AN ABSTRACT OF THE THESIS OF

John W. Metta for the degree of Masters of Science in LaTeX Hackineering and LyX Documentation presented on April 26, 2006.

Title: BeamTeX : Overview and Documentation of the Oregon State University LaTeX Class and LyX Layouts

Abstract approved: _____

Donald K. Nuth Leslie A. Aamport

BeamTeX is a replacement for the old osuthesis class. It is both a LaTeX class and set of LyX layout files that allow the user to quickly and painlessly format a thesis according to the requirements of the Oregon State University Graduate School. Most, if not all, formatting requirements are automagically prepared. It was created from the ground up, with some input from a historical set of files and macros, both from OSU and external sources. This fake thesis serves both as an example and as documentation. It contains full documentation on all of BeamTeX's options, as well as on the LyX layout files.

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Masters of Science thesis of John W. Metta presented on April 26, 2006.

APPROVED:

Co-Major Professor, representing LaTeX Hackineering

Co-Major Professor, representing LyX Documentation

Head of the College of TeX/LaTeX Engineering

Chair of the Department of LyX–ology

Dean of Graduate School

I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my thesis to any reader upon request.

John W. Metta, Author

ACKNOWLEDGEMENTS

This page is mostly here to demonstrate one of the pretext pages. However, there *are* a lot of people who deserve some credit for making the earlier incarnations of the osuthesis class possible. Unfortunately, I don't even know who they all are. I've gathered what names I could that were sprinkled around various source files to the original osuthesis class. One of the template files that I found acknowledges Dr. Gregg Rothermel of the Oregon State University Software Engineering Group, but states that "most of the credit for the real work in creating [one of the original versions], however, belongs to Lixin Li and Chengyun Chu." That file also states that it was modified by Alexey G. Malishevsky. I got these templates from Eric Altendorf, who in turn got them from Rogan Creswick, whence he got them, I don't know. Both Eric and Rogan apparently did a lot of work on what were a large number of templates and macros. Both of those intrepid explorers weeded through code a great deal to leave something better and easier for the next users. Some of the macros from those original templates are included here and have helped build this class— especially the table of contents formatting, which is the main section culled from those original templates. Some credit should also also go to Norman Gall of University of Calgary, who wrote a .cls file for Rayees Shamsuddin, who in turn sent it to me. I didn't actually use any of Norman's code (at least, I don't think I did), but the fact that he went through the trouble to create a LaTeX class for others to use is deserving of credit.

DEDICATION

To Donald Knuth and Leslie Lamport.
Without them, TEX and LATEX would never have been possible.

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BeavTeX Chapter 1 –Introduction

BeavTeX (the Beaver's LaTeX) is a LaTeX class designed specifically to format theses and dissertations at Oregon State University. It was created almost completely from the ground up as a fully functional LaTeX class. The original class was found to be inadequate, as it was mainly a complex set of templates and files and borrowed classes from other universities that was very hard to use. Many intrepid explorers tried to fix it bit by bit and send it to others in an improved form. I decided to essentially scrap everything and start from scratch, borrowing specific macros and definitions (mostly from the Table of Contents down, in the source file).

This chapter introduces BeavTeX and gives some hints on installation. The following chapters detail BeavTeX's commands/internals, and introduce using BeavTeX in LyX. I hope you enjoy using BeavTeX , and find that it helps you in writing your thesis. Please send me any ideas you may have about improving it.

–John Metta
<john.pennington@lifetime.oregonstate.edu>

1.1 LaTeX and LyX

Some quick information first, for those who may not be aware. LaTeX has a graphical front-end called LyX. Depending on your field of study, learning LaTeX may be a good idea; however, it's quite possible to get along with LyX without knowing a great deal of LaTeX.

1.1.1 Getting and Learning LaTeX

If you are reading this, you are either aware of, or curious about, the beauty of using LaTeX to format documents. For windows users who may have gotten a hold of this document and want to try LaTeX, the distribution you should look for is called MiKTeX. *MiKTeX is Free.*

My suggestion, for those who are not total LaTeX gurus, is to get a copy of the User's Guide by **?**. It is a fast reference for nearly all of the commands you will need in your day-to-day LaTeX life. Another source, for those who want to learn TeX programming, is The TeXbook (**?**). It is the definitive guide to TeX as a programming language.

