# A LATEX CLASS FOR TYPESETTING UTD DISSERTATIONS AND THESES

by

Kevin W. Hamlen

APPROVED BY SUPERVISORY COMMITTEE:
Austin J. Cunningham, Chair
Gopal Gupta
Mark Spong
Richard Benson

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This thesis class file

is dedicated to my students,

who suffered without a proper one

until the present time.

# A LATEX CLASS FOR TYPESETTING UTD DISSERTATIONS AND THESES

by

KEVIN W. HAMLEN, BS, MS, PhD

#### DISSERTATION

Presented to the Faculty of
The University of Texas at Dallas
in Partial Fulfillment
of the Requirements
for the Degree of

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#### ACKNOWLEDGMENTS

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 ${\bf December}\ 2012$ 

A LATEX CLASS FOR TYPESETTING

UTD DISSERTATIONS AND THESES

Kevin W. Hamlen, PhD

The University of Texas at Dallas, 2013

Supervising Professor: Austin J. Cunningham, Chair

This mock dissertation concerns the development and usage of a LATEX class file that eases the

task of creating UTD theses and dissertations. The class file automatically creates margins,

page headers and footers, page numbers, paragraph parameters, title pages, and table/figure

captions consistent with the guidelines set forth by the UTD graduate school. In contrast

to many prior works, care has been taken to respect relevant LATEX coding conventions and

standards. This helps to maximize compatibility with other LATEX packages, and eases the

incorporation of existing publication texts into a dissertation master document.

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#### CHAPTER 1

#### INTRODUCTION

This document demonstrates how to use the utdthesis document class. It is *not* a tutorial on LaTeX. The reader who is unfamiliar with LaTeX is urged to first invest at least a few hours learning the basics through the help of a guide. We recommend the one by Oetiker et al. (2016), though there are many others.

Being a demonstration, the source file of this document (sample.tex) contains example LaTeX code that you may use as a template. Authors should start with the source file and replace the various texts with content appropriate for their theses. In order to keep this document self-contained, chapter texts are in-lined into sample.tex; however, a real dissertation should probably organize them into separate files that are loaded by substituting the texts in sample.tex with \input or \include¹ macros.

Although this document summarizes many of the UTD dissertation formatting requirements, it is not a substitute for reading the UTD *Thesis and Dissertation Guide* (UTD, 2016).<sup>2</sup> Wherever this document and the guide disagree, the guide takes precedence. You should also consult one of the guide-approved style manuals (Coghill and Garson, 2006; APA, 2009; U. Chicago, 2010; IEEE, 2014; MLA, 2008; Turabian, 2013).

The rest of the sample dissertation proceeds as follows: Chapter 2 details the proper usage of macros provided by the class file. Chapter 3 concludes the sample dissertation. The appendix demonstrates the formatting of an appendix (optional).

<sup>&</sup>lt;sup>1</sup>If you use \include, be sure to put the \chapter command in the loaded file, not in the master file, so that chapter texts aren't separated from their titles by page breaks.

<sup>&</sup>lt;sup>2</sup>At the time of this writing, the guide was last revised in 2016.

#### CHAPTER 2

#### USAGE INSTRUCTIONS

#### 2.1 Initialization

The first line of your .tex file should be:

\documentclass[doublespacing]{utdthesis}

To create a dissertation whose lines are one-and-a-half-spaced instead of double-spaced, use halfspacing instead of doublespacing.

#### 2.2 Loading Packages

Next, load any desired packages using \usepackage commands. Be sure to avoid packages that violate the UTD thesis formatting requirements. Here are some common conflicts:

- Do not load any packages that change the default font size (but you may change the default font face, as long as the entire dissertation uses the same font face).
- Do not load any packages that change the margins (e.g., geometry).
- Do not load any packages that change the page numbering, headers, or footers.
- Do not load any packages that change the formatting of chapter titles.
- Do not reformat the table of contents or the lists of figures or tables.
- Do not load any packages that change the formatting of captions for tables and figures.
- Only load hyperref if you are using pdflaTeX to generate PDF files directly. (Converting DVI files to PDFs results in poor-quality PDFs, and is therefore not recommended.)

