

Latex Style Guideline For Design For Electrical and Computer
Engineers

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Chapter 1

L^AT_EX 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 L^AT_EX and 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 Resource, 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 For example, some of the processes in this text are outdated.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 L^AT_EX for 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 L^AT_EX packages 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 L^AT_EX code 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 L^AT_EX if 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.

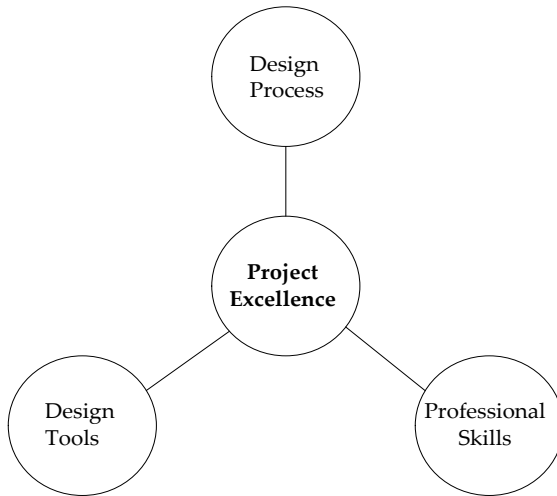


Figure 1.1: The guiding philosophy of this book. In order to achieve success in executing engineering and design projects, it takes an understanding of the design process, strong technical design tools, and professional skills.

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

Being a design textbook, I didn't think that there would be many equations. Boy, was I wrong. The chapter on reliability was chock-full of equations. Thank goodness, \LaTeX is a master of equations. So writing them will be one of the more pleasant and straightforward tasks. For example, let's look at Equation 1.1.

$$x = \int v(t) dt \quad (1.1)$$

Notice the reference to "equation" starts with a capital letter "E". Not all equations will need a number, in which case use the `$$` delimiters when you want the equation to float centered

in the page. For in-line equations use a single $at the start and end of the equations. Pretty standard L^AT_EX stuff.$

1.4 Examples

I wanted the examples to stand out in the text. The `example` environment allows you to put a numbered, referencable, example in a shaded box. Most examples will have a problem and solution. When they do, put these terms in bold.

Example 1.1 A Simple Example

Problem: Choosing a senior design textbook for ECE.

Solution: Look at a bunch of textbooks and consider a variety of factors. It is a very individual decision.

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 `description` should be self explanatory. I tend to try to summarize both rather than being too 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

Thanks for taking the time to review this How-To guide. I appreciate your contributions to the text and any of the associated materials.

1.7 Problems

1. Which \LaTeX environment do you use to enclose the solution to a homework problem?
2. What default formatting text do you include inside every solution?
3. There are three qualifiers for homework questions. What are they and what are their abbreviations?

