

EXTREMELY LONG AND COMPLICATED TITLE OF
AN EXCELLENT THESIS PAPER (WRITTEN IN L^AT_EX)

ITIS RESEARCH PROJECT REPORT

presented by

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ES-P004

Luis Alberto Meza Ruiz: *Extremely Long and Complicated Title of an Excellent Thesis Paper (written in L^AT_EX)*

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STATUTORY DECLARATION

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Ich erkläre mich zudem mit der öffentlichen Bereitstellung meines ITIS Research Project Report in der Instituts- und/oder Universitätsbibliothek einverstanden.

Clausthal-Zellerfeld, 31 December 2016

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Luis Alberto Meza Ruiz

ABSTRACT

Short summary of the contents in English...

A great guide by Kent Beck how to write good abstracts can be found at:

<https://plg.uwaterloo.ca/~migod/research/beck00PSLA.html>

It is particularly important to only use the language that has been specified in its surrounding otherlanguage block to cater to proper hyphenation.

ZUSAMMENFASSUNG

Hier eine kurze Zusammenfassung des Inhaltes in deutscher Sprache... Sollten Sie die Thesis auf Englisch schreiben, ist dennoch eine deutsche Zusammenfassung notwendig. Im umgekehrten Fall kann die englische Zusammenfassung durch Auskommentieren weggelassen werden.

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ACRONYMS

UML Unified Modeling Language

LISTE DER NOCH ZU ERLEDIGENDEN PUNKTE

Textblock entfernen, falls keine Bereitstellung erfolgen darf. . . iii

INTRODUCTION

This bundle for L^AT_EX has two goals:

1. Provide students with an easy-to-use template for their Bachelor's or Master's (or even Ph.D.) thesis.
2. Provide a classic, high-quality typographic style that is inspired by "*The Elements of Typographic Style*" [3].

This package supports acronyms (like Unified Modeling Language (UML)) which are defined in `Contents.tex`. On the second use of the acronym (i.e., UML again), it will be replaced by the short form. If you deliberately need it spelled out, use Unified Modeling Language or Unified Modeling Language (UML), respectively.

Starting from the second paragraph in a section/chapter, paragraphs are always indented. You can avoid this by prefixed them with the `\noindent` keyword. If you want all paragraphs to be indented, configure this in `thesis-config.tex`.

If you like the style then its author would appreciate a postcard:

André Miede
Detmolder Straße 32
31737 Rinteln
Germany

You can itemize lists like this:

- *For example* and *that is* are prefixed and suffixed by a comma, i.e., like this.
- Of course this does not apply when starting a sentence. E.g., this is a valid sentence, too.

1.1 STRUKTUR DER ARBEIT

Diese Arbeit ist wie folgt strukturiert. In [Chapter 1](#) gibt es eine Einleitung. In [Chapter 2](#) eine Anleitung zu *Getting started*. Folgend in [Chapter 3](#) ein paar mathematische Beispiele. Eine Zusammenfassung mit Ausblick findet sich in [Chapter 4](#).

GETTING STARTED

As follows, some rules by the authors of `classicthesis`.

2.1 STYLE RECOMMENDATIONS

- No bold fonts are used. Italics or spaced small caps do the job quite well. To use them, enclose your text in `\emph{xyz}` or `\spacedlowsmallcaps{text}` or `\spacedallcaps{abc}`.
- The tables intentionally do not use vertical or double rules. See the documentation for the `booktabs` package for a nice discussion of this topic.¹ A sample table is shown in Table 2.1 on page 4.

Graphics files can be easily included like the one shown in Figure 2.1.



Figure 2.1: Seal of TU Clausthal

2.2 ORGANIZATION

A very important factor for successful thesis writing is the organization of the material. This version modified for use at TU Clausthal suggests a structure as follows:

- `sections/` is where all the “real” content goes in separate files. Naming is free; you can either enumerate them, such as `section01.tex`, or give your sections descriptive names like `introduction.tex`. In order to include a new section in the document, it must be

¹ To be found online at <http://mirror.ctan.org/macros/latex/contrib/booktabs/>.

Table 2.1: Tolle Tabelle. Sie hat keine Unter-, sondern eine Überschrift!

JAHR	MONAT	TAG	EREIGNIS
2016	Juni	1	Erstellung dieser Formatvorlage

added in the main matter part of `TUCthesis.tex` by including it (see existing include commands for other sections for reference).

- `FrontBackMatter/` is where all the stuff goes that surrounds the “real” content, such as the acknowledgments, cover page layout, etc.
- `gfx/` is where you put all the graphics you use in the thesis. Maybe they should be organized into subfolders depending on the chapter they are used in, if you have a lot of graphics.
- `Bibliography.bib`: the Bib_T_EX database to organize all the references you might want to cite.
- `classicthesis.sty`: the style definition to get this awesome look and feel.
- `TUCthesis.tex`: the main file of your thesis where all gets bundled together.
- `thesis-config.tex`: a central place to load all nifty packages that are used. You also adjust the title of your thesis, your name, and all similar information here.

2.3 CODE LISTINGS

Listing 2.1: Beispielcode

```

1 int j=1;
2 for (int i=1; i<24; i++) {
3     j = j * i;
4 }

```

The code is shown in [Listing 2.1](#)

Ei choro aeterno antiopam mea, labitur bonorum pri no. His no decore nemore graecis. In eos meis nominavi, liber soluta vim cu. Sea commune suavitate interpretaris eu, vix eu libris efficiantur.

