The MIT thesis template

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SUMMARY

This LaTeX class formats theses according to the requirements of the MIT Libraries. The template is suitable for MIT theses of all types and at all levels. The title and abstract pages are automatically laid out from information provided by the user. The template includes options for a variety of typefaces, and it is compatible with either pdfTeX or the Unicode-aware engine LuaLaTeX. When using LaTeX formats dated November 2022 or later, the resulting PDF file can meet the PDF/A archivability standard. For formats November 2025 and later, the PDF can meet the technical requirements of the PDF/UA-2 accessibility standard. An up-to-date TeX Live installation includes all packages required by the template. This document provides instructions for installation and use of the template.

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1 BACKGROUND

The original MIT thesis template was written in LaTeX 2.09 by Stephen Gildea in the late 1980s (available on CTAN, at this link). That template was edited by many later students.

LaTeX has changed greatly since the original MIT thesis template was written. LaTeX 2.09 was replaced by LaTeX 2_ε in 1994. New engines were developed, particularly pdfTeX during the 1990s and Unicode-aware engines in the decades that followed. Many packages and fonts were developed to accompany LaTeX, particularly after 2000, and major updates to the LaTeX kernel began in 2018. Over the years, the MIT Libraries changed the required format several times, especially as electronic thesis submission became the norm. The original template served MIT well, but by the early 2020s, it was substantially out of date. That situation motivated the creation of a new template.

This new MIT thesis template was developed in 2023 at the request of the MIT Libraries. The title and abstract pages strictly follow the current requirements of the Libraries. The underlying code is entirely new, with extensive use of `expl3` syntax.

2 SYSTEM REQUIREMENTS AND INSTALLATION

The new `mitthesis` class uses the features of LaTeX as of 2022, with limited backward compatibility. An up-to-date LaTeX system is therefore necessary when using this template.

LaTeX is a free, open source system. The entire system is distributed through the TeX Live platform (https://www.tug.org/texlive/), including the basic format, packages, and user interfaces. The system operates on Windows, macOS, and Unix/Linux. TeX Live is formally updated each year in the spring, and the associated utility package (`tlmgr`) allows users to download the latest versions more frequently if they desire. (The commercial platform Overleaf.com also uses TeX Live.)

If you are missing a package or documentation, you may obtain it at no cost from the Comprehensive TeX Archive Network, CTAN (ctan.org).

2.1 Downloading the template

The files needed for preparing your thesis are in the CTAN repository: https://ctan.org/pkg/mitthesis. Copy the subdirectory `MIT-thesis-template` onto your system. That directory contains files you can adapt for your own thesis.

If your TEX system has the most current version of `mitthesis.cls` installed (e.g., you have an up-to-date version of TEX Live), you are all set. If not, copy the file `mitthesis.cls` into your working directory. If you plan to use fonts other than the default fonts, ensure that the `fontsets` subdirectory is present in your working directory.

2.2 File structure

The new MIT thesis template consists of: `mitthesis.cls`; a root file `MIT-Thesis.tex`; a file to load the abstract, `abstract.tex`; a file for design options, `mydesign.tex`; and an optional file to change the fonts (see the subdirectory, `fontsets`). You should change the name of the root file to something more descriptive of your own work (e.g., `JohnsThesis.tex`, `MagnumOpusScientiae.tex`,...). In addition, files can be loaded for acknowledgments, an optional biosketch, chapters, optional appendices, and a bibliography.

2.3 LaTeX engine: pdfTeX or LuaLaTeX

The template works with either the pdfTeX engine or the Unicode-aware LuaLaTeX engine.

The pdfTeX engine, first released around 1996, uses the older 7- and 8-bit font encodings of LaTeX (fonts of 128 or 256 characters). Because each 8-bit font holds at most 256 characters, a given font encoding covers only a limited character set—typically the Latin script for Western and Central European languages, with other scripts (Cyrillic, Greek) requiring different encodings and fonts. (Font loading is done automatically by `mitthesis.cls`.)

LuaLaTeX uses Unicode fonts, such as OpenType or TrueType. The Unicode standard provides 1,112,064 usable code points, covering nearly all the world's scripts, and a single Unicode font often contains thousands of glyphs. Unicode assigns distinct code points to mathematical letter styles—such as bold, italic, script, and fraktur—for which Unicode math fonts supply dedicated glyphs. LuaLaTeX is built on the Lua programming language and enables the direct use of Lua code in your `.tex` files; with Lua, you can automate plotting, table generation, and other numerical computations [1]. LuaLaTeX will become the primary LaTeX engine over time [2], and it is required for producing tagged (accessible) PDF documents with `mitthesis.cls` [3].

