time to build the text. All things being equal, I will always prefer a Minimum Working Example (MWE) over something more complex. As a consequence of these two preferences, when you inevitably need to search for a way to complete some text formatting goal, I generally preface "MWE" in front of the thing I am trying to accomplish.

While tables are an incredibly important tool to communicate a lot of information in a structured format, they can be a challenge to tame. As a result, I'll introduce Table **??** as an example. The LaTeXcode for this table is shown below.

The following are some of the non-standard commands used in tables throughout the text. I'd appreciate if you would edit this document to introduce new table features you might need to add with your content.

1. `rowcolor`
2. `multicolumn`
3. `hhline`
4. `multirow`
5. `makecell`

Table 1.1: Selection criteria for a ECE senior design textbook.

Criteria	Weights	Alternatives		
		Design for ECE	Ulysses	Goodnight Moon
Relevance to class	0.4	0.40	0.20	0.40
Depth	0.2	0.40	0.30	0.30
Additional Resources	0.2	0.40	0.30	0.30
Length	0.1	0.45	0.20	0.35
Bedtime reading	0.1	0.10	0.10	0.80
Lots of text in a multicolumn requires makecell and linebreaks.		0.8	0.1	0.1
Notes		This is the logical choice.	I think it ends where it begins???	Great choice for younger students.

1.2 Figures

Thankfully figures are a lot easier to incorporate into LaTeXif you follow a few simple rules.

1. Store all artwork in folder called "Fig" located in the chapter directory.

2. Convert all images to PDF format. This will eliminate needing additional packages to process different formats.

3. Include `\graphicspath{ {./chapter01/Fig} }` at the top of your `chapter.tex` file. This will insure that the path to your graphics file

With this, let's admire Figure 1.1.

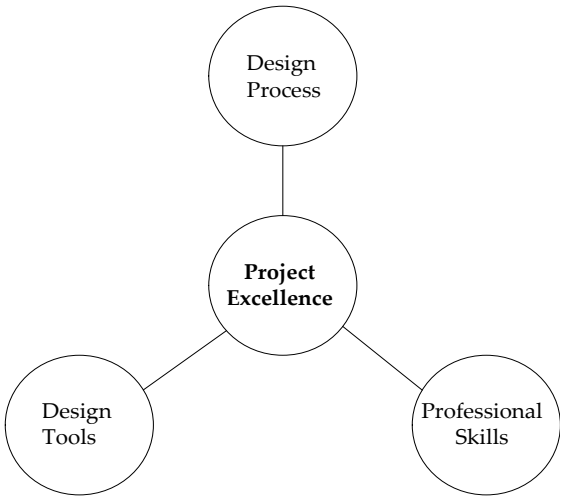

Figure 1.1: The guiding philosophy of this book. In order to achieve success in executing engineering and design projects, it takes an understanding of the design process, strong technical design tools, and professional skills.

The only exception to this simple format is when you want to include several different images in the same figure frame. When you do this you will need to use the hspace command to stop all the images from being squished next to one another.

Figure 1.2: (a) .

1.3 Equations

A reference to Equation 1.1. Etiam euismod. Fusce facilisis lacinia dui. Suspendisse potenti. In mi erat, cursus id, nonummy sed, ullamcorper eget, sapien. Praesent pretium, magna in eleifend egestas, pede pede pretium lorem, quis consectetuer tortor sapien facilisis magna. Mauris quis magna varius nulla scelerisque imperdiet. Aliquam non quam. Aliquam porttitor quam a lacus. Praesent vel arcu ut tortor cursus volutpat. In vitae pede quis diam bibendum placerat. Fusce elementum convallis neque. Sed dolor orci, scelerisque ac, dapibus nec, ultricies ut, mi. Duis nec dui quis leo sagittis commodo.

$$x = \int v(t)dt \tag{1.1}$$

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1.4 Examples

Example 1.1 A Simple Example

Problem: Consider....
Solution: The parallel systems...

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1.5 Linking

The use of links inside and outside the document are an important feature. The use of descriptive names in your label commands is a good start. As best practice, use the following format for your labels. And remember, you need to put the `\label` after any associated captions.

```
\label{<type>:<chapterName><description>
```

The `chapterName` and `desciption` should be self explanatory. I tend to try to summarize both rather than being to verbose. I have tried to standardize the `<type>` field to one of the following:

- table, like for Table 1.1
- figure, like for Figure 1.1
- equation
- example
- section
- chapter

Use external links to point readers to an important resource like the US Bureau of Labor Statistics, http://stats.bls.gov. Note, some URLs can get quite long, so be prepared to introduce some line breaks before and after URL references.

1.6 Summary and Further Reading

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1.7 Problems

1. In your own words, describe the differences between creative, variant, and routine designs.