Essential LaTeX Templates for Report Writing

A Seminar Report
Submitted in partial fulfillment of
the requirements for the degree of
Doctor of Philosophy
by

My name
(Roll No. ....)

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Dedicated to . . .

Acceptance Certificate

Department of Chemical Engineering

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The seminar report entitled "Essential LaTeX Templates for Report Writing" submitted by My name (Roll No. ....) may be accepted for being evaluated.

_____

Date: 17 January 2019

Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I declare that I have properly and accurately acknowledged all sources used in the production of this report. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be a cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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Abstract

This document contains essential templates required to write technical reports using LaTeX. Particularly it shows how to create an equation, figure, table, symbols list, and bibliographic citation in a LaTeX document.

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Chapter 1

Introduction

This document contains commonly used essential templates to write a LaTeX document. This document is to be used along with the files and folders provided. Writing a LaTeX document is very simple. Often students need only very simple constructs. This document shows certain essential features that almost all technical report writing requires. Please consult the PDF file for the output of the document, and then look at the corresponding LaTeX file to reproduce it. The document illustrates the following constructs

- Unnumbered and numbered Lists
- Equations
- Defining short macros for frequently used symbols
- Bibliography
- Figures
- Tables

The normal procedure for compiling a LaTeX document that contains bibliographic entries is to follow the following steps

1. `pdflatex mainrep`
2. `bibtex mainrep`
3. `pdflatex mainrep`
4. `pdflatex mainrep`

In the above example `mainrep` is the main LaTeX file.

1.1 First section of this chapter

This is the first chapter, which resides in a directory (folder) intro. Each chapter can contain `section`, `subsection` and so on.

1.1.1 Equations and Math symbols

Equations should be set in a separate mode. For details on getting various types of aligned equations, consult the $\mathcal{AMS}$-LaTeX documentation `amsldoc.pdf`. Simple equations are set as

$$\int \mathrm{d}x \ \cos x = \sin x \tag{1.1}$$

Equation (1.1) is the integral of the cosine function. Mathematical symbols must always be put inside `$$`, when they appear outside a math environment (such as `equation`, `align`, `gather`, etc). The symbol "ex" must be written as x and not as x.

Another commonly used construct for equations is the `align` environment to align several equations along a vertical line. It is usually the = sign across which the alignment is done. The point of alignment for each equation is specified using the ampersand symbol

$$a = b \tag{1.2}$$

$$a + e + f + g = m + n + z \tag{1.3}$$

$$x + 2 = x^3 + 3x^2 + 2x + 5 \tag{1.4}$$

1.1.2 Commonly used Symbols

For mathematical symbols it is very convenient to define frequently used symbols as a short macro. For example if you are to be using the symbol η_s frequently it is convenient to define it in as:
`\newcommand{\etas}{\ensuremath{\eta_{\mathrm{s}}}}`
in the preamble and to simply refer it to in the text as η_s or in a mathematical equation as $\eta_s = \eta\,(1 + \phi)$.

1.2 How to write nomenclature

1.2.1 General guidelines:

1. Use `\nomenclature[prefix]{symbol}{description}` for symbols, the best place for this command is immediately after you introduce the symbol for the first time

2. Shorten the long command:
   `\newcommand{\nm}[2]{\nomenclature{#1}{#2}}`

3. Create compiler for nomenclature with the given code:
   makeindex %.nlo -s nomencl.ist -o %.nls -t %.nlg
   For TeXstudio: go to options > build > user command > write- 'user1: Nomenclature' amd paste the above code
   For compiling the nomenclature: go to tools > user > Nomenclature

1.2.2 Grouped nomenclature

1. For acronyms, use:
   `\nmA[sorting letter]{symbol}{descritpon}`

2. For roman symbols, use:
   `\nmR[sorting letter]{symbol}{descritpon}`

3. For greek symbols, use:
   `\nmG[sorting letter]{symbol}{descritpon}`

4. For superscripts, use:
   `\nmS[sorting letter]{symbol}{descritpon}`

5. For subscripts, use:
   `\nms[sorting letter]{symbol}{descritpon}`

6. For any other symbol, use:
   `\nmX[sorting letter]{symbol}{descritpon}`
   Name of other symbols can be changed with `\OtherSym{Name of symbols}`