LuaLaTeX is slower than pdfTeX. The difference can be noticeable with large documents or on platforms with limited resources. The LaTeX `\includeonly{..}` command lets you process a single chapter at a time while writing and editing, if the chapters have been loaded with `\include{..}`.

3 SETTING UP TITLE PAGE, ABSTRACT, AND BIBLIOGRAPHY

Various fields and commands must be changed to your own information in the preamble of `MIT-Thesis.tex` and immediately after the `\begin{document}` command. This information includes the title, author, degree, and other essential information. With the comments in `MIT-Thesis.tex`, this step should be self-explanatory. Nevertheless, some explanation follows.

Table 1: Primary user commands

Command	Comments
`\hypersetup{keyword=value,…}`	metadata for archiving, indexing, discovery, and accessibility
`\title{title text}`	the title
`\Author{name}{department}[first previous degree][second…]`	use separately for each author, up to four optional previous degrees
`\Degree{degree name}{department}`	use separately for each degree and department
`\DegreeDate{month}{year}`	date when degree is *granted*
`\ThesisDate{date}`	date when thesis is *submitted*
`\Supervisor{name}{title}[department]`	once for each supervisor, add department if using optional committee members page
`\Acceptor{name}{title}{thesis-related position}`	once for the thesis acceptor of each department
`\CClicense{license type}{license URL}`	optional creative commons license
`\Reader{name}{title}{department}`	one or more thesis readers, optional

3.1 Set-up commands

The primary commands are listed in Table 1.

1. In the `\hypersetup{..}` command, change the keywords in the sample file to match your own information (name, title, subject, etc.). These commands generate metadata that are incorporated into the PDF file.

2. `\title{the title of your thesis}`

3. `\Author{author full name}{author department}[1st PREVIOUS degree][2nd...` Note that the third, fourth, fifth, and sixth arguments are optional [..] and may be omitted. Use once for each author.[1] See §7.2 if you are enrolled in more than one department.

4. `\Degree{name of degree}{department giving degree}`. Use once for each degree fulfilled by the thesis.

   If two departments jointly issue a single degree, leave the degree name blank for the *second* degree: `\Degree{}{2nd department name}`. If the thesis satisfies two degrees from one department, leave the department argument blank: `\Degree{2nd degree name}{}`.

   If you wish to cause a line break in a very long degree name, you can insert `\\` at an appropriate point. Department names should not break across lines. For example:

[1] Most MIT theses have a single author. Joint theses require an approved petition.

```
\Degree{Doctor of Philosophy \\ in \\ Electrical Engineering and Computer
    Science}{Department of Electrical Engineering and Computer Science}
```

5. `\Supervisor{supervisor name}{supervisor title}[supervisor department]`. Use once for each supervisor. The optional supervisor department is used to generate the optional thesis committee page. See §7.2 if your supervisor has more than one title or sits in more than one department.

6. `\Acceptor{acceptor name}{acceptor title}{thesis-related position}`. The acceptor is the professor who accepts theses for your department (e.g., the Graduate Officer). Use once for each department. See §7.2 if an acceptor has more than one title or sits in more than one department.

7. `\DegreeDate{Month}{year}`. Date degree is awarded (February, May, June, or September).

8. `\ThesisDate{date}`. Date that your final thesis is submitted to the department.

9. `\Reader{reader name}{reader title}{reader department}`. For thesis committee members other than the supervisor. Using this once will cause the generation of a thesis committee page between the title and abstract pages. See §7.2 if a reader has more than one title or sits in more than one department.

3.2 Copyright license

By default, the thesis template reserves all rights for the author, with a carve-out for MIT. If you wish to make your thesis available under a Creative Commons License, issue the following command between `\begin{document}` and `\maketitle`: `\CCclicense{license type}{license url}`. For example,

```
\CCclicense{CC BY-NC-ND 4.0}{https://creativecommons.org/licenses/by-nc-nd/4.0/}
```

MIT thesis copyright options and policies and Creative Commons licenses are discussed at these links:

- https://libraries.mit.edu/distinctive-collections/thesis-specs/#owner
- https://creativecommons.org/share-your-work/cclicenses/

3.3 Bibliography

You may generate your bibliography using either `biblatex/biber` or `natbib/bibtex`. The template is set up for `biblatex` by default, rather than the older, less flexible `natbib`. The `biblatex` package is very powerful, and you can customize most aspects of the reference list and citations to suit your needs. See the documentation for details: ctan.org/pkg/biblatex.

