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## How to use the `ubonn-letter` document class for (Xe/Lua/PDF)LaTeX

March 7, 2024

Dear Professor Smith,

This letter was compiled with **LuaLaTeX**:

This is LuaHBTeX, Version 1.17.0 (TeX Live 2023) (format version: 2023-11-01).

The options used during the compilation were:

- ✗ 9pt
- ✓ 10pt
- ✗ 11pt
- ✗ ngerman
- ✗ UKenglish
- ✓ USenglish
- ✗ justified
- ✗ looserlinespacing
- ✗ nameinmargin
- ✗ serifmath
- ✗ seriffont
- ✗ bank
- ✗ wir
- ✗ cmyk
- ✓ mathtools
- ✓ siunitx
- ✓ hep-packages
- ✗ showframe
- ✗ showbaselinegrid
- ✗ showgrid

The `biblatex` option is set to: `alphanumeric`.

### Typefaces according to the University of Bonn style guide

To typeset letters based on this template that are completely in line with the University of Bonn style guide, you can use **XeLaTeX** or **LuaLaTeX** for compiling the `.tex` document. The following fonts should be available on your computer:

- the **Calibri** sans-serif font,
- the **Cambria** and **Cambria Math** serif fonts, and
- the **Consolas** monospaced font

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If you do not have these fonts or if you want to use **PDFLaTeX**, you can use fallback fonts – see below under “Font selection and substitution”.

The three typefaces come bundled with Microsoft Windows and are automatically installed system-wide on Windows (in *C:\Windows\Fonts*). They need to be manually installed on macOS and Linux computers. For legal use, you need to own a Microsoft Office or Windows license. (If you use Microsoft Office for Mac, you’ll find the fonts, for instance, in */Applications/Microsoft Word.app/Contents/Resources/DFonts/*).

### Immediate use (files available locally)

For immediate use, the class file *ubonn-letter.cls* and the logo files *UNI\_Bonn\_Logo\_Standard\_RZ.pdf* and the PDF files of the logos have to be placed in the same folder as the *.tex* file, or you have to adjust the macro `\input@path` according to their location.

### User-wide installation for repeated use

To make the *ubonn-letter.cls* document class and the logo files available to (Xe/Lua)LaTeX no matter in which directory your *.tex* file is placed, please perform the following steps.

#### Step 1: Navigate to your “local texmf” folder

The location of your “local”—that is, user-specific—*texmf* (“TeX and Metafont”) folder depends on your TeX distribution and operating system. The locations are as follows:

**MiKTeX (Windows):**      `%UserProfile%\AppData\Roaming\MiKTeX\`.  
`%UserProfile%` usually expands to `C:\Users\YourUserName`. Unfortunately, the *AppData* folder is hidden. However, you can access it by entering `%UserProfile%\AppData\Roaming\MiKTeX` in the Address Bar of Windows Explorer.

**MacTeX (macOS):**      `~/Library/texmf/`.  
 Create this folder if it does not exist yet. Unfortunately, the `~/Library` folder is hidden in the Finder by default. You can un-hide it, however. Alternatively, access it by selecting “Go” > “Go to folder...” from the menu bar in Finder and by entering `~/Library` in the address field that appears.

**TeX Live (Linux):**      `~/texmf/`.  
 Create this folder if it does not exist yet.

#### Step 2: Create the necessary subfolder(s)

Create a folder *tex* in the “local texmf” directory (if it doesn’t exist yet). Then create a subfolder *latex* in the *tex* folder (if it doesn’t exist yet). That is, the complete paths will be

- `%UserProfile%\AppData\Roaming\MiKTeX\tex\latex` for MiKTeX on Windows;
- `~/Library/texmf/tex/latex` on a Mac;
- `~/texmf/tex/latex` on Linux.

If you prefer not to install the Microsoft fonts system-wide, you also need to create a folder *fonts* with a subfolder *truetype* in the “local texmf” folder (i.e. `~/Library/texmf/fonts/truetype` for macOS and `~/texmf/fonts/truetype` on Linux).

Please note that this directory structure cannot be simplified because it has to correspond to

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the “TeX Directory Structure” (TDS), see <https://tex.stackexchange.com/a/58468/156280>.

