Guidelines for writing a master's thesis at the KU Leuven Faculty of Engineering Science

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The evaluation of the master's thesis depends largely on the quality of the text. Because the master's thesis equals 25 to 50 % of the marks of the last year, it is important that the presented work is clearly described. But please refrain from repeating the course material. And of course, plagiarism will not be tolerated!

1 Contents of the thesis text

The master's thesis text should be complete, meaning that all of your thesis work is covered. However it is not a diary but a synthesis of your work. Therefore you should not make the document needlessly long: you are judged by the contents, not by the number of pages.

The master's thesis text is not meant to be read only by your jury; it is a public text. This means that the text must be written in such a way that any engineer with a degree similar to yours must be able to understand it. If some of your work cannot be disseminated to the broad public, e.g. because of pending patents, you can leave this information out of the text. But all your results must be communicated to your jury, even the parts which were removed from your text. So if you leave out important results from your text, consult your thesis supervisor ('promotor') and programme director for the exact guidelines.

The language used to write the text in is normally the same as the master's programme language (namely the official language of the master's programme). Your master's programme director can allow you to use another text language as a departure from this rule. This is typically the case for students who prepare their thesis abroad, such as Erasmus students. But as indicated below, some items (e.g., the title page) are always typeset in the master's programme language, even if it differs from the text language.

The following sections describe the elements of the thesis text and the order in which they must appear in the printed thesis. Unless mentioned otherwise, all these sections are mandatory. Additionally the master's programme guidelines must be checked for extra requirements.

1.1 Front pages

The front pages consist of the title page and the copyright page. These pages have a fixed layout. You can generate them yourself using LaTeX with the document class kulemt or with the Word templates. Both are available from the website [1].

Cover page ('kaft') The cover page will be printed on the front of the hard cover of your booklet. Therefore there is no need to include it in an electronic version. It is a copy of the title page.

Title page The title page (Figure 1) is the first page of the actual document. It contains the necessary logo, an identification of the master's degree, the academic year, the title (and if wanted a subtitle), and the names of the students, of the thesis supervisor(s), and of the jury members. The title page is always typeset in the master's programme language, except for the title and the subtitle, which are typeset in the text language.

The branding of the Faculty of Engineering Science requires a uniform look of the title page and the cover page. So not only the layout is fixed, but also the fonts and font sizes used on those pages. Only Helvetica or Arial (or a look-alike, such as TeX Gyre Heros) can be used. The title is set in 25 pt and the subtitle in 17 pt. The author(s) and the academic year are set in 14 pt. The rest of the title page is set in 11 pt.

Copyright page The copyright page (Figure 2) contains the necessary copyright statements and contact information. It is printed on the verso side of the title page. If the text language differs from the master's programme language, you may provide copyright statements in both languages.

1.2 Front matter

The front matter contains introductory material such as a preface, an abstract, and content lists (table of contents, list of tables, list of figures, list of symbols, etc.).

Preface ('Voorwoord') The preface page contains personal comments from the author(s). The preface can also be used for general acknowledgements and to express one's thanks. This page is recommended but not required.

