The *ut-thesis* class *

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Abstract

The *ut-thesis* document class implements the formatting requirements of the University of Toronto School of Graduate Studies (SGS), as of Fall 2020.

Contents

1 Installation

There are two main options to start using the class:

- **installing**: The *ut-thesis* class is available under the major LaTeX distributions (Linux: TeX Live, macOS: MacTeX, Windows: MiKTeX). Installation steps will depend on the distribution; some helpful information is here. Within TeX Live, *ut-thesis* is part of the publishers bundle, so it should be available on Overleaf.

- **local file**: Place the file `ut-thesis.cls` in your project directory. The class will only be available in this directory. This works if you don't have write access in the LaTeX distribution, or if you want to use an updated version of the class.

2 Usage

```
\documentclass{ut-thesis}
\documentclass[ <options> ]{ut-thesis}
```

The default options produce a final copy, ready for submission to the University of Toronto School of Graduate Studies (SGS). There is some example code on GitHub.

2.1 Options

The default class options are denoted like `option*`.

2.1.1 Font Size

`[10pt*]`
`[11pt]`
`[12pt]`

The three standard font sizes are supported. SGS requires at least 10 pt font for the text, but captions, footnotes, etc. can be smaller.

2.1.2 Line Spacing

`[singlespacing]`
`[onehalfspacing*]`
`[doublespacing]`

Three options are available for line spacing. Note that `[singlespacing]` does not conform to the SGS guidelines, but we provide it in case you ever prefer it while writing.

2.1.3 Margins

We aim to support both digital and print copies of the thesis, with two aspects affected:

1. whether margins are equal (digital) or unequal (print), where unequal margins include a wider inner margin for binding

2. whether pages will be printed on one or both sides, essentially only relevant for print copies

`[equalmargins*]`

The inner and outer margins are averaged to keep the `\textwidth` consistent with the `[unequalmargins]` option.

[unequalmargins]	The outer margin is equal to the top and bottom margins; the inner margin is 0.50 inches wider than the outer margin.
[oneside*]	All pages behave as if they open to the right (wider left margin); no extra blank pages.
[twoside]	Most pages will alternate opening to the right and left; however, some commands which create new pages will always open to the right, sometimes requiring a blank page before to do so. See the book class for more information, as well as details about the [openright*] and [openany] options.
	Four widths of margins are defined based on the inner (left) and outer (right/top/bottom) dimensions. If [equalmargins] is used, the left/right margins are averaged.
[narrowmargins]	Inner: 1.25 inch; outer: 0.75 inch (minimum SGS requirements)
[normalmargins*]	Inner: 1.50 inch; outer: 1.00 inch
[widemargins]	Inner: 1.75 inch; outer: 1.25 inch
[extrawidemargins]	Inner: 2.00 inch; outer: 1.50 inch

2.1.4 Book Options

This class inherits from the standard LaTeX book class, so all other book options are processed by that class. Two caveats are that [titlepage]/[notitlepage] have no effect and [twocolumn] has undefined behaviour.

2.2 Commands

2.2.1 Author Information

The following 5 commands should be used in the preamble to define the content of the titlepage (\maketitle) and abstract page (abstract environment).

\author	Your full name.
\title	The title of your thesis.
\degree	The title of your degree (spelled out, like "Doctor of Philosophy" not "PhD").
\gradyear	The year of your degree completion.
\department	The name of your department. The optional first argument (\department[this]{}) can be used to replace or leave blank the default text "Department of" preceeding the department name.
	If undefined, template values are used like "(author)".
\copyrighttext	The copyright text printed on the titlepage. The default, which can be overwritten if needed, is: {\copyright} Copyright {\@gradyear} by {\@author}.

2.2.2 Document Parts

From the `book` class, four commands can be used to divide the document into major parts. These should be used in the order they appear here, as needed. The first two commands are necessary for the required SGS page numbering style.

`\frontmatter` Turns off chapter numbers, uses roman numerals for page numbers.
Suggested use: immediately after `\begin{document}`.

`\mainmatter` Turns on chapter numbers, uses arabic numerals for page numbers.
Suggested use: immediately before the first main `\chapter{}` command.

`\appendix` Uses letters for chapter numbers, no change to page numbers.
Suggested use: immediately before the first appendix `\chapter{}` command.

`\backmatter` Turns off chapter numbers, no change to page numbers.
Suggested use: immediately before `\printbibliography` or `\bibliography{}`.

2.2.3 Front Matter

From the `book` class, the following commands are available to generate the frontmatter. These should be used in the order they appear here, as needed.

`\maketitle` Creates the title page according to SGS requirements, and adds a blank page following if using `[twoside]`.

(The abstract page should appear here; see § 2.3.1).

(The dedication and acknowledgements should appear here, as needed; see § 2.3.2).

`\tableofcontents` Prints the table of contents, starting on a new page.

`\listoftables` Prints the table of tables, starting on a new page.

`\listoffigures` Prints a table of figures, starting on a new page.