#### Step 3: Copy the files related to this letter template to the “local texmf” location

Copy the folder *ubonn-letter*, including all its contents, to the *latex* folder that you created (or located) in Step 2. That is, the complete paths will be

- `%UserProfile%\AppData\Roaming\MiKTeX\tex\latex\ubonn-letter` for MiKTeX on Windows;
- `~/Library/texmf/tex/latex/ubonn-letter` for macOS;
- `~/texmf/tex/latex/ubonn-letter` on Linux.

If desired, also copy all *.ttf* and *.ttc* files related to the Microsoft fonts to the *truetype* folder (or a subfolder thereof) created/located in Step 2.

#### Step 4: Refresh your “filename database”

For TeX to find the newly added files, you may have to update TeX’s “filename database.” This applies primarily to MiKTeX on Windows:

**MiKTeX (Windows):** Open the MiKTeX Console from the Windows Start menu, that is *Start > Programs/All apps > MiKTeX > MiKTeX Console > Stay in user mode > Tasks* [in the menu bar] *> Refresh file name database*. Alternatively, use the command line: `initexmf -update-fndb`.

**MacTeX (macOS):** Open the Terminal and execute `texhash ~/Library/texmf`.

**TeX Live (Linux):** Open a terminal and execute `texhash ~/texmf`.

#### Language selection

The document’s language(s) can be specified as a class option, that is, via

```
\documentclass[Language, ...]{ubonn-letter}.
```

To do so, replace *Language* by `ngerman`, `UKenglish` and/or `USenglish`. The language mentioned last becomes the active language. Depending on the active language, the relevant elements of the letterhead are switched to German or English.

#### Font selection and substitution

As already mentioned, typesetting this document in line with the University of Bonn style guide—that is, using the **Calibri** font—requires the use of **XeLaTeX** or **LuaLaTeX**.

- The class has been programmed such that if you compile this document using **PDFLaTeX** instead of XeLaTeX, it will use **fallback fonts**.
- When using XeLaTeX, the class instructs the compiler to attempt to first load the Microsoft fonts mentioned above. If these fonts are available neither globally nor locally, XeLaTeX will attempt to use the same fallback fonts as PDFLaTeX.
- The fallback text font is “**Fira Sans**” (via the `FiraSans` package); the fallback monospaced font is “**Fira Mono**” (via the `FiraMono` package); and the fallback math font is “**Fira Math**” (via the `firamath-otf` package) or “**Arev**” (via the `arev` package).

Some users may prefer to use a serif font for mathematical typesetting, in particular, because some letters like uppercase *l* and lowercase *l* are hard to distinguish with sans-serif typefaces. To accommodate such a preference, this class offers the options `serifmath` (for typesetting all

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math in a serif font) and serif font (for typesetting the entire body text in a serif font). Please be aware that this goes against the University's style guide.

The serif (math) font is Cambria (Math), if available, for XeLaTeX/LuaLaTeX. The fallback serif font is Utopia, loaded via the [erewhon](#) package, in combination with the [Erewhon-Math](#) math font (XeLaTeX/LuaLaTeX) or the [newtxmath](#) package with the erewhon option (PDFLaTeX). For TeX Live 2019 and earlier it is also necessary to install the `ly1` package.

### Font size: 10 pt by default

The layout of the letter template is based on a grid of 4 mm × 4 mm, according to the [University of Bonn style guide](#). As a consequence, the baseline grid recommended by the style guide is 4 mm, resulting in 55 lines of text per page.

This recommendation goes along with a recommended font size of 9 pt. A 9 pt font size is, however, considered too small by many readers. Consequently, the [Word templates](#) that can be downloaded from the university's Confluence pages use a font size of 10 pt, and the [guidelines for correspondence](#) also mention a font size of 10 pt in combination with 4 mm (11.35 pt) line spacing. Based on the recommendation from the correspondence guidelines, the **default font size for this document class is 10 pt** (with 4 mm line spacing). Font sizes of 9 pt (with 4 mm line spacing) and 11pt (with 5 mm line spacing, i.e. 44 lines of text) can also be selected.