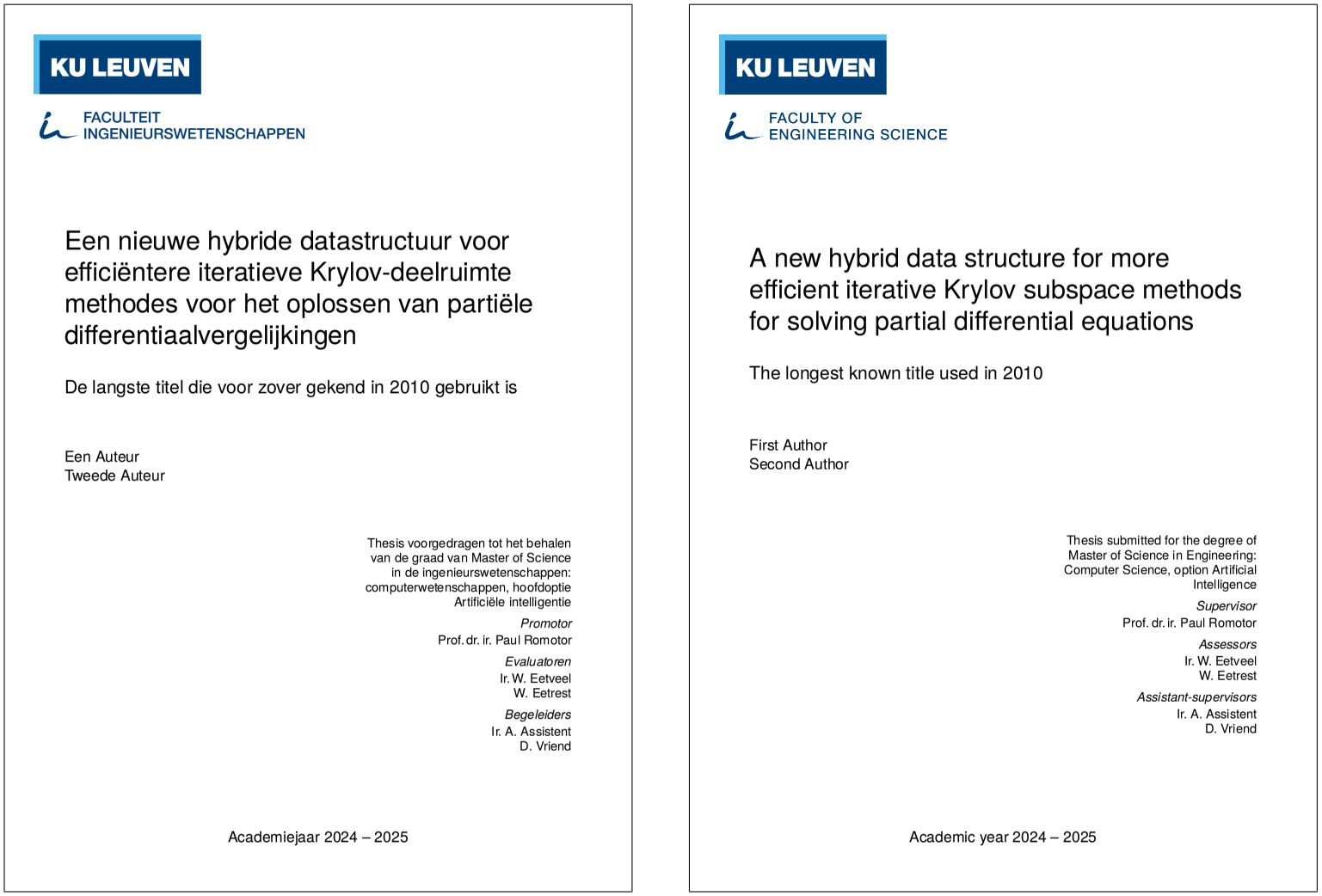

FIGURE 1: The official title page layout for a Dutch master (left) and an English master (right). The cover page has exactly the same look.

