

# Installing L<sup>A</sup>T<sub>E</sub>X and Related Software

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For a proper working L<sup>A</sup>T<sub>E</sub>X installation you need the following:

1. A L<sup>A</sup>T<sub>E</sub>X system with programs and packages: T<sub>E</sub>XLive or MikT<sub>E</sub>X (only Windows).
2. A L<sup>A</sup>T<sub>E</sub>X editor: TeXMaker: recommended.
3. JabRef for bibliographic database.
4. GhostScript & GhostView for working with PostScript images.
5. Graphics and conversion software.

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# 1. L<sup>A</sup>T<sub>E</sub>X system

## 1.1. L<sup>A</sup>T<sub>E</sub>X archives

The Comprehensive T<sub>E</sub>X Archive Network (CTAN) is the central place for all kinds of material around T<sub>E</sub>X.

```
http://www.ctan.org
```

A list of CTAN mirror can be found on

```
http://www.ctan.org/mirrors
```

**On campus connection:** There is a local mirror for all T<sub>E</sub>X stuff on the Stellenbosch University network

```
<CTAN> → ftp://ftp.sun.ac.za/CTAN
```

or you can use the Tertiary Education Network (TENET) that is free on campus

```
<CTAN> → http://ctan.mirror.ac.za  
<CTAN> → ftp://ctan.mirror.ac.za
```

Please download as much as possible from here, because of the fast connection and there are no internet costs involved if you are logged in inside the University system on campus.

**External connection:** If you are outside the Stellenbosch network you can use any of the other CTAN mirrors. The CTAN mirror multiplexor service

```
http://mirror.ctan.org/
```

will automatically redirect to a nearby, up-to-date, mirror.

## 1.2. T<sub>E</sub>XLive

T<sub>E</sub>XLive is an easy way to get up and running with the T<sub>E</sub>X document production system.

```
http://tug.org/texlive
```

It provides a comprehensive T<sub>E</sub>X system with binaries for most flavors of Unix, including GNU/Linux, and also Windows. It includes all the major T<sub>E</sub>X-related programs, macro packages, and fonts that are free software, including support for many languages around the world.

### Installation

- (a) Copy the basic `install-tl.zip` file from your selected CTAN mirror

```
<CTAN>/systems/texlive/tlnet/install-tl.zip
```

to a local directory on your hard drive, say

```
c:\installs\texlive
```

Unzip `install-tl.zip` in place.

```
c:\installs\texlive
├─ \install-tl-2015xxxx
│  └─ install-tl.bat
│     └─ install-tl-advanced.bat
│        └─ README
│           └─ ....
```

- (b) Open a command window at the location where the files `install-tl-advanced.bat` is located.

- Windows 7:  
Inside Windows explorer, on the selected directory,

```
Shift + right click → Open command window here
```

If you want to install for all users, you have to open the command window as Administrator.

- Windows XP:  
Install `CmdHerePowertoySetup.exe`.  
Inside Windows explorer, on the selected directory,  
right click → Open command window here

(c) Run the install script:

```
> install-tl-advanced -repository <CTAN>/systems/texlive/tlnet/
```

Use the defaults except the following to save disk space

- Change language collections:
  - *Language Support*: US and UK English, Dutch, Other hyphens, French, German, Greek, ...
  - *Language docs*: English, Dutch, French, German, ...
- On Windows XP set for all users

### Updating

T<sub>E</sub>XLive can be updated directly with the T<sub>E</sub>XLive manager GUI, or with the command line:

```
> tlmgr update --all # update all packages
```

or

```
> tlmgr update --self --all # update infrastructure and all packages
```

Add "`--repository <CTAN>/systems/texlive/tlnet`" if you are updating from a different mirror than the one you installed from.

### 1.3. MikT<sub>E</sub>X

MikT<sub>E</sub>X is an up-to-date implementation of T<sub>E</sub>X and related programs for Windows.

```
http://www.miktex.org
```

#### Installation

(a) Make a local directory on your hard drive with the following structure, say

```
c:\installs\miktex
├── \setup
└── \tm\packages
```

(b) From the CTAN server copy the following to your local directory (keep the structure)

```
<CTAN>/systems/win32/miktex/setup/setup-2.9.xxxx.exe
<CTAN>/systems/win32/miktex/tm/packages/*.*
```

(c) Run `setup-2.9.xxxx.exe`,

- make full installation
- install to `c:\tex`

(d) After installation set packages repository to your local directory or the internet

```
Start → All Programs → MikTeX → Maintenance(Admin) → setup (admin)
[packages] → package repository → <CTAN>/systems/win32/miktex/tm/packages
```

#### Updates

For MikT<sub>E</sub>X updates on campus InetKey to be switched on for the update manager to find the relevant information. Run the update manager

```
Start → All Programs → MikTeX → Maintenance(Admin) → update (admin)
```

#### Additional software

There are many command line utilities available in MikT<sub>E</sub>X, but most of them need a Perl installation. Download ActivePerl and install

```
http://www.activestate.com/activeperl
```

NB: This is not necessary for T<sub>E</sub>XLive!