The style of citations and references can be set in your `.tex` file. For numerical citations of references (e.g., [1]), you can do

```
\usepackage[style=ext-numeric-comp,giveninits=true,sorting=none,
    language=american]{biblatex}
```

For IEEE-style citations and references, you might do

```
\usepackage[style=ieee,maxbibnames=10,sorting=none]{biblatex}
```

Table 2: Options to the document class

Class option	Effect
`fontset`	is a key value, `fontset = <name>`, which selects the set of fonts used for the thesis. See description below.
`lineno`	loads the `lineno` package, which provides line numbers, which may be useful for editing. The `lineno` package provides additional commands to control line numbering.
`mydesign`	loads the file `mydesign.tex`, which in turn loads code or packages that change the style of titles, headings, captions, margins, lists, and so on. You may edit `mydesign.tex` as you prefer or use the option as a key value to load a different file, `[mydesign=some-file]`.
`twoside`	gives facing-page behavior for two-sided printing; omitting it will eliminate the even-numbered blank pages.

For author/year style (Smith 2024), you might do

```
\usepackage[style=authoryear, maxbibnames=10]{biblatex}
```

In the author/year style, `\cite{..}` commands do not automatically produce parentheses. Instead, you can do `\parencite{..}` to get "(Author year)."

4 CLASS OPTIONS

Class options may be specified for `\documentclass[..]{mitthesis}`. These options are described in Table 2 and the subsections that follow.

4.1 Font choices

By default, `mitthesis.cls` will load the traditional LaTeX typeface, Computer Modern (for pdfTeX) or Latin Modern (for Unicode engines). By using the key value `fontset=⋯` in the `\documentclass` command, you can select a different set of fonts.

Twelve font sets are predefined, including the default set (see Table 3). Three work only with pdfTeX, five work only with LuaLaTeX, and four work with either. These options include a mixture of serif or sans-serif text and math fonts, as shown in the table. To access the predefined font sets, you *must* have the directory `fontsets` as a subdirectory of your working directory, including its files as named. The relevant fonts must also be on your computer; however, all (except Lucida) are included in TeX Live and will be present in a complete LaTeX installation.

Among the predefined font sets, Termes and NewTX are serifed typefaces similar to the digital typeface Times New Roman. STIX Two is more similar to the original metal-type Times typeface. Libertinus (a fork of Linux Libertine) is a serif typeface inspired by 19$^{\text{th}}$-century book type. Lucida is a serifed typeface designed for high legibility at small sizes or on low-resolution devices. Lucida is excellent for mathematics and includes a complete bold-face math font, but it is not free. Heros and NewTX-sans are sans-serif text typefaces similar to Helvetica. NewTXsf is a sans-serif math font which draws upon glyphs from the STIX fonts. Fira is a humanist sans-serif text typeface designed designed for Mozilla's Firefox OS. Lato and Lete Sans Math, which is derived from Lato, are also humanist sans-serif typefaces. Finally, Computer Modern (and its extension Latin Modern)—the traditional LaTeX typeface—is a Didone typeface, with high contrast between thick

Table 3: Predefined font sets

fontset	pdfTeX	Unicode	text font	math font	details
fira-newtxsf	yes	no	sans	sans	included in TeX Live
newtx	yes	no	serif	serif	included in TeX Live
newtx-sans-text	yes	no	sans	serif	included in TeX Live
default	yes	yes	serif	serif	CM & LM fonts are included in TeX Live
libertinus	yes	yes	serif	serif	included in TeX Live
lmodern	yes	yes	serif	serif	included in TeX Live
lucida	yes	yes	serif	serif	the Lucida fonts are available from the TeX Users Group, https://tug.org/store/lucida
heros-stix2	no	yes	sans	serif	included in TeX Live
lato-lete-sans	no	yes	sans	sans	included in TeX Live[2]
stix2	no	yes	serif	serif	included in TeX Live
termes	no	yes	serif	serif	included in TeX Live
termes-stix2	no	yes	serif	serif	included in TeX Live

and thin elements. The lmodern fontset replaces Computer Modern with Latin Modern when running pdfTeX.