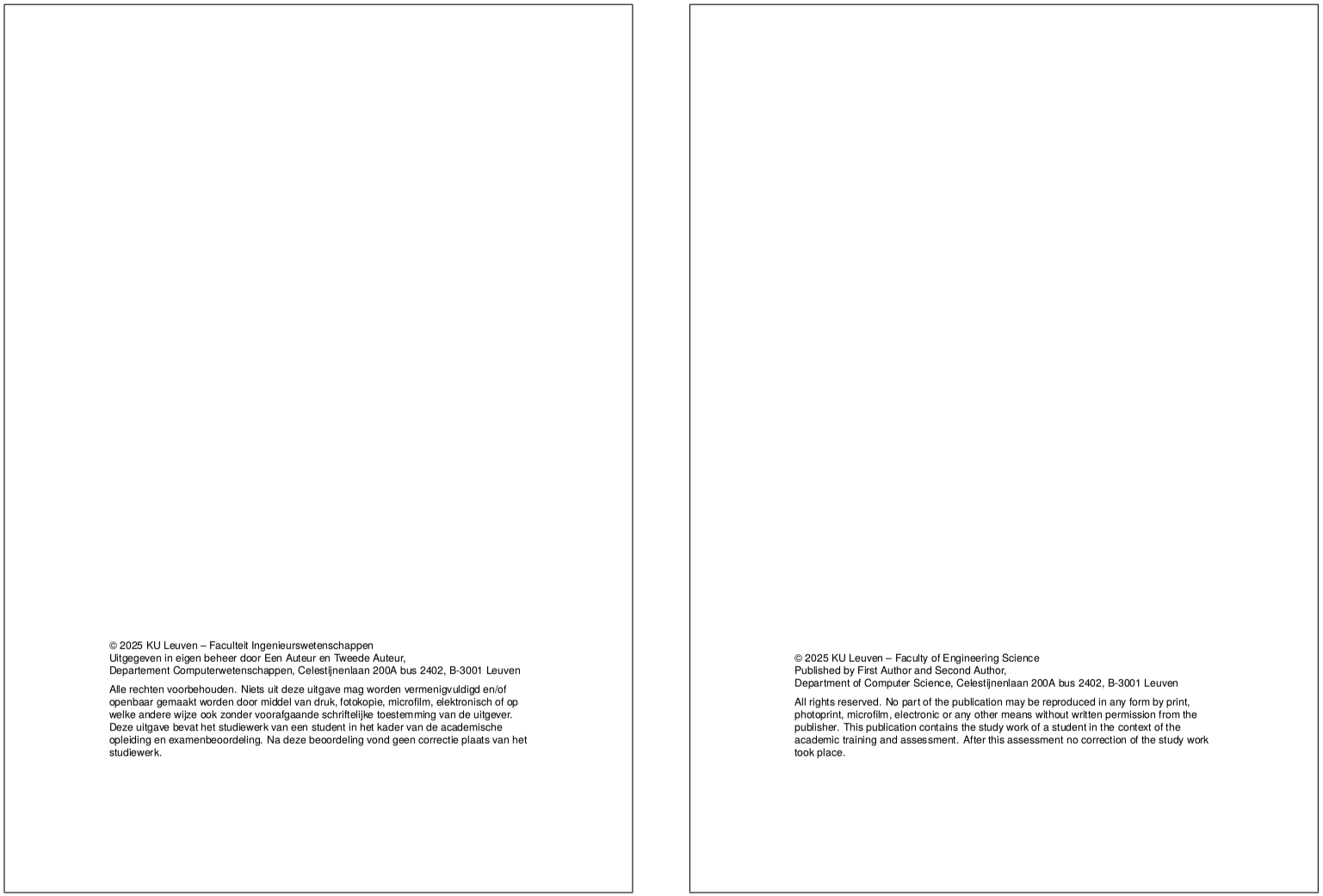

FIGURE 2: The official copyright page layout for a Dutch master (left) and an English master (right).

Table of contents ('Inhoudsopgave') The table of contents should be a clear representation of the breakdown of the chapters and the respective page numbers. Do not show too many levels here since it will make you loose the reader. So either restrict the table of contents to the chapter and the section level or add the subsection level in an unobtrusive way.

Abstract ('Samenvatting') The abstract page gives a one page overview of the work emphasising the results. Try to avoid uncommon terminology, which will only be defined in the main text later on.

If the master's programme language differs from the main text language, a second abstract page is needed, which is written in the master's programme language. This is common practice for Erasmus students, where the main text language is determined by the host institute. However if the master's programme guidelines require a multi-page abstract with figures, it's probably better to put it into an appendix or into an additional chapter in the back matter.

List of figures ('Lijst van figuren') This list contains for each figure its sequence number, its caption and its page number. Such a list is often of limited use in a master's thesis. Therefore it's not required nor recommended unless the master's programme guidelines require or recommend it.

List of tables ('Lijst van tabellen') This list contains for each table its sequence number, its caption and its page number. The same remark as for the list of figures is valid here.

Nomenclature ('Lijst van symbolen') This list holds the nomenclature of the text. It shows all used symbols and abbreviations and their meaning. Also conventions such as "*vectors are printed in bold*" can be put in this list. This list is not required, but it is recommended if some non-evident symbols or abbreviations are used. It's useless to have a list of symbols indicating that α means the Greek letter alpha!

1.3 Main matter

The main matter forms the heart of the thesis text: it contains the real content. One should be able to read only the main matter to take in the whole story. The main matter is divided into chapters, which are the logical entities of the text. The chapters have a logical sequence, which must be made evident to the reader.

First chapter In this general introduction the reader must be informed about the research field of the master's thesis, situating it in a broader context. The goals of the thesis, as well as previous work, are described from a technical point of view. The structure of the thesis text is briefly explained.

Other chapters Each chapter, except the first and the last one, starts with an introduction to the contents of the chapter. If readers would only read the introductions, they should have an overview of the contents of the master's thesis and the relation between the chapters.

Since chapters form a logical unit, it's expected that conclusions can be drawn at the end of each chapter about the work described in it. A concluding section can also help to link a chapter to the next one.

Last chapter The general conclusion summarises all results, criticises the methods used, and makes suggestions for further work. It cannot contain any new elements.

