

Using L^AT_EX to prepare an Informatics thesis

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14 October 2002

1 Introduction

This document describes how you can use the `infthesis` class to prepare a thesis within the School of Informatics. Using `infthesis`, you can prepare a thesis that meets the University of Edinburgh's specific requirements for MPhil and PhD theses (Appendix B); if you are not producing an MPhil or PhD thesis, you can also alter other aspects of the formatting.

The remainder of this document describes how a thesis can be prepared using this class. Section 2 describes the options, commands, and environments provided by `infthesis`; Section 3 provides an outline of how the body of the thesis should be written; Appendix A contains a sample file using this class; and Appendix B contains a copy of the university postgraduate thesis regulations as of October 2002.

2 Class documentation

2.1 Using the class

To use the `infthesis` class, you should use the following as the first line of your document:

```
\documentclass[<options>]{infthesis}
```

Appendix A contains a sample document using this class.

The remainder of this section outlines the options, environments, and commands that are provided by `infthesis`.

2.2 Class options

The following list presents all of the options that can be given to the class.

2.2.1 Degree options

The following options determine the degree title that is given on the title page. At most one degree type should be specified; the default is `phd`.

`phd` Create a PhD thesis title page when the `\maketitle` command is used.

`mphil` Create an title page for an MPhil.

`mscres` Create a title page for an MSc by Research.

`msc` Create an MSc title page.

`bsc` Create an undergraduate project report. The `\course` and `\project` commands should be used to specify the exact nature of the report.

If the thesis is for a research degree (PhD, MPhil, MSc by Research), an institute should also be specified (see Section 2.2.2); for a taught MSc, a particular degree may be specified (Section 2.2.3); and for an undergraduate project report, the course and project type should be specified using the `\course` and `\project` commands (Section 2.4).

2.2.2 Institute options (research degrees)

The following options specify the institute in which the thesis was written. These options only have an effect on the research degrees (PhD, MPhil, and MSc by Research); the following sections describe how to specify a taught degree.

`aiai` Artificial Intelligence Applications Institute

`icsa` Institute of Computing Systems Architecture

`ianc` Institute for Adaptive and Neural Computation

`iccs` Institute for Communicating and Collaborative Systems

`ipab` Institute of Perception, Action and Behaviour

`irr` Institute for Representation and Reasoning

`lfcs` Laboratory for Foundations of Computer Science

2.2.3 Degree options (taught MSc degrees)

The following options specify the degree in which the thesis was written. These should be used for MSc theses for taught courses only; they will have no effect on the title page of theses for research degrees (which should use the above institute options instead), and for the fourth-year report the `\course` and `\project` commands described in Section 2.4 should be used instead to specify nature of the report.

`cogsci` MSc in Cognitive Science and Natural Language

`cs` MSc in Computer Science

`ai` MSc in Artificial Intelligence

If you are producing a thesis for the MSc in Informatics, you should not specify a degree option at all.

2.2.4 Cover page options

The following options control the format of the cover page that is produced.

`deptreport` This option changes the layout of the title page so that the title and author are visible when bound with one of the Computer Science departmental covers. *This option may not work at the moment—MEF, October 14, 2002*

`logo` Puts a University of Edinburgh logo onto the title page between the author name and the degree title.

`frontabs` Puts the abstract of the thesis onto the front page. If this option is not selected, the abstract will instead be put by itself onto the first page of the thesis.

If `deptreport` is specified, then the other cover page options will be ignored; if `frontabs` is specified, then the `logo` option will be ignored. Note that the `frontabs` option is not appropriate for use on theses that are to meet the requirements of the Graduate School (Appendix B); a warning will be produced if this option is specified for such a thesis.

2.2.5 Header style options

The following options control the font and style of the chapter and section headers, running headers and footers, and figure and table captions of the document.

`centrechapter` (or `centerchapter`) All chapter headings are centred on the page. This is the default.

`leftchapter` All chapter headings are left-aligned on the page.

`rightchapter` All chapter headings are right-aligned on the page.

