

**THE TITLE OF YOUR THESIS IN  
INVERTED PYRAMID  
FORMAT**

A THESIS

Presented to the Department of Electrical Engineering  
California State University, Long Beach

In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science in Electrical Engineering

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B.S., 2018, University of California, Irvine

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## **ABSTRACT**

A list of keywords may be used as the last paragraph with first line indented and a heading as the first word or phrase in italics with a colon. The abstract should not be longer than two pages.

## **ACKNOWLEDGEMENTS**

The acknowledgments page is not required, but many people include one. You may give appreciation to anyone who has assisted you with writing or researching your manuscript as well as friends and family or anyone who has inspired you or supported you during your life or the course of your education.

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If you have received funding for your research and the funding organization requires recognition, mention it on the acknowledgments page.

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## LIST OF FIGURES

1. The CSULB logo partially superimposed over a sine wave. This extra text is a test of  
the caption behavior when there is a longer caption. Lorem ipsum dolor. . . . . 3

## LIST OF ABBREVIATIONS

Abbreviation	Description
IEEE	Institute of Electrical and Electronics Engineers
ASME	American Society of Mechanical Engineers

## LIST OF WORKS

1. *Titles of Paintings, Sculptures, and Other Works of Art Use Italics and Headline Style Capitalization and Dimensions of the Piece Can Be Included at the End in Parentheses* (8.5 in. by 11 in.)
2. “Titles of Photographs Use Quotation Marks and Headline Style Capitalization and Dimensions of the Piece Can Be Included at the End in Parentheses” (40 cm by 40 cm)
3. Descriptions of the items depicted in a photograph of an untitled work or a photo of an element in the design of the exhibition can use headline style capitalization or sentence style capitalization; if a title or description takes up more than one line, indent all lines that follow the first line further so that words on those lines begin underneath words on the first line (rather than beginning flush with words on the first line)

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## PREFACE

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## CHAPTER 1

### BASIC TYPESETTING

In these paragraphs, we will display examples for many common features in  $\text{\LaTeX}$ . The code is shown in `main.tex` and the associated output in `main.pdf`. We assume you already know the basic syntactical structure of  $\text{\TeX}$  with its commands and environments. If you are not familiar, it is recommended you read `intro to latex.pdf` provided in this package. We will start with the most basic examples of different fonts and styles.

#### Fonts and Styles

**Bold** font is made using the `\textbf` command. *Italic* font is made using the `\textit` command. Underline font is made using the `\underline` command. Monospace/teletype font is made using the `\texttt` command. Sans-serif font is made using the `\textsf` command. SMALL CAPITALS font is made using the `\textsc` command.

#### Math

One of  $\text{\LaTeX}$ 's greatest strengths is its mathematical typesetting. You can enter inline math  $e^{i\pi}$ . You can also have a math block.

$$f(x) = \int_{-\infty}^{\infty} g(x) dx$$

You can have numbered equations with the `equation` environment.

$$\Phi(n) = \gamma^n + \Delta\gamma \cdot \vec{\zeta} \tag{1}$$

You can also align equations by using a `&` in the `align*` environment. Omitting the `*` will number each line.

$$h_1 = \mathbf{X}_1 + N$$

$$h_2 = \mathbf{X}_1 + N$$

$$\vdots$$

$$h_n = \mathbf{X}_n + N$$

A common mistake is to italicize units in math mode. Units are supposed to be typeset in a roman font because  $\mu m$  in italic means you are multiplying two variables and  $\mu m$  means your value is in micrometers. A similar mistake is often made for special functions. If you are using a multi-letter function such as  $\sin()$  or  $\text{floor}()$ , it should not be italic for the same reason as before. To fix these issues, you can use the `\mathrm` command when in math mode to set your text as roman (or upright). Greek letters need to be specified as upright by prepending ‘up’ to the command, e.g., `\mathrm{\upmu}`.

### Quotation marks

Quotes are written in latex using ``` for opening and `’` for closing. They can be used for ‘single’ and “double” quotes alike.