Appendices ('Bijlagen') The appendices clarify or complete the text but are not an essential part of the work. Extra information which is essential for future work is also included in appendices. Typical examples are: programme code and algorithms, detailed schematics, equipment specifications, mathematical derivations and an exhaustive argumentation.

If the master's programme guidelines give a page limit for the text, it usually only includes the regular chapters, not the appendices. However appendices cannot be used to bypass this page limit because the evaluation of the thesis is mainly based on the regular chapters.

1.4 Back matter

The back matter conveys information ancillary to that in the main matter. Typical examples are a bibliography and a glossary.

Bibliography The bibliography lists all referenced material. The format used for the bibliography items is probably determined by the master's programme guidelines or by the thesis supervisor. References are needed for all statements that are not proven in the thesis. However references to courses are superfluous.

2 Typography

A good first overall impression is always very important. Therefore typography is a very important part of any masterpiece of text. And isn't your master's thesis a masterpiece?

Several good books have been written about typography and book design. A (not so) short overview is found in the Memoir design notes [4].

2.1 Basic principles

The text must be written in a correct language, used in a consistent way. Spelling mistakes are unacceptable, so at least use a decent spelling checker. When in doubt, consult a dictionary or an official word list (known in Dutch as the 'Groene Boekje' [2]). A consistent spelling implies that either British or American spelling is used when writing an English text.

Consistency is also required for the grammar. Some sources suggest to use a passive voice such as "the results are found …". Other sources suggest to rather use an active voice such as "we found this result …". Whatever you use, always try to stick to the same kind of construction.

The master's thesis should be written in a very readable way because it is meant to communicate the results and scientific experience of the authors to others. Since a master's

thesis is a scientific work, official metric units (a.k.a. SI units [3]) must be used. Identical concepts should be described with identical words or identical symbols, as well in the body text and equations as in figures and tables. To help the reader, it may be useful to add a list of symbols and abbreviations in the front matter.

One sentence should not contain more than one thought and is therefore short. Ideas that belong together are kept together in one paragraph. Therefore a paragraph usually contains at least two sentences, spanning at least two lines.

2.2 Fonts

The body text is typically typeset using a proportional serif typeface. Well known examples are Times[1] (or Times New Roman), Cambria, Palatino (or Book Antiqua), Garamond, Utopia, Charter, and Minion. The font used in formulas, figures, and tables must be the same as the body text font. Symbols in the text and in formulas must be compatible with the chosen body text font.

A general rule in typography is: *"using fewer typefaces usually means better readability"*. But it makes sense to add one or two extra typefaces for specific types of data to identify them more easily in running text. To represent the name or contents of a file or a screen, one typically uses a fixed width font, such as Courier or Consolas. For non-body text (e.g., titles, headers, footers, captions) a proportional sans serif font is sometimes used. Well known examples are Helvetica (or Arial), Calibri, Univers, and Myriad. Just in case you're curious about it, the fonts used in this document are Libertinus Serif, Libertinus Sans, and `Latin Modern Typewriter.` .

A font size of 11 pt or 10 pt with a proper leading [2] must be used for text and symbols. On A4 paper the 11 pt size is preferred. If you do not know the proper leading for your font, choose 2.5 pt for the 11 pt font and 2 pt for the 10 pt font. Headings can be made more attractive and outstanding by typesetting them in a larger font size and/or italics or bold.

2.3 Layout

The text is printed on both sides of A4 paper with odd numbered pages on the recto [3] side. This implies that the inner margins (left on recto, right on verso) are smaller than the outer margins, as shown on Figure 3. Contrary to printed books, electronic versions are often only read from the screen, one page at a time. In the latter case it makes more sense to have equal left and right margins.

A page contains a single column typeblock and optionally a header and a footer. The typeblock contains the regular text, the tables and figures, and the footnotes. To improve the readability of the text, the width of the typeblock is limited to 14 cm when using an 11 pt font and to 13 cm when using a 10 pt font.

[1] Since the typeface Times was developed for newspapers with small columns, it is not a good typeface for single column texts on A4 paper!

[2] Leading is the vertical space between two lines of text. The line spacing is the font size plus the leading.

[3] The recto page is the right-hand page of a printed book. The left-hand page is called the verso page.