2.3 Environments

2.3.1 Abstract

`abstract` Creates the abstract page according to SGS requirements, and adds a blank page if using `[twoside]`. The abstract content should be added within the environment, and should be no more than 350 words for a PhD thesis or 150 words for a Master's thesis. We do not provide tools for counting words.

2.3.2 Dedication & Acknowledgements

dedication The `dedication` environment formats text flush right and 1/3 down a new page. Not necessary for SGS requirements, so you can redefine this environment.

acknowledgements The `acknowledgements` environment creates a centered heading using `\section*{}`, and a new page after the text. Not necessary for SGS requirements, so you can redefine this environment.

2.3.3 Base Environments

As in the `book` class, the base environments like `figure`, `table`, and `equation` are sub-numbered within the current chapter like "(2.1)" for Equation 1 in Chapter 2. The behaviour is equivalent to: `\counterwithin{equation}{section}`, and can be undone with: `\counterwithout{equation}{section}`.

For sub-figures, we recommend the `subcaption` package.

The `quote` and `quotation` environments from the `book` class are also available.

3 Implementation

3.1 Margin Math

First, we define a boolean `margins@equal` to store whether margins should be equal or not, plus two lengths to help us compute the margins: `\margin@base` is the minimum used directly for the top and bottom, and `\margin@offset` is the difference between inner/outer margins if they are not equal.

```
1 \newif\ifmargins@equal
2 \newlength{\margin@base}
3 \newlength{\margin@offset}
4 \setlength{\margin@offset}{0.5in}
```

After processing all options, we compute the margins using the above lengths, and adjust the placement of the header, footer, and margin notes. If margins are equal, we average `\margin@offset` to keep the `\textwidth` consistent with the unequal case.

```
5 \AtEndOfClass{
6   \ifmargins@equal
7     \setlength{\leftmargin}{\dimexpr\margin@base+.5\margin@offset}
8     \setlength{\rightmargin}{\dimexpr\margin@base+.5\margin@offset}
9   \else
10    \setlength{\leftmargin}{\dimexpr\margin@base+\margin@offset}
11    \setlength{\rightmargin}{\dimexpr\margin@base}
12  \fi
13  \geometry{
14    top      = \margin@base,
15    bottom   = \margin@base,
16    inner    = \leftmargin,
17    outer    = \rightmargin,
18    headsep  = \dimexpr0.5\margin@base-\headheight,
19    footskip = \dimexpr0.5\margin@base,
20    marginparwidth = \dimexpr\rightmargin-0.25in,
21    marginparsep   = 0.125in,
22 }}
```

3.2 Option Declaration

3.2.1 Margins

Four margin width options are based on `\margin@base`:

```
23 \DeclareOption{narrowmargins}   {\setlength{\margin@base}{0.75in}}
24 \DeclareOption{normalmargins}   {\setlength{\margin@base}{1.00in}}
25 \DeclareOption{widemargins}     {\setlength{\margin@base}{1.25in}}
26 \DeclareOption{extrawidemargins}{\setlength{\margin@base}{1.50in}}
```

Setting the margins either equal or unequal:

```
27 \DeclareOption{equalmargins}{\margins@equaltrue}
28 \DeclareOption{unequalmargins}{\margins@equalfalse}
```

3.2.2 Line Spacing

We're using the `setspace` package. We simply call one of the spacing commands after the class is loaded. So, be careful to place any line spacing commands within a group, or the global setting can be changed in the middle of the document.

```
29 \DeclareOption{doublespacing}{%
30   \AtEndOfClass{\doublespacing}
31 }
32 \DeclareOption{onehalfspacing}{%
33   \AtEndOfClass{\onehalfspacing}
34 }
35 \DeclareOption{singlespacing}{%
36   \AtEndOfClass{\singlespacing}
37 }
```

3.2.3 Book Options

We need to redeclare the `oneside` option from `book` so that it can be used as a default:

```
38 \DeclareOption{oneside}{\PassOptionsToClass{oneside}{book}}
```

Finally, we try to process all remaining options using the `book` class, so the usual options and default values should be defined, like:

- font size: e.g. `10pt`, `11pt`, `12pt`

- sides: e.g. `oneside`, `twoside`

- open side for twoside: e.g. `openright`, `openany`

```
39 \DeclareOption*{\PassOptionsToClass{\CurrentOption}{book}}
```

3.2.4 Default Options & Processing

Executing the default options and processing. Any remaining options should now raise an error like: `LaTeX Warning: Unused global option(s): ...`

```
40 \ExecuteOptions{onehalfspacing,normalmargins,equalmargins,oneside}
41 \ProcessOptions\relax
```

3.3 Loading Dependencies

We load the `book` class and the required packages.

```
42 \LoadClass{book}
43 \RequirePackage{geometry} % for margins etc.
44 \RequirePackage{setspace} % for line spacing
```

3.4 Author Information

Getting the user inputs.

```
45 \renewcommand*{\author}   [1]{\gdef\@author{#1}}
46 \renewcommand*{\title}    [1]{\gdef\@title{#1}}
47 \newcommand*{\degree}     [1]{\gdef\@degree{#1}}
48 \newcommand*{\gradyear}   [1]{\gdef\@gradyear{#1}}
49 \newcommand*{\department}[2][Department of]%
50   {\gdef\@deptpre{#1}\gdef\@deptname{#2}}
51 \newcommand*{\copyrighttext}[1]{\gdef\@copyrighttext{#1}}
```

