

# The hagenberg-thesis Package

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## Abstract

The `hagenberg-thesis` package is a collection of modern LaTeX templates for university theses (bachelor, master or diploma programs) and related documents. This manual describes the main features of this package. Pre-configured document templates for English and German manuscripts and a complete tutorial are available on the package's home repository.

## 1 Introduction

The complete source of this package and auxiliary materials are available on CTAN<sup>1</sup> and its development repository.<sup>2</sup> The package is made available under the terms of the Creative Commons Attribution 4.0 International Public License.<sup>3</sup>

## 2 Document classes

The `hgb` package provides the following document classes, which are based on the standard LaTeX classes `book`, `report` and `article`, respectively:

- `hgbthesis` (`book`): for Bachelor, Master and Diploma theses;
- `hgbreport` (`report`): for project and term reports;
- `hgbarticle` (`article`): for drafting journal articles.

### 2.1 Class options

The above document classes accept the following options:

- `hgbthesis`: `master`, `diploma`, `bachelor`, `praktikum`, `internship`, `english`, `german`;
- `hgbreport`: `notitlepage`, `english`, `german`;

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<sup>1</sup><https://ctan.org/pkg/hagenberg-thesis>

<sup>2</sup><https://github.com/Digital-Media/HagenbergThesis>

<sup>3</sup><https://creativecommons.org/licenses/by/4.0/legalcode>

- **hgbarticle**: twocolumn, english, german.

For example, to start a Master thesis in German one would simply simply place

```
\documentclass[master,german]{hgbthesis}
```

at the beginning of the document.

## 2.2 Thesis parameters (class hgbthesis)

**hgbthesis** supports several types of thesis documents. The following parameters must be specified for *all* types:

- `\title{...}`,
- `\author{...}`,
- `\programname{...}`,
- `\placeofstudy{...}`,
- `\dateofsubmission{yyyy}{mm}{dd}`.

A *Bachelor* thesis requires the following, additional items (not relevant for Diploma and Master theses):

- `\thesisnumber{...}`,
- `\coursetitle{...}`,
- `\semester{...}`,
- `\advisor{...}`.

## 3 Style files and user commands

The package comes with a set of style (**\*.sty**) files that can be used independently of the document classes listed above: **hgb.sty**, **hgbabbrev.sty**, **hgbbib.sty**, **hgbheadings.sty**, **hgblistings.sty**, **hgbmath.sty**.

### 3.1 General user commands (hgb.sty)

- **\hgbDate**: Outputs the package version date, e.g., “2018/11/04”.
- **\calibrationbox**: Inserts a test box for checking the final print size.

### 3.2 Text commands (hgbabbrev.sty)

Special characters:

- **\bs**: Inserts a backslash character (short for `\textbackslash`).
- **\obnh**: Inserts an optional break with no hyphen (e.g., `PlugIn{\obnh}Filter`).

German abbreviations:

- **\bzgl**: bzgl.
- **\bzw**: bzw.
- **\ca**: ca.

- `\dah`: d. h.
- `\Dah`: D. h.
- `\ds`: d. sind
- `\etc`: etc.
- `\evtl`: evtl.
- `\ia`: i. Allg.
- `\sa`: s. auch
- `\so`: s. oben
- `\su`: s. unten
- `\ua`: u. a.
- `\Ua`: U. a.
- `\uae`: u. Ä.
- `\usw`: usw.
- `\uva`: u. v. a.
- `\uvm`: u. v. m.
- `\va`: vor allem
- `\vgl`: vgl.
- `\zB`: z. B.
- `\ZB`: Zum Beispiel

English abbreviations:

- `\ie`: i.e.
- `\eg`: e.g.
- `\etc`: etc.
- `\Eg`: E.g.
- `\wrt`: w.r.t.

### 3.3 Bibliography commands (`hgbbib.sty`)

- `\AddBibFile`: A wrapper to biblatex’s `\addbibresource` macro (for backward compatibility only).
- `\MakeBibliography[options]`: Inserts the reference section or chapter. By default, references are automatically split into category subsections.<sup>4</sup> Use the option `nosplit` to produce a traditional (i.e., contiguous) list of references.
- `\citenobr{keys}`: Analogous to the standard `\cite{keys}` command, but inserts no “backref” page numbers in the bibliography.

### 3.4 Code environments (`hgblistings.sty`)

The following types of code environments are defined:

- `CCode`: for C (ANSI),

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<sup>4</sup>Predefined reference categories are `literature`, `avmedia`, `online` and `software`.

