DEPARTMENT OF AEROSPACE
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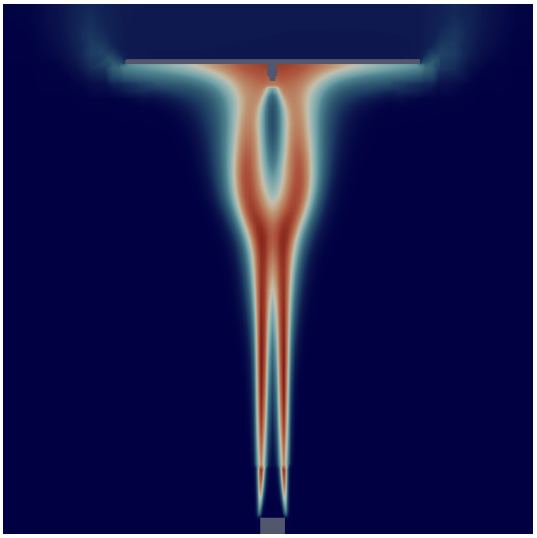
A New and Improved LaTeX Class for Dissertations Submitted to IIT Madras



A Thesis

Submitted by

NAME

For the award of the degree

Of

DOCTOR OF PHILOSOPHY

July 2021

QUOTATIONS

Some say the world will end in fire,
Some say in ice.
From what I've tasted of desire
I hold with those who favor fire.
But if it had to perish twice,
I think I know enough of hate
To say that for destruction ice
Is also great
And would suffice.

ROBERT FROST

DEDICATION

To my beloved

THESIS CERTIFICATE

This is to undertake that the Thesis (or Project report) titled **A NEW AND IMPROVED LaTeX CLASS FOR DISSERTATIONS SUBMITTED TO IIT MADRAS**, submitted by me to the Indian Institute of Technology Madras, for the award of <Ph.D./M.S.>, is a bona fide record of the research work done by me under the supervision of <Name(s) of the Research Guide(s)>. The contents of this Thesis (or Project report), in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

In order to effectively convey the idea presented in this Thesis, the following work of other authors or sources was reprinted in the Thesis with their permission:

- Figure 1.1, page 4: Within the purposes of the organisation under Fair and Non-free usage policy. ©IIT Madras

Place: Chennai 600 036

Date: 20th Sep 2021

Name

Research Scholar

Prof. 1

Research Guide

Prof. 2

Research Co-Guide

LIST OF PUBLICATIONS

I. REFEREED JOURNALS BASED ON THE THESIS

1. Authors.... Title... *Journal*, Volume, Page, (year).

II. REFEREED JOURNALS (Others)

III. PRESENTATIONS IN CONFERENCES

1. Authors.... Title... *Conference*, Page, (year).

IV. PUBLICATIONS IN CONFERENCE PROCEEDINGS

ACKNOWLEDGEMENTS

Thanks to all those who made TEX and LATEX what it is today.

ABSTRACT

KEYWORDS: LaTeX; Thesis; Style files; Format.

A LaTeX class along with a simple template thesis are provided here. These can be used to easily write a thesis suitable for submission at IIT-Madras. The class provides options to format PhD, MS, M.Tech., Dual Degree and B.Tech. thesis. It also allows one to write a synopsis using the same class file. Also provided is a BIBTeX style file that formats all bibliography entries as per the IITM format.

The formatting is as (as far as the author is aware) per the current institute guidelines.

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GLOSSARY

The following are some of the commonly used terms in this thesis:

OpenFOAM An opensource C++ toolbox for the development of customized numerical solvers, and pre-/post-processing utilities for the solution of continuum mechanics problems, most prominently including computational fluid dynamics

CFD A branch of fluid mechanics that uses numerical analysis and data structures to analyze and solve problems that involve fluid flows

FireFOAM FireFOAM is a CFD solver used for LES modeling of fire and its suppression in the OpenFOAM

ABBREVIATIONS

IITM	Indian Institute of Technology Madras
NCCRD	National Centre for Combustion Research and Development
RTFM	Read the Fine Manual

NOTATION

English Symbols

R_E	Radius of the earth
R_u	Universal Gas Constant

Greek Symbols

α	Angle of thesis in degrees
β	Flight path in degrees

Miscellaneous

$\|x\|$	Absolute value of x
$‰$	Per-mille (or per thousand)

CHAPTER 1

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
```

1.1 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.

1.2 Example Figures and tables

Figure 1.1 shows a simple figure for illustration along with a long caption. The formatting of the caption text is automatically single spaced and indented. Table 1.1 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.

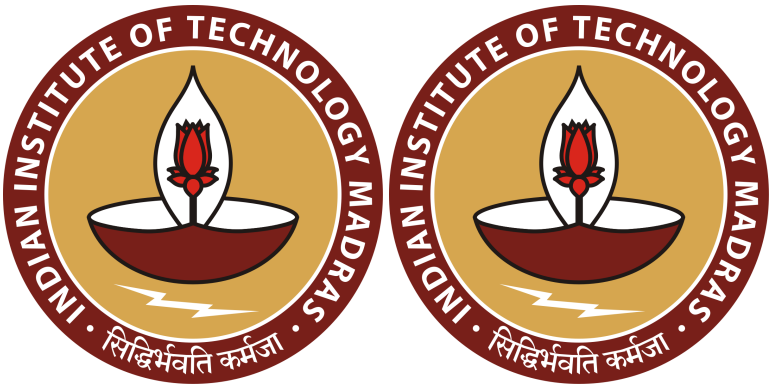

Fig. 1.1: Two IITM logos in a row. This is also an illustration of a very long figure caption that wraps around two two lines. Notice that the caption is single-spaced.

Table 1.1: 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

1.3 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.

1.4 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.

CHAPTER 2

ANOTHER CHAPTER

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

APPENDIX A

A SAMPLE APPENDIX

Just put in text as you would into any chapter with sections and whatnot. That's the end of it.

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

APPENDIX B

ANOTHER SAMPLE APPENDIX

Another sample text

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