Setting default values that will mostly be overwritten.

```
52 \author     {(author)}
53 \title      {(title)}
54 \degree     {(degree)}
55 \gradyear   {(gradyear)}
56 \department{(department)}
57 \copyrighttext{{\copyright} Copyright {\@gradyear} by {\@author}}
```

3.5 Front Matter

3.5.1 Matter Commands

We enforce that the \frontmatter and \mainmatter use the right page numbering and styles.

```
58 \g@addto@macro\frontmatter{\pagenumbering{roman}\pagestyle{plain}}
59 \g@addto@macro\mainmatter {\pagenumbering{arabic}\pagestyle{headings}}
```

3.5.2 Title Page

We don't enforce firm distances between lines, but use \vfill to stretch and fill the space evenly, except for a double-sized gap after the author name. There is one part of space above the title, while the copyright is pushed all the way to the bottom.

```
60 \renewcommand*{\maketitle}%
61   {\thispagestyle{empty}
62     \begin{center}
63       \large
64       \singlespacing
65       \null
66       \vfill
```

```
67      \textsc{\@title}
68      \vfill
69      by
70      \vfill
71      {\@author}
72      \vfill
73      \vfill
74      A thesis submitted in conformity with the requirements\\
75      for the degree of {\@degree}\\[1ex]
76      {\@deptpre} {\@deptname}\\
77      University of Toronto\\
78      \vfill
79      {\@copyrighttext}
80    \end{center}
81    {{\pagestyle{empty}\ocleardoublepage}}
82    }
```

3.5.3 Abstract Page

The abstract is an environment, but it creates its own page (and possibly an extra empty page if using `twoside`). The author and title info is centered and singlespaced. The word "Abstract" uses the `\section*` style, without any numbering. The abstract content is doublespaced.

```
83 \newenvironment*{abstract}%
84   {\thispagestyle{plain}
85    \begin{center}
86      \singlespacing
87        {\@title}\\[2ex]
88        {\@author}\\
89        {\@degree}\\[1ex]
90        {\@deptpre} {\@deptname}\\
91        University of Toronto\\
92        {\@gradyear}\\
93        \section*{Abstract}
94    \end{center}
95    \begingroup
96    \doublespacing}%
97   {\par\endgroup\cleardoublepage}
```

3.5.4 Dedication

As described above.

```
98 \newenvironment*{dedication}%
99   {\thispagestyle{plain}
100    \null
101    \vfill
102    \begin{flushright}}%
103   {\end{flushright}
```

```
104    \vfill
105    \vfill
106    \clearpage}
```

3.5.5 Acknowledgements

As described above.

```
107 \newenvironment*{acknowledgements}%
108   {\thispagestyle{plain}
109    \begin{center}
110    \section*{Acknowledgements}
111    \end{center}
112    \begingroup}%
113   {\endgroup\clearpage}
```

3.6 Page Styles

3.6.1 Blank Pages

By default, all blank pages will have page style `plain`, but the original definition is stored in `\ocleardoublepage`.

```
114 \let\ocleardoublepage\cleardoublepage
115 \def\cleardoublepage{{\newpage\pagestyle{plain}\ocleardoublepage}}
```

3.6.2 Headers & Footers

We redefine the `headings` page style with a new formatting hook `\headerstyle{}`, but is otherwise similar to the original `headings`.

```
116 \newcommand{\headerstyle}[1]{\footnotesize\MakeUppercase{#1}}
117 \if@twoside
118 \renewcommand*{\ps@headings}%
119   {\let\@mkboth\markboth
120    \let\@oddfoot\@empty
121    \let\@evenfoot\@empty
122    \def\@oddhead{\headerstyle{\rightmark\hfil\thepage}}%
123    \def\@evenhead{\headerstyle{\thepage\hfil\leftmark}}%
124    \def\chaptermark##1{\markboth{%
125      \if@mainmatter\headerstyle{\@chapapp\ \thechapter.\ ##1}\fi}{}}
126    \def\sectionmark##1{\markright{%
127      \if@mainmatter\headerstyle{\thesection.\ ##1}\fi}}}
128 \else
129 \renewcommand*{\ps@headings}%
130   {\let\@mkboth\markboth
131    \let\@oddfoot\@empty
132    \let\@evenfoot\@empty
```

```
133    \def\@oddhead{\headerstyle{\rightmark\hfil\thepage}}%
134    \def\chaptermark##1{\markright{%
135      \if@mainmatter\headerstyle{\@chapapp\ \thechapter.\ ##1}\fi}}}
136 \fi
```

Default page style.

```
137 \pagestyle{headings}
```

3.7   Spacing Adjustments

The default spacing below captions is too small for captions on top of floats (e.g. for tables), so we make it consistent above and below.

```
138 \setlength\abovecaptionskip{1ex}
139 \setlength\belowcaptionskip{1ex}
```