`sansheadings` If this option is specified, then all section and chapter headings, running headers and footers, and table and figure captions will be typeset in a sans-serif font (as they are in this document). The official University thesis guidelines specify that this style should be used, and it is therefore the default.

`normalheadings` All headings and captions will be in the same font as the rest of the thesis.

2.2.6 Font options

By default, the `infthesis` class uses the `pslatex`, which changes the body font to Times Roman, the sans-serif font to Helvetica, and the typewriter font to Courier. The following options control this font selection.

`timesfonts` Use the `pslatex` package to change the fonts to Times, Helvetica and Courier (as in the current document). This is the default.

`notimes` Do not change the fonts; use the standard L^AT_EX “computer modern” fonts instead. You can still use other packages to change the fonts yourself if you wish.

2.2.7 One- or two-sided options

The following standard report class options for one-sided and two-sided printing can be used.

`oneside` The thesis will be produced for one-sided printing. This is the default.

`twoside` The thesis will be produced for two-sided printing.

`openright` In two-sided printing, every chapter will start on an odd (right-hand) page, with blank pages inserted if necessary. This is the default.

`openany` In two-sided printing, chapters can start on either an odd or an even page.

Note that the PhD thesis regulations allow a one-sided or two-sided thesis, but if the thesis is two-sided then the `openright` behaviour must also be used (`openright` will automatically be used if `twoside` is specified).

2.2.8 Line-spacing options

The following options control the spacing of lines in the document.

`singlespacing` Makes the thesis single-spaced.

`fullspacing` Makes the thesis one-and-a-half-spaced. This is the default setting.

`doublespacing` Makes the thesis double-spaced.

Note also the commands in Section 2.4 that can be used to temporarily change spacing within the document. MPhil and PhD thesis regulations require that the spacing is at least 1.5 in the body text.

2.2.9 Frontmatter options

The following options control the appearance and content of the “frontmatter” (abstract, table of contents, etc.) of the thesis.

`listsintoc` If this option is specified, then the List of Figures and List of Tables will appear in the Table of Contents.

`nolistsintoc` The List of Figures and List of Tables will not appear in the Table of Contents. This is the default.

`romanprepages` With this option, the frontmatter will be numbered with lower-case Roman numerals (i, ii, ...), and the first chapter will start on page 1. This is the default.

`plainprepages` With this option, the pagenumbers start with 1 for the first page of the frontmatter and continues throughout the thesis.

2.2.10 Other options

The following other options are also available.

`draft` The draft option will produce a single-spaced, double-sided thesis with smaller fonts and margins, to reduce the paper used. In addition, all of the standard \LaTeX behaviour of the draft option is implemented; in particular, any images will be replaced by a box and a filename.

`parskip` Alters the formatting so that paragraphs are separated by vertical space and there is no indentation at the start of each paragraph.

`abbrevs` Exports a number of commands for common abbreviations, such as “e.g.” or “N.B.”. These commands are listed in Section 2.4.1.

2.3 Environments

This section describes the various environments that are defined or redefined by the `infthesis` class. All other standard \LaTeX environments are also available. To use an environment `foo`, you would enter:

```
\begin{foo}
... text here ...
\end{foo}
```

acknowledgements Normally, an Acknowledgements section follows the abstract. This environment creates a page with the appropriate header.

declaration University regulations require that you include a Declaration section to state that the thesis is your own work. This will normally follow the Acknowledgements section. Note that the command `\standarddeclaration` will produce a default Declaration page.

quotation The University regulations state that quotations should be single spaced; the `quotation` and `quote` environments have therefore been redefined to enforce this.

2.4 Commands

This section describes the commands that are provided or redefined by the `infthesis` class. Other standard \LaTeX commands are also available; for a list of these, please see the local documentation.

\maketitle This command has been redefined to produce a title page containing the thesis title, author name, and degree, formatted suitably. The precise contents and layout of the title page are controlled by the `deptreport`, `logo`, and `frontabs` options (see above); users can also use the following commands to specify the contents of the page.

\title{...} The title of the thesis

\author{...} The author of the thesis

\submityear{...} The year of presentation. If omitted, the current year will be used.