- **CppCode**: for C++ (ISO),
- **CsCode**: for C#,
- **CssCode**: for CSS,
- **GenericCode**: for generic code,
- **HtmlCode**: for HTML,
- **JavaCode**: for Java,
- **JsCode**: for JavaScript,
- **LaTeXCode**: for LaTeX,
- **ObjCCode**: for ObjectiveC,
- **PhpCode**: for PHP,
- **Swift**: for Swift,
- **XmlCode**: for XML.

`hgblistings` is based on the `listingsutf8`<sup>5</sup> package, thus any valid `listings`<sup>6</sup> option may be used; for example, the option `numbers=none` to suppress line numbers:

```
\begin{JavaCode}[numbers=none]
... // Java code comes here
\end{JavaCode}
```

### 3.5 Mathematical commands (`hgbmath.sty`)

`hgbmath` requires (and automatically loads) the `amsmath`<sup>7</sup> package, thus all commands and symbols of `amsmath` are available by default. The following *additional* commands can only be used in math mode:

- **\Cpx**:  $\mathbb{C}$  (complex numbers),
- **\N**:  $\mathbb{N}$  (natural numbers),
- **\R**:  $\mathbb{R}$  (real numbers),
- **\Q**:  $\mathbb{Q}$  (rational numbers),
- **\Z**:  $\mathbb{Z}$  (integer numbers).

### 3.6 Algorithms (`hgbalgo.sty`)

`hgbalgo` is a stand-alone package that is based on – and extends – the `algorithmicx` and `algpseudocode` packages.<sup>8</sup> It fixes some (mostly indentation-related) problems, adds color and provides some additional commands. It also loads the `algorithm`<sup>9</sup> package which defines a compatible float container for algorithms: `\begin{algorithm} ... \end{algorithm}`.

<sup>5</sup><https://ctan.org/pkg/listingsutf8>

<sup>6</sup><https://ctan.org/pkg/listings>

<sup>7</sup><https://ctan.org/pkg/amsmath>

<sup>8</sup><https://ctan.org/pkg/algorithmicx>

<sup>9</sup><https://ctan.org/pkg/algorithms>

Additional user commands:

- `\StateL{<text>}`: Creates a *numbered* statement like `algorithmicx`'s `\State` command but provides consistent indentation on multi-line statements. Note that the statement `<text>` must be passed as a single argument in `{...}` brackets.
- `\StateNN[<nesting>]{<text>}`: Creates a *non-numbered* statement like `algorithmicx`'s `\State` command but provides consistent indentation inside nested constructs and over multiple lines. The optional integer argument `<nesting>` can be used to specify the *nesting depth* to compensate for a bug in `algorithmicx` (the nesting level inside a block is not set properly before the first `\State`). Omitting the optional argument should give correct indentation in most cases.
- `\Input{<text>}`: For describing the input parameters in a procedure's preamble.
- `\Output{<text>}`: For describing the output values in a procedure's preamble.
- `\Returns{<text>}`: For describing the return values in a procedure's preamble.

Defined algorithm colors:

`AlgKeywordColor` (for algorithm keywords),  
`AlgProcedureColor` (for procedure and function names),  
`AlgCommentColor` (for comments).

The above colors can be redefined at any time (see the `xcolor`<sup>10</sup> package), e.g., by

```
\definecolor{AlgKeywordColor}{named}{black}
\definecolor{AlgProcedureColor}{rgb}{0.0, 0.5, 0.0}    % dark green
```

## 4 Package dependencies

The `hagenberg-thesis` package builds on the following LaTeX packages:

`abstract`, `algorithm`, `algorithmicx`, `algpseudocode`, `amssbsy`, `amsfonts`, `amsmath`, `amssymb`, `babel`, `biblatex`, `breakurl`, `caption`, `cmap`, `csquotes`, `datetime`, `enumitem`, `epstopdf`, `eurosym`, `exscale`, `fancyhdr`, `float`, `fontenc`, `geometry`, `graphicx`, `hycap`, `hyperref`, `ifpdf`, `ifthen`, `inputenc`, `listingsutf8`, `lmodern`, `moreverb`, `overpic`, `pdfpages`, `pict2e`, `subdepth`, `titlesec`, `titling`, `tocbasic`, `url`, `upquote`, `verbatim`, `xcolor`, `xifthen`, `xspace`.

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<sup>10</sup><https://ctan.org/pkg/xcolor>