However, here are some recommended packages that may help improve the quality of your dissertation, or help you meet the UTD formatting requirements:

- If you want to use a Times font instead of Computer Modern, load the appropriate package for your LATEX (usually times, mathptmx, tgtermes, or newtxtext/newtxmath).
- If your dissertation contains math or theorems, the amsmath, amssymb, and amsthm packages are recommended.
- If you need to import graphic files for figures, use graphicx.
- To improve the appearance of web URLs (e.g., in references), use the url package.
- To typeset a large table or figure in landscape orientation, use the rotating package.
- The microtype package improves overall font appearance in a variety of ways. However, be careful with the options since some conflict with the UTD formatting requirements.

  (We recommend using only the default option settings.)
- If you use pdfTeX or pdfETeX to generate PDFs, the hyperref package adds many useful features. If you use it, make it the last package that you load, since it modifies the behavior of many other packages.

#### 2.3 Dissertation Setup

Before the first page of the dissertation, you must use the following commands to identify the author, title, and type of the dissertation.

Specify your name as you'd like it to appear in title pages:

\author{Kevin W. Hamlen}

Specify your dissertation title. Use \\ to create line breaks in multi-line titles.

\title{A LaTeX Class \\ For UTD Theses}

Specify whether your document is a dissertation (usually for a PhD) or a thesis (usually for a Master's degree):

```
\t or \t o
```

Specify the full name of the degree for which you are a candidate:

```
\degreefull{Doctor of Philosophy}
```

Specify the degree's abbreviation. Do not include any periods.

```
\degreeabbr{PhD}
```

Specify the full name of the subject in which you are pursuing your degree (as specified by your department):

```
\subject{Computer Science}
```

If your degree program requires you to identify a specialization as part of the subject on the dissertation's title page, you can use \\ within the subject text to create multiple lines.

Specify the month and year in which you expect to be awarded your degree:

```
\graduationmonth{August}
\graduationyear{2012}
```

Write a comma-separated list of the abbreviations of the degrees you already hold, not including the degree for which you are a candidate. Do not include any periods.

```
\prevdegrees{BS, MS}
```

List the members of your supervisory committee in the order that they should appear on the signature page. Use the \* form of the command for committee chairs. All chairs should always come before all non-chairs, and the first member should always be a chair.

```
\committeemember*{Austin J. Cunningham}
\committeemember{Gopal Gupta}
\committeemember{Mark Spong}
\committeemember{Richard Benson}
```

If your committee has multiple chairs but some chairs require the title "Chair" instead of the more customary "Co-Chair" title, use two \*'s to force a member's title to "Chair".

#### 2.4 Preliminary Pages

The first command after the \begin{document} line should be \frontmatter. This sets up the page numbering style of the preliminary pages.

```
\begin{document} \frontmatter
```

Create the signature page as the first page:

```
\signaturepage
```

If you want a copyright page, create it and specify the copyright date:

```
\copyrightpage{2012}
```

If for some reason the name on the copyright page should be different than the name given to the \author command, use: \copyrightpage[your name] {year}

If you wish, add a dedication page. End all but the last line with \\.

```
\begin{dedication}
For everyone \\
who helped me \\
write this.
\end{dedication}
```

Create the title page:

```
\maketitle
```

Create the acknowledgments page as follows:

```
\begin{acks}{December 2012}
The author thanks ...
\end{acks}
```

The month and year on the first line should identify when you first gave your thesis or dissertation to your committee for review (which is possibly different than your graduation date). The acknowledgments themselves should consist of complete sentences and paragraphs. Do not use any sectioning macros (e.g., \section). If your work was supported by a grant, some sponsors require an acknowledgment of the grant using specific text, so be sure to consult your supervisor on how to include that in your acknowledgements if relevant.

All dissertations and theses must next include an abstract:

```
\begin{abstract}
(Put sentences and paragraphs here.)
\end{abstract}
```

After the abstract comes the table of contents. LaTeX generates tables of contents automatically, but you must run LaTeX at least *twice* after any document change that affects the table of contents to be sure the table is fully updated.