\graduationdate{...} The date (Month Year) of graduation (optional).

\course{...} The course (e.g., Artificial Intelligence and Psychology). Used for undergraduate reports only.

\project{...} The project type (e.g., Fourth Year Project Report, Undergraduate Dissertation). Used for undergraduate reports only. Please check with your school to see which is the appropriate title; the default is Fourth Year Project Report.

\abstract{...} The abstract of the thesis, which will be placed on the title page if the `frontabs` option is specified or on the first page after the title page if it is not.

\bibliography{...} The bibliography environment has been redefined so that an entry for the bibliography will always appear in the table of contents, as is required by the thesis regulations. As well, commands have been added to make sure that the page headers within the bibliography are correct.

\footnote{...} This command has been redefined so that footnotes are always single-spaced, whatever the spacing of the rest of the document (as per thesis regulations).

`\dedication{...}` You can use this command to insert a short dedication page at the front of your thesis. This will usually come between the title pages (abstract, acknowledgements, etc.) and the table of contents.

`\thesiscaption` You can use this command in place of the `\caption` and `\label` commands. It is used as follows:

```
\thesiscaption[<lof-caption>]{<caption>}{<label>}
```

where `lof-caption` is the caption for the List of Figures or List of Tables, `caption` is the caption to appear under the figure, and `label` is the label of the figure (for use in subsequent `\ref` commands). If `lof-caption` is omitted, then the same caption will be used under the figure and in the List.

`\standarddeclaration` Produces a standard Declaration section (see the discussion in Section 2.4 of the declaration environment).

`\singlespace` This command sets the subsequent line spacing to single-spaced.

`\oneandahalfspace` This command sets the subsequent line spacing to one-and-a-half (the default).

`\doublespace` This command sets the subsequent line spacing to double.

2.4.1 Abbreviations

If the `abbreviations` class option is used, the following commands are also defined to produce common abbreviations.

Command	Description	Example
<code>\NB</code>	nota bene (note well)	N.B.
<code>\eg</code>	exempli gratia (for example)	e.g.
<code>\Eg</code>	exempli gratia (for example)	E.g.
<code>\ie</code>	id est (in other words)	i.e.
<code>\Ie</code>	id est (in other words)	I.e.
<code>\etc</code>	et cetera (and other things)	etc.
<code>\etal</code>	et alii (and others)	<i>et al.</i>
<code>\etseq</code>	et sequens (and the following)	<i>et seq.</i>
<code>\role, \Role</code>	accented versions of role	rôle, Rôle
<code>\naive, \Naive</code>	accented versions of naive	naïve, Naïve
<code>\precis, \Precis</code>	accented versions of precis	précis, Précis
<code>\tm</code>	superscripted trademark symbol	TM
<code>\copyright</code>	superscripted copyright symbol	©
<code>\degrees</code>	degrees symbol	°

3 Tips

3.1 Structure of the document

The standard order for a thesis is the following:

- Title page
- Abstract (if not on title page)
- Acknowledgements (optional)
- Declaration, if required
- Dedication (optional)
- Table of contents and lists of figures and tables
- The chapters of the thesis
- Any appendices
- The bibliography

The sample file in Appendix A shows a skeleton document that can be used as a basis for your thesis. Notice that each chapter and appendix is in a separate file which is then included into the main file; this makes it easier to edit the document when it starts to get longer.

3.2 Changing the format

If you are preparing an PhD, MPhil, or MSc by Research thesis, you will have to make sure that your thesis follows the regulations laid out in Appendix B. The `infthesis` class will produce a warning if you try to change the format of such a thesis in a way that is not compatible with the regulations.

If it is an MSc or undergraduate thesis, your school may have specific requirements for formatting—for example, they may require double-sided printing or single spacing, or may have particular limits on the number of pages or words. Make sure that you are aware of and follow all of these regulations.

3.3 The bibliography

The easiest way to set up a bibliography is to put all of your references in a separate file and then to use the `\bibliography` command (as in the template file) to include it in your document. Your department or school may require a particular citation style; if so, you should use a BibTeX style file that produces the correct references. The template uses `apalike`, which produces author-date references like (Jones, 2000).