1.1.2 Using LaTeX Without Learning It

Even if you know LaTeX, you may not be aware of LyX (`http://www.lyx.org`). LyX is a graphical user interface to LaTeX. If you are a Micro$oft user, think of it as a "Word for LaTeX". It's available for Linux, Mac and Windows, and makes using LaTeX possible, and even easy, without knowing anything about LaTeX programming.

For those who are LaTeX hackers, it basically makes your life a lot easier, because you can use it as a front end, but also have the ability to add LaTeX code whereever/whenever you want. LyX will not get in your way.

LyX is essentially the only thing I use to write with, since everything can be done in it. It's a wonderful thing, but I'm probably biased. In any case, if you are not using LyX, I suggest you look into it.

1.2 Installing BeAmTeX

I've decided not to distribute BeAmTeX in the standard CTAN manner, mainly because it will be provided specifically to students at OSU, and all others would find it essentially useless but for the possibility of using it to build another class.

This source distribution includes 4 folders:

`archive` This folder is a collection of various versions and assorted files of the original osuthesis class. These are provided, in no particular organizational structure, mainly to satisfy the curiosity of TeX/LaTeX hackers. You can safely discard this folder.

`documentation` Where the LaTeX version of the documentation, as well as the most recent version of the Oregon State Graduate School style guide, resides. Do with this what you wish.

`latex` Contains the beavtex folder, copy this folder in its entirety (it contains only beavtex.cls) to the appropriate place in your LaTeX distribution. After you copy these files, you will have to run texhash as the superuser. Windows users should consult their MiKTeX documentation to see about installing classes.

`lyx` Contains the LyX layout definitions. `beavtexchapter.layout` is the layout used for individual chapters and sections. `beavtexmaster.layout` is the main file layout. Copy these layout files to the layouts folder of your LyX program. Run LyX, go to Edit ▷ Reconfigure, then restart LyX.

That should do it. With this little effort, you'll be on your way to spending time writing your thesis, rather than formatting it.

1.3 Documentation as Example

You can use BeavTeX's documentation as an example of how to build a thesis. One way is to look into the LaTeX file `beavtex.tex`. This is the main file for the documentation, and includes the other files so that you can see how to include individual chapters as seperate files. The other way is to use LyX and open the file `beavtex.lyx`. The thesis was actually written using LyX, and exported into LaTeX and PDF formats from there.

1.3.1 Typesetting the Name

You can typeset the name BeavTeX within your document by using the LaTeX command `\beavtex`. This will automatically insert a trailing space, so if you want to say something like "BeavTeX's cool layout options rule," use the nospace version as so

```
\beavtexnospace 's cool layout options rule
```

Honestly, this is only available for purely egotistical reasons. I mean, there's absolutely no reason that you would *need* this functionality, unless you were going to use it to acknowledge BeavTeX as... say... the single most important thing you've used to complete your thesis.

Using BibTeX

John W. Metta, Leslie A. Aamport and Donald K. Nuth

Journal of LaTeX Fun
Oregon State University
Corvallis, Oregon
Vol. 4, Num 5, pp. 234-345

BeAmTeX Chapter 2 –Using BeAmTeX

The first thing you should notice about BeAmTeX is this documentation. It is formatted in the manner of a dual masters thesis. Even the previous page is a cover page for those who choose manuscript style and have published a chapter before presenting their thesis. Most (it should be all, but I may have missed some) formatting requirements of the Oregon State thesis guide have been taken care of, and the design of this documentation is such that many optional requirements are used so that you have an example.

2.1 Loading the class

The basic options of BeAmTeX are similiar to those in any class, and BeAmTeX itself is based on the book class. Thus, you can load the class with

```
\documentclass[opts]{beavtex}
```

and any options that you pass as `opts` and that BeAmTeX does not recognize, will go straight on to the book class. Thus, if you want to format your thesis to print on both sides of the page, you would load the class as

```
\documentclass[twoside]{beavtex}
```

Since BeAmTeX does not recognize the `twoside` option, it will pass to the underlying book class.

Margins The graduate school requires margins that are 1.5 inch left and 1 inch elsewhere *at a minimum*. They recommend 1.7 inch left. BeAmTeX natively sets a 1.7 inch left margin, which you can change to 1.5 inch by using the option `1.5`. Regardless of your choice of inner margin, BeAmTeX will set your outer margins at 1.1 inch, to assure that your document conforms to the graduate school requirements.