You may also place your own font-set file, say Myfontset.tex, in your working directory, and load it with: \documentclass[fontset=Myfontset]{mitthesis}.

4.2 Design options

The thesis will follow the default styles of the LaTeX report class for section headings, captions, and lists. If you prefer different styles you can use the class option [mydesign] which loads the file mydesign.tex. The mitthesis class will insert the content of mydesign.tex at an appropriate point. You should not need to edit the class file.

With mydesign.tex, you can set options for a package that manages color, such as xcolor. You can change the margins with \newgeometry{..} from the geometry package, say, to create a binding margin for two-sided printing. You can insert any other code to change the design. For instance, you can renew the definition of \section to change fonts, font color, or font features (using commands from the fontspec package with LuaLaTeX). You can also load other packages.

As distributed, mydesign.tex will set caption labels in boldface type. For example, "Figure 1.1:" is made bold. If your LaTeX format is dated 2025/11/01 or later, the code uses LaTeX's socket and plug mechanism to change the label. If your format is older, the caption package is loaded to change the label.[3] For formats of 2026/11/01 or later, section and chapter headings are customized using LaTeX's templates mechanism; older formats use LaTeX 2_ε commands. For more information, see the comments in mydesign.tex.

The class option [mydesign] can also be used as a key value, in the form [mydesign=some-file], where some-file.tex will be loaded if it is in your working directory. Two examples of design files are in the examples directory. One, mydesign_redsans_headings, puts chapter headings, section headings, and caption labels in dark red, sans-serif type. This option pairs well

[2] The lato-lete-sans fontset requires the experimental lua-unicode-math package, preferably Sept. 2026 or later.

[3] As of version 1.22, mitthesis.cls includes its own implementation of \subfigure and \subcaption, without loading the subcaption package.

with fontsets like `newtx` and `heros-stix2`. The second, `mydesign_libertinus_headings`, uses stylistic alternate characters and ligatures in chapter titles and section headings, and it puts caption labels in bold type. This style runs only with the `libertinus` fontset; by editing this file, you can restrict the use of alternates to chapter titles to provide a more restrained design. These are simply examples, not official MIT styles.

Hyperlink colors and PDF bookmark or viewing options from the `hyperref` package can be changed with `\hypersetup{ .. }` in the preamble or `\AtBeginDocument{ \hypersetup{ .. } }` in the `mydesign.tex` file.

4.3 Single-sided vs. two-sided layout

The sample template uses the option `[twoside]`, which starts major sections (abstract, table of contents, chapters, etc.) on odd-numbered pages. This arrangement is suitable for two-sided printing, but it can cause some empty even-numbered pages. If you do not wish to have this behavior, omit that option. By default, even and odd page margins are the same; this can be changed in `mydesign.tex` if necessary.

4.4 Additional commands

The class also provides `\DegreeYear`, `\DegreeMonth`, and `\CopyrightAuthor`. The latter combines all author names into a single token list, e.g., "Joseph O. Hirschfelder, Charles F. Curtiss, and R. Byron Bird"; a period at the end of the final name (as in "John F. Nash, Jr.") is removed.

4.5 Nomenclature

An optional nomenclature environment is provided by the class. This environment can support either chapter-by-chapter nomenclature (at the section level) or a single nomenclature for the entire thesis (at the chapter level). As of v1.25 of `mitthesis.cls`, the environment uses key values to set the format; these keys are listed in Table 4.[4]

The key `title` sets the title of the nomenclature list (default is "Nomenclature"), and `short-title` sets a shorter version for the table of contents (and running head if in use). The `heading` key sets the heading level of this list, which typically will be `chapter` or `section` depending on whether you have one nomenclature list for the whole thesis or one for each chapter (the default is `section`). The key `indent` adjusts the width of the column holding the symbols defined, to make it wider or narrower (the default width is 2 em). The key `toc` sets the style of the entry in the table of contents, which can be given as `frontmatter` or `backmatter` (italicized in the table of contents) if you are using a single nomenclature for the whole thesis (the default is to match `heading`).

