CHAPTER 3

INTRODUCTION

This document provides a simple template of how the provided `iitmdiss.cls` LaTeX class is to be used. Also provided are several useful tips to do various things that might be of use when you write your thesis. The template has been standardized in caompliance with the new format guidelines released in Feb 2021.

Before reading any further please note that you are strongly advised against changing any of the formatting options used in the class provided in this directory, unless you are absolutely sure that it does not violate the IITM formatting guidelines. *Please do not change the margins or the spacing.* If you do change the formatting you are on your own (don't blame me if you need to reprint your entire thesis). In the case that you do change the formatting despite these warnings, the least I ask is that you do not redistribute your style files to your friends (or enemies).

Also, since we are talking about the responsibility here, like any other piece of freely-distributable code, this template and other files within this folder are provided "as is", and there is no guarantee of any kind from the author. In short, that means, it is your personal responsibility to make sure the template is complaint with the guidelines, and I cannot be held responsible.

It is also a good idea to take a quick look at the formatting guidelines. Your office or advisor also should have a copy. If they don't, pester them, they really should have the formatting guidelines readily available somewhere. I personally would strongly suggest you to go through them even before you venture into the present template. For convenience, the formatting guidelines have been included in a separate folder along with other proformas required while submitting your synopsis or thesis.

To compile your sources run the following from the command line:

```
% latex thesis.tex
```

```
% bibtex thesis
% latex thesis.tex
% latex thesis.tex
```

Modify this suitably for your sources. Or you can use standard TEXenvironments like TEXStudio, TEXMaker etc., to make this process way simpler.

To generate PDF's with the links from the `hyperref` package use the following command:

```
% dvipdfm -o thesis.pdf thesis.dvi
```

3.1 Package Options

Use this thesis as a basic template to format your thesis. The `iitmdiss` class can be used by simply using something like this:

```
\documentclass[PhD]{iitmdiss}
```

For getting a print form of the same thesis, add the option `PrntForm` like:

```
\documentclass[PhD,PrntForm]{iitmdiss}
```

There are also default color bars on the title page in the new format. For PhD thesis, the default would be black, and for MS thesis, it is cyan-blue. As for other programmes, there has not been any specific guidelines on how to make the title page, so black has been set as default. There is also 'NoColor' option you can give to not print this color bar.

```
\documentclass[PhD,PrntForm,NoColor]{iitmdiss}
```

To change the title page for different degrees just change the option from `PhD` to one of `MS`, `MTech`, `DD`, `MBA`, `MSc` or `BTech`. The other specific degrees are not supported

yet but should be quite easy to add if you look at the code used to generate above degree pages in `iitmdiss.cls` file. The title page formatting really depends on how large or small your thesis title is. Consequently it might require some hand tuning. Edit your version of `iitmdiss.cls` suitably to do this. I recommend that this be done once your title is final.

The new format has an option to include a visually appealing figure/image from your thesis. I have given the file name as `titleImage.png` for this sample image from my work. So if you are planning to use it, place that image file in png format with the main folder and rename it as `titleImage.png`. But if you are not happy with this concept, and want to include custom image formats or file name of your image/figure, and are comfortable in LaTeX, I would suggest editing the `iitmdiss.cls`. Look for `titleImage` string, and start editing there. You can also

To write a synopsis simply use the `synopsis.tex` file as a simple template. The synopsis option turns this on and can be used as shown below:

```
\documentclass[PhD,synopsis]{iitmdiss}
```

For synopsis, the concept of 'Blue' or 'Yellow' tape to represent the draft and approved reports has to be reflected on the title page of respective documents in the new guidelines. Remember that there is a compliance-checking staff at the DR office who would ensure you submit it with right color coding. Or else, you might have to re-make and re-submit the report again. Options to give would be 'BlueTape' or 'YellowTape', and can be used as shown below:

```
\documentclass[PhD,synopsis,BlueTape]{iitmdiss}
```

Like thesis, there is a 'NoColor' option for synopsis as well, but it won't be that useful. Also default option gives black color bar.

If you want to modify spacing between the lines/text of the title page, again it can be easily done by editing the class file if you are familiar, and may require some small amount of fine tuning.

This sample file uses the `hyperref` package that makes all labels and references clickable in both the generated DVI and PDF files. These are very useful when reading the document online and do not affect the output when the files are printed.