1.2.3 Some examples

1. `\nmA[FF]{FFA}{Free fatty acid}`

2. `\nmA[AO]{AOR}{Angle of repose}`

3. `\nmR[Ra]{$R$}{Radius of circle}`

4. `\nmR[ra]{$r$}{Intrinsic length}`

5. `\nmR[Gr]{$G_\mathrm{r}$}{Gravity}`

6. `\nmG[al]{$\alpha_{\mathrm{a}}$}{Angular acceleration}`

7. `\nmG[et]{$\eta$}{Viscosity}`
8. `\nmG[be]{$\beta$}{Shape factor}`
9. `\nmS[v]{$v$}{Vapor phase}`
10. `\nmS[g]{$g$}{Gas phase}`
11. `\nms[i]{$i$}{Indices}`
12. `\nms[x]{$x$}{Variable in x-direction}`
13. `\nmX[f]{foo}{foo`

Chapter 2

Literature Survey

The bibliographic entries are to be kept in a file named `<something>.bib`. In this sample report we call it as `mylit.bib`. This file must be included without the `.bib` extension in the main file as: `\bibliography{mylit}`. Open the file `mylit.bib` to see the format in which the entries are written. This is written in the BibTEXformat. Most of the bibliographic web pages (Scopus, ISI Web) and software (EndNote, etc) allow you to export bibliographic entries in the BibTEXformat.

Citations are referred in the text using `\citet` command which produces citations as though they are part of the text. In order to say somebody did this work as a part of a line use: `\citet{Batzri1973}` have done extensive work on .... This will produce Batzri and Korn (1973) have done extensive work on .... Alternately citations can appear in parenthesis. The command `\citep{Batzri1973}` is used to automatically put the citations in parenthesis. As an example consider the extensive work done in the area of book writing (Sackmann, 1995; Boal, 2012).

Conferences (Richman and Martin, 1992) or collection of work (Sackmann, 1995) also have special entries.

It is also possible to cite thesis like this: Jariwala (2000); Luding (1994) or just unpublished work from Sunthar (2003). Some times there are unclassified bibliographic entries which can be put under “misc” (Smith, 1999).

Chapter 3

Materials and Methods

3.1 Including Figures

Figures are conveniently included using postscript format. If you are generating a figure in a software, please check if the software supports writing to a postscript or a PDF format. This format is loss less vector format and with reproduce in any magnification without any pixelation. Make sure to write it to an "Encapsulated Post-script"or .eps format.

Figures should be given a label and which can be used to refer to them in the running text using `\ref{}` command. Figure 3.1 describes the process flow sheet of the experimental set up used in this report. The Figure 3.1 can also be refered by a short form notation a pre-defined macro `\Figref`.

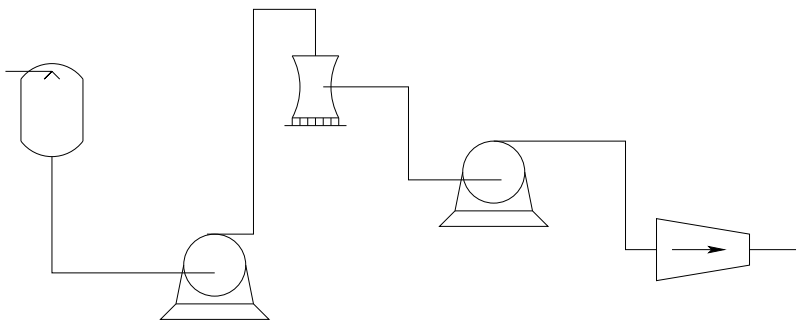

Figure 3.1: Process flow sheet of the experimental setup. The caption of the figure goes here. A shorter caption can be written in square brackets to identify it in the list of figures.

Chapter 4

Results and Discussions

4.1 Including Tables

Tables are to be used in a special environment so that they have a Number, caption and appear in the list of tables. Table 4.1 is a sample table. In the case of tables, it is a convention to write the caption above the table. Note that in the case of figures the caption appears below the figure.

Table 4.1: Physical properties of the materials used.

Property	Value
Particle Density, ρ_p	2500 kg/m^3
Viscosity, η_s	1 $\times 10^{-3}$ Pa-s

Appendix A

Supporting Material

References

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Sunthar, P., 2003, "Calculation of fixed point in the zimm model: revisited," unpublished notes.

List of Publications

Put your publications from the thesis here. The packages `multibib` or `bibtopic` or `biblatex` or enumerate environment or thebibliography environment etc. can be used to handle multiple different bibliographies in the document.

Acknowledgements

This section is for the acknowledgments. Please keep this brief and resist the temptation of writing flowery prose! Do include all those who helped you, e.g. other faculty/staff you consulted, colleagues who assisted etc.

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17 January 2019

Colophon

This document has been typeset using the `iitbreport.cls` typesetting system developed by P. Sunthar and Chandra Has. The body text is set at 12pt and a similar to times new roman font is accessed using `txfonts` package; default line spacing is set at 1.5. Other important packages such as `amsmath, amssymb, amsfonts, fancyhdr, hyperref, natbib`, and `graphicx` are installed to use this style file.

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