



Trinity College Dublin

Coláiste na Tríonóide, Baile Átha Cliath

The University of Dublin

## PHD THESIS

TRINITY COLLEGE DUBLIN

THE UNIVERSITY OF DUBLIN

DEPARTMENT OF CIVIL, STRUCTURAL AND ENVIRONMENTAL ENGINEERING

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# Project Title

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A dissertation submitted in partial fulfillment of the degree of  
Doctor in Philosophy

## Declaration of Work

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## **Abstract**

*Place abstract here.*

## Acknowledgements

*Place acknowledgement here.*

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# Nomenclature

## Abbreviations

PV Photovoltaic

## Physical Constants

$c$  The speed of light in vacuum  
 $299\,792\,458\text{ m s}^{-1}$

# Chapter 1

## Introduction

Do look up report style and requirements of your department and ensure that the report follows the standard set by your department. For example, the page margins can be set under the package *geometry*. It is advisable to look up the margin requirements of your department.

If you are not familiar with concepts like styles, captioning, cross-referencing, and how to generate tables of contents, figures etc. in LaTeX, the Overleaf guides are a useful start at: [https://www.overleaf.com/learn/latex/Learn\\_LaTeX\\_in\\_30\\_minutes](https://www.overleaf.com/learn/latex/Learn_LaTeX_in_30_minutes).

Otherwise, a lot of help can be obtained through Stack Exchange, a forum where people get help from others regarding LaTeX writing.

Other useful tools are

- Detexify, which can convert your drawings to LaTeX commands,
- Mathpix tools, which you can use to screenshot an equation and it will convert into LaTeX equation form to be copied into your .tex document,
- Grammarly is a great help for grammar assistance on overleaf.

### 1.1 Sectioning

This is a section. You can also use subsections but subsections should be avoided if possible. If used, it should be unnumbered using `\subsection*{}`.

#### 1.1.1 Subsection

Example of a subsection.

##### Subsubsection

Example of a sub-subsection.

This document will have a brief reminder of report writing conventions (IEEE style). Then, some templates will be included, which can be copied from the editor for ease of use. The rest of the document is irrelevant to the template.



## Chapter 2

# Some helpful reminders

### 2.1 Citations and Reference

The common two ways of doing it is by numbers (generally Vancouver style [1, 2]) or by author-year (generally Harvard style [3, 4]). These citations are clickable and will bring you to a general guide on how to prepare your references in general and also in L<sup>A</sup>T<sub>E</sub>X, prepared by the Imperial College London library.

If paraphrasing can be done, that would be much more recommended than a direct quote. However, if the message cannot be transmitted through paraphrasing, a limited amount of direct quoting can be done. Also, self-plagiarism is still considered plagiarism!

### 2.2 Typography

Typically, scientific writing should be in the passive voice. The use of active voice has been more and more accepted in scientific writing, however, it is generally better to be in a passive voice. The **bold** style is not recommended to be used for emphasis. Excessive (or any) use of **bold** in text is frowned upon. Emphasis is usually done using *italics*.

The open quotation mark (‘) is different to the close quotation mark (’). An easy way to avoid this issue is to use the command *enquote*, which needs the package *csquotes*.

By convention, *italics* should only be used for mathematical terms (e.g. *l* for length, *m* for mass), while units should be in normal style (e.g. m for metre, and kg for kilogram). When writing symbols, it is generally recommended to keep one symbol to represent one quantity, while using subscripts to specify the specific quantity it represents. For example, for the population of Dublin,  $P_D$  is good while *Population<sub>Dublin</sub>* or *Pop<sub>Dublin</sub>* are not recommended. Always explain any variables introduced in the report.

## Chapter 3

# Templates of L<sup>A</sup>T<sub>E</sub>X groups

List of groups which can later be copied and pasted to keep the style while changing the content of the groups.

### 3.1 Equations

Equation 3.1 is the famous Einstein mass-energy equation:

$$E = mc^2, \tag{3.1}$$

where  $E$  is energy,  $m$  is mass and  $c$  represents the speed of light. This can also be written in text –  $E = mc^2$ . The terms must be explained, and equations labelled.

### 3.2 Figures and subfigures

Subfigures require the package *subfigure*. Figure 3.1 is a typical figure and Figure 3.2 is in a subfigure style. The captions should be elaborate and clearly describe the figure. Use

in the figure captions if you wish to shorten the figure details at the list of figures.