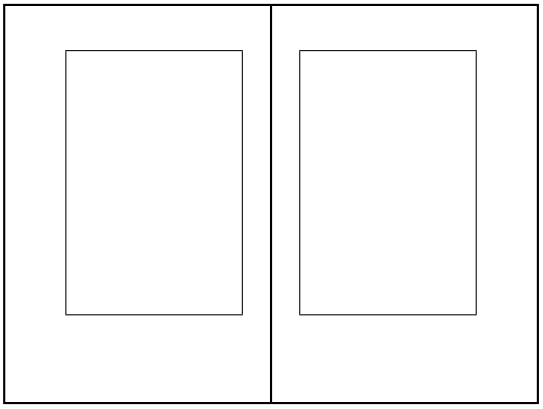

FIGURE 3: In a spread, showing a recto and a verso page, the combination of the two inner margins is perceived as a single margin. Therefore the width of an outer margin is comparable to two times the width of an inner margin.

The pages should be numbered consecutively, except for the front pages. It is customary for front matter pages to use lowercase roman numerals and for other pages to use arabic numerals. In this case the page number is reset to 1 on the first page of the main matter.

Only chapters in the main matter are numbered: regular chapters with arabic numerals and appendices with uppercase letters. Chapters in the front and back matter are unnumbered. Numbered chapters normally start on a recto page in a printed text. Inside a chapter, only sections and subsections are numbered, always with arabic numerals. Too many document levels will confuse the readers instead of helping them.

One should be able to unambiguously interpret the figures, tables and equations and they should be numbered. Each reference to equations, figures, and tables should mention the corresponding number. Each figure should have a caption below it which briefly indicates what is shown. The main text should refer at least once to each figure and its content should be discussed in the text. The author must do the interpretation of the figures, not the reader. The same is true for tables, but traditionally the table caption is put above the table.

3 Master's programme specific data

This section describes some master's programme specific data as it was known on 17 February 2025.

3.1 List of the masters and their options

In the academic year 2024 – 2025 these are the masters of the Faculty of Engineering Science.

Dutch initial master's programmes

- Master of Science in de bio-informatica
- Master of Science in de ingenieurswetenschappen: architectuur
- Master of Science in de ingenieurswetenschappen: artificiële intelligentie
- Master of Science in de ingenieurswetenschappen: biomedische technologie
- Master of Science in de ingenieurswetenschappen: bouwkunde
  - optie Gebouwentechniek
  - optie Strucurele ingenieurskunde
  - optie Waterbouwkunde
- Master of Science in de ingenieurswetenschappen: chemische technologie
  - optie Chemische en biochemische proces engineering
  - optie Milieu engineering
  - optie Product engineering
- Master of Science in de ingenieurswetenschappen: computerwetenschappen
  - hoofdoptie Artificiële intelligentie
  - hoofdoptie Computationele informatica
  - hoofdoptie Gedistribueerde systemen
  - hoofdoptie Mens-machinecommunicatie
  - hoofdoptie Software engineering
  - hoofdoptie Veilige software
- Master of Science in de ingenieurswetenschappen: elektrotechniek
  - optie Elektronica en chipontwerp
  - optie Energiesystemen en automatisatie
  - optie ICT-beveiliging en netwerken
  - optie Informatiesystemen en signaalverwerking
- Master of Science in de ingenieurswetenschappen: energie
- Master of Science in de ingenieurswetenschappen: materiaalkunde
  - optie Biomaterialen
  - optie Metalen en keramieken
  - optie Nanomaterialen
  - optie Polymeren en composieten
- Master of Science in de ingenieurswetenschappen: mobiliteit en supply chain
- Master of Science in de ingenieurswetenschappen: werktuigkunde
- Master of Science in de ingenieurswetenschappen: wiskundige ingenieurstechnieken

- Master of Science in de nanowetenschappen, nanotechnologie en nano-engineering
  - optie Nanobiotechnologie
  - optie Nanocomponenten en circuits
  - optie Nanofysica engineering
  - optie Nanomaterialen en nanochemie
  - optie Quantum engineering, materialen en technologie
- Master of Science in de statistiek
  - profiel Algemene statistische methodologie
  - profiel Biometrie
  - profiel Business statistiek
  - profiel Industriële statistiek
  - profiel Statistiek in de sociale, gedrags- en pedagogische wetenschappen