3.1 SOME FORMULAS

Due to the statistical nature of ionisation energy loss, large fluctuations can occur in the amount of energy deposited by a particle traversing an absorber element¹. Continuous processes such as multiple scattering and energy loss play a relevant role in the longitudinal and lateral development of electromagnetic and hadronic showers, and in the case of sampling calorimeters the measured resolution can be significantly affected by such fluctuations in their active layers. The description of ionisation fluctuations is characterised by the significance parameter κ , which is proportional to the ratio of mean energy loss to the maximum allowed energy transfer in a single collision with an atomic electron:

$$\kappa = \frac{\xi}{E_{\max}} \quad (3.1)$$

E_{\max} is the maximum transferable energy in a single collision with an atomic electron.

$$E_{\max} = \frac{2m_e\beta^2\gamma^2}{1 + 2\gamma m_e/m_x + (m_e/m_x)^2} ,$$

where $\gamma = E/m_x$, E is energy and m_x the mass of the incident particle, $\beta^2 = 1 - 1/\gamma^2$ and m_e is the electron mass. ξ comes from the Rutherford scattering cross section and is defined as:

$$\xi = \frac{2\pi z^2 e^4 N_{Av} Z \rho \delta x}{m_e \beta^2 c^2 A} = 153.4 \frac{z^2}{\beta^2} \frac{Z}{A} \rho \delta x \quad \text{keV},$$

where

¹ Examples taken from Walter Schmidt's great gallery:
<http://home.vrweb.de/~was/mathfonts.html>

z charge of the incident particle

N_{Av} Avogadro's number

Z atomic number of the material

A atomic weight of the material

ρ density

δx thickness of the material

κ measures the contribution of the collisions with energy transfer close to E_{max} . For a given absorber, κ tends towards large values if δx is large and/or if β is small. Likewise, κ tends towards zero if δx is small and/or if β approaches 1.

The value of κ distinguishes two regimes which occur in the description of ionisation fluctuations:

1. A large number of collisions involving the loss of all or most of the incident particle energy during the traversal of an absorber.

As the total energy transfer is composed of a multitude of small energy losses, we can apply the central limit theorem and describe the fluctuations by a Gaussian distribution. This case is applicable to non-relativistic particles and is described by the inequality $\kappa > 10$ (i.e., when the mean energy loss in the absorber is greater than the maximum energy transfer in a single collision).

2. Particles traversing thin counters and incident electrons under any conditions.

The relevant inequalities and distributions are $0.01 < \kappa < 10$, Vavilov distribution, and $\kappa < 0.01$, Landau distribution.

3.2 VARIOUS MATHEMATICAL EXAMPLES

If $n > 2$, the identity

$$t[u_1, \dots, u_n] = t[t[u_1, \dots, u_{n-1}], t[u_n, \dots, u_n]]$$

defines $t[u_1, \dots, u_n]$ recursively, and it can be shown that the alternative definition

$$t[u_1, \dots, u_n] = t[t[u_1, u_2], \dots, t[u_{n-1}, u_n]]$$

gives the same result.

ZUSAMMENFASSUNG UND AUSBLICK

In dieser Arbeit wurden folgende wissenschaftlichen Punkte betrachtet:

1. Wie schreibe ich eine Thesis?
2. Wie gestalte ich sie optisch wertvoll?
3. Wie wird sie strukturiert?

„Das alles. Und noch viel mehr. Würde ich machen“ [1].

4.1 AUSBLICK

Weiterhin kann man auch betrachten, wie ...

Empfehlenswert sind auch die weiteren Arbeiten in [6, 9–11].

Und damit das Literaturverzeichnis auch mal 2 Seiten umfasst noch ein paar [2–5, 7, 8, 12, 13]

LOTS OF LOTS OF TEXT

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APPENDIX TEST

Lorem ipsum at nusquam appellantur his, ut eos erant homero concludaturque. Albucius appellantur deterruisset id eam, vivendum partiendo dissentiet ei ius. Vis melius facilisis ea, sea id convenire referrentur, takimata adolescens ex duo. Ei harum argumentum per. Eam vidit exerci appetere ad, ut vel zzril intellegam interpretaris.

Errem omnium ea per, pro congue populo ornatus cu, ex qui dicant nemore melius. No pri diam iriure euismod. Graecis eleifend appellantur quo id. Id corpora inimicus nam, facer nonummy ne pro, kasd repudiandae ei mei. Mea menandri mediocrem dissentiet cu, ex nominati imperdiet nec, sea odio duis vocent ei. Tempor everti appareat cu ius, ridens audiam an qui, aliquid admodum conceptam ne qui. Vis ea melius nostrum, mel alienum euripidis eu.

A.1 APPENDIX SECTION TEST

Test: [Table A.1](#) (This reference should have a lowercase, small caps A if the option `floatperchapter` is activated, just as in the table itself → however, this does not work at the moment.)

LABITUR BONORUM PRI NO	QUE VISTA	HUMAN
fastidii ea ius	germano	demonstratea
suscipit instructor	titulo	personas
quaestio philosophia	facto	demonstrated

Table A.1: Autem usu id.

A.2 ANOTHER APPENDIX SECTION TEST

Equidem detraxit cu nam, vix eu delenit periculis. Eos ut vero constituto, no vidit propriae complectitur sea. Diceret nonummy in has, no qui eligendi recteque consetetur. Mel eu dictas suscipiantur, et sed placerat oporteat. At ipsum electram mei, ad aequae atomorum mea. There is also a useless Pascal listing below: [Listing A.1](#).

Listing A.1: A floating example (listings manual)

```
1 for i:=maxint downto 0 do
2 begin
3 { do nothing }
4 end;
```