Font Size You may use the options `12pt`, `11pt`, and `10pt` to set the base font size. The default is a 12 point font.

As an example, to print on both sides with a 1.5 inch inner margin and an 11 point font, use:

```
\documentclass[twoside,1.5,11pt]{beavtex}
```

and the class will load, passing the `twoside` option to the book class.

2.2 Basic Commands

Since BeAvTeX was designed to take care of all the pretext page formatting automagically, you should only need to give it the basic information. All of the following commands should be written as:

```
\command{This is what you want printed}
```

Most commands have a LyX counterpart in the master layout file (the chapter layout file holds no BeAvTeX commands) and are noted below.

Commands with no LyX counterpart can still be used in LyX easily by using Layout▷ Document and adding them to the preamble.

2.2.1 Mandatory Commands

All mandatory commands have LyX counterparts.

`\title` This is the title of your thesis. If your title is very long, you will be interested in the optional command `\twotitle`, given below.

`\author` In short, you. Do not use the LaTeX `\and` command. Ideally, your thesis should be one author only. If you must use more than one author, you can simply type something like:

```
\author{U.R. Wise and I.M. Dumb}
```

`\major` The official name of your major, such as Geography, or Bioresource Engineering. Two majors are allowed (See Sections 2.2.2 and 2.3).

`\department` The name of your department, such as Geosciences or Bioengineering. Two departments are allowed (See Sections 2.2.2 and 2.3).

`\advisor` The full name (including middle initial) of your advisor. Two co-advisors are allowed (See Sections 2.2.2 and 2.3).

`\degree` This will be something like "Masters of Science" or "Doctor of Philosophy".

`\doctype` The document type is probably either "Thesis" or "Dissertation," though you may define your own, such as "Project" or "Presentation". *(LyX: Document Type)*.

2.2.1.1 Default Commands

These commands are either optional, or are mandatory but have default values built in. Not all have LyX counterparts.

`\abstract` This should be the *text* of the abstract only— the formal stuff is preformatted. The abstract is formatted on the first page of the thesis. If for some reason, you do not need an abstract, the abstract will still be formatted, but you needn't print the first page. This page does not get numbered, so will not affect numbering of subsequent pages if you discard it. *(LyX)*

`\submitdate` The submission date of your thesis. This value defaults to `\today` if it is not present, but you can enter whatever day you wish. This is the date printed on the abstract and signature pages. *(LyX: Submission Date)*

`\copyrightyear` This is the year of your document's copyright. It defaults to the current year (`\the\year`), but can be changed. *(LyX)*

`\commencementyear` The year of your commencement. Default is the current year. *(LyX)*

`\depthead` This is the title of the head of your department, school, whatever. It defaults to "Chair," but you can use "Head," "Dean" or whatever you want. *(No LyX)*

`\depttype` This is the type of the department. It defaults to "Department," but "School," "College," etc. are sometimes necessary. *(No LyX)*

2.2.2 Optional Commands

Some optional reqirements, including some for those who are dual majors. Many of these options were used to format this documentation, so that you can see how they look.

`\twotitle` If your title is long, it will overrun the margin on the abstract page. This is a serious TEX problem, that is even mentioned in the TEXbook as being difficult at best to solve (**?**). For this reason, you should format your title completely with the `\title` command, then view the dvi or pdf file to see where your title should have a line break. You can then put the portion of your title after the point of a necessary linebreak into this command, and it will look fine. This does not affect the titlepage or anything else, so if you are not formatting an abstract, you needn't worry about using `\twotitle`. *(LyX: Second Title)*

`\coadvisor` Your co-advisor, or your second advisor if you are a dual/double major. *(LyX)*

`\twomajor` This is your second major if you are a dual/double major. *(LyX: Second Major)*

`\twodepartment` Likewise for your department. *(LyX: Second Department)*

`\twodepthead` The title of the head of your second department. *(No LyX)*

`\twodepttype` The type of your second department. *(No LyX)*

2.2.2.1 Optional pages

The following pages only print if you use the commands.