For mathematics-heavy text—in particular, in the presence of numerous superscripts and subscripts—increasing the line spacing may be desired. This can be achieved with the `looserlinespacing` option. Activating the option increases the line spacing to 4.4 mm (50 lines of text) for the 10 pt font size and to 5.5 mm (40 lines of text) for the 11 pt font size. These values can be set as class options, for instance,

```
\documentclass[USenglish, 11pt]{ubonn-letter}
```

or

```
\documentclass[USenglish, 11pt, looserlinespacing]{ubonn-letter}.
```

### Typographic recommendations

Following the University's style guide, paragraphs are separated by vertical white space of exactly one line of text. As usual in LaTeX, a new paragraph is started by including a blank line in the source code.

As recommended for letters by many typographers and by the University's style guide (see Section 4.4.1, p. 17), the body text is not horizontally justified—instead, it is typeset **ragged right**. If you prefer justified body text regardless of the University's guidelines, you can achieve this via the `justified` class option.

According to the style guide, **in-text highlighting** should be done via **bold type**, while quotations should be typeset *in italics*.

### Citations

Citations are enabled via the [BibLaTeX](#) package. BibTeX cannot be used in conjunction with the `scrlltr2` "letter" class because the class does not provide the necessary bibliography-related environments. BibLaTeX is loaded with the [Biber](#) back end. Different citation styles are available and can be set using the `biblatex` option: `chicago`, `aea` or `aer` assume that the `chicago-bilatex` style is there. This is installed with the `'biblatex-chicago'` package and follows the

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`citation style` of the *Chicago Manual of Style*. `numeric-comp` uses the ‘`numeric-comp`’ style; `alphanumeric` uses the alphabetic sorting of bibliography.

To test things, let’s cite a couple of publications, first a book and a working paper: [Luc59; Lai+18]. Let’s also cite a journal article and a book chapter [Sim03; Del18].

## Other features

Most other LaTeX features—citations, cross-references, tables, and the like—are usable, too. However, the `table` environment is undefined in the `scr1ttr2` class—so `tabular` has to be used on its own to generate tables, as in the following example:

	(1)	(2)
Row 1	Some text	Some more
Row 2	in a table.	text here.

Itemized lists and numbered lists are adapted to the university style:

- First itemtext
    - First itemtext
      - \* First itemtext
      - \* Second itemtext
      - \* Last itemtext
    - First itemtext
    - Second itemtext
  - Last itemtext
  - First itemtext
1. First itemtext
    - a) First itemtext
      - i. First itemtext
      - ii. Second itemtext
      - iii. Last itemtext
    - b) First itemtext
    - c) Second itemtext
  2. Last itemtext
  3. First itemtext

## Packages and compatibility

This document class has been tested extensively with MacTeX 2022 and 2023 and with an up-to-date MiKTeX installation (as of June 17, 2023) on Windows. We worked hard to ensure compatibility with T<sub>E</sub>X distributions from previous years. In these older distributions, some of the packages used by the class were not yet available or missing some features. We included work-arounds to compensate for the reduced functionality, but the compiled PDF file may look slightly different (in particular with respect to fonts and Greek characters). T<sub>E</sub>X distribution versions earlier than 2017 may have compilation problems, depending on the compiler and the options used.

The following packages are included in the class:

- `kvoptions`, `ifthen`, `iftex`, `xpatch`, `xparse`
- `geometry`, `catchfile`

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- babel, csquotes
- graphicx, picture
- calc, amssymb, enumitem
- hyperref
- xcolor, relsize, microtype
- tikz

LuaLaTeX and XeLaTeX use the unicode-math package to set up the fonts. XeLaTeX also includes xunicode.

If you use PDFLaTeX the following extra packages can be included (the details depend on the TeX Live version you are using):

- inputenc, fontenc
- erewhon, newtxtext, newtxmath
- FiraSans, FiraMono
- bm, mathastext
- textcase

The justified options adds the ragged2e package. The UKenglish language adds the isodate package. If you use a serif font, you may have to install the xits package. Other packages can be added in your document preamble as usual.

In order to use PDFLaTeX with a fairly basic TeX Live installation the following extra packages had to be installed:

- fira, arev, cbfonts, mathdesign, erewhon.

For older versions one needs in addition:

**2019** ly1  
**2018** ly1, mweights  
**2017** ly1, mweights  
**2016** ly1, greek-fontenc, mweights  
**2015** ly1, greek-fontenc, cyrillic, mweights

Compilation will not work for TeX Live 2014 and earlier, as the FiraMono package was not available then.