Additionally, the key `columns` sets the number of columns for the nomenclature. The default is a single column. Two (or more) columns can be specified, *provided that* `\usepackage{multicol}` is added to your preamble.

For example, with `\usepackage{multicol}` in the preamble, the following code produces the two-column nomenclature list that follows it:[5]

[4] The keys replace the positional optional arguments and the `nomenclature*` environment of earlier versions.

[5] The command `\cramped` is from the `mathtools` package; it sets the superscript slightly lower. The commands `\symcal`, `\symbfup`, and `\symbfit` are from the `unicode-math` package, which is automatically loaded when running LuaLaTeX; in pdfTeX, use `\mathcal{C}`, `\mathbf{r}`, and `\bm{\omega}` (from the `bm` package) instead.

Table 4: Key values for `nomenclature` environment

Key	What it sets	Default
`title`	Heading text	Nomenclature
`short-title`	Shortened title for the table of contents and running head	same as `title`
`heading`	Heading level: `chapter`, `section`, `subsection`, ...	`section`
`toc`	Table of contents style: a heading level, or `frontmatter` or `backmatter`	same as `heading`
`indent`	Width of the symbol column	`2em`
`columns`	Number of columns used for the list	`1`
`column-sep`	Space between columns	`2em`

```
\begin{nomenclature}[title = Nomenclature for Section~\thesection,
                     heading=subsection, columns = 2 ]
\EntryHeading{Roman letters}
\entry{$\symcal{C}$}{material curve}
\entry{$\symbfup{r}$}{material position [m]}
\entry{$\symbfup{u}$}{velocity [m $\cramped{\textsf{s}^{-1}}$]}
\EntryHeading{Greek letters}
\entry{$\Gamma$}{circulation
            [$\cramped{\textsf{m}^2}$ $\cramped{\textsf{s}^{-1}}$]}
\entry{$\rho$}{mass density [kg $\cramped{\textsf{m}^{-3}}$]}
\entry{$\symbfit{\omega}$}{vorticity [$\cramped{\textsf{s}^{-1}}$]}
\end{nomenclature}
```

Nomenclature for Section 4

Roman letters

$\mathscr{C}$	material curve
$\mathbf{r}$	material position [m]
$\mathbf{u}$	velocity [m s^{-1}]

Greek letters

Γ	circulation [m^2 s^{-1}]
ρ	mass density [kg m^{-3}]
$\boldsymbol{\omega}$	vorticity [s^{-1}]

To use the same settings for every nomenclature list, put `\NomenSetup{...}` in the preamble, with any of the keys in Table 4. For example, for chapter-by-chapter lists:

```
\NomenSetup{title=Nomenclature for Chapter~\thechapter,
            short-title=Nomenclature, columns=2}
```

Keys given to an individual nomenclature will override these settings.

A single nomenclature for the entire thesis, placed after the chapters and appendices, can be started with

```
\begin{nomenclature}[title = Nomenclature List, heading = chapter,
                     toc = backmatter, columns = 2]
```

If the nomenclature precedes the chapters, use `toc = backmatter`.

5 PACKAGES FOR MATH, CHEMISTRY, CODE, TABLES, AND MORE

The `mitthesis` class loads the `amsmath` package and its extension `mathtools`. These packages provide many useful macros for typesetting equations and symbols, such as: environments for aligning and splitting equations or groups of equations; tools for matrices; a wide variety of operators and symbols; tools to define new math operators and paired delimiters; and much, much more. If you are including equations, look at the documentation for these packages: https://ctan.org/pkg/amsmath and https://ctan.org/pkg/mathtools.

Specialized packages for many disciplines—including chemistry, linguistics, and physics—are available from CTAN. For example, the sample Appendix B uses the mhchem package to set chemical equations and the listings package to lay out computer code.

Several packages can improve table formatting. The `booktabs` package, used in the sample thesis template, produces better quality horizontal lines (called *rules*) for separating material in tables. The `array` package (also used) provides additional options for column formats in tabular environments. The `dcolumn` package (also used) aligns columns of numbers on the decimal separator. For multipage tables, the `longtable` package (also used) provides automatic page breaking with headings on each page.

When selecting a package, check that it is currently maintained (with relatively recent updates), and compare it to other packages that perform similar functions. Some packages are better than others, and some obsolete packages remain available online.