`\acknowledgements` These are your acknowledgements usually in paragraph form, but formatted however you like. *(LyX)*

`\preface` Your preface. *(LyX)*

`\dedication` Your dedications page. *(LyX)*

`\contributors` For manuscript format, these are the contributions of other workers/authors. *(LyX)*

2.3 Advanced Options

There are many small things that can be different from project to project, and thus much that is unique to each thesis/dissertation. I've tried to capture all that I found here. Those that are not here, you may have to add yourself or contact me and I can probably add them. *None of these commands have LyX counterparts, all of them must go into the preamble.*

`\chapword` This is the name (not the title) of all chapters. It defaults to blank, which will just print a chapter number. For an example, this document uses the command

```
\chapword{\beavtex Chapter}
```

so that you can see what it looks like to change the word.

`\chapheadsep` This is a field which separates the chapter number and the chapter title. It defaults to a space and a double hyphen as in "Chapter 1 – Some Title," but you can choose to make this a single period with

```
\chapheadsep{.}
```

which would read "Chapter 1. Some Title." unless `\chapword` is not defined, in which case it would read "1. Some Title."

`\nopretext` Often, during the writing of your thesis, you may want to check out how the formatting looks or proof-read it as a document. For this, it may be cumbersome to print all of the pretext pages only to ignore them and have to scroll past them to get to your thesis. using the option

```
\nopretext{}
```

will force LaTeX to ignore all of the pages that come before your table of contents.

`\depthoftoc` This controls how many levels of sections and subsections are listed in the Table of Contents. The number defines levels *below* the chapter level. It defaults to 2, meaning that sections and subsections will be listed in the TOC. If you want, for instance, subsubsection and paragraph headings, you would use

```
\depthoftoc{4}
```

which may be quite busy and awkward, but it's your thesis, not mine. This also comes in handy in context with the `\nopretext{}` option, since you can set the depth to zero and only print chapter names, ensuring that you don't need to scroll through a long TOC to read your text. You can also comment out the `\tableofcontents` command to avoid printing it at all.

`\smallitem` An itemize environment that is used exactly like the LaTeX `\itemize`, but which has smaller spaces between the text.

- This is a list with the normal `\itemize` environment.
- It has rather large spacing between the items.

versus the `\smallitem` environment

- The `\smallitem` environment
- has smaller spaces between each item.

`\smallenum` This is an enumerate environtment that is used exactly like the LaTeX `\enumerate`, but which has spacing like `\smallitem`.

1. Like the `\smallitem` environtment,
2. the `\smallenum` environment
3. is similiarly spaced.

`\headingpage` For those using the manuscript layout, there is the possibility that you have published a chapter of your thesis prior to submitting it to the graduate school. These chapters require a cover page (as in the beginning of this chapter) stating the title of paper (this must match the chapter title exactly!), the authors, and the journal information. This page can be automagically formatted with a single command:

```
\headingpage{Title}{Authors}{Journal Title}{Journal address}
{Issue Information}
```

where any of the fields can include a newline in the form of a LaTeX double slash (\\). This command must come before the chapter title in the document. For LyX users: Use the TeX entry method, which is the standard method that TeX/LaTeX commands are entered. Again, do not use `\and` in the author list.

`\bigfloatskip` This is an option for setting a wider separation for floats. It defaults to false, but you may use

```
\bigfloatskip{true}
```

to have 42pt, vs. 20pt spacing.

`\begin{figure}` Figures are placed in your document with

```
\begin{figure}\end{figure}
```

This will also allow for a separate list of figures to be included in your Table of Context. If you have enough figures that you require them to be in an appendix, use

```
\begin{afigure}\end{afigure}
```

`\listoffigures` This works exactly as it should. It puts a List of Figures, formatted just as the Table of Contents. To use it, place

```
\listoffigures\clearpage
```

immediately after the TOC. You can also use

```
\listofappendixfigures\clearpage
```

to format a list of figures that have been inserted with `\begin{afigure}`.

`\begin{table}` This works the same as `\begin{figure}` above. Use `\begin{atable}` for appendix tables.

`\listoftables` This works the same as `\listoffigures` above. Use `\listofappendixtables` to list appendix tables.

2.3.1 Line Spacing Options

BibTeX uses the default LaTeX linespacing. The commands are `\singlespacing` (this is the default), `\onehalfspacing` and `\doublespacing`. In order to set your thesis in doublespace type, issue the `\doublespacing` command in the preamble.