**Please let us know if you encounter any issues!**

### Checking the functionality of the template

The rest of this document can be used to check that all features of the class work with your installation.

Check the available different styles (`\emph`):

- `\textrm`, `\mathrm`, `\mathup`
- `\textsf`, `\mathsf`
- `\textit`, `\mathit`
- `\textbf`, `\mathbf`, `\mathbfup`
- `\texttt`, `\mathtt`
- `\sffamily\TEXTSC\textit\textbf\textbf{\textit}`
- `\rmfamily\TEXTSC\textit\textbf\textbf{\textit}`

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We can try an equation or two to check fonts etc.

$$E = m c^2 \quad (1)$$

$$\sin \theta = -\frac{d}{dx} \cos \theta \quad (2)$$

$$\int_0^{2\pi} \sin x \, dx = 0 \quad (3)$$

$$\Delta R = \sqrt{\Delta \eta^2 + \Delta \phi^2} \quad (4)$$

$$\alpha + \beta + \theta \rightarrow \mu + \nu + \varepsilon + \Gamma + \Xi + \Psi + \Theta + \Phi \quad (5)$$

$$\rightarrow \mu + \alpha \alpha + \gamma \gamma + \nu \nu + \theta \theta + \psi \psi + \varepsilon \varepsilon \quad (6)$$

$$\Delta R = \left\{ \left( \sqrt{\Delta \eta^2 + \Delta \phi^2} \right)^{1/3} \right\} \quad (7)$$

We can check a few language capabilities that are offered by the csquotes and siunitx packages.

In US English:

- “This text should be in quotes.”
- If I cycle up 200 m, I have to cycle down 0.2 km.
- Water boils at 100 °C, which is 373.15 K.

Auf Deutsch:

- „Dieser Text sollte in Anführungszeichen stehen.“
- Wenn ich bergauf 200 m fahre, muss ich 0,2 km herunterfahren.
- Wasser kocht bei 100 °C, das entspricht 373,15 K.

■ Uni blue with name UBNblue.

■ Uni yellow with name UBNyellow.

■ Uni grey with name UBNgrey.

The equation  $E = mc^2$  is well known and good to test inline math.

Of course, you can include mathematical formulas. It might be that  $\bar{U}^r = x^*$ , but it might also be that  $\bar{U}^r \neq x^*$ . Here,  $x^* := \sup_{\bar{x}} \{-\bar{x}^2 - 5.47 \bar{x} y + \xi y\}$  with  $y > 0$ . However, almost surely,  $\hat{W}^e R > \bar{x}$ , where  $\bar{x} := \frac{1}{l} \sum_{i=1}^l x_i = \frac{1}{L} \sum_{l=1}^L x_l = \frac{1}{L} \sum_{\ell=1}^L x_\ell$ . Do you think that  $x_\phi > x_\phi$ ? Or maybe

$$f(z) = -z^2 + c \quad \Rightarrow \quad f'(z) = -2z \quad \Rightarrow \quad f''(z) = -2$$

and

$$E_\sigma[X^2; \mu] := \int_{-\infty}^{\infty} x^2 f_\sigma(x; \mu) \, dx \geq \left\{ \int_{-\infty}^{\infty} x f_\sigma(x; \mu) \, dx \right\}^2 = \{E_\sigma[X; \mu]\}^2.$$

What about

$$E_\sigma[X^2; \mu] := \int_{-\infty}^{\infty} x^2 f_\sigma(x; \mu) \, dx \geq \left\{ \int_{-\infty}^{\infty} x f_\sigma(x; \mu) \, dx \right\}^2 = \{E_\sigma[X; \mu]\}^2?$$

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Let's test different math series—*standard (italic)*, upright, **bold (italic)**, and **bold upright**:

Default : 123123alℓuvxyITYY, *mathup* : 123123alℓuvxyITYY, **bm** : **123123alℓuvxyITYY**, *mathbfup* : **123123alℓuvxyITYY**,

Default : αβγδεεζηθθικκλμνξοππρρσςτυφφχψωφ,

*mathit* : αβγδεεζηθθικκλμνξοππρρσςτυφφχψωφ, *mathup* : αβγδεεζηθθικκλμνξοππρρσςτυφφχψωφ,