#### \tableofcontents

If your dissertation has any figures it must have a list of figures, and if it has any tables it must have a list of tables. (But do not include an empty list of figures or tables.) These too are generated automatically and require two runs of LATEX to be fully updated.

```
\listoffigures
\listoftables
```

After all of the above, you must execute the macro \mainmatter. This changes the page numbering and sectioning styles to the format needed for the majority of the dissertation.

\mainmatter

#### 2.5 Chapters

The majority of your dissertation should consist of chapters, each started with a \chapter command (or a chaptertitlepage environment—see §2.5.2). The following subsections provide tips on how to use the utdthesis class in a way that satisfies the UTD formatting requirements (UTD, 2016) and best practices recommended by approved style guides.

#### 2.5.1 Fonts

UTD mandates a consistent 11pt or larger font size throughout the main text of the dissertation, with 12pt as the recommended size. This class therefore sets 12pt as the document default font size. Do not change the size using LaTeX commands like \Large; doing so will

violate the UTD requirements. Outside the main text (e.g., in tables and figures), other sizes are permitted.

#### 2.5.2 Chapter Titles and Sectioning

Chapters may be subdivided into sections and subsections using the usual commands (e.g., \section and \subsection). Chapter titles must remain in the default font style produced by the class file; don't load any packages that change the look of chapter headings. The style of section titles is more flexible, but they must remain in the default font size.

To footnote a chapter or section title, use LATEX's \thanks macro within the title text:

```
\chapter{Introduction\thanks{This is a footnote.}}
```

Paragraph titles. Special paragraphs may be titled using the \paragraph macro, as demonstrated here. Again, these must remain in the default font size.

Chapter Title Pages. Any dissertation chapter comprised of a verbatim reproduced publication must start with a separate chapter title page instead of the usual chapter heading. To produce a separate chapter title page, use a chaptertitlepage environment as shown:

Chapter 4 of this guide demonstrates the resulting output. The three macro arguments (each enclosed in braces) consist of the paper title, author list, and department name. Do not write the university name or address; those are automatically added to the final document for you by the class file.



Figure 2.1. A sample figure

As with other LATEX sectioning commands (e.g., \chapter), you may differentiate the title's appearance in the table of contents from its appearance on the chapter title page using an extra, optional argument enclosed in brackets. For example,

```
\begin{chaptertitlepage}
    [The Chapter Title Goes Here]
    {The Chapter Title \\ Goes Here}
    {John Q. Author, Jane Doe, and Fred Smith}
    {The Computer Science Department, EC 31}
```

puts a line break (\\) between "Title" and "Goes" on the chapter title page, but not in the table of contents (where it should probably have different line-breaking).

#### 2.5.3 Figures and Tables

Figures and tables (collectively called *floats*) are started as usual with \begin{figure} or \begin{table}.

Captions of figures and tables should be created using LaTeX's standard \caption macro placed at the *bottom* of figures (see Figure 2.1) but at the *top* of tables (see Table 2.1). Do not load packages that change the captioning style, or you may violate UTD's requirements.

If you have a table that spans multiple pages, use a separate table environment for each part, use the [p] (page) positioning option, and use \contcaption (with no argument) instead of a \caption command in all but the first one. The results are illustrated by Table 2.2. This typesets the captions of the split parts of the table in the style recommended by Turabian (2013).

Table 2.1. A sample landscape-oriented table  $\,$ 

Macro	Required	Purpose
\frontmatter	>	begins pagination style for preliminary pages
\signaturepage	>	creates the signature page
\copyrightpage{YYYY}		creates a copyright page for year YYYY
\begin{dedication}		begins the dedication page
\end{dedication}		ends the dedication page
\maketitle	>	creates the title page
\begin{acks}{Month YYYY}	>	begins the acknowledgments
\end{acks}	>	ends the acknowledgments
\begin{abstract}	>	begins the abstract
\end{abstract}	>	ends the abstract
\tableofcontents	>	creates the table of contents
\listoftables	П	creates the list of tables
\listoffigures	П	creates the list of figures
\mainmatter	>	begins pagination style for the main document
$(main\ content)$	>	main body of dissertation/thesis
\appendix		start numbering style for appendixes
(appendixes)		create appendixes just like chapters
\begin{thesisbib}	>	start bibliography line spacing
$\verb \bibliography!  bibliography! $	>	references
\end{thesisbib}	>	end bibliography line spacing
\begin{biosketch}	>	begin your biographical sketch
\end{biosketch}	>	end your biographical sketch

L: Lists of tables and figures are only required when there are tables and figures (respectively) to list.