## 1.4. L<sup>A</sup>T<sub>E</sub>X information

For more information on L<sup>A</sup>T<sub>E</sub>X please visit:

```
http://latex-project.org
http://latex-project.org/guides
http://www.tug.org
http://www.tug.org/interest.html
http://www.ctan.org
```

Tutorials & wikis

```
http://www.ctan.org/pkg/lshort-english
http://en.wikibooks.org/wiki/LaTeX
http://www.andy-roberts.net/writing/latex
http://latex.silmaril.ie/formattinginformation
http://tug.org/tutorials/tugindia
http://csweb.ucc.ie/~dongen/LAF/LAF.html

https://www.overleaf.com/latex/learn/free-online-introduction-to-latex-part-1
https://www.overleaf.com/latex/learn/free-online-introduction-to-latex-part-2
https://www.overleaf.com/latex/learn/free-online-introduction-to-latex-part-3
```

Newsgroups

```
http://tex.stackexchange.com
http://groups.google.com/group/comp.text.tex
```

## 2. Utility software

### 2.1. $\text{\LaTeX}$ editors

You need an IDE to edit and compile tex documents. Download and install one of the following IDE's

- TeXMaker:

<http://www.xmlmath.net/texmaker> ..... (Recommended)

- TeXstudio:

<http://texstudio.sourceforge.net>

- TeXnicCenter:

<http://www.texniccenter.org>

- WinShell:

<http://www.winshell.org>

- TeXWorks:

Came installed with  $\text{\TeX}$ Live and  $\text{\MikTeX}$

### 2.2. JabRef bibliographic database

JabRef is an open source bibliography reference manager. The native file format used by JabRef is Bib $\text{\TeX}$ , the standard  $\text{\LaTeX}$  bibliography format. JabRef runs on the Java VM (version 1.6 or newer)

<http://jabref.sourceforge.net>

### 2.3. SumatraPDF

SumatraPDF is a free PDF reader for Windows and it works well together with  $\text{\LaTeX}$ .

- Do not lock PDF file (main drawback of Adobe Reader)
- Can use syntex to jump between source and PDF and can be used with most  $\text{\LaTeX}$  editors.

<http://blog.kowalczyk.info/software/sumatrapdf/free-pdf-reader.html>

### 2.4. Ghostscript and Ghostview

#### Programs

**Ghostscript** is an interpreter for the PostScript language, with the ability to convert PostScript language files to many raster formats, view them on displays, and print them on printers that don't have PostScript language capability built in.

<http://pages.cs.wisc.edu/~ghost>

Download Ghostscript 9.15 (GNU Public License) or newer version.

**Ghostview** is a graphical interface for Ghostscript

<http://pages.cs.wisc.edu/~ghost/gsview/index.htm>

Download GSview v5.0 or newer version

**Epstool** is a utility to create or extract preview images in EPS files, fix bounding boxes and convert to bitmaps.

<http://pages.cs.wisc.edu/~ghost/gsview/epstool.htm>

Download epstool 3.08 Windows zip file or newer version.

**pstoedit** translates PostScript and PDF graphics into other vector and bitmap formats. Note that ImageMagick can be used for some conversions (if it is installed).

```
http://www.pstoedit.net
http://sourceforge.net/projects/pstoedit/files
```

Download pstoedit 3.70 binary (pstoeditsetup\_win32.exe) or newer or 64bit version.

**Imagemagick** is a powerful program in its own right. It is a robust collection of tools and libraries which support reading, writing, and manipulating an image in over 88 major formats.

```
http://www.imagemagick.org
```

Download ImageMagick-6.9.0-9-Q16-x86-dll.exe or newer or 64bit version.

### Installation

- (a) Uninstall any previous versions of GSview and Ghostscript. Please use the uninstall utility in Control Panel.
- (b) Install Ghostscript by running the self-extracting archive file gs915w32.exe (or newer or 64bit version). Install in a user program directory, say c:\usr in the root directory, because many command line programs can not handle file names with spaces such as Program files.

```
e.g.: → c:\usr\gs
```

A directory c:\usr\gs\gs9.15 will be created with 9.15 the current version of Ghostscript.