### Lists

Bulleted lists are made with the `itemize` environment. Numbered lists are made with the `enumerate` environment. They can be made hierarchical by embedding another lists within. A bulleted list:

- First level
  - second level

A numbered list:

## 1. First level

### (a) second level

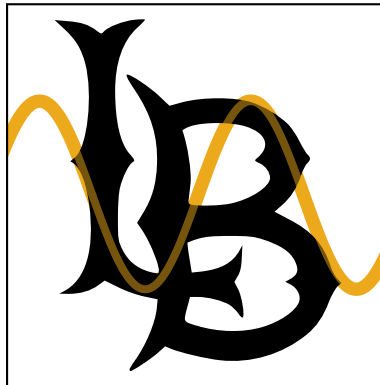
#### Code Listing

You can make a code block using the `verbatim` environment. Be mindful that unlike most  $\text{\TeX}$  environments, it is sensitive to spaces (but not tabs) at the beginning of lines so that you may indent your code.

```
class Fill:
    def __init__(self, color=BLACK, style='solid'):
        self.color = color
        self.style = style
```

#### Figures

Figures can be included using the `\includegraphics` command, and their placement and captioning can be configured using the `figure` environment. Generally,  $\text{\LaTeX}$  can determine the best placement of your figure on the page itself, but you can give it a placement option of `h`, `t`, `b`, or `p` to place it here, on top, on bottom, or on its own page.



**FIGURE 1.** The CSULB logo partially superimposed over a sine wave. This extra text is a test of the caption behavior when there is a longer caption. Lorem ipsum dolor.

The graphics path is already set

**TABLE 1. An example of a table**

Color	Radius, $r$ [mm]	RMS Voltage, $v$ [V]
Cyan	72.2	2.1
Magenta	45.2	5.5
Yellow	78.5	1.3
Black	33.3	6.9

## Tables

Tables can be generated using the `tabular` environment, and their placement and captioning is configured with the `table` environment, like with figures.

## Citations and Cross-references

Many items can be cross-referenced in  $\text{\LaTeX}$  using labels.[1]

## Footnotes

Footnotes can be placed with the `\footnote` command <sup>1</sup>.

## Headings

This document class supports up to third level subheadings or *subsubsections*. Fourth level headings are not currently supported.

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<sup>1</sup>This is a footnote but it's a very long footnote so that we can test the indent of the footnote text when it leads onto a second line at the bottom of the page.

## CHAPTER 2

### DUMMY TEXT

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

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#### First Level Subhead (section)

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## **Second Level Subheads (subsection)**

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**Third level subheads (subsubsection).** Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas

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## **2.1 Example of First-Level Subheading With Hierarchical Numbering**

Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio. Sed vehicula hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Donec odio elit, dictum in, hendrerit sit amet, egestas sed, leo. Praesent feugiat sapien aliquet odio. Integer vitae justo. Aliquam vestibulum fringilla lorem. Sed neque lectus, consectetur at, consectetur sed, eleifend ac, lectus. Nulla facilisi. Pellentesque eget lectus. Proin eu metus. Sed porttitor. In hac habitasse platea dictumst. Suspendisse eu lectus. Ut mi mi, lacinia sit amet, placerat et, mollis vitae, dui. Sed ante tellus, tristique ut, iaculis eu, malesuada ac, dui. Mauris nibh leo, facilisis non, adipiscing quis, ultrices a, dui.



### 2.1.1 Example of a Second-Level Subheading With Hierarchical Numbering

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**2.1.1.1 Example of a third-level subheading with hierarchical numbering.** Morbi luctus, wisi viverra faucibus pretium, nibh est placerat odio, nec commodo wisi enim eget quam. Quisque libero justo, consectetur a, feugiat vitae, porttitor eu, libero. Suspendisse sed mauris vitae elit sollicitudin malesuada. Maecenas ultricies eros sit amet ante. Ut venenatis velit. Maecenas sed mi eget dui varius euismod. Phasellus aliquet volutpat odio. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Pellentesque sit amet pede ac sem eleifend consectetur. Nullam elementum, urna vel imperdiet sodales, elit ipsum pharetra ligula, ac pretium ante justo a nulla. Curabitur tristique arcu eu metus. Vestibulum lectus. Proin mauris. Proin eu nunc eu urna hendrerit faucibus. Aliquam auctor, pede consequat laoreet varius, eros

tellus scelerisque quam, pellentesque hendrerit ipsum dolor sed augue. Nulla nec lacus.

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*Non-hierarchical heading:* Sed feugiat. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Ut pellentesque augue sed urna. Vestibulum diam eros, fringilla et, consectetur eu, nonummy id, sapien. Nullam at lectus. In sagittis ultrices mauris. Curabitur malesuada erat sit amet massa. Fusce blandit. Aliquam erat volutpat. Aliquam euismod. Aenean vel lectus. Nunc imperdiet justo nec dolor.

## **APPENDICES**

## **APPENDIX A**

### **AN EXAMPLE OF A SINGLE PART OF MULTIPLE APPENDICES**

Some information that would go in the appendix.

## **APPENDIX B**

### **ANOTHER EXAMPLE OF A SINGLE PART OF MULTIPLE APPENDICES**

More information that would go in an appendix.

## **REFERENCES**



## REFERENCES

- [1] R. Wayne, “The book title,” *The Journal*, vol. 72, pp. 500–505, 2012.