Table 2.2. Turing Award winners, sorted by year of award

NameInstitutionAwardField(s)Alan PerlisMIT1966programming languages (PL)Maurice WilkesCambridge1967PL and systemsRichard HammingUIUC1968numerical methodsMarvin MinskyPrinceton1969artificial intelligenceJames H. Wilkinson-1970numerical analysisJohn McCarthyPrinceton1971artificial intelligenceEdsger DijkstraAmsterdam1972PLCharles Bachman-1973databasesDonald KnuthCaltech1974algorithms and PLAllen NewellCMU1975artificial intelligenceHerb SimonChicago1975artificial intelligenceMichael RabinPrinceton1976theory of computationJohn BackusPoincaré1977PLBob Floyd-1978PL and algorithmsKen IversonHarvard1979PLTony HoareOxford1980PLEdgar CoddUMI1981databasesStephen CookHarvard1983operating systems (OS)Ken Thompson-1983OSNiklaus WirthBerkley1984PLDick KarpHarvard1985algorithmsJohn CockeDuke1987PLIvan SutherlandMIT1988graphicsVelvel KahanToronto1989numerical analysisCorby CorbatoMIT1990 <th></th> <th>PhD-granting</th> <th>Year of</th> <th></th>		PhD-granting	Year of	
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Table 2.2 continued

	PhD-granting	Year of	
Name	Institution	Award	Field(s)
Doug Engelbart	Berkley	1997	human computer interaction
Jim Gray	Berkley	1998	databases
Fred Brooks	Harvard	1999	architectures, OS, & software engi-
			neering
Andrew Yao	UIUC	2000	theory of computation
Ole-Johan Dahl	_	2001	PL
Kristen Nygaard	_	2001	PL
Len Adleman	Berkley	2002	cryptography
Ron Rivest	Stanford	2002	cryptography
Adi Shamir	Weizmann	2002	cryptography
Alan Kay	Utah	2003	PL
Vint Cerf	UCLA	2004	networking
Bob Kahn	Princeton	2004	networking
Peter Naur	Copenhagen	2005	PL
Fran Allen	-	2006	PL
Edmund Clarke	Cornell	2007	formal verification
E. Allen Emerson	Harvard	2007	formal verification
Joseph Sifakis	NTUA/Grenoble	2007	formal verification
Barbara Liskov	Stanford	2008	PL and systems
Chuck Thacker	_	2009	networking and systems
Leslie Valiant	Warwick	2010	theory of computation
Judea Pearl	NYU-Poly	2011	artificial intelligence
Shafi Goldwasser	Berkeley	2012	cryptography
Silvio Micali	Berkeley	2012	cryptography
Leslie Lamport	Brandeis	2013	distributed computing
Michael Stonebraker	Michigan	2014	databases
Whitfield Diffie	_	2015	cryptography
Martin Hellman	Stanford	2015	cryptography
Tim Berners-Lee	_	2016	world wide web
David Patterson	UCLA	2017	architectures
John Hennessy	Stony Brook	2017	architectures
Yann LeCun	Sorbonne	2018	artificial intelligence
Geoffrey Hinton	Edinburgh	2018	artificial intelligence
Yoshua Bengio	McGill	2018	artificial intelligence
Ed Catmull	Utah	2019	graphics
Patrick Hanrahan	Wisconsin	2019	graphics
Jeffrey Ullman	Princeton	2020	algorithms
Alfred Aho	Princeton	2020	algorithms
Jack Dongarra	New Mexico	2021	algorithms

#### 2.5.4 Block Quotations

To create block quotations, use a quote or quotation environment (they are synonymous):

```
\begin{quote}
(Write the quotation text here.)
\end{quote}
```

The quotation will be single-spaced and indented, as shown below.