The packages called by `mitthesis.cls` are listed in Table 5, and packages loaded in the `.tex` files are listed in Table 6.

6 PDF/A COMPLIANCE, PDF ACCESSIBILITY, AND HTML CONVERSION

PDF/A-2b compliance can be met if the following command is issued before the `\documentclass{..}` command:

```
\DocumentMetadata{
  pdfstandard = a-2b,
  pdfversion=1.7,
  lang = en-US,% default
}
```

Recent LaTeX formats (November 2025 and later) have implemented *tagged* PDF. Depending upon the packages loaded, the MIT thesis template run with the LuaLaTeX engine can produce "well-tagged PDF" that meets the technical requirements of the PDF/UA-2 and PDF/A-4F standards. In this case, use:

```
\DocumentMetadata{
  pdfstandard = { ua-2 , a-4f },
  tagging = on,
  tagging-setup={math/setup=mathml-SE},
  pdfversion=2.0,% default
  lang = en-US,%   default
}
```

[6] The Lato/Lete font set calls the `lua-unicode-math` package instead of `unicode-math`.

Table 5: External packages loaded by `mitthesis.cls`. For documentation, visit CTAN, https://ctan.org. Or, if you have TeX Live installed, you can open a terminal window and type `% texdoc package-name`.

Package	Purpose in class file	How it can be used
`bookmark`	manages PDF bookmarks (is loaded by `hyperref` if `\DocumentMetadata` is active)	customize PDF bookmarks
`doi`	support for hyperlinking doi number	hyperlink a doi number: `\doi{..}`
`etoolbox`	extend or modify other macros	can use in preamble to modify macros, if needed
`geometry`	set page size and margins	can use `\newgeometry` in `mydesign.tex` to change margins
`graphicx`	support for inserting images	use to include graphics
`hyperref`	support for hyperlinks and metadata	add metadata for thesis in preamble
`mathtools`	loads and extends `amsmath`	**adds many useful math macros.** See documentation for `amsmath` and `mathtools`
`lineno`	class option to add line numbers	class option `[lineno]` will give line numbers; the `lineno` package adds commands to control numbering
`bm`	enable bold math symbols with pdfTeX	command `\bm{..}` produces a bold math symbol
`fontenc`	manages font encoding with pdfTeX	additional encodings can be set for non-Latin fonts in a fontset file
`fontspec`	required for text font management with LuaLaTeX (`unicode-math` loads `fontspec` by default)	use to load additional Unicode text fonts
`unicode-math`	required for math font management with LuaLaTeX[6]	can choose math symbols, e.g. `\symbfit{\Gamma}` for $\boldsymbol{\Gamma}$; load or alter math fonts in a fontset file
`xcolor`	support for colors, including colored fonts	`\textcolor{color}{text}`, `\color{color name}`

Table 6: External packages that load outside the class file.

Package	How it can be used
biblatex	bibliography loading and formatting. Change to natbib if you prefer
microtype	typographical refinements: character protrusion, font expansion, letter spacing, etc.
multicol	environment for multiple text columns; required with two-column nomenclature list
array	additional options for formatting table columns
booktabs	publication quality tables, with better horizontal lines and additional commands
dcolumn	align columns of numbers on selectable separator (e.g., decimal point)
longtable	automatically formats multipage tables with page breaking and headings
rotating	rotate material, create sideways figures and tables
lipsum	create filler text (see sample template, Chapter 1)
listings	for listing computer code (see sample template, Appendix B)
mhchem	to format chemical formulæ (see sample template, Appendix B)
setspace	can be loaded to change the default line spacing, if desired (e.g., for “double-spacing”)

PDF standards compliance can be tested at demo.verapdf.org. Most of the files in the examples directory are PDF/UA-2 compliant (the ones that are not were generated with pdfTeX owing to font limitations).

6.1 Accessibility, PDF tagging, and archivability

Tagging is necessary for accessibility: a tagged PDF embeds structural and semantic information, along with metadata, that enable screen readers to interpret the document. In the US, new federal accessibility rules require state and local governments, public universities, and covered federally funded organizations—including many private universities—to ensure their online PDFs meet WCAG 2.1 AA. For text documents, automated PDF/UA-1 checks satisfy WCAG 2.1 AA’s structural requirements, but for math-heavy documents, like many MIT theses, PDF/UA-2 is necessary [3].[7]

For long-term preservation, the PDF should also meet a PDF/A archival standard. PDF/A-2b, based on PDF 1.7, is an older standard that pdfTeX can readily achieve (see the first recipe above). PDF/A-4 and its variant A-4F, based on PDF 2.0, are the current standards. They require Unicode mappings for all fonts, among other features. LuaLaTeX supports these standards. The A-4F standard also permits embedded files, such as the MathML and CSS files attached to a tagged thesis.