3.2 Example Figures and tables

Figure 3.1 shows a simple figure for illustration along with a long caption. The formatting of the caption text is automatically single spaced and indented. Table 3.1 shows a sample table with the caption placed correctly. The caption for this should always be placed before the table as shown in the example.

In the new format, emphasis has been made on the proper copyright compliance when reusing figures/images/tables from other authors and sources. Relevant attributions and usage policy has to be included within the thesis certificate page. An example has been provided for the usage of IIT Madras logo that is used as a sample figure in the present template.

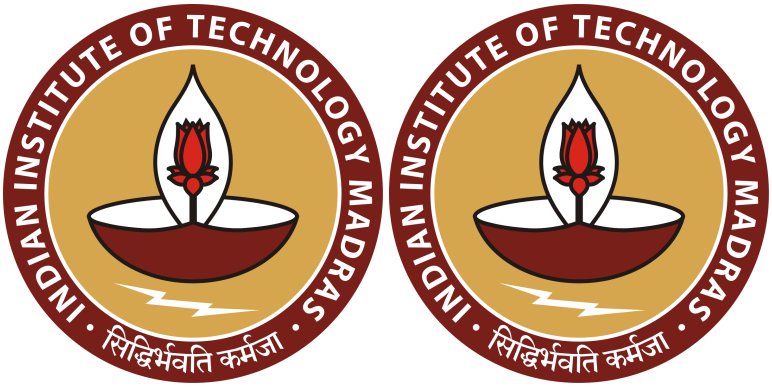

Fig. 3.1: Two IITM logos in a row. This is also an illustration of a very long figure caption that wraps around two two lines. Notice that the caption is single-spaced.

Table 3.1: A sample table with a table caption placed appropriately. This caption is also very long and is single-spaced. Also notice how the text is aligned.

x	x^2
1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64

3.3 Bibliography with BIBTEX

I strongly recommend that you use BIBTEX to automatically generate your bibliography. It makes managing your references much easier. It is an excellent way to organize your references and reuse them. You can use one set of entries for your references and cite them in your thesis, papers and reports. If you haven't used it anytime before please invest some time learning how to use it. Also you can use reference managers like Mendeley, Zotero etc., to import these bib-formatted library with all the references, making the citation process less painful. The `refs.bib` used in this template is one such example.

I've included a simple example BIBTEX file along in this directory called `refs.bib`. The `iitmdiss.cls` class package which is used in this thesis and for the synopsis uses the `natbib` package to format the references along with a customized bibliography style provided as the `iitm.bst` file in the directory containing `thesis.tex`. Documentation for the `natbib` package should be available in your distribution of LATEX. Basically, to cite the author along with the author name and year use `\cite{key}` where `key` is the citation key for your bibliography entry. You can also use `\citet{key}` to get the same effect. To make the citation without the author name in the main text but inside the parenthesis use `\citep{key}`. The following paragraph shows how citations can be used in text effectively.

More information on BIBTEX is available in the book by Lamport (1986*a*), which is a citation for book. Lamport (1986*b*) is the same book citation in the old format where the year comes at the end. Now to cite the references within parentheses. There are many references (Lamport, 1986*a*) that explain how to use BIBTEX. Read the `natbib` package documentation for more details on how to cite things differently.

Here are other references for example. The present study has been carried out in OpenFOAM which is based on Weller *et al.* (1998). The Lagrangian solver has two injection models based on the nature of injection source viz. `pointInjection` model which injects the spray at a given point, and `detailed- SprayProfileInjection` model which injects the spray over a spherical sector of given injection radius. The configuration and experimental data to compare the spray statistics is taken from Zhou (2015)

The above paragraphs had journal and book references. Other sample references to check are: for thesis Syed (2013); Cheekati (2014); Syed (2020), for conferences Sasidharan *et al.* (2017); Syed and Kumar (2018*b*,*a*), for manual Ayachit (2015), for book chapter Ahren *et al.* (2005). One more reference, Roenby *et al.* (2016) with arxiv and doi.

Python (van Rossum *et al.*, 1991–) is a programming language and is cited here to show how to cite something that is best identified with a URL. For technical report, Syed (2015) is an example, and United Nations Security Council (2019) is an example of a non-technical report.