- (c) Install GSview by running the self-extracting archive file gsv50w32.exe (or newer or 64bit version).

```
e.g.: → c:\usr\gs\Ghostgum
```

It will create the directories C:\usr\gs\Ghostgum\gsview and C:\usr\gs\Ghostgum\pstotext

- (d) Unzip epstool-3.08-win32.zip in a temporary directory. Copy epstool.exe and epstool.html to your GSview directory.
- (e) If you want to use pstoedit in combination with GSview, install pstoedit into the pstoedit directory that is in parallel to the gsview directory where gsview is installed.

```
e.g.: → C:\usr\gs\Ghostgum\pstoedit
```

Use PstoEdit from GsView's menu option.

```
Edit → "Convert to vector format"
```

If you want to use GraphicsMagick/ImageMagick together with pstoedit, mark the option during installation.

- (f) Install ImageMagick to you user program directory, say c:\usr

```
e.g.: → c:\usr\ImageMagick-6.9.0-9-Q16
```

with 6.9.0-9 the newest version. Because it is very much a command line utility, it appends the PATH variable with its path to the local binaries.

Remove the drvmagick.dll file from the pstoedit directory if you get a missing dll file error message

### Setup

- (a) Associate .ps files with GSview (run as administrator)

```
Options → Advance Configure → Associate .ps files with GSview
```

- (b) Some very useful programs needs the command line utilities of GhostScript, therefore add the following to your environment variables (as administrator):

```
GS_ROOT = c:\usr\gs\gs9.15
GS_PATH = %GS_ROOT%\bin;%GS_ROOT%\lib
```

Append the search path

```
PATH = .....;%GS_PATH%
```

Remember to change GS\_ROOT after an update.

**Danger: Never, ever corrupt or delete the PATH variable!!**

## 3. Graphic software

### 3.1. Graphics editors

#### 3.1.1. Inkscape

Inkscape is an Open Source vector graphics editor, with capabilities similar to Illustrator, CorelDraw, or Xara X, using the W3C standard Scalable Vector Graphics (SVG) file format. It supports many advanced SVG features (markers, clones, alpha blending, etc.) and great care is taken in designing a streamlined interface. It is very easy to edit nodes, perform complex path operations, trace bitmaps and much more.

Inkscape can export directly to EPS or PDF format that can be imported into L<sup>A</sup>T<sub>E</sub>X. For advanced users L<sup>A</sup>T<sub>E</sub>X text and formulas can be imbedded into Inkscape graphics.

<http://inkscape.org>

#### 3.1.2. Gimp

GIMP (GNU Image Manipulation Program) is a free and open source software image retouching and editing tool and is freely available in versions tailored for most popular operating systems including Microsoft Windows, Apple Mac OS X, and Linux.

GIMP has tools used for image retouching and editing, free-form drawing, resizing, cropping, photo-montages (combining multiple images), converting between different image formats, and more specialised tasks. Animated images such as GIF and MPEG files can be created using an animation plugin.

<http://www.gimp.org/>

#### 3.1.3. LibreOffice

LibreOffice Draw can export to EPS and PDF format. To remove white space around PostScript figures use the utilities inside GhostView and for PDF files use the command-line utility `pdfcrop`.

<http://www.libreoffice.org>

#### 3.1.4. Microsoft Office

MS Office 2007 can save any figure to PDF. Use the command-line utility `pdfcrop` to remove whitespace around figure

#### 3.1.5. Dia

Dia is roughly inspired by the commercial Windows program 'Visio', though more geared towards informal diagrams for casual use. It can be used to draw many different kinds of diagrams. It currently has special objects to help draw entity relationship diagrams, UML diagrams, flowcharts, network diagrams, and many other diagrams. It is also possible to add support for new shapes by writing simple XML files, using a subset of SVG to draw the shape.

It can export diagrams to a number of formats, including EPS, SVG, WMF and PNG, as well as L<sup>A</sup>T<sub>E</sub>X MetaPost, PGF, and PStricks formats. It can print diagrams, including ones that span multiple pages.

<https://live.gnome.org/Dia>

### 3.2. Programable graphics

#### 3.2.1. PGF/TikZ

TikZ is a package for L<sup>A</sup>T<sub>E</sub>X for drawing pictures. It is a frontend to the Portable Graphics Format (PGF) package. In TikZ, the user programs the picture with commands that draw element by element.

The advantage of TikZ over imported graphics is that it uses fonts and line widths consistent with the rest of the L<sup>A</sup>T<sub>E</sub>X document. In contrast, imported graphics usually embed their fonts and rescaling the graphic also rescales line widths. Also, TikZ pictures are easier to adjust since the commands are part of the document.

<https://www.ctan.org/pkg/pgf>

### 3.2.2. MetaPost

— To be completed

<http://www.tug.org/metapost.html>

### 3.2.3. PSTricks

PSTricks offers an extensive collection of macros for generating PostScript that is usable with most TeX macro formats. Included are macros for colour, graphics, pie charts, rotation, trees and overlays. It has many special features, including a wide variety of graphics (picture drawing) macros, with a flexible interface and with colour support. There are macros for colouring or shading the cells of tables.