Standards compliance can depend on your fonts and figures: as noted, current standards require that fonts have Unicode mappings, and also that PDF figures be standards compliant. Not all LaTeX packages have been upgraded for tagging compliance. In particular, the listings and mhchem packages, used in appendixb.tex, are not compatible with tagged PDF as of July 2026, and they can cause compilation errors if tagging is on.[8]

[7] Many aspects of the accessibility standards cannot be evaluated by machine and require human review. For instance, is the text of a hyperlink descriptive of the link target or is color alone being used to convey meaning?

[8] A list of tagging-compatible LaTeX packages is at https://latex3.github.io/tagging-project/tagging-status/.

Images and alt text. Accessibility standards require that alt text (alternative text) be included with graphics:

```
\includegraphics[ alt={describe image in words} ]{image.png}
```

To assist readers who cannot see the graphics, the alt text should describe the content of the figure in words. The caption is already available, so `alt` text that repeats the caption is redundant. Similarly, it's not helpful to use `alt` text like "This is an image." The `alt` text should not rely on color to convey meaning, and it should be sufficiently concise to avoid cognitive overload.

6.2 HTML (web) rendering of tagged PDF

Tagged PDF files can be rendered accurately as HTML files, as used by web browsers. See, for example, ngpdf.com. As of v1.21, a style sheet (CSS) can be embedded in the MIT Thesis PDF to control web presentation (`mitthesis-style.css`). This feature enables a thesis in tagged PDF to be converted to a well-formatted web page.

If HTML conversion is expected, authors should be aware that web conversion may downgrade image quality. For example, vector graphics in PDF format are resolution-independent and scale without loss; but PDF is not a native web image format, like `.png` or `.jpg`. When files containing PDF images are converted to HTML, the images may be rasterized, with a potentially significant loss of resolution and detail. For technical drawings, the labels, data symbols, and annotations can become illegible.

7 TROUBLESHOOTING AND MODIFICATIONS

7.1 Listing thesis committee members or using a signature page

Listing committee members (with or without signatures) is not required under MIT's thesis specifications. Only the thesis supervisor should appear on the title page, not a list of committee members. However, some departments may require a separate committee or signature page. Check with your department about this page and any associated formatting requirements.

If a `\Reader{..}` command is used (see §3), a committee members page will be automatically generated. Alternatively, you may create your own page and insert it between the title and abstract pages.

7.2 People in multiple departments or with multiple titles

When a student is in multiple departments or a thesis supervisor, acceptor, or reader has multiple titles, you can obtain a line break with proper horizontal spacing by doing

```
\Author{name}{first department and \\ & second department}
\Supervisor{name}{first title and \\ & second title}
```

The same trick works in the `\Acceptor` command and for permutations of these multiplicities. **TEX hacker's note:** The signature block is typeset as a LATEX `tabular` environment as of version 1.18.

7.3 Adding text to title page when required by your program

A few programs ask students to add a line of text to the degree section of the title page. For example, the Leaders for Global Operations (LGO) program requests the addition of "in conjunction with the Leaders for Global Operations program." For LGO, this text is added automatically if you include `\LGO` in the preamble of your thesis. For other programs, you can use

```
\TitlePageProgramNote{text for your program}
```

Do not add text unless your program has approval for the addition from the MIT Libraries; otherwise, your thesis may not be accepted.

7.4 Overflowing title page: managing space

If your title page overflows the vertical space (from too many authors, degrees, previous degrees, etc.), you can use some or all of the following techniques. The commands must be given before `\maketitle`.