3.4 Producing PDF output

There are several ways to produce a PDF version of your thesis. The following are the possibilities:

- Use `pdflatex` instead of `latex` to process the document—this creates a PDF file directly from the `.tex` source. This approach has the advantage that all the fonts that you use will show up in the PDF file with no hassle; however, you will have to convert all included graphics to `.pdf` or `.jpg` files, and the output for this route is often larger than with other possibilities.
- Create a PostScript document using `latex` and `dvips` and then use `distill` to create the PDF. There are some considerations when taking this route:

- The fonts will generally be better, and the documents smaller, if you use the `pslatex` package—this means that your thesis will use Times for the body instead of the default Computer Modern. This is the default setting for `infthesis` unless you use the `notimes` option.
- Whatever font you use, make sure that you use the following syntax with `dvips`:

```
dvips -Ppdf <filename>.dvi -o
```

Otherwise, some or all of the document may look very bad when it is viewed on screen. If you are using a font other than Computer Modern, you should also include `-G0` (number “zero”, not letter “o”), or some of the characters may be wrong (e.g., *fi* may be replaced by £).

- To make sure that the resulting document is on A4 paper (rather than US “letter” size), you must specify the page dimensions to `distiller`:

```
distill -pagesize 8.26 11.69 in <filename>.ps
```

- Create a PostScript document as above, but use `ps2pdf` instead to create the PDF. This option is not recommended, because the fonts tend to look ugly whatever options are chosen.

If you want the resulting PDF file to have hyperlinks (as this document does), you can use the `hyperref` package.

Acknowledgements

The `infthesis` class was based on a number of previous classes and example documents, including:

- Martin Reddy’s `csthesis` class, on which this is largely based. Credit/blame for the Frankenstein sample text should also be given to him. :-)
- *How to Type your MSc Dissertation using \LaTeX* (School of Artificial Intelligence), by Andrew Ireland and Michael Keightley.
- Will Lowe’s `scs-msc` class for Cognitive Science MSc theses.
- The `cs4rep` fourth-year project example file from Computer Science.
- François Pitt’s `ut-thesis` class from the University of Toronto Department of Computer Science, for various tricks with headers and page-numbering.

As well, the technique used to get the bibliography to appear reliably in the table of contents is based on postings to `comp.text.tex` by Peter Wilson, Heiko Oberdiek, and Michael J Downes.



A Sample thesis master file and chapter

This section contains a sample file, `infthesis-template.tex`, that can be used as a template for a thesis written with `infthesis`. `chap1.tex` and `appendix1.tex` are sample chapter files, and `thesis.bib` is a sample Bib_T_EX file; all of these files should be available from the same place as this documentation.