When you reset the spacing, two important things will be reset. Your Table of Contents and your Bibliography (and index, etc. if you include them). If you want these single spaced, put them in a `singlespacing` environment as so

```
\begin{singlespacing}\tableofcontents{}\end{singlespacing}
```

Likewise, for your bibliography, you would use something like

```
\begin{singlespacing}
\bibliographystyle{jawra}
\clearpage\addcontentsline{toc}{chapter}{Bibliography}
\bibliography{bibfile}
\end{singlespacing}
```

Keep in mind, that you can singlespace virtually anything you want this way, by starting with `\begin{singlespacing}` and ending with `\end{singlespacing}`. For instance:

- This is a list of items

- with the smallitem environment.
- and I want to make them print with single spacing

2.3.2 Controlling Page Alignment

The optional pages (abstract, acknowlegements, contributors, dedication and preface) as well as the body of the text can be aligned as you see fit. The default is a justified body and left-aligned optional pages, but some users may wish to change these settings. *All page alignment settings go into the preamble.*

2.3.2.1 Body Alignment

`\pagealignment{ALIGN}` Will reset the alignment of the *thesis body only*. `ALIGN` is one of `\raggedright`, `\raggedleft`, or `\centering`. It is unlikely that you would use them; however, if either the graduate school or your department balks at a properly formatted text body, just use

```
\pagealignment{\raggedright}
```

and the result will be the older, ugly, technically incorrect, typewriter-style text alignment.

2.3.2.2 Optional Page Alignment

The default alignment for the optional pages is `\raggedright`. Each of the four pages has a different suite of settings that can be controlled, allowing you to have, for instance, a justified preface and a centered dedications page. The commands are given below, and are the exact same for each page. Replace `XXX` with either `ack`, `abs`, `cont`, `ded` or `pref` to use the command on the abstract, acknowledgements, contributors dedications or preface pages, respectively.

`\XXXpage[start|end]` Use this command and its arguments will be run immediately before and after the text (not the title!) of the page. Be careful with these commands because some commands will not end when the page ends. Thus, if you *only* use

```
\ackpagestart{\scshape}
```

then all of the text from the Acknowlegements on— throughout your entire thesis— will be in SMALL CAPS. Why? Because you didn't end the command with something like

```
\ackpageend{\upshape}
```

`\XXXpagestart` and `\XXXpageend` are fairly robust, but you should still be careful using them.

`\XXXpageclear` This command clears the settings for the page. *Using this command by itself will result in justified text.* By default, everypage has the same settings, which are

```
\XXXpagestart{\begin{flushleft}}
\XXXpageend{\end{flushleft}}
```

Using `\XXXpagestart` by itself will therefore give you an error (because the page will still end with `\end{flushleft}`. If you always remember to issue a `\XXXpageclear` before changing any commands, and you'll be fine. Optionally, you can use

```
\XXXpageend{}
```

which serves to clear out the ending command as well.

`\XXXpagecenter` This command results in the page's text being centered.

Page-Alignment Recap Here's a recap of the alignment options for the optional pages:

- Use nothing and the page will be left-aligned. This is the default.
- Use `\XXXpageclear` and the page will be justified.
- Use `\XXXpagecenter` and the page will be centered.
- Use `\XXXpagestart` and `\XXXpageend` to do something crazy.

As an example, for this documentation, I used the following commands

```
\ackpageclear
\abspageclear
\dedpagecenter
```

2.4 BibTeX's Idiosyncracies and Problems

With any program, various choices have to be made by the programmer. I've tried to limit these choices where I can. Still, there are a few, and I'll add options for them if I know that people want them changed.

2.4.1 Choices

At some points, I've no doubt made choices without creating options so that the user can use to modify them. As people use this and complain about those choices, I will either create an option or note them here. Eventually, I may make another chapter which details the code so that people can modify it.

2.4.2 Problems

This is mainly a list of things I need to fix. If there is nothing in the list, then there is nothing I know about.

BEAVTEX Chapter 3 –Using The LYX Layouts

There are two layout files for LYX, one for chapters, one for the master document. To use a layout, go to Layout▷Document and choose BEAVTEX, either MASTER, for the main document or CHAPTER for individual chapters.

I chose this design because I thought people would benefit from having a separation between all of the information necessary for the pretext pages, and the information necessary for the chapters. The information on the pretext pages can then be forgotten, as you work on files that are specific to either the rest of your thesis (all chapters can be included in one file) or to a particular chapter (each chapter/section can have its own file).

In LYX, you can include individual chapter by using Insert▷Include File. Make sure that you check include (as opposed to input, unless you desire this LATEX option) in the dropdown menu of the popup window.

...