1. Reduce the 12 pt and 18 pt skips between the various blocks of text to 6 pt with this command:

   ```
   \Tighten
   ```

2. Reduce the font size in the signature block with this command:

   ```
   \SignatureBlockSize{\small}
   ```

3. Put the acceptor name and title onto two lines, rather than three, by putting the acceptor's position into the second argument and leaving the third argument blank:

   ```
   \Acceptor{Tertius Castor}{Professor and Graduate Officer, Department of Research}{}
   ```

4. Reduce the font size of the author name[s] from `\large` to `\normalsize` with this command:

   ```
   \AuthorNameSize{\normalsize}
   ```

5. Omit previous degrees from the title page, instead mentioning them in the biographical sketch.

7.5 Push title page text toward top

If you prefer to keep the text toward the top of the title page with most white space at the bottom, you can use this command to squash the vertical glue (TEX's stretchy space):

```
\Squash
```

This command is useful when the text has not already reached the bottom of the page, since the glue gets squashed automatically when the page is full. This command must be given before `\maketitle`.

7.6 Overflowing thesis committee members page: managing space

Reduce the skips at the top of the committee members page from 56 pt to 32 pt with this command:

```
\CMPShortenTop
```

This command must be given before `\maketitle`.

7.7 Changing paragraph separation

If you prefer to denote paragraph breaks by vertical space rather than indentation, you can try the `parskip` package: ctan.org/pkg/parskip. See that package's documentation for details.

7.8 Use outside MIT

To adapt this template for use at a different institution, or for specific departmental needs, you can put the following commands in your preamble.

- Use `\Institution{Your Institution}` to change MIT to your own institution on the title page.
- Use `\maketitle*` (in place of `\maketitle`) to drop the MIT copyright permission statement.
- If your institution issues degrees in months other than February, May, June, or September, you can still put those months into the `\DegreeDate` command. To suppress the resulting error message, put `\SuppressMonthError` before `\maketitle*`.
- Omitting `\Acceptor` commands will drop the "Accepted by:" field. To suppress the resultant error message, put `\SuppressAcceptorError` before `\maketitle*`.
- To change "Thesis Supervisor" to something else, use `\SupervisorDesignation{..}`.
- To change "Thesis Committee" to something else, use `\ThesisCommitteeName{..}`.
- To change "Thesis Readers" to something else, use `\ThesisReaderName{..}`.
- To change the title page bookmark from "Title page", use `\TitlePageBookmark{..}`.

Please do not remove the license/copyright text from the source files—this code took me some time to write!

7.9 Languages other than English

To include passages in languages other than English, load the `babel` package in your preamble. Include every language you use, e.g. `\usepackage[french,english]{babel}`. The last language is the main language of the document. If you change the main language of your thesis, also change the `language` or `lang` key of `\DocumentMetadata` to match (for example, `lang=fr-FR`).

Within the text, use `\foreignlanguage{french}{..}` for short passages and the `otherlanguage` environment for longer ones. The `babel` package then applies the hyphenation and typographic conventions of each language.

For non-Latin scripts, such as Arabic or Chinese, compile with LuaLaTeX and use `\babelfont` to choose a font that contains the needed characters.

8 RESOURCES FOR LEARNING LaTeX

LaTeX documentation is easy to find online. A few useful resources, among many, are these:

LaTeX Wikibook. https://en.wikibooks.org/wiki/LaTeX. An online tutorial book.

LaTeX 2$_\varepsilon$: An unofficial reference manual. https://latexref.xyz/dev/latex2e.html. A comprehensive explanation of each LaTeX command by Karl Berry.

TeX Stack Exchange. https://tex.stackexchange.com/. More than 250,000 answered questions, and you can ask your own!

Generative AI systems. At the time of this writing, AI models can sometimes answer LaTeX-related questions accurately or write acceptable LaTeX and expl3 code. Different AI models have different capabilities. This landscape is changing very rapidly, but at present you should be cautious about AI-generated code.

Good luck with your thesis and your thesis defense!

References

[1] J. I. Montijano, M. Pérez, L. Rández, and J. L. Varona. "Numerical Methods With LuaLaTeX." *TUGboat*, **35**(1), Jan. 2014, pp. 51–56. URL: https://tug.org/TUGboat/tb35-1/tb109montijano.pdf.

[2] LaTeX Project Team. *LaTeX News: Issue 40*. Nov. 2024. URL: https://www.latex-project.org/news/latex2e-news/ltnews40.pdf.

[3] J. H. Lienhard. "Modernizing MIT's Thesis Template: `mitthesis.cls`." *TUGboat*, **47**(2), 2026, pp. 212–221. DOI: 10.47397/tb/47-2/tb146lienhard-mitthesis.