A.1 Template main file

```
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%% Sample use of the infthesis class to prepare a thesis. This can be used as
%% a template to produce your own thesis.
%%
%% The title, abstract and so on are taken from Martin Reddy's csthesis class
%% documentation.
%%
%% MEF, October 2002
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

%%%
%% Load the class. Put any options that you want here (see the documentation
%% for the list of options). The following are samples for each type of
%% thesis:
%%
%% Note: you can also specify any of the following options:
%% logo: put a University of Edinburgh logo onto the title page
%% frontabs: put the abstract onto the title page
%% deptreport: produce a title page that fits into a Computer Science
%%      departmental cover [not sure if this actually works]
%% singlespacing, fullspacing, doublespacing: choose line spacing
%% oneside, twoside: specify a one-sided or two-sided thesis
%% 10pt, 11pt, 12pt: choose a font size
%% centrechapter, leftchapter, rightchapter: alignment of chapter headings
%% sansheadings, normalheadings: headings and captions in sans-serif
%%      (default) or in the same font as the rest of the thesis
%% [no]listsintoc: put list of figures/tables in table of contents (default:
%%      not)
%% romanprepages, plainprepages: number the preliminary pages with Roman
%%      numerals (default) or consecutively with the rest of the thesis
%% parskip: don't indent paragraphs, put a blank line between instead
%% abbrevs: define a list of useful abbreviations (see documentation)
%% draft: produce a single-spaced, double-sided thesis with narrow margins
%%
%% For a PhD thesis -- you must also specify a research institute:
\documentclass[phd,iccs,twoside]{infthesis}

%% For an MPhil thesis -- also needs an institute
% \documentclass[mphil,ianc]{infthesis}

%% MSc by Research, which also needs an institute
% \documentclass[mscres,irr]{infthesis}
```

```
%% Taught MSc -- specify a particular degree instead. If none is specified,
%% "MSc in Informatics" is used.
% \documentclass[msc,cogsci]{infthesis}
% \documentclass[msc]{infthesis} % for the MSc in Informatics

%% Undergraduate project -- specify the degree course and project type
%% separately
% \documentclass[bsc]{infthesis}
% \course{Artificial Intelligence and Psychology}
% \project{Fourth Year Project Report}

%% Put any \usepackage commands you want to use right here; the following is
%% an example:
\usepackage{natbib}

%% Information about the title, etc.
\title{How I Did It}
\author{Victor von Frankenstein}

%% If the year of submission is not the current year, uncomment this line and
%% specify it here:
% \submityear{1785}

%% Optionally, specify the graduation month and year:
% \graduationdate{February 1786}

%% Specify the abstract here.
\abstract{%
  This doctoral thesis will present the results of my work into the
  reanimation of lifeless human tissues.
}

%% Now we start with the actual document.
\begin{document}

%% First, the preliminary pages
\begin{preliminary}

%% This creates the title page
\maketitle

%% Acknowledgements
\begin{acknowledgements}
Many thanks to my mummy for the numerous packed lunches; and of course to
Igor, my faithful lab assistant.
\end{acknowledgements}

%% Next we need to have the declaration.
\standarddeclaration

%% Finally, a dedication (this is optional -- uncomment the following line if
%% you want one).
% \dedication{To my mummy.}
```

```

%% Create the table of contents
\tableofcontents

%% If you want a list of figures or tables, uncomment the appropriate line(s)
% \listoffigures
% \listoftables

\end{preliminary}

%%%%%%%%%
%% Include your chapter files here. See the sample chapter file for the basic
%% format.

\include{chap1}
% \include{chap2}
%% ... etc ...

%%%%%%%%%
%% Any appendices should go here. The appendix files should look just like the
%% chapter files.
\appendix
\include{appendix1}
%% ... etc...

%% Choose your favourite bibliography style here.
\bibliographystyle{apalike}

%% If you want the bibliography single-spaced (which is allowed), uncomment
%% the next line.
% \singlespace

%% Specify the bibliography file. Default is thesis.bib.
\bibliography{thesis}

%% ... that's all, folks!
\end{document}

```

A.2 Template chapter file

```

%% Sample chapter file, for use in a thesis.
%% Don't forget to put the \chapter{...} header onto each file.

\chapter{Experimental Procedure}

```

First you have to get some dead tissue (the knack here is in also managing to avoid a short custodial sentence for grave-robbing). Then you need one of those crackling things which makes lots of sparks. The work must also be conducted in a suitable dark and ancient castle, in close proximity to a town of highly suspicious and pitchfork-wielding peasants.

The remaining experimental procedure and theoretical mumbo-jumbo is left as an exercise for the interested reader \citep{shelley-1818}.

B University thesis regulations

The following regulations have been extracted from the University of Edinburgh Postgraduate Study Programme as of October 2002. Before submitting a thesis, please ensure that it complies fully with the most current version of these guidelines, which are available online at

<http://www.cpa.ed.ac.uk/calendar/pgradh/regs/index.html>

3.8.7

- Every candidate for the PhD, MPhil, MLitt or a taught professional doctorate must incorporate in the thesis a signed declaration
 - (a) that the thesis has been composed by the candidate, and
 - (b) either that the work is the candidates own, or, if the candidate has been a member of a research group, that the candidate has made a substantial contribution to the work, such contribution being clearly indicated, and
 - (c) that the work has not been submitted for any other degree or professional qualification except as specified.