**bm** : **αβγδεεζηθθικκλμνξοππρρσςτυφφχψωφ**, *mathbfup* : **αβγδεεζηθθικκλμνξοππρρσςτυφφχψωφ**,

Default : ΓΔΘΘΛΞΠΣΥΦΨΩΦ,

*mathit* : ΓΔΘΘΛΞΠΣΥΦΨΩΦ, *mathup* : ΓΔΘΘΛΞΠΣΥΦΨΩΦ,

**bm** : **ΓΔΘΘΛΞΠΣΥΦΨΩΦ**, *mathbfup* : **ΓΔΘΘΛΞΠΣΥΦΨΩΦ**.

Math versions:

<b>Default</b>	0123456789 + aℓ × E[uv] − xy ÷ ∂l = βΓ;
<code>\mathversion{normal}</code>	0123456789 + aℓ × E[uv] − xy ÷ ∂l = βΓ;
<code>\mathversion{bold}</code>	<b>0123456789 + aℓ × E[uv] − xy ÷ ∂l = βΓ;</b>
<code>\mathversion{normal}</code>	0123456789 + aℓ × E[uv] − xy ÷ ∂l = βΓ;
<code>\mathbf{...}</code>	<b>0123456789 + aℓ × E[uv] − xy ÷ ∂l = βΓ.</b>

Text/math figures: 112233. Text/math figures: 112233. Text/math figures: 112233.

HEP names regular (math):  $\bar{B}_d^0, \ell^+, \mu^\mp, \chi_{c2}(1P), \Sigma(2030) F_{17}, \Omega(2250)^-, \bar{c}, \bar{\chi}_2^0, \rho^0, \Upsilon(1S), \Upsilon(2S)$

HEP names italic:  $\bar{B}_d^0, \ell^+, \mu^\mp, \chi_{c2}(1P), \Sigma(2030) F_{17}, \Omega(2250)^-, \bar{c}, \bar{\chi}_2^0, \rho^0, \Upsilon(1S), \Upsilon(2S)$

HEP names bold:  **$\bar{B}_d^0, \ell^+, \mu^\mp, \chi_{c2}(1P), \Sigma(2030) F_{17}, \Omega(2250)^-, \bar{c}, \bar{\chi}_2^0, \rho^0, \Upsilon(1S), \Upsilon(2S)$**

HEP names bold italic:  ***$\bar{B}_d^0, \ell^+, \mu^\mp, \chi_{c2}(1P), \Sigma(2030) F_{17}, \Omega(2250)^-, \bar{c}, \bar{\chi}_2^0, \rho^0, \Upsilon(1S), \Upsilon(2S)$***

Greek and bold in a formula:

$$\Sigma := \text{Cov}[\epsilon] = \begin{bmatrix} 1.90 & 0 \\ 0 & 0.67 \end{bmatrix}.$$

References

[Del18] S. DellaVigna. "Structural Behavioral Economics." In: *Handbook of Behavioral Economics: Foundations and Applications*. Ed. by B. D. Bernheim, S. DellaVigna, and D. Laibson. Vol. 1. Elsevier B.V., 2018. Chap. 7, pp. 613–723. doi: [10.1016/bs.hesbe.2018.07.005](https://doi.org/10.1016/bs.hesbe.2018.07.005).

[Lai+18] D. Laibson et al. *Estimating Discount Functions with Consumption Choices over the Lifecycle*. working paper. Cambridge, MA, USA, et al.: Harvard University et al., Sept. 2018. URL: <https://www.dropbox.com/s/khoyt5hz9ci1qfy/Estimating%20Discount%20Functions.pdf?dl=0>.

[Luc59] R. D. Luce. *Individual Choice Behavior: A Theoretical Analysis*. New York, NY, USA: John Wiley & Sons, 1959.

[Sim03] C. A. Sims. "Implications of rational inattention." In: *Journal of Monetary Economics* 50.3 (2003), pp. 665–690. doi: [10.1016/S0304-3932\(03\)00029-1](https://doi.org/10.1016/S0304-3932(03)00029-1).

Yours sincerely,

Anna Schmidt