The programmer, like the poet, works only slightly removed from pure thought-stuff. He builds his castles in the air, from air, creating by exertion of the imagination. Few media of creation are so flexible, so easy to polish and rework, so readily capable of realizing grand conceptual structures. . . .

Yet the program construct, unlike the poet's words, is real in the sense that it moves and works, producing visible outputs separate from the construct itself. . . . The magic of myth and legend has come true in our time. One types the correct incantation on a keyboard, and a display screen comes to life, showing things that never were nor could be. (Brooks, Jr., 1995)

#### 2.5.5 Line Spacing

The main text must be double- or one-and-a-half-spaced throughout; do not change the default line-spacing. Footnotes, figures, tables, and block quotes (see §2.5.4) are single-spaced.

If for some reason you need to force single-spacing in other areas of the document, use the singlespace environment or \singlespacing macro as illustrated below:

```
\begin{singlespace}
(Put text here.)
\end{singlespace}
{\singlespace
(Put text here.)
\par}
```

Do not load the setspace package, whose implementation conflicts with the line-spacing requirements for UTD dissertations.

### 2.6 Appendixes

After the your final chapter (i.e., the conclusion chapter), you may add one or more appendixes. To do so, first execute the \appendix command, which changes the chapter labeling style to one suitable for appendixes.

#### \appendix

Then create appendixes with \chapter commands, just as you would chapters.

If you have only one appendix, you must use \chapter\* to create an unlabeled appendix, and you must refer to it in the text as "the appendix." The appendix of this document demonstrates the formatting of this sort of appendix.

If you have multiple appendixes, use \chapter (without the star) to give them alphabetical labels, and refer to them in the text using LaTeX code like "Appendix~\ref{...}", which generates "Appendix A", etc.

#### 2.7 Citations and the References Section

All authors are strongly urged to use a LaTeX citation management system (e.g., BibTeX) to typeset citations semi-automatically. Typically this means you will use the \cite macro within your chapters to create citations automatically, rather than typing out the citation texts manually.

The acceptable citation formats vary from department to department, so you should consult your supervisor and your chosen style manual to determine which is appropriate for your dissertation. In general, we recommend using the natbib package with the chicago bibliography style. To do so, put the following lines near the top of your .tex file:

\usepackage[authoryear]{natbib}
\bibliographystyle{chicago}
\let\cite=\citep

If you want numbered citations instead of author-year citations, replace authoryear with numbers in the above.

The references section comes after all chapters and appendixes. It must be contained within a thesisbib environment:

```
\begin{thesisbib}
(Bibliography commands go here.)
\end{thesisbib}
```

Within the thesisbib environment should go the various commands required by your citation management system, assuming you are using one. The section *must* be entitled "REFERENCES" (not "BIBLIOGRAPHY"), each entry must be single-spaced, and there should be a single blank line between each pair of entries. Be sure you configure your chosen bibliography style file to do this. If you are using natbib as suggested above, the correct commands are:

```
\begin{thesisbib}
\setlength{\bibsep}{12pt plus 1pt minus 1pt}
\bibliography{name of your bib file}
\end{thesisbib}
```

#### 2.8 Biographical Sketch

After the bibliography should be your personal biographical sketch:

```
\begin{biosketch}
(Write sentences and paragraphs here.)
\end{biosketch}
```

The content should be standard sentences and paragraphs; do not use any sectioning commands within the biographical sketch.

#### 2.9 Curriculum Vitae

The final page(s) of your dissertation should be your CV:

```
\begin{vita}
(Write your CV here, or substitute with your own pages.)
\end{vita}
```

The CV pages are not numbered and have no special formatting requirements. Therefore, if you already have a CV that you've created using another program, you can optionally substitute the vita pages generated by this template with pages created by another program. However, if you do this, you must still use the commands above to create an empty CV (which you will replace with different pages when printed), since the commands are responsible for adding the (unnumbered) Curriculum Vitae entry to the table of contents, which UTD requires.

## 2.10 Proofing

Before visiting the graduate office to have your dissertation checked, be sure to consult the .log file generated by LaTeX for warnings. The class file is programmed to elicit warnings—each prefixed by the word utdthesis—for many common errors, such as inappropriate changes made by other packages to the dissertation margin settings, and misordered mandatory pages.