<http://tug.org/PSTricks>

### 3.2.4. Asymptote

Asymptote is a powerful descriptive vector graphics language that provides a natural coordinate-based framework for technical drawing. Labels and equations are typeset with LaTeX, for high-quality PostScript output.

A major advantage of Asymptote over other graphics packages is that it is a programming language, as opposed to just a graphics program. Features of Asymptote are:

- provides a portable standard for typesetting mathematical figures, just as TeX/LaTeX has become the standard for typesetting equations;
- generates high-quality PostScript, PDF, SVG, or 3D PRC vector graphics;
- embeds 3D vector PRC graphics within PDF files;
- inspired by MetaPost, with a much cleaner, powerful C++-like programming syntax and IEEE floating-point numerics;
- runs on all major platforms (UNIX, MacOS, Microsoft Windows);
- mathematically oriented (e.g. rotation of vectors by complex multiplication);
- LaTeX typesetting of labels (for document consistency);
- uses simplex method and deferred drawing to solve overall size constraint issues between fixed-sized objects (labels and arrowheads) and objects that should scale with figure size;
- fully generalizes MetaPost path construction algorithms to three dimensions;
- compiles commands into virtual machine code for speed without sacrificing portability;
- high-level graphics commands are implemented in the Asymptote language itself, allowing them to be easily tailored to specific applications.

<http://asymptote.sourceforge.net>

## 3.3. Graphic tools

### 3.3.1. Graphics conversion software

— To be completed



## 4. Stellenbosch thesis bundle

The Stellenbosch thesis bundle is distributed with standard  $\TeX$ Live and Mik $\TeX$  systems and there is no need to install it separately if you have a full installation. All the package updates and error fixes can then be obtained with the normal system updates.

You can test if the Stellenbosch bundle is installed by searching for one of the style files with the  $\TeX$  command line utility:

```
> kpsewhich usthesis.sty
```

If it returns the path to `usthesis.sty` then the bundle is installed and  $\TeX$  can find it.

### 4.1. Packages and files

The Stellenbosch thesis bundle is provided to typeset reports, theses and dissertations that conform to the requirements of the Stellenbosch University.

#### Usthesis:

The Usthesis is primarily concerned with the formatting of report and thesis front matter such as the title page, abstract, etc. It also works together with the babel package to provide language options to typeset documents in Afrikaans or in English.

The class file `usthesis.cls` is based on the standard  $\LaTeX$  book class, while `usthesis.sty` is a style file to be loaded on top of the very powerful memoir class. Both options give identical output, but the benefit of using memoir is that it has many additional commands and environments for formatting and processing of a document.

#### USbib:

A Bib $\TeX$  package for the formatting of bibliographic references of theses. This package is tailored towards citations and bibliographical formatting for the natural sciences and engineering.

#### Ustitle:

A package that redefines the standard title page of the  $\LaTeX$  classes to add a logo at the top and an address line below the author. It is intended for use when writing general notes and articles.

#### USnomencl:

Simple utility to set a nomenclature or list of symbols.

#### USsummary:

Summary page required for the final year projects of the M&M Department.

#### USlogos:

A collection of Stellenbosch University crest and logos and Engineering logos.

#### Templates:

Two basic templates for a final year M&M project and a Masters thesis are provided.

### 4.2. Documentation

The documentation of the Stellenbosch thesis bundle can be found at

```
http://www.ctan.org/pkg/stellenbosch
```

If you have full  $\LaTeX$  installation then the documentation can be obtained with the command line utility

```
> texdoc -l stellenbosch
```

### 4.3. Local installation

If for one or other reason you do not have a full  $\LaTeX$  installation and need to install the Stellenbosch thesis bundle on your machine, you can download the full package from CTAN:

```
http://mirror.ctan.org/install/macros/latex/contrib/stellenbosch.tds.zip
```

Note that all the files needed to be installed in the correct directory structure so that the T<sub>E</sub>X search engines can find them. The files can be installed in the "TEXMFHOME" directory for the current user or "TEXMFLOCAL" directory for all the users. These directories are created when your T<sub>E</sub>X system is installed and can be found by running the command line utility:

```
> kpsewhich -var-value TEXMFHOME
```

```
> kpsewhich -var-value TEXMFLOCAL
```

Unzip `stellenbosch.tds.zip` to the selected directory and make sure that the unzipped directory structure stays intact. The files must be in the structure as indicated below with `(my-texmf)` the TEXMFHOME or TEXMFLOCAL directory:



The final step is to update the T<sub>E</sub>X file name database so that all the files can be found by the search engines. Run the following command line utility (it may take a while):

```
> mktexlsr
```

or

```
> texhash
```

Finally to see if your the bundle is installed correctly, compile one of the provided templates.