3.4 Other useful LATEX packages

The following packages might be useful when writing your thesis.

- It is very useful to include line numbers in your document. That way, it is very easy for people to suggest corrections to your text. I recommend the use of the `lineno` package for this purpose. This is not a standard package but can be obtained on the internet. The directory containing this file should contain a lineno directory that includes the package along with documentation for it.

- The `listings` package should be available with your distribution of LaTeX. This package is very useful when one needs to list source code or pseudo-code.
- For special figure captions the `ccaption` package may be useful. This is specially useful if one has a figure that spans more than two pages and you need to use the same figure number.
- The notation page can be entered manually or automatically generated using the `nomencl` package.

More details on how to use these specific packages are available along with the documentation of the respective packages.

REFERENCES

1. **Ahren, J.**, **B. Gevci**, and **C. Law** (2005). ParaView: An End-User Tool for Large-Data Visualization. *In Visualization Handbook*, 717–731. Elsevier. ISBN 978-0123875822. doi:10.1016/B978-012387582-2/50038-1.

2. **Ayachit, U.** (2015). *The ParaView Guide: A Parallel Visualization Application*. Kitware Inc.

3. **Cheekati, D.** (2014). *Numerical Study of Multiple Turbulent Round Jets*. Master's thesis, Department of Aerospace Engineering, IIT-Madras.

4. **Lamport, L.** (1986*a*). *LaTeX: A document preparation system*. Addision-Wesley.

5. **Lamport, L.**, *LaTeX: A document preparation system*. Addision-Wesley, 1986*b*.

6. **Roenby, J.**, **H. Bredmose**, and **H. Jasak** (2016). A computational method for sharp interface advection. *Royal Society Open Science*, **3**(11), 160405. ISSN 2054-5703, doi:10.1098/rsos.160405, arXiv:1601.05392v2.

7. **Sasidharan, S.**, **A. Syed**, and **A. Kumar** (2017). Sensitivity study of solid fuel properties and dynamic behavior of pyrolysis in non-charring materials. *In 26th International Colloquium on the Dynamics of Explosions and Reactive Systems*. Boston, USA. URL http://www.icders.org/ICDERS2017/abstracts/ICDERS2017-1142.pdf.

8. **Syed, A.** (2013). *RANS of a turbulent round jet*. Bachelor's thesis, Department of Aerospace Engineering, IIT-Madras, Chennai – 600036.

9. **Syed, A.** (2015). *Description and verification of Lagrangian sub-models in OpenFOAM - 2.2.x*. Technical report, FM Global Research, Norwood, MA, USA.

10. **Syed, A.** (2020). *A new and improved LaTeX class for dissertations submitted to IIT-M*. Doctoral thesis, Department of Aerospace Engineering, IIT-Madras, Chennai – 600036. URL https://github.com/ashrufsyed/iitm_thesis.

11. **Syed, A.** and **A. Kumar** (2018*a*). Effect of injection model and turbulent dispersion models on prediction of full-cone nozzle spray in OpenFOAM. *In 71st Annual Meeting of the APS Division of Fluid Dynamics*. American Physical Society, Atlanta, GA. URL http://meetings.aps.org/link/BAPS.2018.DFD.D37.8.

12. **Syed, A.** and **A. Kumar** (2018*b*). Numerical study of buoyant flame interacting with water-mist spray in counter-flow configuration. *In 10th FM Global CFD Fire Modeling Workshop*. Norwood, MA, USA.

13. **United Nations Security Council** (2019). *Children and armed conflict in Yemen*. Report S/2019/453, UNSC, UN Headquarters, New York. URL https://undocs.org/en/S/2019/453.

14. **van Rossum, G.** *et al.* (1991–). The Python programming language. URL http://www.python.org/.

15. **Weller, H. G.**, **G. Tabor**, **H. Jasak**, and **C. Fureby** (1998). A tensorial approach to computational continuum mechanics using object-oriented techniques. *Computers in Physics*, **12**(6), 620–631. ISSN 08941866, doi:10.1063/1.168744.

16. **Zhou, X.** (2015). Characterization of interactions between hot air plumes and water sprays for sprinkler protection. *Proceedings of the Combustion Institute*, **35**(3), 2723–2729. ISSN 15407489, doi:10.1016/j.proci.2014.05.078.