Figure 3.1: The logo of Trinity College Dublin. Image taken from the Trinity College Dublin website [5].

### 3.3 Simple and complex tables

Table 3.1 is a dummy table. Table ?? is a multi-row and multi-column table, which needs the package *multicol*.



**Trinity College Dublin**  
Coláiste na Tríonóide, Baile Átha Cliath  
The University of Dublin

(a) Caption 1



**Trinity College Dublin**  
Coláiste na Tríonóide, Baile Átha Cliath  
The University of Dublin

(b) Caption 2

Figure 3.2: The logo of Trinity College Dublin. Image taken from the Trinity College Dublin website [5].

Table 3.1: Each row should be a different manipulated variable while each column is the corresponding results obtained.

Manipulating var. / <i>unit</i>	Responding var. 1 / <i>unit</i>	Responding var. 2 / <i>unit</i>
Option 1	Outcome 1-1	Outcome 2-1
Option 2	Outcome 2-1	Outcome 2-2

Table 3.2: A complex table with multirows and multicolumns.

Year	Quantity 1	Quantity 2	Quantity 3	
	(a.u.)	(m)	3.1 (%)	3.2 (%)
2007	$5 \times 5 \times 0.3$	x	10	90
2008	$5 \times 5 \times 0.3$	y	10	80
2009	$12 \times 12 \times 0.3$	z	20	70

Table 3.3: Using *threeparttable* to add footnotes to a table (not recommended).

Letter	Number	Description
A	1	
B	2	*
C	3	
D	10	No same pattern

\* This is a footnote for the table.

### 3.4 Bullet points

Using *enumerate* for numbered points while *itemize* for bullet points. The points should be written in a sentence. For example,

1. point 1,
  2. point 2,
- item 1,
  - item 2.

If the items can be in paragraphs without using bullet points, that will be much better.

### 3.5 Nomenclature

The speed of light is  $c$ , while PV is an abbreviation for photovoltaic.

# Chapter 4

## Evaluation

### 4.0.1 Scientific Analysis

When working on analysis, making assumptions is good if insufficient information is provided. However, any assumptions made should be clearly stated and described, and if possible, elaborated such that the assumptions made are logical. This also makes the assumptions thought out and can be scrutinised and analysed. It gives the readers some understanding of potential errors and uncertainties that arise from any of the data presented in the report, such that if any replication of research was done, potential deviation from the presented data in the research can be easily determined.

When presenting your values, take note of the use of significant figures or decimal places. The main thing that is driving the accuracy of the data is the uncertainty or error of the reading. Generally, high accuracy (thus a large number of significant figures) data is unlikely, and the general rule is to have the same number of significant figures as the value of the lowest significant figures in the calculation. However, if a value has a known uncertainty, it can be written until that level of accuracy (e.g. a measuring tape has an accuracy of up to 1mm, so any measurements of length can have up to 3 decimal points in m).

Besides, when presenting the observation of data, any interesting findings should be discussed and analysed. If no interesting data is found, it is fine to just state the findings are trivial or within expectation and move on. Any data that is presented in the report should be discussed. Any data that is not discussed should not be presented in the report. If there is weird data that is suspicious, it is fine to just say that the results obtained are not within expectations, and discuss the possible errors causing the unexpected results, or potentially discuss what can be improved to obtain better results.

If an unexplainable result is obtained, it is fine to include it in the report but give some potential future work that can be done to resolve the error or explore the new discovery. Scientific work is a process of learning, and it is fine to obtain results that cannot be clearly explained. It is better to acknowledge the lack of understanding than to brush it off.

## Chapter 5

# Conclusion

A brief summary and highlight of findings in the report, dissertation or thesis.

# Bibliography

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- [4] Library Services: Imperial College London. A Harvard style for use with LaTeX (using natbib) – example, 2019. URL <https://www.imperial.ac.uk/media/imperial-college/administration-and-support-services/library/public/LaTeX-example-Harvard-apr-2019.pdf>. [Accessed 4 June 2024].
- [5] Trinity College Dublin. Logo downloads, n.d. URL <https://www.tcd.ie/identity/logo-downloads/>. [Accessed 19 November 2023].

# Appendix A

## First Appendix

This is the first appendix. For more appendices, add `\chapter{appendix title}` for another appendix.