3.9.1 Size and Thickness of Paper

- For both copies either A4 (minimum weight 70 gsm.) or permanent photocopies cut to A4 size

3.9.2 Type or Print

- Consistent and clear type of laser print quality should be used for all copies for both text and illustrations.

3.9.3 Layout of Text

- 4cm binding margin, 2cm head margin, 2.5cm fore-edge margin, 4cm tail margin
- The text of the thesis should be produced in single-sided copy, on right-facing pages only. Alternatively, the text of the thesis may be produced in double-sided copy; in which case each chapter must start on a right-facing page. The main text should be in not less than 1 1/2 spacing (or 18 points leading). Quotations and notes should be in single spacing.
- Pagination must be continuous throughout and include all plans, tables, illustrations etc., which are bound in with the text. Handwritten numbers in indelible ink are acceptable.

3.9.4 Character Size

- The size of character used throughout the text, including prefatory material, appendices and displayed matter, should not be less than 2.0 mm for capitals and 1.5 mm for x-height (i.e. the height of lower-case x). Character sizes should be at least 10 points, with body text (text other than headings) not exceeding 12 points.

3.9.5 Character Styles—fonts

- Where there is a choice of character style or font, a serif font—eg Times (New Roman) or Palatino—should be used for the main text and a sans serif font—eg Helvetica or Arial—for headings and labelling diagrams, etc.

3.9.6 Word spacing and division

- Text should be set to ensure an even spacing between words for any particular line. Word division at the ends of lines (hyphenation) should be avoided if possible.

3.9.7 Title Page

- Title of thesis.
- Authors name.
- At foot of page:
 - name of degree
 - The University of Edinburgh
 - year of presentation.
- In the case of a thesis which is resubmitted, the year in which the thesis is resubmitted should be shown as the year of presentation.

3.9.8 Binding

- Sewn and bound in strong, waterproof black cloth.
- Not more than 6.5cm thick. If more than 6.5cm thick—two or more volumes.

3.9.9 Lettering on both copies

- In gold on spine only:
 - Top: degree
 - Middle: name of author (initials and surname)
 - Foot: year of graduation.

3.9.10 Diagrams, Maps, Illustrations, etc.

- Wherever possible, to be placed near to the appropriate text.
- If placed in pocket, pocket to be attached to inside back cover by the bookbinder.
- If illustrations are contained in a separate volume, binding must correspond to that of the text.
- Photographic illustrations must be permanent reproductions. Good quality colour photocopies of diagrams and photographs may be used rather than the originals.

3.9.11 Published Papers

- Published papers should be sewn in by the bookbinder, as an appendix. If photocopies of published papers are to be included in the thesis, the publisher's formal permission should be obtained and, where appropriate, the permission of any joint authors. A note that permission has been obtained should be included in the thesis.

3.9.12 Data in Electronic Form

- Candidates may be advised or required to submit data in electronic form for the purposes of assessment. This material is supplementary to the main text and should be submitted in a pocket inside the back cover of the thesis.

3.9.13 Notes, Bibliography and Contents Page

- Notes and the bibliography may be typed in single spacing. A consistent policy should be used, inserting the notes at the foot of the page or at the end of each chapter or at the end of the thesis. All separate sections, e.g. bibliography, list of abbreviations, etc., must be identified on Contents page.

3.9.14 Abstracts

- Six copies of an abstract must be submitted. The abstract must be no longer than can be accommodated in single-space type on one side only of a single form obtainable from the Faculty Office. Abstracts should conform to Regulations 3.9.2–3.9.6. In addition, the text of the abstract should be incorporated at the beginning of each copy of the thesis.

3.12.16 [excerpt]

- Candidates submitting a dissertation or portfolio of projects *under modes (b) or (c) of the MSc by Research, MTh by Research or for the MRes*, should submit two typewritten copies of their work in a format specified by the Department within the scope of Regulations 3.9.1–3.9.7.

Candidates submitting a dissertation under *mode (a) of the MSc by Research or MTh by Research* must submit two bound copies of their work which conform to the regulatory standards for theses set out in Regulations 3.9.1–3.9.13.