#### CHAPTER 3

#### **CONCLUSION**

Although the scientific and/or creative contributions of a dissertation are its most important qualities, the impact of those contributions remains contingent upon a clear, lucid presentation that invites wide readership. High-quality typography and consistent typographic style is particularly important when the dissertation content is highly technical.

This UTD thesis class file aids the dissertation author (and future readers) by automating much of the required formatting dictated by the UTD graduate office. It does so in a way that avoids conflicts with existing LaTeX style packages, maximizing the set of tools that remain at the author's disposal.

#### CHAPTER 4

# SAMPLE DISSERTATION CHAPTER COMPRISING A PUBLISHED WORK

Authors – Kevin W. Hamlen and K.L. Turabian

The Computer Science Department, EC 31

The University of Texas at Dallas

800 West Campbell Road

Richardson, Texas 75080-3021

Key words: typography, formatting, education Corresponding author: Kevin W. Hamlen This sample text demonstrates the formatting of a chapter headed by a *separate chapter title page* (see p. 17). Separate chapter title pages are for chapters comprised of a verbatim work that has already been published or submitted for publication. In general, you should consult your supervising professor and the graduate office to determine whether a separate chapter title page is appropriate for your dissertation chapter.

### **APPENDIX**

## SAMPLE SOLO APPENDIX

This appendix illustrates the typesetting of a solo appendix, as specified in §2.6. Solo appendixes are not labeled (although any constituent subsections, tables, or figures are labeled as if the appendix is labeled "A").

#### REFERENCES

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#### **BIOGRAPHICAL SKETCH**

Kevin W. Hamlen began learning the basics of LaTeX in the Fall of 2000 in order to publish computer science journal articles as part of his PhD candidacy at Cornell University. By the completion of his degree in 2006, he had written thousands of lines of TeX code.

After completing his PhD, Dr. Hamlen joined the faculty of the Computer Science Department at The University of Texas at Dallas, and graduated his first two PhD students (Micah Jones and Sunitha Ramanujam) in 2011. By the graduation of his third student (Richard Wartell) in 2012, he had concluded that a properly crafted LATEX class file for UTD theses was badly needed to streamline future dissertation preparations. He therefore created this one in December 2012.

#### **CURRICULUM VITAE**

# Kevin W. Hamlen

October 15, 2016

#### Contact Information:

Department of Computer Science Voice: (972) 883-4724 The University of Texas at Dallas Fax: (972) 883-2349

800 W. Campbell Rd. Email: hamlen@utdallas.edu

Richardson, TX 75080-3021, U.S.A.

## **Educational History:**

B.S., Computer Science and Mathematical Sciences, Carnegie Mellon University, 1998

M.S., Computer Science, Cornell University, 2002

Ph.D., Computer Science, Cornell University, 2006

Security Policy Enforcement by Program-rewriting

Ph.D. Dissertation

Computer Science Department, Cornell University

Advisors: Dr. Greg Morrisett and Dr. Fred B. Schneider

Proof-Carrying Code for x86 Architectures

Senior Undergraduate Honors Thesis

School of Computer Science, Carnegie Mellon University

Advisor: Dr. Peter Lee

# **Employment History:**

Professor, The University of Texas at Dallas, September 2018 – present Associate Professor, The University of Texas at Dallas, September 2012 – September 2018 Assistant Professor, The University of Texas at Dallas, August 2006 – August 2012

# Professional Recognitions and Honors:

Louis A. Beecherl, Jr., Faculty Endowment Award, UTD, 2020

Eugene McDermott Faculty Endowment Award, UTD, 2018

Outstanding Teaching Award, Engineering and Computer Science, UTD, 2013

Faculty Research Award, Engineering and Computer Science, UTD, 2012

CAREER Award, National Science Foundation, 2011

Young Investigator Program (YIP) Award, AFOSR, 2008

Allen Newell Award for Excellence in Undergraduate Research, Carnegie Mellon U., 1998 Graduated summa cum laude (3rd in class), Carnegie Mellon University, 1998

# **Professional Memberships:**

Institute of Electrical and Electronics Engineers (IEEE), 2010–present Association of Computing Machinery (ACM), 2008–present