English initial master's programmes

- EIT-KIC Master of Science in Energy
- EIT-KIC Master of Science in Sustainable Materials
  - option Materials Development
  - option Sustainable Materials
  - option Sustainable Metallurgy
- Erasmus Mundus Master of Science in Nanoscience and Nanotechnology
  - graduation option Bionanotechnology
  - graduation option Biophysics
  - graduation option Modelling and Analysis at the Nanoscale
  - graduation option Nanochemistry
  - graduation option Nanoelectronics
  - graduation option Nanomedicine and Nanotheranostics
  - graduation option Nanophysics
  - graduation option Organic and Molecular Electronics
  - graduation option Quantum and Nanoscale Engineering
  - graduation option Quantum Computing
- Master of Science in Bioinformatics
- Master of Science in Biomedical Engineering
  - option Bio-Electronics
  - option Bio-Informatics and AI
  - option Biomechanics

  - option Biomedical Data Analysis
  - option Medical Physics
  - option Tissue Engineering
- Master of Science in Chemical Engineering
  - option Chemical and Biochemical Process Engineering
  - option Environmental Engineering
  - option Product Engineering
- Master of Science in Civil Engineering
  - option Hydraulic Engineering
  - option Structural Engineering
- Master of Science in Electrical Engineering
  - option Electronics and Chip Design
  - option ICT Security and Networks
  - option Information Systems and Signal Processing
  - option Power Systems and Automation
- Master of Science in Engineering: Computer Science
  - option Artificial Intelligence
  - option Secure Software
- Master of Science in Engineering: Energy
- Master of Science in Materials Engineering
  - option Biomaterials
  - option Metals and Ceramics
  - option Nanomaterials
  - option Polymers and Composites
- Master of Science in Mathematical Engineering
- Master of Science in Mechanical Engineering
- Master of Science in Mobility and Supply Chain Engineering
- Master of Science in Nanoscience, Nanotechnology and Nanoengineering
  - option Nanobiotechnology
  - option Nanodevices and Circuits
  - option Nanomaterials and Nanochemistry
  - option Nanophysics Engineering
  - option Quantum engineering, Materials and Technology
- Master of Science in Statistics and Data Science

  - abridged programme – Quantitative Analysis in the Social Sciences
  - profile European Master of Official Statistics
  - profile Interdisciplinary Statistics and Data Science
  - profile Statistics and Data Science for Biometrics
  - profile Statistics and Data Science for Business
  - profile Statistics and Data Science for Industry
  - profile Statistics and Data Science for Social, Behavioral and Educational Sciences
  - profile Theoretical Statistics and Data Science

Advanced master's programmes

- Master of Science in Artificial Intelligence
  - specialisation Big Data Analytics
  - specialisation Engineering and Computer Science
  - specialisation Speech and Language Technology
- Master of Science in Conservation of Monuments and Sites
- Master of Science in Cybersecurity
- Master of Science in de medische stralingsfysica
- Master of Science in Digital Humanities
- Master of Science in Human Settlements
- Master of Science in Nuclear Engineering
- Master of Science in Safety Engineering
  - option Prevention
  - option Process Safety
- Master of Science in Space Studies
  - profile Space Law, Policy, Business and Management
  - profile Space Sciences
  - profile Space Technology and Applications
- Master of Science in Urbanism, Landscape and Planning

3.2 Specifying the master's programme option

Most master's programmes allow you to specify your option ('optie') or major topic ('afstudeerrichting') of the master's degree, if you want. But there are some exceptions.

- The following master's programmes are known to *oblige* you to mention the option or major topic on the title page:

  - Master of Science in de ingenieurswetenschappen: elektrotechniek
  - Master of Science in Electrical Engineering
  - Master of Science in Safety Engineering
- The following master's programmes are known to *disallow* you to mention the option or major topic on the title page:
  - EIT-KIC Master of Science in Energy
  - Master of Science in de ingenieurswetenschappen: architectuur
  - Master of Science in de ingenieurswetenschappen: energie
  - Master of Science in de ingenieurswetenschappen: werktuigkunde
  - Master of Science in Engineering: Energy
  - Master of Science in Mechanical Engineering

Bibliography

[1] Master's thesis templates of the Faculty of Engineering Science [online]. 2025. URL: https://eng.kuleuven.be/docs/kulemt/.

[2] Nederlandse Taalunie. *Woordenlijst Nederlandse Taal*. Van Dale, 2021. URL: https://woordenlijst.org/.

[3] Wikipedia. International System of Units [online]. URL: https://en.wikipedia.org/wiki/International_System_of_Units.

[4] P. Wilson. *A Few Notes on Book Design*, Sept. 2018. URL: https://mirror.ctan.org/info/memdesign/memdesign.pdf.